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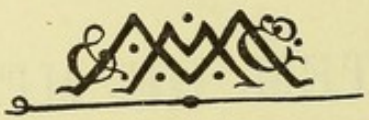
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A SYSTEM OF MEDICINE



A

SYSTEM OF MEDICINE

BY MANY WRITERS

EDITED BY

THOMAS CLIFFORD ALLBUTT

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ERRATA IN VOL. VII

Page 335, line 20, *for* "one degree" *read* "two and three-quarter degrees."

Page 335, lines 20 and 21, *for* "To produce this effect it was necessary that the lesion should be bilateral" *read* "This effect followed a lesion of either corpus striatum."

Page 454, line 35, *for* "Idioglossia.—This name was given by the late Dr. Hadden" *read* "Idioglossia.—This name was given by Hale White and Golding-Bird."

In order to avoid frequent interruption of the text, the Editor has only inserted the numbers indicative of items in the lists of "References" in cases of emphasis, where two or more references to one author are in the list, where an author is quoted from a work published under another name, or where an authoritative statement is made without mention of the author's name. In ordinary cases an author's name is a sufficient indication of the corresponding item in the list.

DISEASES OF THE NERVOUS SYSTEM

CONTINUED

OTHER DISEASES OF THE NERVOUS SYSTEM

CONTINUED

CRAFT PALSIES

CRAFT PALSIES may be defined as neuroses caused by handicraft or interfering with it; the body being otherwise unaffected. The nerve tissue, the master tissue of the body, is inextricably mixed up with all other tissues, and holds them under its control; and it is often impossible to say whether the initial vice leading to deranged function be in the neurons or in the allied cells. This difficulty will be freely recognised in discussing the diseased conditions which form the subject of this chapter.

When we speak of nervous tissue as composed of "neurons," we must remember that these neurons are of very different ranks, and that while some merely subserve purely automatic reflexes, others seem to act less and less automatically, until we come to the highest of all concerning which the question *Quis custodiet?* has not yet been answered.

The occupations dealt with in this chapter are for the most part complicated acts brought to perfection by education and practice. By "perfection" I mean the greatest degree of skill of which the individual is capable. Such degrees of skill are very various: some persons attain a dexterity which is marvellous, others (who have mistaken their vocation) are but poor bunglers to the end; yet this latter class supplies not a few of those who seek advice for a craft palsy.

"Practice makes perfect"; nutrition follows function, and perfection of function cannot be attained without perfection of nutrition. Thus it is that incessant practice of complex acts for definite ends may result in marvellous skill. For the attainment of great skill education must begin in the period of development; the younger the pupil the greater his ultimate skill. The greatest skill is attained in those cases in which a child, in whom a natural aptitude is spontaneously manifested, is carefully educated with a view to its special development. The names of many musicians will occur to the reader in this connection.

It is interesting to remark that no education, however narrow, serves to efface individuality. A hundred children taught by the same master, sitting at desks of the same pattern, and all using pens, ink, and paper

which are practically identical, will eventually write one hundred different hands. In the same way the style and touch of the artist or musician is always recognisable, by the expert, as an individual quality which nothing can efface. Variety is infinite; and, as the furrows on our finger-tips are not alike in any two of us, so we may feel certain that the organisation of our muscular, vascular, and nervous systems is no less various. It is tolerably certain, therefore, although incapable of demonstration, that the mechanism of a complicated act, such as writing, is not identical in any two individuals.

There is very little evidence, if any, that the faculty of performing the complicated acts which are acquired only by a course of laborious education is hereditary. The child of educated parents brought up in an atmosphere of reading and writing will probably acquire both these arts at an earlier age than the child which enjoys no such advantages; but whether such precocity be due to inheritance of opportunity, or inheritance of organisation, is impossible to say. The former we can often demonstrate; the latter, at best, is merely a conjecture.

The majority of craft palsies take the form of what Duchenne called "professional impotences," whereby the patient finds himself unable to perform the particular acts by which he earns his living.

The profession in which, above all others, such impotency is prone to declare itself is that of the clerk. Cases of difficulty in writing are far more common than all the other craft palsies taken together. In the past twenty-five years I have seen many hundred cases of craft palsy of one kind and another, and of these at least 90 per cent have been cases of "writing difficulty." The numerical preponderance of writing difficulty over other craft palsies is due in part, no doubt, to the fact that the occupation of the clerk outnumbers all other occupations in which special neuroses are apt to occur. Writing, to a greater or less extent, is the "occupation" of all educated persons, a fact which alone is sufficient to account for a preponderance of palsy in writing; nevertheless, I shall attempt to show also that the act of writing is, in its nature, one peculiarly liable to derangement.

A man who takes a pen in his hand and rapidly, almost automatically, covers a sheet of paper with manuscript, is apt to forget "the base degrees by which he did ascend," and can hardly recall the labour and sorrow of his early writing lessons. Those who can recall their own early efforts, or who closely watch a little child receiving its first instruction in the art of writing, will be slow to believe that the "faculty" of writing is transmitted by inheritance. Although we begin to learn to write very early in life we must remember that the characteristic "handwriting" is not "formed" until we approach adult life, and that it takes eight or ten years or more before the signs of juvenility are effaced from our penmanship.

The little child can succeed in making its clumsy pot-hooks only by dint of considerable muscular exertion; and the boy or girl who is able to wield a knife and fork without obvious effort has to strain every muscle

in order to obtain that necessary combination of firmness and mobility which goes to the production of the simplest written character. In order that the shoulder of the writing-arm may work from a fixed point the trunk needs a maximum amount of support by the child; and this end he attains by twisting one or both feet round the legs of the chair, and by leaning with the left arm on the desk or table. If uncontrolled, the child is tolerably sure to rest his right elbow and the whole of the forearm on the table in order to afford a fixed point for wrist movement, and the movement of the pen is generally accompanied by associated movements of the muscles of the opposite hand, the face, the tongue, and probably of the feet and toes also. In short, when the child attempts to write almost every muscle of the body is engaged more or less in the effort. Effort indeed is almost always accompanied by associated movements. Lagrange has pointed out that the act of cracking a walnut between the finger and thumb is accomplished without effort if the shell be thin and the fingers strong; but if the shell be thick, and an effort be made, trunk movements and facial movements are set up, the breathing is arrested (in order to give a fixed point for the arm muscles), the veins of the face become congested, and the pulse is quickened.

There can be no doubt that our muscles are controlled by the kinæsthetic centres in the "motor areas" of the cerebral cortex; but we must never forget how much unseen and unfelt muscular effort is put forth before the visible movement, even of a single finger, can be efficiently executed; and how, when effort is made, the discharge of the cerebral motor cortex, beginning probably in the centre for a small group of muscles or even of a single muscle, rapidly spreads first to contiguous and then to more distant centres, and, either by the direct track or by commissural fibres, reaches even the muscles on the opposite side of the body.

And yet by long practice and much painful experience the act of writing becomes so easy that it is often almost automatic. The skilled penman can write fairly well with his eyes shut—his chief difficulty, under these circumstances, being not in the formation of words and letters, but in keeping to the proper line of the paper.

There can be no doubt that constant practice in this slowly acquired art serves to strengthen the muscles which are mainly concerned; and we learn to apportion the work among these muscles so as to use each to the greatest possible advantage.

Athletes tell us that many feats of strength, which to the unpractised onlooker seem almost superhuman, are performed not so much by dint of enormous muscular development as by learning, by frequent practice, how to bring about the most economical co-operation of many muscles. So it is with writing, which, if rightly regarded as a muscular performance, transcends all the feats of the circus. What can be more wonderful than to watch a man's thoughts trickling from the end of his pen at the rate of nearly a word a second! How perfect must cutaneous and muscular sensibility be for the attainment of such skill! It is probably to the perfec-

tion of sensori-motor reflexes (both cutaneous and muscular) acting through the spinal cord that writing becomes almost automatic. The so-called "motor areas" of the brain are now admitted to have sensory functions; and lately Sherrington and Mott have shown that complete paralysis of a limb follows the division of all the posterior sensory nerve-roots coming from that limb. Our actions are dependent upon impressions made upon the peripheral parts of our bodies, and the cells of gray matter seem almost everywhere to be "reflecting" points which are stimulated to activity by impressions from without. The complete paralysis which follows division of all the sensory roots of a limb seems to indicate that, for the generation of nervous currents, the circuit must be complete.

To show how automatic the most delicate act may become, I may mention a personal experience. Many years ago I was suffering from a slight injury to the eye which produced at intervals a sudden and painful gush of tears which necessitated the complete closure of both eyes. This happened to me one morning while shaving, but nevertheless this delicate act was successfully and unconsciously completed with the eyes shut. Had not, happily, the cerebral cortex been asleep or otherwise engaged on this occasion the consequences might have been serious. When the cerebral cortex interferes with automatic acts, and spoils them, we say that the failure of the act is due to "nervousness" or self-consciousness; and there can be no doubt that many "craft palsies" are of this order. The acts of the somnambulist are accurately performed while the cerebral cortex is apparently fast asleep; and if these acts be such as to endanger the body it is said that the danger is increased by waking the sleeper, because "fright" and "nervousness" upset the delicate adjustments of the sensori-motor co-ordination. We do not attain perfection in any complicated manipulations, such as writing, knitting, or piano-playing, until it is accomplished without the active or conscious interference of the mind; and if by any chance, as from fear of failure in public, the performer direct too much attention to his hands, the manipulative skill is embarrassed. Patients will often say, "I am much worse when anybody is looking at me."

We must never forget that every muscular movement, "performed" by the executive muscles, is also "permitted" by the antagonists, which by their tone and degree of contraction or relaxation help to regulate and steady the movement. The sudden jerking movements so characteristic of "locomotor ataxy" are probably due in great measure to a failure of co-operation in executive and antagonist muscles.

Again, a healthy condition of all bones, joints, ligaments, tendons, and other tissues is essential for the smooth and proper working of the master tissues. This complicated and delicate machinery may break down from a variety of causes; a cerebral lesion involving some of the cells of the cortex cerebri and a slight inflammatory condition of a joint or tendon are equally capable of upsetting its orderly working. Much has been written about "co-ordinating centres," and it is tolerably certain that the respiratory movements or the symmetrical movements of

the eyes and face, which are wholly independent of education, must be controlled from "centres"; but that similar "centres" exist for various and complicated acts, the result of long and wearisome practice, is not only unproven but highly improbable.

A true "craft palsy" is definitely due to the craft, and interferes solely with the craft. It is evident, however, that the vital machinery may break down from accidental circumstances which are unconnected or only remotely connected with the occupation; thus I have seen many cases of so-called "writer's cramp" in persons who write little, and whose disability was due to other circumstances, traumatic or pathological, wholly unconnected with the act of writing. Moreover there are many "occupation neuroses," such as painter's colic or mercurial tremor, which are not due to the handicraft.

Sex.—The prognosis of these cases in women is better than it is in men. A far larger proportion of the women have made a good recovery than of the men. This may be due to the fact that "pure" neuroses are more common in women than in men; but it is probably due also to the fact that writing or piano-playing is less of a business with women than with men, and is more easily laid aside for a time.

Age.—After middle life we are more likely to have to deal with degenerative changes which, however indirectly, may seriously interfere with the exercise of a profession.

The bulk of the patients are adults, and it is in vigorous adults, up to middle life, that we are most likely to find the true craft palsies; especially if the occupation have been followed continuously and with energy. Some of my patients, however, were young children or young adults; and in these we shall always carefully seek for congenital defects, especially for infantile hemiplegia and for well-marked congenital left-handedness. Congenital hemiplegia or hemiplegia occurring very early in life is far from uncommon, and is often due to cortical hæmorrhages occurring during birth, or following attacks of convulsions (vol. vii. p. 735).

In a paper on "Visceral Hæmorrhage in Still-born Children" Dr. Herbert Spencer gives the results of the post-mortem examination of 130 fœtuses. Limiting our attention to intercranial hæmorrhage, there was found—

Congestion or œdema of the brain in	45 cases
Thrombosis of longitudinal sinus in	4 „
Œdema of meninges in	1 case
Hæmorrhage into substance of brain (and 3 in anencephalic fœtuses).	1 „
Meningeal hæmorrhage	53 cases

In the 53 cases of meningeal hæmorrhage, bilateral hæmorrhage on the convexity was found 29 times; unilateral on the convexity, 20 times (10 right, 10 left); hæmorrhage at the base, 35 times; into the ventricles, 7 times; and in but a few cases was the hæmorrhage between the dura mater and the skull, associated with fracture of the overlying bones.

Among the 130 bodies examined, the forceps was "employed fifteen times in vertex presentations. Of these 15 cases, 12 had cerebral hæmorrhage (11 meningeal, 1 intra-cerebral). Of the remaining 3 patients, 2 were dead before the forceps was employed. In the other cases the forceps was merely applied to hold the head in the brim, and was not used to deliver. We have here, then, the interesting and remarkable fact that cerebral hæmorrhage was found in every case in which the forceps was employed to deliver living children who died during or shortly after birth."

In 44 cases only was the spinal cord examined, and hæmorrhage of the membranes or cord was found in 30 cases, and no hæmorrhage in 14 cases.

In patients who may ultimately seek advice for some disability of the hand, the signs of hemiplegia, if not obtrusive, may be plain enough when looked for. Besides the clumsiness and feebleness of the hand, there is often a want of symmetry of the face, a very slight deviation of the tongue, and a trifling droop of one foot, which, if not at once manifest when walking, is betrayed by the state of the toe of one boot.

In these cases of congenital hemiplegia and decided left-handedness (which I believe is no infrequent result of injury to the left cortex) there is often a well-marked lack of symmetry between the two sides of the body, which is best shown in the face, in the lengths of the clavicles, and in the sizes of the hands and feet.

Examination of the patient.—All patients complaining of craft palsy should undergo a thorough physical examination. The thorax, abdomen, and urine should be examined in the ordinary routine. I can recall one case in which the feebleness of the right hand and arm was caused by the pressure of an undetected thoracic aneurysm; and several in which a slight albuminuria or glycosuria afforded the key to the problem.

The "neurotic" temperament will not escape the practised eye; which must also distinguish between persons really worn out with overwork and the modern seers of both sexes, excitable and restless persons, whose supplies of energy, both mental and physical, are small. Any evidence of alcoholism in the countenance, tongue, smell of the breath, utterance, and manner must be noted.

Having excluded degenerative changes, congenital defects, and ordinary bodily disease, we next examine the patient for the cause of his special defect. The patient being stripped to the waist, the movements of the shoulders and scapulæ are first examined. When the arms are raised above the head, and the palms are brought together at the middle line, the position of the two arms is noted;—a want of symmetry may betray muscular weakness on one side. If there be reason to suspect some feebleness of the scapular muscles, it is a good plan to make the patient "stand attention," and to outline the borders of the scapulæ, as they hang at rest, with an aniline pencil. In this way we may detect want of symmetry in the relation of the shoulder-blades to the spinal column. Then the patient must be made to shrug the shoulders, to make the

shoulder-blades meet by trussing back the elbows, and to hold the arms in front of him on the shoulder level. In this way we gain knowledge of defective action on the part of the trapezii, levatores anguli, rhomboidei, and serrati magni.

While the arm is extended on the shoulder level, both limbs must be very narrowly examined for *tremor*. The observer should stand between the extended arms of the patient, and examine first one hand and then the other. In this way a very fine tremor of one side may be detected. Next the arms, forearms, and hands will be examined for general want of nutrition, and for wasting of particular muscles; especially in the hands, between the metacarpal bones and in the ball of the thumb. The strength of grasp will be tested, and the "interosseal movements" of the hand and fingers.

Next we must ascertain whether any of the nerve-trunks of the arms are definitely tender. This examination requires care because normal nerve-trunks are somewhat tender, and it is only by comparison of one side with the other that we can arrive at any useful conclusions.

My own procedure is as follows:—the patient stands facing the examiner with both hands resting, palms upwards, on the examiner's shoulders. It is important that the patient's arms should be really at rest, and as free from all muscular efforts as possible. The physician then examines the nerve-trunks of both limbs simultaneously by means of gentle pressure on the ulnars behind the olecranon, on the musculo-spirals at the inner borders of the supinator longus, and on the median at the elbows, on the inner side of the biceps tendon. The simultaneous examinations of the medians can only be made by crossing the hands (the hands, that is, of the examiner). If the examination of the nerve-trunks on the two sides be made thus simultaneously, there is a greater likelihood of the pressure being equal on the two sides; and if the examiner find a well-marked difference in the tenderness of the nerves, he is justified in recording it as a symptom which may point to neuritis. The patient is, of course, in ignorance of the object of the examination, and when nerve-tenderness is well-marked his response to a gentle pressure of the thumb is startling alike to examiner and examinee. It is important to remember, however, that, if there be marked flabbiness or wasting of the muscles, the nerves are deprived of the plump muscular cushions which normally protect them, and they are laid more open to the thrust of the fingers. Again, the comparison of the two sides can only be trustworthy when the nutrition of the two is equal; if one arm be wasted the comparison is no longer possible. The search for tender nerves is important in all these cases; and not seldom one of the palmar twigs of the median or ulnar is found tender, or tenderness is detected along the course of the suprascapular, circumflex and anterior thoracic nerves. The axillæ will be searched minutely for any swollen glands which may press upon the nerve-trunk.

Attention must next be directed to the bones, joints, and ligaments. A creaking shoulder-joint with incipient ankylosis, stiffness of the

elbow or wrist, and gouty nodules invading the phalanges, have all to be looked for. While investigating the mobility of the joints, knowledge will be gained of the condition of the tendons. A small amount of teno-synovitis will greatly interfere with function.

The patient, still stripped to the waist, should now be asked to go through the act which is at fault, or to attempt to perform it. If it be to write, give him a sheet of paper and a good pen, see that he has a comfortable chair and table, and ask him to write his name and address, and the date. A great deal may often be learnt by watching the patient in his attempt to perform the deranged action. Occasionally nothing amiss is to be detected, except perhaps that the writing may be produced rather slowly. The patient may tell you that the effort to write causes pain; but so far as any objective change in the mode of production or in the product itself is concerned, there is nothing objectively amiss. This of course is important both in diagnosis and prognosis. At the other end of the scale is the man who is scarcely able to make a mark upon paper; whose efforts are accompanied by most tumultuous movements of the shoulder; who is obliged to fix his arm securely before beginning to write; who grasps the pen with all his might, and perhaps drips with perspiration as he makes an abortive attempt to sign his name.

It often happens that the ordinary method of holding the pen is altered; if this be so, the patient should be asked to write with the pen held in the conventional manner, when his difficulties will be accentuated. For it is not the "faculty" of writing which is deranged, but only certain methods of executing it. In well-marked cases the pen is grasped very tightly, the wrist and forearm do not rest on the desk or table, and, in very severe and long-established cases, there is much tumultuous action of the shoulder muscles. There are one or two points in these disorderly movements which deserve attention; one being the conduct of the right index-finger. The patient will often complain that he cannot write if the index be placed upon the pen-holder; and, when he tries to write in this way, it will be observed that the index ceases after a time to press upon the pen-holder, slowly leaving it and slipping upwards until the pen-holder evades the grasp. This, the most common of all the failures in writing, will receive further consideration.

Lastly, we shall test the muscles of the hand with the faradic current. In a large number of these cases certain muscles are very sluggish in their response to both forms of current (faradic and galvanic), as compared with the corresponding muscles on the opposite side of the body. The reactions are not degenerative, but reveal an altered irritability; usually they are depressed, in rarer instances exalted. This testing must be done with care, and a good faradic battery, capable of very accurate graduation, should be used. The patient should sit astride a chair facing the operator, with his hands hanging listlessly like a couple of dead hands over the back of the chair. One rheophore of large surface is fastened to the back of his neck, while the muscles are tested with a rheophore of small surface which will allow of accurate application to the small intrinsic muscles of the hand.

Our object is to compare one side with the other; therefore the testing is begun on the sound side, usually the left. After thoroughly moistening the skin with warm salt and water, apply the rheophore to (let us say) the left first dorsal interosseus muscle, and, having found the feeblest current which will cause a contraction of the muscle, apply the same current to the corresponding muscle of the right side. In well-marked cases a current which evokes a vigorous contraction on the sound side has no such effect on the diseased side; and certain muscles of the right hand require a much stronger current to produce contraction than is the case with the left. It is with the galvanic current as with the faradic, but, as no object is gained by the use of both currents in these cases, the more easily graduated faradic current is recommended.

This altered irritability to faradism was demonstrated in a large proportion of the cases (168 in number) which formed the basis of two papers communicated by me to the Royal Medical and Chirurgical Society in 1878 and 1886. In the whole series of cases,

The interossei were affected	79 times
Abductor and opponens pollicis . . .	28 „
Extensors of thumb	32 „
Muscles of little finger	9 „

and other muscles rarely and exceptionally. Of the interossei muscles the first dorsal interosseus or abductor indicis was affected far more frequently than the others, and may be regarded as the muscle in which impairment of irritability to faradism is most readily demonstrated.

Pathogeny.—What is the meaning of this impairment of irritability? Without venturing to speculate on any histological changes in the muscle I hold that it is due to "fatigue." The same diminution of irritability may be induced in the laboratory by fatigue artificially brought about; and it seems then fairly warrantable to speak of the condition of impaired irritability of muscles which is found in occupation neuroses as due to "chronic fatigue."

Fatigue of a muscle is much more easily brought about by prolonged contraction than by a succession of intermitting contractions, no matter how forcible these may be. This everybody knows who has tried the familiar experiment of holding out the poker or even the unloaded hand at arm's length, or who has stood at "attention" during a prolonged ceremony.

In investigating craft palsies, the evidence of chronic fatigue is to be looked for in the muscles subjected to prolonged contraction for the purpose of maintaining the accurate position of a tool, rather than in the alternating muscles which move the tool.

In writing likewise it is the muscles of pen-prehension rather than those of pen-movement which betray chronic fatigue, and which, when tested by the electric current, show diminished irritability. The chief muscles of pen-prehension are the first and second dorsal interossei and the muscles of the thenar eminence; especially the abductor and opponens,

which, by rotating the thumb slightly outwards, enable the pulps of the thumb and index to be maintained in apposition. The stress of the work usually falls within the group of these muscles; and the "quill-driving" automaton, who earns his living by "piece-work," scarcely relaxes the grasp of his pen, sometimes for hours together, as he sits in a foul, gas-lit office inhaling at best the used-up air of the crowded streets.

Symptoms.—We are now in a position to review with profit the various craft palsies which have been described in the records of such maladies.

As it is the prolonged muscular stress or contraction which seems to determine the disorder, we should not expect that periodic manipulations, the essence of which is rhythm, would be very liable to break down. Nevertheless, cases of break-down in piano-players, and in performers on other musical instruments, are not very uncommon. In all cases where the musician holds the instrument there must be prolonged stress; and in performers on the violin or violoncello we generally expect to find the cause of break-down either in the bow-hand or in the left hand. In performing on these instruments the greatest amount of work is generally thrown upon the left hand, which grasps the instrument and fingers the strings. In the violoncello players who perform solos, and who seek to get high-pitched notes from their instruments by shortening the string by violent pressure with the outside of the phalangeal joint of the left thumb, while the fingers are engaged in stopping the string lower down (a manœuvre known as "making the nut"), there is very great strain upon the abductor and opponens pollicis, and I have known a break-down thus to occur in these muscles.

The grasp of the bow in the practised musician is too delicate to cause strain, but it is otherwise with the beginner. If neuritis should occur, the constant stretching of the bow-arm to its fullest extent is apt to prove irksome and painful; for the stretching of a nerve in such a condition is very painful. I have been informed that in violinists, especially in those who began to practise very early in life, the bow-arm is always considerably longer than the left arm; and that the difference may amount to as much as 1½ inches. This, which I can readily believe, serves to emphasise this stretching of the bow-arm. In piano-playing it is at first sight difficult to see where any prolonged muscular stress occurs; for piano-playing seems to consist not in grasp but in quickly alternating rhythmical movements. The strain in piano-playing falls on the extensors of the wrist, for, to obtain rapidity of finger movement, it is necessary to restrain the play of the wrist as much as possible. The forearm, carpus, and metacarpus are (in what is known as the "Stuttgart method") maintained on one level; and in cases of piano failure I always examine carefully the extensors of the wrist and fingers, and the muscular groups which are innervated by the musculo-spiral nerve. In a considerable portion of these cases there has been obvious defect in this region, but my experience leads me to say that piano failure, or, indeed, a break-down with any musical instrument, is more often due to incidental conditions than to a definite injury to the muscles from over-work.

Allied to piano-playing is the act of working a key telegraph instrument, and here break-down might be expected to occur from causes similar to those observed in the pianist. It is interesting, however, to record that of some 400 cases of professional ailments which I have examined, two only were telegraphists; and in neither of these was it possible to say that the break-down was definitely due to a particular group of muscles.

As I have only seen two cases which could fairly be regarded as "telegraphist's cramp," it may be well to give a brief abstract of them :—

The first was "V," aged 40, a telegraphist who complained especially of a difficulty in writing, but also that he could not use "Morse's Telegraph Key" with his accustomed facility.

There was tremor of both hands, but especially of the right; the right shoulder drooped, the tongue deviated very slightly to the right, and he did not move quite as briskly with the right foot as the left.

There was no nerve-tenderness, no wasting or change of electric irritability in any muscle.

The tongue was furred and tremulous, he was fat and flabby, took rather plentifully of beer, had a high-pressure pulse and a distinct aortic systolic murmur. The arteries were visible, and my view of the case was that the patient had probably some arterial thrombosis interfering with the nutrition of the cerebral cortex on the left side.

The other case, "F. B.," aged 39, was somewhat similar. He had worked a Morse's Key for nineteen years; that is, until four years previously, when he gave it up. He had as much difficulty in writing as in telegraphing, and it was noticeable that all delicate acts—such as shaving, holding a tea-cup, or wielding a salt-spoon—were seriously impeded by tremor. The tremor affected all the muscles of right upper limb, including the pectoralis major; but it was most marked when the hand was prone in the telegraphist's position. The median and musculo-spiral nerves on the right side were markedly tender. There was a very slight and doubtful deviation of the tongue to the right, and the knee-jerk of the right leg was slightly in excess of the normal.

It will be observed that neither of these cases was "telegraphist's cramp" pure and simple; the first case was almost certainly cerebral, and the second probably so.

In all occupations involving prolonged strain there is a liability to break down. I have seen a case of "sawyer's cramp" in a man who made packing-cases "by the piece"; in him was found marked tenderness of the suprascapular nerve and of the nerve twigs (anterior thoracic) piercing the pectoralis major muscle. The pectoralis major and the supraspinatus muscle were slightly wasted; and one of these muscles, if not both, is concerned in holding the humerus in its socket, and in regulating the distance of the shaft of the bone from the side of the body.

Another interesting case was that of a man whose work consisted in covering pickle-jars with bladder. In this case it was the left hand which became impotent, and the muscles affected were the flexors of the finger which tightly grasped the top of the jar.

It has fallen to my lot to see cases of break-down in the needle-hand of tailors and sempstresses; in a compositor who had lost the power of holding his compositor's stick with the left hand; in a goldbeater who could not wield his mallet; in a nailmaker who had "hammerman's palsy" (of which more will be said hereafter): and cases have been reported of "bricklayer's cramp," in which the difficulty consisted in using the trowel; of milker's cramp, in which the grasp of the teat became impossible: indeed there can be no reason why any occupation should not furnish a "cramp," provided that some one action be repeated incessantly. From what has been said, however, it will be evident that such actions as involve a prolonged stress of particular muscles are far more likely to produce a break-down than those which involve no such enduring stress.

Special attention must be given to one form of craft palsy which has been described as *hephestic palsy*, and which occurs in those who wield light hammers for forging such articles as nails and the blades of penknives. I have seen only one such case, but it is worth reciting in some detail:—

The patient was a nailmaker aged 25. The onset of his trouble was sudden; that is, he could fix the exact date (June 8th, 1885) when he was seized with an inability to direct the hammer in the right hand towards the metal held in pincers by the left hand. With slight fluctuations his trouble intensified, and some three months later (September 4) he had to abandon his employment altogether.

When admitted to University College Hospital, in February 1886, the right arm was the seat of constant jerking movements, which reached a climax of disorder when he attempted to use his hammer; but which were always present, and seriously interfered with all movements of the right arm. The sudden onset, the movements of the arm and hand, the deviation of the tongue to the right, the inequality of the naso-labial folds, an exaggerated right plantar reflex, and a very slight degree of mental hebetude left no doubt that the cause of his disorder was cerebral, and due in all probability to arterial thrombosis affecting the left cortex. A careful examination served to demonstrate that there was slight wasting and some want of tone in the right serratus magnus, but beyond this nothing was discovered amiss at the periphery.

It is an interesting fact that all the eight cases of hammerman's palsy, recorded by the late Dr. Frank Smith of Sheffield, were similar to the above; six were cases of hemiplegia, and two of brachial monoplegia.

The constant repetition of strokes with a light hammer does not seem to involve prolonged stress on any muscle (unless it be in poising the shoulder); and, having regard to the muscular work only, we should not expect this occupation to cause a break-down.

My belief is that the fatigue in these cases is cerebral rather than muscular, and that certain acts can never become automatic; this is especially the case when the movement of the limb is not guided by tactile sense. When did any one ever thread a needle automatically or unconsciously? During such acts the face affords evidence of strong

cerebral effort. To take aim, whether it be at a needle's eye, a bull's-eye, or the bit of iron to be forged into a nail, involves the bending of the mind towards the object aimed at; and to aim at an object against time, as is done by the piece-worker forging nails, is an act one would think much more likely to cause brain fag than muscle fag. When the work done by the muscle is great, and the cerebral effort involved is small, we may expect the muscle rather than the brain to show signs of failure; when, however, the cerebral effort is out of proportion to the mechanical work, as in the repeated act of aiming with a light hammer, it is not surprising that, if break-down occur, it should occur in the brain.

The above considerations seem to afford some explanations of the fact that "hephestic palsy" stands in some degree in contrast to most other craft palsies.

Craft palsies affecting the lower limbs are rare. Dr. Rivers (*Brain*, 1891) describes the case of a handloom weaver, aged 56, who lost the power of working the treadle with the right foot. The patient was also lame, and the lameness and the "treadler's cramp" appeared simultaneously. Looking at the age of the patient, and at the fact of "lameness," it is doubtful if this case be fairly admissible to the present class. It is interesting to note, however, that in this case, as in "writer's cramp," certain muscles (glutei and hamstring) of the right leg, when compared with those of the left leg, showed a diminished irritability both to the faradic and galvanic currents, but manifested no qualitative change.

Duchenne has drawn attention to an interesting condition which he called "*Functional impotence and functional spasm of the peroneus longus.*" He points out how important is the action of the peroneus longus in standing and walking. This muscle depresses the near end of the first metatarsal bone, and helps to maintain the arch of the foot. The holding of the first metatarsal bone on the ground gives firmness of support. If this muscle be paretic, "flat foot" comes on, and the antagonist of the muscle (tibialis anticus) and the abductors of the foot move it into the valgus position. The characteristic of this form of flat foot is that when the foot is taken off the ground the arch of the foot reappears.

This condition is caused, Duchenne says, by the fatigue of the peroneus longus in standing or walking; and is common in shop assistants, and in persons who stand for long periods of time. It is especially common in those who are passing through the developmental stages of life, who are growing rapidly, and are imperfectly nourished. In this early phase the condition is painless; but it tends to become painful, and to be accompanied by reflex spasm in other muscles (especially the extensor longus digitorum and the peroneus brevis). This condition, as described by Duchenne, is recognised by him as analogous to "writer's cramp," and he adds that Nelaton also recognised this analogy. It is of further interest, because Duchenne recognised that this form of valgus is peripheral in origin, is definitely due to fatigue of the peroneus longus, and is curable by localised faradisation of the muscle. But he states, no

less distinctly, that writer's cramp and allied troubles cannot be cured by faradisation, and that the origin of these troubles is in the nerve-centres.

Among craft palsies affecting the lower limbs the so-called *dancer's cramp* must be mentioned. At first sight it appears strange that an exercise so essentially rhythmical as dancing should be liable to functional derangement. It appears, however, that the stage dancer only is affected, and of these such only as perform the "pas des pointes" on the tips of the toes, a position which involves prolonged contraction and great strain of the muscles of the calf to maintain the necessary extension of the foot. In connection with dancer's cramp mention may be made of an actor who, while performing a part in which he assumed the attitude of a bandy-legged man, was more than once seized with violent cramp of the leg. Doubtless the assumption of an unnatural and strained position involved the prolonged and fatiguing contraction of some of the muscles.

Miner's nystagmus would appear to be a craft palsy, distinctly analogous to writer's cramp and like troubles. Mr. Simeon Snell of Sheffield, who has written a monograph on the subject, points out that the workers in a mine who are most liable to nystagmus are those who, in consequence of restrained movements of the head, are obliged to move the eyeball in the orbit to a maximum extent. Thus a man walking along a low passage in a mine (say 4 feet high) has to keep his head down and at the same time to roll his eyes upward to watch the roof. This strains the eyes intensely. In the getting of coal by the process known as "holing" the miner is recumbent; lying on one side, he has to keep the eye in a constantly strained position obliquely upwards and to one side. These strained positions are very painful, and lead to nystagmus. The miner knows perfectly well that at his work he is obliged to rest the eye from time to time by looking downwards, and the only satisfactory treatment for the condition is to change the work to something of a kind which brings no strain upon the eye. In the extreme cases of miner's nystagmus not only are there the objective oscillations of the eyeball, but the patient complains that objects "dance" before him; and this unsteadiness of vision is accompanied by headache and giddiness. In this view of the causation of miner's nystagmus Mr. Snell is supported by Mr. Bell Taylor of Nottingham, and by Dr. Dransart who has studied the disease among the miners of the north of France. It is interesting to note also that Mr. Snell recognises a predisposition in the individual, and he records instances in which several members of the same family have suffered from miner's nystagmus. He gives an interesting case of a compositor attacked by nystagmus from causes analogous to those which produce it in a miner, and who subsequently became incapacitated for his work by "compositor's cramp." He further states that a form of torticollis, due to the maintenance of a strained position of the neck while at work, has been observed in miners.

It must be acknowledged that nystagmus is often a symptom of the gravest import, pointing to incurable changes in the brain or cerebellum,

and it is of great interest to have it fairly well established that "chronic fatigue" of certain muscles of the orbit is competent to give rise to a similar condition. I fear to say that the causes of miner's nystagmus are peripheral and not central, for it is obviously as easy to say that the nerve-cell is fatigued as it is to say the "muscle" is fatigued. When we add, however, that the treatment is peripheral and not central—that is, rest for the eye and not a trephine for the brain—the importance of this distinction will be appreciated.

In addition to nystagmus three *cases in which the muscles of accommodation become fatigued* may be mentioned. In the eighth volume of the *Transactions of the Clinical Society* Mr. Brudenell Carter has recorded the case of a young man who had been reading hard at the University, and who became troubled with attacks of vertigo when he attempted to read. His case was regarded as one of cerebral disease by more than one physician; but he was completely cured by a pair of concave glasses which relieved the internal recti of the strain imposed upon them when reading. I have also recorded (5) the case of a young man who suffered and was cured, precisely as Mr. Carter's patient, and whose case is of the more interest as he had previously suffered from writer's cramp. I have also had under my care, in University College Hospital, a postman whose headaches and attacks of what were regarded as "petit mal" were completely cured by glasses which corrected his errors of refraction. Duchenne has recorded two cases of a similar kind. The first was that of a scholar engaged in deciphering manuscripts. "A few seconds after his eyes had rested on any object he saw double, although his sight was good enough as long as his eyes were wandering. It was easy to establish the fact that this trouble was due to spasm of the internal rectus of the left eye, a spasm which subsided as soon as he stared less intensely." The second case was similar to it; the patient was a student in whom attempts to read caused painful tightness across the temples, forehead, and eyes. "This young man," says Duchenne, "whom I was unable to cure, committed suicide in despair." It is curious that Duchenne, who correctly diagnosed the cause of the trouble in one of his patients, did not call in an ophthalmologist. It must be remembered, however, that Duchenne's observations on these patients were made forty years ago. I also was once consulted by a watchmaker who was seized with a painful cramp of the orbicularis palpebrarum whenever he attempted to hold his watchmaker's lens in his eye.

Stammering is a derangement of a painfully acquired function, the result of education; on this account it has some claim to be included among "occupation neuroses." A full description of this unhappy disorder is to be found in a special article (vol. vii. p. 447). Although stammering is a very common trouble it does not often appear after the faculty of articulate speech has been fully acquired. There are no records, so far as I am aware, of the onset of stammering as the result of excessive talking. The trouble appears in early life, and is not infrequently cured, or, if not cured, greatly benefited by exercises in elocution.

I have somewhere read of "auctioneer's cramp," and indeed was once consulted by a gentleman who found great difficulty in saying, "Going, going, gone"; but there is no satisfactory evidence that any form of stammering has a right to be regarded as an occupation neurosis in the proper sense. Articulation may be deranged by many well-known organic lesions, which, however, are not easily confounded with stammering.

I was once consulted also by a vigorous elderly lady whose trouble consisted in the fact that the tongue became liable to disorderly contractions during the act of mastication. This interfered very seriously with the taking of food. The tongue moved properly when talking, it was only in eating that there was any perversion. Otherwise this patient was, for her years, very strong and vigorous. When the chin was forcibly depressed with the finger a very well marked "jaw-clonus" was found in the case. In the course of a year or so both these troubles had considerably diminished.

Duchenne has recorded the case of a priest who had a mania for playing the hautboy, and, as a consequence (as the patient thought) of excessive practising on this instrument, he became troubled with a spasmodic contraction of the muscles of the right half of the abdomen which came on with each inspiration for a sufficient blast. Consequently his hautboy often emitted wrong notes, which considerably astonished his congregation.

Some few cases (but only a few) of spasmodic torticollis seem to be due to fatigue of one or more muscles which maintain the head in a strained position necessitated by the occupation of the patient (*vide* p. 27). I have recorded the case of a sempstress whose attack seemed to have been caused by the efforts of the muscles which pulled the left scapular arch upwards while she was supporting heavy materials (curtains and carpets) with the left hand. Duchenne also has recorded similar cases.

Strain.—It must always be borne in mind that nerves and muscles may be acutely "strained." The word is placed between inverted commas to show that it is used in its popular sense. After some exceptional effort, such as the wringing of clothes by a laundress, the arm becomes painful, the nerve-trunks are tender, and the limb is rendered useless. Whether this be due to the stretching of fine nerve-twigs it is scarcely possible to decide; but that an arm or hand may be "strained" in the manner indicated does not admit of a doubt. I recall cases in which (*a*) excessive efforts with a crowbar, (*b*) pulling hard upon a rope on board ship, (*c*) wringing clothes, and (*d*) severe traction on one arm, while getting off an omnibus in motion, were each respectively followed by an inability to perform delicate acts. Whenever patients complaining of craft palsies state that their troubles began on or about a certain date, careful inquiry should always be made for some determining cause; and the reader is warned that the existence of such determining cause may have escaped the patient's memory, and is to be elicited only by cross-examination.

Sometimes the strain affects smaller muscles, is produced by prolonged rather than violent acts, and perhaps merits the name of subacute fatigue. Thus an architect who worked many hours consecutively, putting in the details of a design by means of strong pressure with a hard pencil, suffered from a transient attack of "cramp" and some general disability of the implicated limb.

Slight injuries seem capable of producing a functional incapacity. Thus a medical friend suffered for a few days from a "writer's cramp," which was caused by sleeping upon his right arm in the train. In another case the functional clumsiness of the right hand seems to have been caused by the implication of the median nerve in the effusion which followed a Colles' fracture of the arm.

There is one more characteristic of a typical craft palsy which is worthy of notice; namely, its *proneness to rapid extension* if the occupation be persisted in. This is best shown in the case of a writer who, beginning with a slight awkwardness in writing, ends by having tumultuous action of all the muscles of his arm whenever he attempts to make a mark upon paper.

Ordinarily the muscles of normal pen-prehension (and of these the first dorsal interosseus is the most easily investigated) become fatigued, and thereupon the scrivener throws the burden of pen-prehension upon other muscles, such as the superficial and deep flexors of the fingers. When this is the case the burden of pen-movement is thrown upon the muscles of the shoulder, and, if the new muscles of pen-prehension become fatigued in their turn, the attempt to write must cause further confusion. Another method of presenting this series of facts would be to say that there is an extension of "cortical discharge," but it is better to explain by the "seen" than by the "unseen."

It is impossible to write, or indeed to perform any movement involving the use of a tool which has to be held steadily, without throwing a prolonged strain upon the muscles which hold the tool. By means of instruments, such as penholders, which fasten to the fingers, and so forth, the strain may be thrown upon a new set of muscles and thus temporary relief be given; yet such relief is but temporary; the new instrument merely throws the prolonged strain upon a new set of muscles, which in their turn will surely break down if the occupation be persisted in. In short, the muscles which are subjected to prolonged effort soon become morbidly fatigued.

Whether the daily recurrence of "fatigue" in a muscle leads to any permanent change in the constitution (chemical or microscopical) of the organ is a question which must as yet remain unanswered. That it leads to a change (generally depression) in the irritability of the muscle to electrical stimulation seems tolerably certain. A muscle which is acutely fatigued becomes acid in reaction, stiff, painful, and liable to sudden cramp; and it is probable that the frequent repetition of such a condition would produce a permanent change in nutrition.

Professor Haughton's law of fatigue is to the effect that "when the

same muscle, or group of muscles, is kept in constant action until fatigue sets in, the total work done multiplied by the rate of work done is constant." In muscles which are subjected to prolonged strain without intermission, the rate of work done is at its maximum; hence this great liability to fatigue. That "'tis the pace that kills" is generally admitted. Dr. Waller's observations on fatigue show that the fatigued muscle is (*a*) less excitable, (*b*) shortens less, and (*c*) can do less work; and certainly my clinical observations tend to establish the same thing.

Dr. Waller has also shown that a muscle, the nerve of which has degenerated, is more easily fatigued than a muscle with normal nerve-supply; here, too, clinical experience is in accord with physiological experiment. Moreover, Dr. Waller has shown that, in fatigue induced by over-stimulation of a nerve, it is at the motor end plate that conduction is first interrupted; and Dr. Reid has shown that when stimulation takes place from the brain, failure of conduction occurs first in the cord where relations are established between the fibre of the pyramidal tract and the fibre of the anterior nerve-root. Unfortunately these two statements are incapable of clinical confirmation.

Diagnosis.—It will be gathered from what has gone before that craft palsies are, after all, merely symptoms of many conditions; and that, when we are confronted by them, our chief duty is to make out the cause of the break-down, and to determine whether such break-down is, so to speak, accidental, or whether there are reasonable grounds for supposing the break-down to be definitely due to the too frequent repetition of the particular act in which the occupation consists. The latter conclusion can never be justified until by careful examination the other causes of break-down have been excluded. Having excluded all congenital defects, and those degenerative and other changes of the nerve-centres which are fairly well known, and to which special names are assigned, we arrive at our diagnosis of craft palsy mainly by way of exclusion. If, in addition, we are able to say that certain muscles upon which the stress of the occupation falls are deficient in irritability, and if we find the nerve-trunk or the nerve-twigs of the limb affected tender upon pressure, our diagnosis will be strengthened. The statement has frequently been made that in craft palsies it is only the movement of the occupation that is deranged, and that, with the exception of the upset of this particular co-ordination, there is nothing amiss. I believe I am correct in stating that I have never seen a case of the kind of which such a statement could be made. The occupation movement no doubt shows derangement far in excess of any other; but patients who assert that "there is nothing amiss except the writing," will often in the course of conversation drop an expression showing that this is not true. There is a difficulty in winding up the watch, or in getting a teaspoon steadily to the mouth; a clumsiness in pinning two articles together, or a fatigue in holding up the dress. Any such deranged movement is usually allied in character to the occupation movement which is mainly deranged, and involves prolonged use of the same muscles. The muscular actions concerned in writing,

in holding a dinner-knife or a razor, or in firing a gun, are very different; but in holding a pen we use the same muscles as are employed in the use of a watch-key or teaspoon.

It is not unusual to find that, although the professional act is the one mainly deranged, more or less tremor is observed in all co-ordinate movements of the limb concerned. Tremor of a limb is usually intensified when any muscles which are especially feeble or deficient in irritability are brought into play. I have seen some cases in which this was very well marked. I may allude to the case of an old gentleman with writing difficulty, whose tremor was scarcely noticeable until he attempted to put the hand into the breast-pocket of his coat. This tremor was apparently started so soon as the pectoralis major came into use. In another case the bending of the end joint of the thumb by the flexor longis pollicis was the signal, as it were, for general tremor of the right arm; and in a third the use of the extensor secundi internodii pollicis was the immediate cause of a similar phenomenon.

The **prognosis** of craft palsies is generally a matter of some difficulty. It necessarily hangs upon the diagnosis. If, as I have argued, an alleged craft palsy is but a symptom of many different pathological conditions, the prognosis differs widely in different cases. We may form the opinion that the trouble is an early sign of senile degeneration, not really dependent upon the occupation, and not likely to be greatly influenced in its course by treatment or regimen; or we may recognise it as caused by an accidental condition, such as neuritis or rheumatism, which may be curable; or, again, we may recognise it as a genuine craft palsy which, if indeed without influence on the expectation of life, demands nevertheless an instant remission of the injurious occupation.

If, in a case of writer's cramp for an example, we find (*a*) that the writing is gravely affected, (*b*) that there has been overwork with the pen, (*c*) that there is no evidence of neuritis, and (*d*) that the irritability of certain muscles used in writing is undoubtedly depressed, we must give a very grave prognosis as to the recovery and maintenance of the normal power of penmanship.

Treatment, like prognosis, depends upon diagnosis.

It is almost always necessary to prescribe *rest*, more or less absolute, from the occupation; but this piece of advice is not to be given without taking all the circumstances into consideration. If we come to the conclusion that rest is not likely to relieve the disease to any great extent, perhaps the best advice, and that which will best serve the interests of the patient, is to get him to ease his work if possible, but to permit him to go on with it. If, for example, the disorder be due to incipient senile tremor or ataxy in the upper limbs, it is clearly to the patient's interest that he should make full use of whatsoever power may remain to him, and he should be told to continue his work and to make the best of it. When a patient is suffering from a disease which is usually progressive, and is little influenced by treatment, we clearly do him a great disservice if we deprive him of the privilege of earning his living a day

earlier than necessary. This is especially true in the case of an artisan. It is astonishing how long an ataxic patient will manage to "rub along," and earn, or partly earn, his living after the physician has made this diagnosis. We must not lose sight of the uncertainty of the rate of progress.

If, however, a young, delicate, and neurotic clerk, who has come out of the country into a city office, comes complaining of a difficulty in writing, the best advice, if he be "without encumbrance," is to change his occupation instantly. The name given to the best-known craft palsy, namely, "writer's cramp," is a name full of terror for the clerk whose sole means of livelihood is penmanship. He comes and asks with trepidation, "Have I got writer's cramp?" by which he unconsciously means, "Is my difficulty incurable?" Often this question is not to be answered off-hand; but in any case it is necessary to relieve the patient from his occupation for a time, and my general rule is to forbid the patient to write for three months. This injunction is a hard one, and in most cases a compromise has to be made. In large mercantile houses it is often possible to find a change of occupation for a valuable servant; and many of my patients have been sent on a voyage on the business of the firm, or have been employed as overlookers at the warehouses, or in some form of travelling; or they have had the services of a shorthand clerk. Such brief notes as a man, thus occupied, finds it necessary to make should be made with a pencil, for a pencil, upon which some pressure can be made, is easier to write with than a pen, and serves the unwilling hand very much as a walking-stick serves a man with a weak leg. It is much better for the patient to have employment of some kind, provided it do not entail prolonged writing. These patients are often worried and apprehensive about their condition, and if they be deprived of all employment they are very apt to brood over their troubles, and to become hypochondriacal.

Patients often think that their ills are to be cured by gymnastics, such as the use of dumb-bells and the like; such a proceeding cannot do good, and, if the muscles be overstrained, may do harm. I always discountenance any kind of violent exercise with the arms, and recommend any gentle exercise which involves no prolonged strain, and does not cause pain, stiffness, or uneasiness. There is no object to be attained by keeping the arm and hand in a sling (which I have frequently known to be recommended); there is no reason why the patient should be debarred from making ordinary use of the limb.

Pianists, to whom the abandonment of employment means a serious money loss, I allow to go on teaching; but I absolutely forbid any public performances which entail many hours of daily severe practice. All practising must be abandoned.

I have spoken of tenderness of the nerves as a common symptom. Sometimes the tenderness is primary, but more frequently it is secondary, and due to the great efforts made to overcome the incipient disability. The tenderness of the nerves is usually accompanied by some aching of the limb, and the patients often complain that they find great difficulty

in placing the limb in a painless position; that they "cannot make it comfortable when in bed." Now this condition is nearly always benefited by counter-irritation over the trunks of those nerves which are tender, and at points where they are most superficial. It is not easy to explain this procedure on theoretical grounds, but as a piece of practical treatment I have no hesitation in recommending it strongly. *Counter-irritation* may be carried out in many ways. If the pain be severe it is a good plan to apply blistering fluid or a blistering plaster; but if less severe I recommend the application of strips of capsicum plaster. This plaster should be made with india-rubber, and spread upon thin perforated linen. It should be so thin as to interfere as little as possible with the free movement of the limb; and, if it be mixed with the india-rubber medium, the patient can wash as usual without great risk of removing it. The plaster should be worn until it wears off, and, if necessary, it may be renewed once or twice.

The next point in treatment is to try to stimulate the nutrition of the muscles. To this end we may use *massage* or *electricity;* and, as a rule, the use of the former is far the more easy and satisfactory. Neither massage nor electricity must be used so long as the nerves are tender, for under such circumstances they are positively harmful.

It is very important that the masseur should be gentle in the exercise of his craft; for if he exercise too much force he is likely to bruise the nerves, and to do harm rather than good. It is also of great importance that special attention should be given to the intrinsic muscles of the hand, such as the interossei and lumbricales, and the muscles of the thenar and hypothenar eminences. The whole limb and hand should be rubbed; and if there be any suspicion of rheumatic thickening in and around the joints, these should be submitted to passive movements. A limb thus treated will, in favourable cases, get plump and strong, although to begin with it may have been in a very different condition.

I have never known much benefit, if any, result from faradising the muscles. *The galvanic current* alone is to be used, but in combination with rhythmical movements of the fatigued muscles. A current of moderate intensity (one which slightly reddens the skin and produces a slight contraction of the muscles without causing pain or burning) is employed. The positive rheophore, which should be of large area (a small bath sponge wrung out of hot salt and water answers admirably), should be fastened to the nape of the neck with a bandage, the clean copper end of the positive wire being interposed between the bandage and the sponge. The negative rheophore, also of large surface and soaked in hot salt and water, is then placed seriatim over the implicated muscles and (where possible) the nerves supplying them. While the rheophore is thus placed, and the current still passing, the patient should be made to exercise these muscles thoroughly and rhythmically. The effect of the current when thus used is most refreshing; and, as a rule, removes any sense of fatigue. Finally, the whole limb should be sponged, and the effect is to leave the limb reddened and glowing. Galvanism thus used

stimulates the nutrition of the part, and I have published some few cases in which the result was most gratifying. The late Dr. Fagge also employed this method with excellent results in a case of "artisan's cramp" (hammer cramp) (6).

Unfortunately some cases do not respond to this treatment, and of late years I have employed massage rather than electricity; partly because I think it nearly if not quite as useful, partly because I had not the leisure to carry out the electrical treatment. It is far more difficult to get electrical treatment carried out by independent persons than massage.

These methods are most useful in cases of neuritis, or in chronic fatigue of the muscles, or in the rarer cases in which muscles have been deranged by local accidental causes. But in saying this it is necessary to repeat with emphasis that neither of these methods is of any use so long as the nerve-trunks, nerve-twigs, or muscles are tender.

These methods of treatment, when successful, are to be regarded as curative; but it must be remembered that a man who suffers from craft palsies must be regarded as disposed to these troubles; and it is generally necessary to warn him that, unless he is able to "ease off" his work, he will be liable to a recurrence. Dyspepsia may be held in check by careful dieting and medical treatment; but in one who is constitutionally unable to take liberties in the matter of eating and drinking, the weak stomach is easily overtaxed.

Mechanical methods of overcoming craft palsies are temporary subterfuges. A man who cannot write with a pen often has no difficulty in doing so with a piece of chalk on a black-board or other large surface. He finds some less relief from a penholder which offers a big grasp to the writing hand, and many patterns of penholders have been made to this end. Big cork penholders, globular penholders, or penholders which slip on the finger and are retained without the apposition of the thumb, have also been tried, and in many cases they afford temporary relief. Yet the relief is but temporary, because, as has been explained already, it is quite impossible to hold a pen steadily with the hand without throwing some of the muscles of the arm or hand into a state of prolonged strain. So long as writing is really fluent, and the result of an extensive co-operation on the part of many muscles, large and small, the strain is not great; but as soon as there is a break-down in the smallest link of the machinery the strain increases to an enormous extent, and persistence in writing is sure to increase the disability, because the act has risen to the level of a serious muscular effort. A copying clerk can write, let us say, a word a second; and at that rate could copy a page of this book in about sixteen minutes. He could not write at that rate with a piece of chalk on a black-board; neither could he do so with a globular penholder; nor if he used a big penholder held like a baton. If, again, he deliberately alters his handwriting, and produces a large round text instead of a small running hand, he very much increases his labour in producing each word and letter. It is apparent, therefore, that, although these subterfuges may enable him to do a small amount of writing with

comparative ease, he will inevitably be worse off than ever if he attempt to produce the same amount of manuscript in the same time.

For small amounts of writing there is no objection to the use of the left hand; but in aggravated cases of writer's cramp the use of the left hand for "quill-driving" is not without danger, not only to the left hand but to the right hand also. It is probable that when a man has learnt to write with his right hand the normal method of writing with the left hand would be to write backwards, and to produce what is known as mirror-writing, which can only be readily deciphered when it is held before a mirror. I have seen two patients in whom the production of mirror-writing seemed to be almost natural. One case was that of a child (girl, æt. 10) who had congenital right-sided hemiplegia, and who wrote "backwards" with the left hand without any difficulty. The other case was that of a young lady who could write fairly well with her right hand, but who wrote more fluently "mirror" fashion with the left hand. She protested that she had never had any difficulty in writing in this way, and seemed almost surprised that any one else should find it difficult. Dr. Savage relates a case of mirror-writing, and says that it is met with in hysterical subjects; but certainly one of the above patients could not be placed in this category. Mirror-writing is of no commercial value; and persons who have learnt to write with the left hand, and who produce normal writing flowing from left to right, find the act laborious, and the rapidity of production never very great. The labour of writing (normally) with the left hand is greater than it is with the right hand, and persons disposed to craft palsies are very apt to break down with the left hand as they have done with the right. Further, it must be remembered that to learn to write with the left hand is a labour and a worry, and is often accompanied by associated movement of other muscles, notably of the intrinsic muscles of the right hand. I have recorded a case of extreme writer's cramp (7) in which the patient had learnt to write with the left hand, yet he was quite unable to write with his left hand without performing unconscious movements with the fingers of the right hand, which, while he was writing with his left, were never still. Whatever the physiological explanation, it seems probable that in writing with the left hand there is occasionally some fatigue produced in the right limb. There is no harm in learning to make use of the left hand for minor acts of writing, but there must always be a risk of its "giving out" just as the right hand has previously done.

The only apparatus which is of undoubted and permanent use to the sufferer from "writer's cramp" is a typewriter, of which many varieties are now to be obtained. The typewriter must be one which is worked with a key-board, because it is only in these that prolonged muscular strain is avoided. One typewriter, at least, is worked by means of a handle, which is grasped with one hand. This machine certainly involves prolonged strain, and is not to be recommended, therefore, to sufferers from writer's cramp. Typewriters are useful enough for letter-writing and for producing "copy" for the press, but, unfortunately, they are

so costly as to be beyond the means of most clerks; they are not readily portable, they are more or less noisy in their action, and are of no use for book-keeping, which is the chief occupation of the great majority of clerks.

With regard to the general health little need be said. Whatever is found amiss should be corrected, if possible. If the patient be exhausted by overwork he must seek complete rest and change; and we must treat such conditions as gout or rheumatism on ordinary dietetic and medical lines. Alcohol is a danger to some of these patients, and one or two I have seen definitely cured by abandoning its use. A man finds, perhaps, that a stimulant enables him to get through a certain amount of work; but if he indulge this manner of overcoming his difficulty he soon falls into the state of the chronic drunkard who takes a glass of spirits to "steady the hand." The temporary relief leaves him worse than before, and the need of the stimulant steadily increases. Such patients should be warned that they are on the brink of a precipice, and should be dissuaded in the strongest way from a habit so dangerous.

No narcotics afford any permanent relief, and their employment is fraught with great danger to the future health of the patient, both moral and physical.

In conclusion, a word may be said as to the prevention of "writer's cramp." We are taught to write exclusively with the right hand, and even those who are hopelessly left-handed are severely drilled to use their worse member nevertheless. If it were possible to use either hand for writing, each would in turn be rested; and clearly it would be a great gain if children were trained to a certain degree of ambidexterity. If we were all taught to make our writing strokes vertical instead of sloping it might be possible to produce a page of manuscript partly with the left hand and partly with the right without causing any very obvious change of handwriting.

Girls who learn some ambidexterity from piano-playing, and knitting, are at an advantage in this respect as compared with boys.

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G. V. P.

SPASMODIC WRY-NECK, OR SPASMODIC TORTICOLLIS

SPASMODIC wry-neck, or spasmodic torticollis, is characterised by a jerking of the head due to the clonic contraction of one or more muscles, whereby, in the more commonly observed forms, the head is rotated so that the chin is turned towards the opposite shoulder, and the ear on the side of the affected muscle or muscles is approximated to the shoulder of the same side.

Numerous causes have been adduced to explain the origin of the condition; but these vary so much in their nature, and are so indefinite in their bearing upon the actual condition, that it would seem as if any preceding affection connected with the nervous or muscular structures in the neighbourhood of the neck had been seized upon as a premonitory symptom. The condition is obviously a nervous one, whether spinal or cortical in situation; and it is not surprising, therefore, that its occurrence should be most frequent in persons of a neurotic temperament: but it is very doubtful whether we can assign a definite cause for the occurrence of the affection in more than a small minority of cases.

The following causes, amongst others, have been cited: trauma, mental excitement, over-action of the affected muscles. The last of these indicates a relationship to craft spasm, and in some cases there is evidence that the condition may be produced in this way (*vide* p. 18).

In one very marked case which came under my observation, and one to which I shall again have occasion to refer, the patient was a tailor, and the muscle affected was the left sterno-cleido-mastoid. He stated that on each occasion when he drew a stitch tight he partially turned the head to the right side, precisely the involuntary action of the affected muscle. Other muscles were affected in this case, particularly the smaller muscles of the hand, so that he grasped a needle with difficulty. Indeed, had there been no torticollis the case would have been considered one of craft spasm. Professor Annandale relates a case, which also closely resembled a craft spasm, in which the sterno-mastoid muscle was affected alone. Trauma, such as forcible twisting of the neck, has been adduced as a cause (9). Recently a patient was under my care in whom the condition supervened shortly after the death of his wife, which had caused him intense grief, followed by great nervous prostration; but previously he had suffered from a slighter form of spasm in the same muscles.

Anatomy.—For convenience of description I propose to consider the anatomy of the parts implicated in torticollis before proceeding to describe the symptoms of the affection. In a simple case the sterno-cleido-mastoid may be the only muscle affected; but in more complicated cases the following muscles may be associated with it; namely, the trapezius of the

same or the opposite side or both of them, the splenius, the trachelo-mastoid, and the deep rotators of the neck.

The sterno-mastoid, attached below to the upper part of the anterior surface of the manubrium sterni by one head, has another attachment from the upper part of the inner third of the clavicle. It passes upwards and obliquely backwards to be inserted into the mastoid process by a thick tendinous portion, while a thinner part is attached to the outer half of the superior curved line of the occipital bone.

Action.—When the two sterno-mastoid muscles act together they raise the head; but when only one is thrown into action it rotates the head so as to bring the ear of the same side down towards the shoulder, turns the chin towards the opposite side, and throws it forward.

The trapezius.—The upper portion only of the trapezius requires consideration — that portion which arises from the inner third of the superior curved line of the occipital bone and the external occipital protuberance, the ligamentum nuchæ, and the spine of the seventh cervical vertebra. The upper part of this interlaces with the sterno-mastoid of the same side. This portion of the trapezius inclines downwards and forwards, and is inserted into the outer third of the posterior border of the clavicle.

Action.—This portion of the trapezius rotates the head to the opposite side, but at the same time pulls the head backwards and strongly towards its own side. If, however, the superior attachment be the fixed point, and the fibres contract towards it, it also acts in the opposite direction, raises the shoulder, and pulls it back.

The splenius has its origin from the upper six spines of the dorsal vertebræ, the seventh cervical, and the greater part of the ligamentum nuchæ. It is divided, according to its insertion, into a capitis and colli portion; but it is the former of these only with which we have to deal at present. This portion consists of fibres inserted into the lower half of the mastoid process, and into the outer half of the superior curved line of the occipital bone at a deeper level than the sterno-mastoid.

Action.—This portion of the splenius rotates the face slightly to the same side.

The trachelo-mastoid arises from the spines of the upper three or four dorsal and the lower cervical vertebræ, and passes obliquely upwards under the splenius to be inserted into the posterior part of the mastoid process.

Action.—The action of the trachelo-mastoid is practically the same as that of the splenius capitis.

Nerve-supply.—These muscles are all supplied in part by the posterior primary branches of the cervical spinal nerves. The trachelo-mastoid and splenius derive their complete nerve-supply from this source, but the sterno-mastoid and trapezius have a further and chief supply from the spinal accessory nerve. The spinal branches to the sterno-mastoid and trapezius come from the third and fourth cervical nerves; and it is by these twigs, and the spinal accessory nerve, that the sub-trapezial plexus

on the under surface of the trapezius muscle is formed. Nerve-twigs from the spinal accessory nerve can be traced to the inferior margin of the trapezius muscle; but it is interesting to note that in the condition of torticollis the lower part of the muscle is very rarely, if ever, affected.

Symptoms.—The symptoms vary as regards the severity of the condition and the extent of the muscles which are affected; but the distinctive features are the same in all cases. Naturally in the early stage the symptoms are not so marked as in the later stages of the affection. At an early stage of an uncomplicated case, the symptom of which the patient complains, and which is manifest to the observer, is a spasmodic contraction of one or more muscles on one side, which results in a rotation of the head and turning of the face in the direction in which the muscle or muscles normally act. Thus if the sterno-mastoid of the left side be at fault the head is rotated to the left, and the face inclined to the right, so that the left ear is approximated to the left clavicle and the chin passes to the right side. The effect produced is just that which is seen when the left sterno-mastoid muscle is contracted in a simple case of congenital wry-neck. The spasms vary in their frequency and force. At first they may be infrequent and slight, but later they may become rapid and severe. For a time they may occur only at long intervals, and when the patient is excited; and they may be controlled by an effort of the will, or by gentle support applied to the head: but, generally, sooner or later no effort of the will suffices to control them, and when support is applied the contraction rather increases.

These points were well illustrated in a patient who was recently under my care. Sometimes the very gentlest pressure applied to the chin or nose enabled him to maintain the head in a proper position, particularly if he were sitting; but at other times, when standing and a little agitated, the more he tried by pressure with the hand to steady his head the more powerful the contractions became, and even severe pain resulted.

Pain is not necessarily present; but as the spasms increase in degree it may supervene, and then is usually cramp-like in character. Occasionally the pain is extreme, and, as in the case of the patient just referred to, may become unbearable.

During sleep the spasms cease, and not infrequently to rest the head on the pillow may be sufficient to control the contractions, or wholly to prevent them.

In the early stage one muscle only may be affected; and during the intervals, when spasm is absent, the patient may hold his head normally, and no thickening or other deformity be observable. Later, however, other muscles may become affected, and changes become obvious: the muscles from over-action hypertrophy, and the structures generally of the affected side contract, so that deformity is produced. Further, the trapezius on the opposite side, in its upper part, may be thicker and

better developed than that of the affected side. It is probable that changes of a hypertrophic character occur in certain muscles which are specially used by the patient to counteract or lessen the effect of the spasmodic contracture of the affected muscle. Thus, the trapezius may be hypertrophied in its upper portion from the frequent endeavour on the part of the patient to relax the structures by elevation of the shoulder. If the spasms be very frequent and severe, the clonic may merge into a tonic condition. In the later stages endeavours to overcome the spasm by force rather increase the over-action. In these severer forms of the affection the patient may walk with the head held in the position of wry-neck. Sometimes both sides of the neck are affected, and then the wry-neck position is no longer produced, but the head is drawn backwards. The above description applies more particularly to cases in which one sterno-mastoid is chiefly at fault; but if the splenius and trapezius on the same side be affected also, the condition may be much aggravated. These more complicated cases, however, produce symptoms similar in character to those described—the movements and position of the head varying with the action of the various muscles; and each case can be analysed through a knowledge of the effect of each group of muscles. Thus, if we have the sterno-mastoid and trapezius on the right side affected and the posterior deep rotators on the left (supplied by the sub-occipital nerve), we expect the condition just described to be much accentuated; while if the deep rotators on the same side as the sterno-mastoid and trapezius be implicated, we should have the condition less severe, as these groups would counteract each other.

It is quite possible that the affection which has begun in the spinal accessory nerve (deep origin) may spread to other parts, so that other muscles are affected: an overflow of nerve energy may occur, and there may be an establishment of lines of lessened resistance between different nerve-centres. That this may be so is more or less proved by the effect of faradisation of the cortex. When we use a weak current and place the electrodes very near each other we induce a limited spasm, but if we stimulate three or four times successively the spasm spreads to other parts, and other muscles are contracted. So, too, if we increase the strength of the current; indeed, in this way by either method a general convulsive seizure affecting the whole of one side or both sides of the body may be produced.

Diagnosis.—There is no difficulty in the diagnosis of spasmodic wry-neck, using the name in its ordinary significance. It is very important, however, to recognise that the condition may be simulated in affections which are much more amenable to medicinal treatment than true torticollis. Thus, in a small number of instances, patients suffering from hysteria are seized with spasms which resemble it, and which may be even more violent and distressing. As a rule, however, there are in these cases other symptoms or indicative conditions of hysteria which suffice for differentiation. Sir William Gowers points out that any case in a woman under thirty years of age may be hysterical; and further that in such

persons the condition usually tends to spread from the neck to the trunk. These cases, although often very severe and obstinate, are as a rule amenable to the treatment suitable for patients who suffer from hysteria. As surgical interference is improper in these "neurotic cases" it is of the utmost importance that they be carefully distinguished from the local disease.

In an examination of many cases which have been treated by methods short of neurectomy, and in which a permanent cure has been obtained, considerable numbers are found to be in young women under thirty years of age. Thus Isidor quotes seventeen cases where operative treatment short of neurectomy was adopted, and, of these, three cures and two cases of improvement were in women under thirty years of age.

Prognosis.—In uncomplicated cases, even when severe, there is no likelihood of the life of the patient being shortened; the disease does not spread to other and more vital parts. In some instances patients who have suffered for months have recovered without treatment; but it is questionable whether such cases were not hysterical in their nature. Dr. Althaus describes the case of a lady, aged thirty-four, who had suffered for eighteen months, and who recovered after electricity had been applied to the antagonist muscles. Mr. Noble Smith, in referring to this case, remarks that it seems to have been essentially hysterical, and, inasmuch as the treatment adopted is wholly irrational and useless in true spasmodic torticollis, probably he is correct in his opinion. When this latter affection is present in an aggravated form the probability of spontaneous cure is very slight, and the prospect of much benefit from treatment other than operative is practically nil. In the most severe forms operation may be beneficial or even curative; but the prospect of permanent cure is in inverse proportion to the severity of the spasm, the extent of the muscles affected, and the duration of the disease.

Treatment.—While it is possible that in slight and early cases some one or other of the numerous methods of medicinal treatment may prove effectual, it has been found that in severe cases measures short of operation are almost invariably unavailing.

Dr. Poore (10) relates a peculiar case which improved, and was finally cured by medicinal treatment. He states that "it was by far the most severe case of torticollis which I have ever seen. The spasm was so strong that the whole body rotated with the head." The spasmodic action shifted from one rotator muscle to another, and from one side of the body to the other, and this seemed to preclude the localisation of the lesion either in the nerves or in the muscles, and gave rise to the question: "Is the lesion central?" Other symptoms present pointed to this possibility. The patient had suffered from syphilis. Mercury was accordingly given, and in less than a month a marked palliation of the symptoms was noticeable, and in five weeks he was discharged from hospital well.

In this case we have not only an example of cure by medicinal

treatment, but we have the hint thrown out that these conditions of torticollis may be central—cortical in origin. In this case trephining was suggested over the area No. 12 of Ferrier, and if improvement had not taken place the operation would have been carried out by Mr. Horsley. To this aspect of treatment I shall refer later.

Dr. Poore (11) refers to other cases in which electricity had been used beneficially; but these, as others cured by medicinal measures, may have been cases of false torticollis. The employment of electricity, faradisation or galvanism, is empirical. It is generally admitted that the condition is not due to weakness of the opposing muscles, and certainly it is not due to disease of the muscles which clonically contract.

Morphia, given hypodermically in large doses as recommended by Sir William Gowers, may alleviate the condition, or cause cessation of the spasms; but, as he himself points out, treatment has to be continued indefinitely, and is open to the grave objection that the morphia habit may be acquired.

Nerve tonics, hypnotics, narcotics, and hypnotism all seem to be of little permanent value, and merely to palliate the condition. Mechanical supports have been assiduously resorted to, but, ingenious as many of them are, they also are but makeshifts. It is extraordinary, however, how in severe cases slight support with the finger on the brow, or chin, may prevent or control spasm. In an aggravated case, upon which I recently operated, such gentle support with the finger was efficient, and enabled the patient to walk with greater comfort, and to carry the head straight. In this case, however, a support which enabled the patient to rest the head on a pad, just at the point where the finger succeeded in controlling the movement, although successful for a few minutes at a time, failed to give much comfort. The support was securely fixed to the patient's shoulders, and had a truss spring with a pad affixed. It showed, what I have observed in other cases, that no mechanical contrivance can give such efficient support as the hand of the patient; yet sooner or later the patient tires of it, as he finds that it requires some attention to keep the head resting upon the hand.

In cases where the spasms are slight in degree, inextensive in area, and of short duration, there may be some doubt as to the advisability of operative interference; and these patients may benefit from one or other of the various drugs referred to, more particularly where there seems to be a distinct cause, such as syphilis, as in the case described by Dr. Poore; but even in these cases, after a fair trial of medicinal treatment, and certainly in severe and prolonged cases, operation becomes imperative if improvement does not occur. The initial cause of the condition is not known: but there is an affection present which causes the patient grave discomfort, and which may become still further aggravated; and as relief can be given by throwing the affected muscles out of action, this is the aim of the surgeon. Nerve-stretching is of but temporary value, as was seen in a case in which Professor Annandale adopted that method in 1878; later in the same case he performed

neurotomy with success. Nerve-division has the objection that reunion occurs, and the malady returns.

The removal of a portion of the nerve is the best treatment, and should be had recourse to whenever active surgical interference is required. The muscle affected is chiefly the sterno-mastoid, and it seems that the spinal accessory nerve is chiefly, or wholly, the motor nerve which conveys the impulse to the muscle. A portion of this nerve must therefore be removed. This excision was first carried out by Campbell de Morgan in 1866, and again in 1867. Professor Annandale, in 1878, divided the nerve with complete temporary success, stretching having previously failed. Since then many operations, notably neurectomies, have been performed with complete success by Noble Smith, Keen, Ballance, Southam, Richardson, and others.

It may be asked, if other muscles supplied by other nerves are also affected, how can we expect improvement to result in them by division of the spinal accessory? If the view here stated be correct, namely, that the primary condition is central—whether spinal or cortical, and that the spinal accessory nerve simply acts as a path for efferent impulses, then I think in some cases such treatment may result in cessation of contracture in the other muscles; but if need be their nerves of supply may be attacked later, as has been done indeed by Keen and Noble Smith. Nevertheless, it may be well to add that Dr. Risien Russell undertook a careful research into the relation of the cervical nervous supplies to the muscular groups respectively; seeing that, if all are not directly innervated by the spinal accessory, division of the latter in certain cases may not be completely successful. Dr. Russell found that to excite the first and second cervical nerve roots draws the head laterally towards the same shoulder, the second cervical giving a slight rotation to the head. To excite the third and fourth cervical draws the head backwards with the occiput towards the side of the stimulus, and the chin upwards and away from the stimulated side.

If neurectomy fail and the patient's life be rendered miserable, the surgeon should not hesitate to expose the cortex and, after locating by faradisation the nearest "proportionate" areas, remove that portion of the brain which seems to be at fault.

In 1881 and 1882 I operated on two cases, in men of 60 and 35 years respectively, by neurectomy, and in each a cure was effected. Since then I have had under my observation other two cases: in one complete cure followed operation; in the other, upon which I operated this year, considerable improvement has followed; but it is too early to speak of the ultimate result.

Operation.—The spinal accessory nerve crosses the internal jugular vein—it may pass posteriorly to it—and passes backwards to reach the under surface of the sterno-cleido-mastoid muscle. For nearly an inch it passes downwards and slightly backwards under cover of this muscle, which it then pierces to reach the under surface of the trapezius, where, along with the third and fourth cervical nerves, it forms the sub-

trapezial plexus. It gives off branches to supply the sterno-mastoid either before or while perforating the muscle. It is obvious from this that the nerve may be reached by an incision along either the anterior or posterior border of the sterno-cleido-mastoid muscle, but as the supply to that muscle is given off before the nerve appears at the posterior border it is preferable to adopt the anterior incision.

An incision two inches in length is made along the anterior edge of the sterno-mastoid, with its centre opposite the angle of the lower jaw. (Kocher's normal incision may be used.) The edge of the muscle is exposed and turned outwards, and the posterior belly of the digastric is got at a slightly deeper level. At this level the spinal accessory nerve passes from under the lower border of the digastric muscle obliquely across to the sterno-mastoid muscle, and it is here that we can most readily find it. Below this point the nerve lies for a little way under the sterno-mastoid and parallel to it, without, however, entering its substance. This should be remembered, as we may have to hook it out from under the muscle. The nerve is isolated, and a portion, three-quarters of an inch to an inch in length, excised. The wound is closed and dressed, and the patient put back to bed.

Immediately after the operation the sterno-mastoid muscle is paralysed, and spasm of it necessarily ceases; although other muscles which are affected may still contract spasmodically. In the course of a day or two, however, such spasm passes off; the trapezius muscle also is partially paralysed. Gradually the patient recovers power in the sterno-mastoid through its cervical supply, and in a successful case he is again able to carry the head straight, and at rest. It may be several weeks before such a result is got, but improvement may be hastened at this stage by massage and galvanism.

Conclusions.—1. Affection a nervous one, probably central.

2. Sterno-mastoid muscle mainly at fault, other muscles most probably affected secondarily by overflow.

3. Treatment short of operative as a rule unavailing, except in hysterical cases.

4. Neurectomy of spinal accessory nerve cuts off motor path and spasms cease.

5. Neurectomy of spinal accessory in many carefully recorded cases has been attended by complete success.

6. If this fail to remedy the disorders of other muscles their nerve-supply also should be removed.

7. As a last resource, in severe cases, a portion of cortex may be excised from the proportionate area of affected muscle.

JOHN CHIENE.

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Note.—This article was written in 1895. Since that date other cases have been reported in which cure has resulted from neurectomy of the spinal accessory nerve. I particularly desire, however, to mention that Kocher advocates complete excision of the affected sterno-mastoid from origin to insertion, and reports cases to show that this gives good results —he thinks better than those got from neurectomy.

J. C.

FACIAL SPASM

SYN.—"*Facial tic*"; "*Mimic spasm*"; "*Convulsive tic*"; "*Histrionic spasm of the face*"; "*Tic non-douloureux.*"

Definition.—This is an affection in which spasms, usually clonic and sometimes tonic, occur in the muscles supplied by the facial nerve, on one or both sides; in either case the spasm may occur in all or only in some of the muscles thus supplied. The spasm may be either secondary to paralysis, or the condition may be primary; in the latter case it may be either idiopathic or consequent on some organic disease.

Causation.—It is very rare to meet with any direct hereditary transmission of this affection, though instances have been recorded by Sir William Gowers, Piedagnel, and Rosenthal. A neurotic heredity, as manifested by epilepsy, insanity, and the like, in other members of the family, is sometimes observed. No doubt more than one member of a family may be affected, as observed by Blache, Delasiauve, Gintrac, Rosenthal, and others; but most cases of this kind are open to the fallacy that simple tic (vol. vii. p. 869) (habit-spasm), not true facial spasm, was the condition present.

Women are much more frequently affected than men; and the idiopathic form of the affection is a neurosis of advanced life, being rarely met with in persons younger than about forty-five; most cases occur between this age and sixty, though some may begin even later; exceptional cases have been recorded in people even as young as twenty. The subjects of the affection are themselves commonly neurotic in temperament, and may have presented evidence of some other neurosis earlier in life. A lowered state of general health and, consequently perhaps, of the nutrition of the nervous system, favour the occurrence of

facial spasm. According to some authors, the most common cause of the condition is some mental emotion, such as a sudden shock, great grief, or long-continued anxiety. One of the most striking instances of this effect of shock is the case mentioned by Romberg, in which facial spasm appeared in a woman on the sudden death of her husband. That such emotions have a powerful disturbing effect on the nervous system, and that under their influence the nutrition of the neurons may suffer greatly, is abundantly proved by the frequency with which neurotic affections, in all their forms, follow in the train of such emotions; and in this particular neurosis it is not a little interesting to note that the muscles most commonly involved are those concerned with the emotional movements of the face.

Other authors, while recognising emotion as an important cause of facial spasm, nevertheless regard peripheral irritation as a more common etiological factor, more especially sources of irritation in some part of the distribution of the fifth cranial nerve, to which, in reflex action, the facial is specially related. The irritation may be in a carious tooth, or in some disorder of the eye; or wounds of the face, again, especially when the orbital region was involved, have had this consequence. Other such sources of irritation are otitis media, caries of the petrous portion of the temporal bone, pressure on the fifth nerve by a new growth or aneurysm at the base of the brain, abscess in the parotid region, an inflamed gland in the neighbourhood of the stylo-mastoid foramen, and so forth. Facial spasm has followed migraine of many years' duration, and under rare circumstances neuralgia has been the precursor of the facial spasm; wherein we are reminded that attacks of tic douloureux are often accompanied by contraction of the facial muscles. Exposure of the head and face to intense cold is regarded by some as a frequent cause, and this influence is certainly operative in some cases, acting no doubt reflexly through the afferent channel of the fifth nerve; severe neuralgia of the face may in its turn be followed, after a long interval it may be, by the muscular spasms.

Again, it has been supposed that irritation at a distance may lead to a like result; even uterine or intestinal irritation has been regarded as thus operative. It is worthy of note that the condition has been known to come on during pregnancy, and to be recovered from on delivery; moreover, many cases begin about the climacteric period.

Another way in which facial spasm may come about is by repeated performance of some facial movement, as if the act were allied to habit spasm or simple tic.

Then, again, it may form but a part of a more widespread affection; for, just as we shall presently learn that a spasm beginning in the muscles of the face may subsequently extend its range so as to involve the muscles of the neck, and beyond it, so we find that spasm beginning in the muscles of the neck, and constituting one or other of the varieties of torticollis, may subsequently spread so as to involve the muscles of the face. In the most common variety of torticollis—that in which the

muscles of one side of the neck only are affected—the spasm would spread to the muscles of the same side of the face; but in bilateral cases the muscles of both sides of the face may be involved. What is more interesting, however, is the combination of spasm in muscles associated in action, as when the spasms in the neck muscles draw the head backwards ("retrocollic spasm," Gowers) while at the same time the frontales contract, raising the eyebrows as in the ordinary associated action of looking up.

Finally, facial spasm may be brought about as the result of organic disease. That the spasm may result from pressure on the facial nerve, by a tumour or aneurysm at the base of the brain, we have already seen; but there are yet two other ways in which organic disease brings about the affection: the one is when a tumour at the lower end of the pons irritates, but has not as yet produced sufficient pressure on the facial nucleus, or the emergent fibres of the nerve, to cause paralysis; the other is when the lesion lies in the cerebral cortex, in the region of the facial centre. Not only in progressive lesions, such as tumours in this situation, has facial spasm been met with, but also with stationary lesions, such as a patch of softening, as in Berkeley's case; or where there has been reason to suspect injury to the cortex during delivery. Blows and accidents to the head have seemed to be the cause in some cases, presumably as a result of contusion of the cerebral cortex; and Féré mentions a case in which a depression of the cranium in the region of the angular gyrus was attended with this result.

Pathology.—The absence of any evidence of structural change in cases of idiopathic facial spasm causes the pathology of this condition to be shrouded in much obscurity. Nevertheless, as facial spasm may be a symptom of organic disease, we are able to learn enough from cases of this class to make conjecture not only permissible but also profitable in our inquiries into the possible pathology of the idiopathic cases. The definite relation which appears to exist between the malady and some source of reflex irritation is not without its useful lesson also.

When, in the first place, we examine the organic cases of which facial spasm is a symptom, we note that the lesion has sometimes been found in the cortex cerebri; but a little further deliberation must make it evident that any attempt to attribute the spasm to discharges of nerve energy of cortical origin is not wholly satisfactory. It is true that the cortex gives origin to spasms which are clonic in character, but that such spasms should be repeated time after time, and year after year, and be confined to the anatomical distribution of a single nerve without further spread, is contrary to the best established doctrines of discharging lesions. Nevertheless such spontaneous discharges of nerve energy as occur in facial spasm must of necessity depend on the activity of nerve-cells, and we may inquire whether it is possible that discharge of the group of cells which constitute the facial nucleus in the pons can account for the phenomena. For my own part I can see little against this opinion, and much in its favour. It has been assumed, on insufficient data as it

seems to me, that discharge of the cells of the nucleus of a nerve like the facial, or of a group of cells in the ventral horn of the spinal cord, can only give rise to tonic spasm. That this view is erroneous, in so far as both seats are concerned, I feel convinced.

That organic disease of the cortex of the brain has been found in some cases of symptomatic facial spasm in which the facial nucleus was apparently intact, may be held to prove that to ascribe the phenomena of facial spasm to some morbid condition of the facial nucleus cannot be universally correct. It may be, however, that in these cases the lesion of the cortex diminishes the amount of controlling influence which its neurons are supposed normally to exert on a lower level centre, such as the facial nucleus. Moreover, secondary changes occur in such subsidiary centres when the higher centre to which they are related is damaged. It seems reasonable, then, to argue that the cells of the facial nucleus, no longer held in check by the inhibiting influence of the cortex, and subject to secondary nutritional changes, should be prone to periodic discharges such as those which occur in facial spasm.

This hypothesis is further supported by the cases in which facial spasm is attributable to pressure on the facial nerve; for it is contrary to our knowledge of spasm to suppose that clonic spasm, occurring in paroxysms, can be a direct consequence of mere pressure on a nerve. On the other hand, damage to a motor nerve may produce very pronounced changes in the group of nerve-cells from which it arises. We may suppose, then, that pressure on the facial nerve induces secondary changes in its nucleus leading to an instability which permits of periodic discharges of the cells.

Furthermore, this view of the pathology of facial spasm is that which accords best with those idiopathic cases which seem to be due to some reflex influence through the fifth nerve. The researches of Warrington have shown that section of a sensory spinal nerve has even a more powerful influence on the motor cells to which it is related in reflex action than section of the motor fibres derived from these cells. Now, as in reflex action the fifth nerve is specially related to the facial, we may suppose that destructive effects in the fifth nerve may secondarily induce changes in the cells of the facial nucleus, rendering them unstable and prone to spontaneous discharge; more especially in view of the further disturbing reflex influences which must reach them, constantly or periodically, through the fifth nerve.

The cases of facial spasm in which some emotion appears to set up the condition have been regarded as affording strong support to the view that the discharges are of cortical origin. That such cases do support the cortical hypothesis is beyond dispute; nevertheless, it cannot reasonably be maintained that they militate at all seriously against the view that the discharges originate in the facial nucleus. Emotional disturbance may equally well be regarded as rendering the cortex less capable of exercising control over subsidiary centres, as of engendering in its own neurons a liability to spontaneous discharges of energy. And it may be by some

such general lowering of tone of the cortex that a damage to some part of it, far removed from the centre for facial movements, may be capable of inducing facial spasm.

Symptoms.—All degrees of severity of spasm of the facial muscles are met with, both as regards intensity of the contractions and the range of their distribution; but in the typical and most prevalent form there are rapid clonic contractions which begin perhaps more or less slowly, and then the successive contractions are repeated more and more rapidly until, at the height of the paroxysm, the clonic passes into tonic contraction of the muscles. As the attack passes off this form of spasm gives way to clonic jerks, which, as a rule, are slower and of greater excursion than those which precede the tonic stage. The clonic spasms may be repeated so rapidly as to have a quivering character, more especially as the paroxysm is reaching its height; the terminal clonic spasms, on the other hand, become separated by longer and longer intervals, and at the same time the excursions may be smaller and smaller, until they finally cease. Yet instead of the excursions of the final contractions becoming lessened in range, the range of the last contraction may be as great as any during the whole of the paroxysm.

Instead of the definite order of events just described, the spasms may involve the muscles in more or less instant tonic contraction—clonic spasms being either absent or of such small range as to be scarcely detectable; and there is a more or less abrupt termination equally wanting in distinct clonus.

The whole of the muscles supplied by the facial nerve may be involved in the spasm, but the orbicularis palpebrarum and the zygomatici are more commonly affected than the others; even where all the muscles supplied by the facial are involved, these usually suffer in greatest degree, though, exceptionally, the levator labii superioris is more markedly affected than are the zygomatici. At times the onset is so deliberate as to allow us readily to note the muscle in which the spasm begins, while in other instances the onset is so rapid that it is practically impossible to say which muscle is the first to contract.

Instead of the whole of the muscles supplied by the facial nerve being so affected, the spasm may be limited to certain of them, in which indeed it may be only very slight. Even where the spasms are subsequently general they are at first usually local, and in no part is it initiated more commonly than in the orbicularis palpebrarum, the resulting contraction being known as blepharospasm. Here the spasm may begin and end without extending its range. Where the orbicularis is thus affected the earliest manifestations may be so slight as to resemble that quivering of muscles popularly spoken of as "live blood."

Blepharospasm has received a good deal of attention, especially from von Graefe, and is the most important of the partial forms of facial spasm. There may be either tonic or clonic spasm of the eyelids, the latter being sometimes spoken of as "Nictitating spasm," and consisting in rapid winking movements of the lids in which both the upper and

lower participate; or the twitching may be limited to one lid, in which case the lower is the more commonly affected. This variety may occur, without obvious cause, as a phenomenon in the symptomatology of simple tic (habit-spasm), or as a hysterical manifestation. In the tonic variety there is persistent closure of the eyelids, the paroxysms lasting a few minutes, or it may be for hours; indeed, in rare cases the period has been extended to weeks or months. This form of spasm is usually reflex, the source of irritation being often in the ocular branches of the fifth, the condition being commonly associated with photophobia; but blepharospasm is sometimes associated with trigeminal neuralgia when the source of irritation appears to lie in some other branch of the fifth nerve. The spasm may be arrested by pressure on the points which correspond to the tender spots in trigeminal neuralgia, and nowhere is this so effective as at the infraorbital foramen. With removal of its cause blepharospasm may yield; in other cases it persists, and becomes a source of much annoyance.

When spasm, partial in distribution, affects the lower part of the face, in the distribution of the malar and labial branches, a unilateral or, exceptionally, a bilateral convulsive grin results, which has been variously designated "Risus sardonicus," "Risus caninus," or "Cynic spasm."

When all the muscles supplied by the facial are affected, each paroxysm is separated from the next by an interval which varies considerably in different cases and in the same patient. Several hours may elapse without an attack, or they may be repeated in quick succession every few minutes. The duration of each paroxysm may be only a few seconds, or it may last several minutes.

Instead of the paroxysms of clonic and tonic spasms already described, there may sometimes be single momentary contractions repeated at short and more or less regular intervals, and resembling the results of excitation of the facial nerve by single induction shocks. Or at other times these isolated spasms may be repeated at irregular intervals.

The effect of the spasm in its typical form is to cause partial or complete closure of the eye, drawing of the angle of the mouth outwards, and intensification of the naso-labial groove. The forehead is wrinkled and the eyebrow raised or lowered according to the preponderance of muscular action. Or the angle of the mouth may be depressed while the skin of the chin is puckered and drawn upwards.

The muscles may be affected on one side only, or the spasm may be bilateral; but even in the latter case it usually begins on one side, and is commonly so limited for some time; moreover, even when it subsequently spreads to the opposite side, the side worse affected during a paroxysm is that in which the spasm usually begins.

It is worthy of note that although the spasm may be otherwise unilateral, yet orbiculares, corrugators, or frontales may be in action; when the spasm is limited to the muscles of the upper part of the face both orbiculares or corrugators are frequently involved, but it is unusual for the muscles of the lower part of the face to be affected equally on the two sides, except as part of a general spasm in which the whole of both

sides of the face are affected. Then, again, the spasm is usually more intense on the side first affected; though this is by no means an invariable rule, for ultimately the spasm on the side more recently affected may become more intense; moreover, some paroxysms may begin on the side originally affected, and others on the side more recently involved. Both of these results I have recently observed in a gentleman under my care, in whom the spasms were limited at first to one side of the face, and subsequently involved the other also; in him the spasms ceased for a time under treatment, when those on the side of the face first affected gave way before those on the opposite side. Moreover, when the spasms occurred on both sides of the face they would begin sometimes on one side, sometimes on the other.

Any emotional excitement tends to evoke the spasms, or to make them worse; as may any movements of the face, as in speaking, laughing, chewing, and the like. In an early stage of the affection, or when recovery is taking place, the spasms may arise only under such disturbing influences. On the other hand, the more quiet the patient the less the liability to spasm; mental and physical rest being both operative towards this end. Cold, which apparently may call forth facial spasm in some cases, is also a potent factor in increasing it when already in existence; warmth, on the other hand, has a beneficial effect. In a bright light, again, the spasms, as a rule, become very much worse while by darkness they are calmed.

Evidence that the stapedius muscle is involved in the spasm is very exceptionally met with; but in cases of tonic spasm of the orbicularis palpebrarum, a noise in the ear has continued, not only while the blepharospasm lasted, but also for some time after cessation of all visible spasm. As Sir William Gowers reminds us, many people can produce a rumbling noise in the ear by strongly contracting their orbiculares, especially if, at the same time, they attempt to turn the eyes upwards. In a case recorded by Moos, giddiness and conjugate turning of the eyes to the right during the height of the attack of spasm were regarded as the result of lowered pressure in the labyrinth and semicircular canals, due to spasm of the stapedius.

The spasm sometimes spreads beyond the domain of the facial nerve, in which case it may not only involve muscles supplied by other cranial nerves, but others also, which receive their supply from nerves of spinal origin. In consequence of this spread of the spasm the muscles of mastication, tongue, or eyes may be included; or the spasm may be of still wider range, including muscles of the neck and upper extremity; but it is more especially the muscles of the tongue, the masseters and sterno-cleido-mastoids that are thus affected; implication of the ocular muscles is very exceptional.

It is rare for the muscles of the palate to be involved in the spasm, though some well-marked instances of this have been recorded by Gowers, Leube, Oppenheim, Schütz, and others. Bilateral as well as unilateral spasm of the palate has been observed in conjunction with

unilateral affection of the face; but in a case of the former, observed by Sir William Gowers, the spasms of the face and those of the palate were not synchronous.

Where there is no organic disease behind the paroxysms, no loss of motor power is met with in the muscles of the face, though of course all voluntary facial movements may be hampered by the spasms. The nerves and muscles usually respond normally on electrical excitation, except of course in organic disease of the nerve itself.

Instead of clonic contractions of the muscles of the face, the condition may be one of tonic spasm; but this is quite exceptional, as an independent condition, though cases of the kind have been attributed to cold. It is usually met with in paralysis of the muscles of the face, whether the result of a peripheral lesion of the facial nerve, as a part of a hemiplegia of cerebral origin, or as part of some general condition, such as paralysis agitans and tetanus, in both of which affections the condition is bilateral. Similar spasm may also be met with as a hysterical manifestation. The results of such spasm depend on whether the condition be bilateral or unilateral; but in any case the face may feel stiff, and all voluntary movement of the parts concerned in the spasm may be considerably interfered with. The palpebral fissure is narrowed on one or both sides, there is elevation of one or both eyebrows, and the angle of the mouth is either drawn to the side of unilateral spasm, or, if the spasm be bilateral, the condition may result in the "risus sardonicus."

Sensory symptoms are exceptional, though subjective and objective defects have been observed, both in regard to common sensibility and the special senses. As we have already noted, pain may be present, not as a part of the affection itself, but connected with some influence producing the facial spasm; the pain being referred to some part presided over by the fifth cranial nerve. In rare instances tender points have been present in some part of the distribution of this same nerve. Blunting of sensibility of the skin of the face has only been met with where some destructive process was present in connection with the fifth nerve. Besides the subjective auditory phenomenon, sight has been affected; it is conceivable that sparks, or similar subjective phenomena, may appear from sudden and powerful contraction of the orbicularis palpebrarum compressing the globe. No instances of subjective sensations of taste appear to have been met with, though loss of taste on the anterior part of the tongue has been present where there was reason to suppose that the nerve had been damaged.

Diagnosis.—Two main problems present themselves for our consideration in a case of supposed facial spasm: the one is, whether the genuine condition is present, or only some affection which simulates it; the other, whether, the case being one of true facial spasm, it is idiopathic, or dependent on some organic disease.

The first problem does not, as a rule, cause us much difficulty. In hysteria there may be either a quivering movement of the muscles, which does not in the least resemble true facial spasm, or there may be tonic

spasm, which chiefly affects the orbicularis palpebrarum. Moreover, hysterical stigmata usually make the diagnosis easy. It is conceivable that cases of chorea, in which there has been but little affection of the limbs and a good deal of spasm of the face, may give rise to errors in diagnosis; but attention to the character of the spasm, and careful watch on the limbs, in which some spasm will always be noted in chorea, should prevent mistakes.

A more difficult question, and certainly one of more importance in some of its aspects, is whether we are dealing with a case of idiopathic facial spasm, or with a result of organic disease. It is well first to exclude spasm resulting from facial paralysis, due either to an affection of the nerve or forming part of a hemiplegia. Here, besides the occasional attacks of spasm, there is the history of the previous attack of facial paralysis, or of hemiplegia, and the detection of weakness of the movements of the affected side of the face, together with permanent contracture and overaction. Moreover, in the cases which follow hemiplegia, it may be possible to detect some evidence of weakness or contracture of the limbs of the affected side; or the tendon jerks, or plantar reflexes, may afford us information of a valuable kind. In short, this form of facial spasm is not, as a rule, difficult to discriminate from the idiopathic variety. The cases which may present the greatest difficulty are those in which the facial spasm may be symptomatic of grave organic disease of the cerebral cortex in the region of the facial representation, in connection with the facial nucleus in the pons, or the result of pressure on the nerve itself, after its emergence from the pons, by some kind of tumour. Weakness of the facial movements, coming on concomitantly with the spasm on the same side, or progressively developing afterwards, strongly suggests organic disease; again, the detection of any other signs of organic affection in the parts presided over by others of the cranial nerves adds weight to the probabilities otherwise suggested. It may not be possible to say whether the organic disease, of which the facial spasm is a symptom, be situated in the cortex or in the pons, or whether its influence be exerted on the nerve after its emergence from the pons; but when only some of the muscles supplied by the nerve are affected, such as the zygomatici, then the cortex is the most likely seat of the generating lesion.

Prognosis.—In the absence of evidence of organic disease of which the facial spasm is but a symptom, there is nothing in the nature of the affection to jeopardise life; although indeed it robs the sufferer of much of the pleasure of life. There are few affections which cause their victims more annoyance than facial spasm, and in some cases the subjects become so worried by it that life to them scarcely seems worth having. Trivial as the affection may be, so far as any direct influence on the duration of life is concerned, it is usually most intractable; it either resists all treatment for years, or indeed to the end of the patient's life, or presents intermissions which may last for variable periods. Such cessations may be spontaneous, or may appear to result from treatment; in either case, after a

variable interval, the spasm usually returns, and may eventually persist without any such intermissions. The earlier the case is seen, and the more definitely the spasm can be ascribed to some reflex source of irritation which is removable, the better does prognosis become; the longer the spasm has been in existence, and the more obscure its possible cause, the more unfavourable is the outlook. It must not be supposed, however, that because treatment is begun early, and a definite reflex cause of the spasm detected and removed, that a cure is confidently to be expected; for even in these cases the results are oftentimes most disappointing.

Treatment.—In the exceptional cases in which facial spasm is but a symptom of organic disease, such disease must be treated on the lines which are known to lead to improvement in the particular affection. Apart from this, and in the majority of cases of facial spasm, a careful search must be made for any possible sources of reflex irritation, and suitable measures adopted for their removal or suppression. Decayed teeth should be attended to, and where necessary extracted; the eyes should be examined, more especially with a view to the correction of any errors of refraction. In the case of exposure to cold the side of the face should be kept warm; and the side of the head and face may be bathed with hot water at frequent intervals—measures which may be supplemented by free diaphoresis.

Having removed or neutralised any possible cause, we have next to turn our attention to the hope of finding some treatment to render the neurons of the facial nerve less prone to independent discharge. There are two chief lines on which treatment may be pursued with a view to this end: the first is to try to calm the unstable centres by means of drugs which are known to exert a sedative action on the nervous system. Probably every drug of this kind has been thus tried, yet few of them have been the means of permanently arresting the spasms in more than a single case; and for the majority of them we cannot claim even this meagre measure of success. Morphia, alone or combined with atropine, has done most service, but the evil consequences which may follow the use of the drug are more mischievous than the malady itself. Bromides seem to have little influence on the spasm, if any; but success has been claimed both for conium and gelsemium.

The alternative line of treatment is to attempt to remedy what is possibly the fundamental defect in these cases, if our view of their pathology be correct; for, in the belief that we have to deal with an instability of the discharging nerve-centres, and supposing further that this instability largely depends on nutritional changes in the cells of the affected neurons, we may try to improve the nutrition of the neuron in the hope of rendering it more stable. With this object in view, nervine tonics have been tried extensively, notably arsenic, zinc, strychnine, and silver; but unhappily with little better result than with the sedative drugs. Iron and quinine are useful general tonics in these cases, and by building up the system generally we hope to influence, secondarily, the nutrition of the neurons which are at fault. This being

the case, it is especially important that if the spasms appear to have been induced by depressing emotion, measures should be adopted to remove any such unfavourable influence as far as possible; and where any general impairment of the patient's health exists, we must endeavour to rectify the defect. This end may be best attained by complete isolation of the patient, absolute physical rest, as much mental calm as can be secured, forced feeding, general massage, and faradism.

Electricity.—Except when used to the body generally, as indicated above, faradism is contra-indicated; but some good may be expected from the use of galvanism locally. This mode of current should be employed in an uninterrupted or "stabile" manner, and only the gentlest currents, carefully measured by a galvanometer, ought to be used. A current of not more than two milliampères should be employed, and care should be taken to introduce it gradually, and to shut it off as gradually. On the whole, it will be found of most advantage to make use of the sedative action of the current, by placing the anode over the trunk of the nerve in front of the ear, or on its branches in turn, while the kathode is placed at some indifferent point, such as the back of the neck. The method may be supplemented by placing a pole on each mastoid for a few minutes towards the end of each application. This form of treatment may be judiciously combined with massage of the face; and this latter means, and facial gymnastics, are especially useful in those cases in which the facial spasm arises out of some habitual movement.

Counter-irritation by means of a blister placed behind the ear, on the affected side, usually appears to diminish the amount of spasm, at any rate for a time; but no permanent good can be expected. So, too, counter-irritation of the cervical spine has been tried, and is said to have been successful in one case. When there are tender points in the distribution of the fifth cranial nerve, pressure on which stops the spasm, Gowers recommends hypodermic injection of cocaine at these spots; others recommend blistering, or the application of the thermo-cautery to the painful points. Freezing of the cheek, by means of a spray, for a few minutes every day, or every other day, has been recommended by Weir Mitchell as affording relief in some cases.

Stretching of the facial nerve is a procedure which at one time gave hopes of relief for the unfortunate victims of facial spasm, but these hopes have not been realised. To have any effect on the spasm the stretching must be powerful, and this is, of course, followed by paralysis of the muscles formerly in a state of spasm; experience has also shown that, with returning power in the facial muscles, spasm once more reasserts itself. The statistics of Godlee and of Keen both show how little is to be expected from this method of dealing with facial spasm. The former observer collected thirteen cases thus treated, and in only one of them was spasm absent two years after the operation; while of twenty cases, subsequently collected by Keen, only one was free from spasm longer than six months after the operation. Schott, after excluding all cases inadequately reported, and such as had not been observed

sufficiently long after the operation, found that (including a case recorded by himself) nineteen cases had been published from which the result of the operation could be gauged; in only two of this number was there cure (10 per cent), in six there was improvement (32 per cent), and in eleven failure (58 per cent). Though in so great a proportion of the cases there is this return of spasm, it is sometimes less pronounced than before the stretching of the nerve; in other cases, however, it is quite as severe as ever, so that it will readily be understood that this method of treating facial spasm is not one which can be enthusiastically recommended. With proper technique, and good antiseptic precautions, there is no special difficulty or danger about the operation; and the prognosis as regards recovery from the resulting facial paralysis is good. It is well to supplement the operation by the continuous use of sedatives for a few months, in the hope that the combined effect may bring about what so rarely happens when either measure is adopted alone.

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TETANY

SYNONYMS.—*Heat rheumatism; Intermittent tetanus; Essential contracture; Nurse's contracture; Epidemic muscular contractions; Idiopathic contracture; Intermittent rheumatic contracture; Tetanilla; Remittent tetanus; Rheumatic tetanus; Arthro-gryposis; Pseudo-tetanus; Tonic occupation spasm; Shoemaker's spasm, etc.*

TETANY is an affection characterised by tonic muscular spasms involving especially the distal portions of the limbs; it is usually bilateral, and either paroxysmal or continuous. In severe cases the muscles of the trunk, neck, face, eyes, and larynx may become involved in the spasm. The affection is met with under a variety of circumstances; more than one toxic agent appears capable of generating it, and there are many exciting causes which evoke paroxysms of spasm in those so afflicted.

Some writers limit the name "tetany" to cases in which there is marked intermission of the spasm, and apply the name *Arthro-gryposis* to those in which the spasm is more continuous. The carpo-pedal contractions met with in rickety children have been regarded by some as quite distinct from tetany; while others, including no less an authority than the late Hilton Fagge, look on this as a minor form of tetany. Henoch draws a sharp line of distinction between the disease as met with in children and that which occurs in adults; and Strümpell denies its existence in early childhood. Schlesinger and others, chiefly on etiological considerations, distinguish "true tetany" from "pseudo-tetany." Increased mechanical and electrical excitability of the nerves and muscles is looked on by some as the distinguishing characteristics of the affection, while others do not regard these as essential. The truth is, there are different gradations of one and the same affection, from the mild "carpo-pedal contractions" associated with rickets to severe general spasms, which may even simulate tetanus. The absence of certain cardinal symptoms does not necessarily negative the diagnosis.

Spasmodic ergotism is regarded by some as a variety of tetany, others look on it as quite distinct. The degenerative changes met with in the nervous system in chronic ergotism supply the most cogent argument against the identity of the two affections; but the changes may be the secondary results of the prolonged action on the nerve structures of toxic agents such as those responsible for the phenomena of tetany. The affection is included in the present account of tetany.

To Steinheim or Dance is usually given the credit of having first published cases of this affection; but Clarke, in his *Commentaries on some of the most important Diseases of Children*, published in 1815, described cases of spasm of the glottis complicated with rigidity of the

extremities, and thus clearly recognised the association of laryngismus stridulus and tetany in children.

The name "tetany," by which the affection is now universally known, originated with Lucien Corvisart in 1852.

To Erb we are indebted for our knowledge of the electrical changes in the motor nerves, and Frankl-Hochwart has since made this the special subject of a series of careful investigations; while Hoffmann has directed attention more especially to the altered electrical condition of the sensory nerves. Attention was directed to the altered mechanical irritability of the nerves more especially by Chvostek, N. Weiss, and Schultze.

The experimental investigations of Schiff, Horsley, von Eiselsberg and others, and the surgical procedures of Wölfler, Billroth, and Kocher, revealed the affinity of disease of the thyroid gland to tetany. N. Weiss, from Billroth's clinic, first published the remarkable fact that total extirpation of the thyroid results in tetany. More recently our knowledge of the pathology of the affection has been still further advanced by chemical investigations of great importance; for instance, the admirable experimental work of Bouveret and Devic has proved the existence of a poison in the contents of the stomach in cases of tetany associated with gastric dilatation.

Causation.—Tetany is met with at all periods of life, but occurs most frequently in infants and young adults. It is a little more frequent in males than in females; but this is not the case at all ages, for in early childhood the proportion of cases in males is greatly in excess of those in females, while after the age of twenty years this state of things is reversed, females being affected more frequently than males.

A peculiar liability to the affection appears to exist in some families, several members having suffered from it; but hereditary neuropathic influences are not frequently found. The condition is met with under a variety of circumstances, of which the following are the chief:—

A. *In Adults.*—(1) Severe gastro-intestinal affections and entozoa.—Tetany may occur in young people suffering from chronic diarrhœa or obstinate constipation, and Hoffmann has recorded a case in which it was associated with catarrhal jaundice. Instances of the association of tetany with the presence of intestinal worms in the adult have also been recorded, and notably a case by Riegel in which the tetany spasms ceased the day after a tape-worm had been expelled. It has been met with in cases of peritonitis and perityphlitis, and also in connection with acute dyspepsia. Schlesinger observed a case, in an adult, in which tetany occurred in association with an acute gastro-enteritis consequent on eating tainted sausage. But these conditions are all of minor importance in the etiology of the affection when compared with dilatation of the stomach, in connection with which disease a peculiarly fatal form of tetany is met with. An attack is especially apt to occur after the stomach has been washed out, and percussion over the epigastrium, a severe attack of vomiting, or the administration of an enema may similarly induce the spasm. The gastric dilatation is, as a rule, due to contraction of a

chronic ulcer in the pyloric region; or it may be the result of ulceration of the duodenum with cicatrisation. In cases recorded by Bouveret and Devic, Reichartz and Riegel, carcinoma of the stomach existed in conjunction with chronic ulcer; compression of the duodenum by means of a distended gall-bladder has also been found associated with this condition of stomach, as has pressure by means of a pancreatic cyst. Duodenal ulcers, though uncommon, have been met with comparatively often in association with gastric tetany. Simple atony of the stomach walls appears to be very rarely associated with this fatal form of tetany. Max Einhorn and others consider that other gastric affections, apart from dilatation, may give rise to the spasmodic affection; according to Schlesinger, there is a chronic benign form of tetany of gastric origin.

(2) Pregnancy, lactation, and the puerperal state.—A considerable proportion of cases of this affection occur in women during lactation, pregnancy, the puerperal state, and also in connection with menstruation and morbid conditions of the uterus and ovaries. It was in a series of cases in suckling women that Trousseau first described the condition, and this led him to name the affection "*Nurse's contracture.*" The latent period may be only a few days, or more commonly two to eight months; in one case, however, in which the child was suckled for eighteen months, tetany did not manifest itself until the child was weaned. When the spasms occur during pregnancy the patient usually escapes during the first half, and the affection shows itself during the latter half of the pregnancy; sometimes, however, it shows itself earlier. It may occur in several pregnancies of the same person, not necessarily successive; in a case of Maccall's it occurred during the suckling of no fewer than seven children. The spasms are rarely met with during labour, though they sometimes occur then for the first time; nor do they occur as a rule during the puerperium; though this is not invariably the case, as the spasms may occur for the first time after the confinement. When menstruation becomes re-established, tetany is prone to recur at each period, especially during cold weather.

There appears to be something antagonistic to the affection in the early months of pregnancy, for not only is it not common to meet with tetany at that time, but the onset of pregnancy has resulted in disappearance of tetany when it had existed previously; under such circumstances it has reappeared at the fourth or fifth month.

In some years many cases of this form of tetany occur, while in other years they are much fewer. Frankl-Hochwart finds that, out of fifty-two cases of this form of the affection, thirty-nine occurred from January to April; while during the other eight months of the year only thirteen were met with. In Paris, where such cases used to be so frequent, they are now scarcely ever observed.

Tonnellé noticed that young girls with tetany were cured at the onset of the first menses. Some cases of the affection have occurred at the climacterium, and endometritis and carcinoma of the uterus have also been associated with its development.

(3) Thyroidectomy.—Tetany may follow removal of the thyroid gland, in man and in animals. The time of the year when the operation is performed appears to make no difference, but the affection only occurs when the whole gland is removed. The condition has also been met with in association with atrophy of the thyroid and myxœdema. An interesting case of absence of the thyroid in which there was a mixture of myxœdema and tetany has been recorded by Stewart of Montreal.

(4) Acute fevers.—The affection is sometimes a sequel of certain acute fevers, such as small-pox, cholera, enteric, scarlet, and rheumatic fevers, measles, acute tonsillitis, diphtheria, influenza, pneumonia, or malaria. Peculiar epidemics of tetany after enteric fever have been met with, the most noteworthy being those described by Aran in 1855, and by Bouchet in 1876. It usually occurs during the latter part of an attack, or during convalescence; but it has also been met with during the first week, though this is rare. The alleged association with rheumatism is open to question, as swelling in the neighbourhood of joints occurs in tetany, quite apart from rheumatism. As regards malaria also, it is well to remember that in some people tetany spasms only occur at certain times in the day (for example, morning or afternoon); and that rise of temperature and enlargement of the spleen occur in so-called "idiopathic or occupation tetany." One observation by Paynel, however, apparently establishes the occasional connection of malaria and tetany.

(5) Toxic conditions.—It is convenient to describe as a separate group the symptoms met with in connection with certain toxic states, though, as we shall see, some toxic agent is probably concerned in the tetany described in other classes. Jaccoud had two cases of severe kidney disease with tonic spasms, and Kussmaul a case of severe albuminuria with tonic cramps, which disappeared with the albuminuria; but perhaps the best-established cases of nephritis with tetany are those of Imbert-Gourbeyre and of Hoffmann. It is rather suggestive that the latter case occurred at Heidelberg where tetany is so common, and that it affected a shoemaker nineteen years of age. Wick observed a case of tetany in a patient who was not the subject of albuminuria, but who on post-mortem examination was found to be the subject of contracted granular kidneys. This seems, however, to have been an aberrant case in other respects.

Alcohol has been regarded by some as a cause of tetany, and Wick quotes a case in which the phenomena of tetany were associated with delirium tremens. Instances in which chloroform and morphia have caused tetany are on record, and Sir W. Gowers and Letulle have each seen a case in which lead poisoning appears to have been responsible for the occurrence of this affection; the latter observer, however, regarded the condition in his case as hysterical. Oppenheim once observed tetany after a spermin injection.

It was the resemblance of the spasm seen in ergotism to that of other forms of tetany which first suggested the possibility that a toxic agent is responsible for such phenomena. Schlesinger reports the case of a

woman, forty years of age, the subject of myoma of the uterus, who, after ergotin injections, presented paræsthesiæ and then the tetanoid spasms, aggravated by each injection. The symptoms disappeared when the ergotin treatment was discontinued. Trousseau's and Chvostek's phenomena were both present in this case.

(6) Epidemics of tetany have been described on the continent of Europe and in America. Some of these have but simulated tetany; notably that recorded by Simon and Regnard in a girls' school at Gentilly in France; one or two indeed were real cases of tetany, the rest were simulations. In the epidemics in certain prisons in Belgium, in 1844, the malady was epidemic cerebro-spinal meningitis. Other groups of concurrent cases have been traced to conditions known to be favourable to tetany, such as epidemics of diarrhœa, or of some acute fever; or bad hygienic conditions. Vaughan, in America, reported attacks in several members of the same family living in a damp, badly ventilated place, some of them subjected also to other debilitating influences, such as lactation.

But after the various possible sources of error have been excluded, certain outbreaks remain which have suggested a common source of infection. The epidemics described by N. Weiss and by von Jaksch in young men of the working-classes, sometimes attended with fever, and running a course of two or three weeks, belong to this category. Moreover, the affection is peculiarly apt to occur during certain months, and to vary widely in frequency year by year.

This "idiopathic tetany" is peculiarly frequent in Vienna and Heidelberg; very few women are attacked, and people engaged in certain occupations are peculiarly liable to it. Thus, of 399 cases collected by Frankl-Hochwart, 174 occurred in shoemakers ("shoemaker's spasm"); 95 of the cases occurred in tailors. It is especially prone to occur between the ages of sixteen and twenty-five years, 83 per cent of such cases being met with at this time of life; in Vienna the epidemics occurred chiefly during the months of March and April.

(7) The association of tetany with other diseases of the nervous system.—Epilepsy and tetany occur together; the former indeed may be a manifestation of the latter condition, and may thus have to be included in the symptoms of some cases. Whether tetany be a hysterical condition or not, now and then cases are met with in which the two affections are associated; as for instance in a case recorded by Raymond. Exophthalmic goitre, syringomyelia and a unilateral lesion of the spinal cord secondary to influenza have been found in association with tetany, but such occurrences are exceptional, and perhaps mere coincidences.

(8) Occasional causes.—Sexual excess, masturbation, fatigue from prolonged muscular effort, traumatism—for example, a fall on the head, anæmia, emotion have all been regarded as occasional, but probably only contingent, causes of tetany.

Some of the cases regarded as depending on emotion have been associated with exposure to cold and wet; but emotion commonly evokes a paroxysm of spasm in patients known to be the subjects of tetany.

Indeed when tetany has once occurred in any person it may be subsequently induced by conditions other than that responsible for the primary attack.

Prolonged muscular effort may result in the generation of a toxic product of metabolism capable of inducing the manifestations of tetany.

(9) Geographical distribution. Season and climate.—The malady is very frequent in Vienna and Heidelberg. In the neurological clinics of the Austrian capital about seven-tenths per cent of the cases dealt with are recorded as instances of tetany, while in Berlin only one-tenth per cent of such cases are recognised. It has not always been as common in Vienna as it is now; and on the other hand the form of tetany associated with lactation and pregnancy, which was formerly so common in Paris, is now rarely met with in this city. In Moscow, again, where cases occurred rarely before and since, there was an epidemic in one year. In America tetany is comparatively rare; in 1894 Griffith was able to collect only seventy-two records in that country.

It is more common in winter and spring than in summer and autumn; and a curve prepared by Frankl-Hochwart, based on 368 cases of the disease met with in the hospitals of Vienna during a period of fifteen years, shows that the maximum number of cases occur in that city in March and April; and the minimum in July, August, September, and October.

Exposure to cold is commonly regarded as a cause of the affection; but it is probable that cold only determines the outbreak of the latent disease. Fatigue may play an important part in the generation of a toxic body capable of inducing the malady.

B. *In Children.*—The form of tetany which occurs in children, like that which occurs in adults, is not equally distributed over Europe. In London it is much more common than the adult form; in Leipzig both are rare; in Marseilles, Oddo was able to find only 4 out of 3500 cases seen at the Dispensary for Diseases of Children in three years; and Boral found 24 out of 5443 cases. It is not always equally prevalent year by year; it may spring up almost in epidemic form one year in some place where before it was comparatively rare. Thus Lewis Smith saw so many cases of tetany in young children in New York during the first part of 1889, that they almost constituted an epidemic. So, too, the disease was comparatively rare in Prague until the beginning of 1890, when cases suddenly occurred. Of 150 cases in children Frankl-Hochwart found that the majority occurred in February, March, and April. It is almost always children of the lower classes that are affected; a large number of them are usually debilitated, and evidences of rickets are rarely absent. The affection is especially apt to be associated with gastro-intestinal disturbances, either following prolonged exhausting diarrhœa, obstinate constipation, or dilatation of the stomach consequent on errors of feeding; as Comby has insisted. Intestinal entozoa are also met with in some cases. All that can be said of dentition is that it may favour the occurrence of tetany by augmenting the excitability of the nervous system.

A minor degree of the same affection is met with in rickety children under the title of "carpo-pedal contractions," a condition which we regard as identical with tetany.

There is a close relationship between tetany and laryngismus stridulus in young children, as was first noted by Clarke and by Kellie in the earliest records we have of tetany in children. Both conditions are closely associated with rickets.

Morbid anatomy.—The number of fatal cases of tetany is small, and of necropsies still smaller. In the majority of these no changes have been found.

Apart from the sclerosis of the posterior columns of the spinal cord met with in spasmodic ergotism, the changes that have been found are hyperæmia of the dura and pia mater at the base of the brain, sub-arachnoid effusions and a softened or œdematous condition of the cerebral tissue, and hyperæmia of the pons, medulla, upper cervical cord, and of those peripheral nerves which had seemed more especially affected during life; but in two cases Loos found the nerves and muscles intact. Berger and Weigert also have each examined a case in which the peripheral nerves were found to be normal. Capillary hæmorrhages, collections of lymphoid cells surrounding the blood-vessels, and small foci of myelitis have all been met with in rare instances. In a case of Trousseau's, in which death resulted from phthisis, the cervical region of the spinal cord was apparently somewhat softened; and Kussmaul found myelitis in a young man who became paraplegic some weeks after recovery from tetany.

The ganglion cells of the spinal cord have been found shrunken in appearance, and vacuolated. Weiss found swelling and vacuolation of the cells of the ventral horns in three cases of tetany following removal of the thyroid gland, and in one of the cases atrophy of the cells,—they were devoid of processes, and the axis-cylinders of the neurons of the ventral roots presented spindle-shaped swellings. In the cord of a child who died of tetany, Langerhans could find no change except thickening of the adventitia of the arterioles with deposits of cells, granules, and pigment, especially in the upper part of the spinal cord, a state which accorded with the clinical picture; the region of the anterior commissure was especially attacked. Langerhans also found thickening of the walls of the small arteries and veins, especially in the cervical region of the cord; but as his patient was forty-eight years of age, there was nothing uncommon in this.

Bonome and Cervesato have recently recorded the results of their observations in two children in whom the principal changes met with were in the cervical and lumbo-sacral regions of the spinal cord. The meninges and peripheral parts of the cord were normal; but as the central portion of the cord was reached, rarefaction of the nerve-fibres was seen, and in the neighbourhood of the gray matter nothing but neuroglia was left. Serious lesions existed in the gray matter, and consisted in atrophy and rarefaction of the ganglion cells, atrophy and varicosity of the fibres,

augmentation of the neuroglia cells, and formation of spaces resembling the appearance seen in syringomyelia. These changes were most pronounced in the cells of the anterior horns, especially the internal group; which explains the absence of true paralysis and atrophy.

Still more recently Koster has examined a case microscopically in which, beyond extravasation on the anterior aspect of the cauda equina, and both sides of the cervical roots from the third to the fifth, and in a limited portion of the sheath of the right sciatic nerve, nothing abnormal was found in the central nervous system, peripheral nerves, or muscles; but the cells of the spinal cord were not examined by the Nissl method.

The most characteristic lesions, therefore, are those of the anterior horn cells, beginning with hyperæmia and swelling, and passing on to atrophy and sclerosis. These lesions probably depend on the length of time the disease has been in existence. Changes, no doubt, occur in the neurons in recent cases, but they are probably too slight for recognition by ordinary methods.

Pathogeny.—The seat of the morbid process which gives rise to the phenomena of tetany, has been the subject of no small amount of speculation. De la Berge believed that the muscles were at fault; Delpech, Hasse, and others have looked to the peripheral nerves for an explanation; Kussmaul, Erb, and Berger to the spinal cord, and other pathologists to the anterior horn cells: Sir William Gowers infers that the nerve-cells of the spinal cord and medulla are primarily deranged. Weiss and Bonome and Cervesato also regard the affection as a variety of anterior poliomyelitis.

There seems little doubt that the poison of tetany acts on the neurons of the anterior horns of the spinal cord; but, among other considerations, the clinical aspect and issue negative grave organic alteration of the neurons as a rule, though changes, such as have been exceptionally met with, may follow the prolonged action of some toxic substance.

Weiss has suspected derangement of the sympathetic system; and Hughlings Jackson of the cerebellum.

That the nutrition of the peripheral nerves is altered in tetany is placed beyond question, by their behaviour to mechanical and electrical stimuli; it is, however, equally certain that a derangement of the anterior horn cells of the spinal cord and of the cells of the medulla must coexist therewith.

Evidence of the possible implication of the cerebrum is to be found in the occasional association of hysteria, epilepsy, and insanity with tetany, and by the interosseal flexion of the fingers—as in some forms of cerebral spasm; but this peculiar position of the fingers can be explained equally well by irritation of a given group of nerve-cells in the ventral horn of the cervical cord.

A toxic agent having an affinity for the motor neurons of the spinal cord chiefly, may in some cases make its influence more widely felt. That all neurons of the lower level are not equally susceptible to it is shown by the fact that in the spinal cord those which control certain

groups of muscles are much more liable to be affected than others; so, too, evidence of implication of the motor neurons of the medulla oblongata is much less common, and of the pons and corpora quadrigemina rarer still. It is not surprising, then, that in some cases a wider implication of nerve-centres should be met with, including the motor neurons of the cerebral hemispheres. There is, however, nothing to support the view of certain older authors, that tetany is purely of cerebral origin.

Numerous hypotheses have from time to time been advanced in explanation of the phenomena. That of its rheumatic origin is no longer tenable; there seems to be no kinship between tetany and rheumatism. We have already seen that while cold may excite a paroxysm of spasm, it probably cannot generate the disease; the peri-articular swelling depends on vaso-motor and trophic disturbances of innervation.

Again there is a pseudo-tetany of hysterical origin; but it is no less certain that true tetany is quite independent of hysteria.

The dehydration hypothesis of Kussmaul, in view of the tetany of gastric dilatation, has been since discarded by its originator; and Blazicek has shown that there was no increased loss of water in the blood in a case which he investigated. Jürgensen, however, discussing the subject quite recently, reverts with favour to the dehydration hypothesis.

There is much to suggest that tetany is reflex in origin, a view that has been supported by G. Sée, Müller, Berlizheimer and others; but a careful examination of the facts of tetany, and of toxic processes, makes it probable that reflex causes are only responsible for evoking and not for generating paroxysms of the malady. That if some toxin has heightened the excitability of the various neurons, such ordinary interferences as washing out the stomach, percussion of the abdomen, and the like, may be capable of evoking the spasms of tetany, is forcibly suggested by the like effect of cutaneous stimulation in a strychnised frog.

Hyperchlorhydria was supposed by Bouveret and Devic to explain the association of gastric ulcer and tetany, and such excess of hydrochloric acid in gastric tetany has been found by Gumprecht and Thiroloix and Du Pasquin; but this cannot be the explanation for all cases, in that this variety of tetany also occurs under circumstances in which there is no reason to infer hyperchlorhydria; and Blazicek, and others, have recorded cases in which free hydrochloric acid was absent from the stomach contents.

Auto-intoxication by the pent-up, decomposed, and fermenting contents of the dilated stomach is a hypothesis supported by important experimental and other evidence in recent years. This hypothesis has been upheld by Bouchard, Gerhardt, Baginsky, and others. Galliard, by an emetic, arrested attacks of tetany in a patient with dilatation of the stomach, and so concluded that tetany is toxic in nature, not reflex. Müller was the first to attempt experimental inoculation of the gastric juice, but without result. The investigations of von Jaksch and Berlizheimer in one case, and of Blazicek and Landsteiner in another, have also yielded negative results.

Kulnew, by Brieger's method, separated from the contents of such stomachs a toxic product which he regarded as diamine. Proof of auto-intoxication in tetany is also to be found in the admirable researches of Bouveret and Devic, who, in three cases of tetany with gastric dilatation, isolated a substance from the stomach contents which chemically was closely allied to syntonin, and identical with the peptotoxin of Brieger. This substance, when injected into the circulation in animals, produced general convulsions. Frankl-Hochwart points out, however, that these cases were never clearly proved to be tetany, as Trousseau's, Erb's, and Chvostek's phenomena were all absent.

Cassäet and Ferré have isolated two substances, the one evoking convulsions in animals, and the other resulting in coma without convulsions.

Fleiner only obtained positive results after treating the stomach contents chemically; and Gumprecht's results were uncertain, as although he obtained an alcoholic precipitate of albumoses and salts which were very toxic, yet albumoses had not been absorbed, as they were not found in the urine. He found a high urotoxic coefficient in his case, both in the interval and during the attack.

Ewald and Jacobson, also employing the method of Brieger for investigating alkaloids, found an alkaloid in the vomited matter and urine, but, owing to its insufficient quantity, were unable to inoculate animals. Albu, at a later date, obtained an alkaloid from the urine of Ewald's patient during the attacks, which, during the intervals, he was never able to detect in this medium itself.

It still remains to be proved whether identical or similar toxic bodies are to be found in infantile tetany. Toxic substances of much less virulence, or in quantities proportionally much smaller than in the adult, may evoke tetany in young children, for the mechanical irritability of nerves in young animals is very great.

Closely linked to these effects in gastric dilatation are the toxic effects of constipation and retention of fæces, which have been studied by Reuss. Albu has also attempted to show that intestinal parasites produce their effects in association with tetany by the excretion of a substance that has a toxic action on the organism; a view recently discussed by Peiper also.

I shall refer more in detail to the association of albuminuria and renal disease with tetany when dealing with the clinical aspect of our subject. All that need be said here is that there is no proof that the poisons which cause uræmia can produce tetany. Further, if tetany be due to a poison, it is not surprising that the elimination of the toxic body by the kidneys may be fraught with danger to the renal epithelium; if, on the other hand, renal disease be present it is reasonable to suppose that failure of the kidneys to eliminate in sufficient quantity any poison which is capable of inducing tetany may determine the attack.

That some toxic product is primarily responsible for the altered conditions of the neurons in tetanilla strumipriva was first suggested by

Professor Victor Horsley. Two views have been held concerning the thyroid in this form of tetany. One is that the gland is capable of neutralising certain toxic products of general metabolism, either by altering their composition or by counteracting their influence by some internal secretion which acts either directly on the neurons so as to immunise them, or that it acts indirectly by providing an antitoxin to neutralise the toxin in the blood. The other view is that the thyroid secretes some substance which is necessary for the nutrition of the organism. The bulk of the evidence at our disposal supports the former of these hypotheses; the phenomena which result from removal of the thyroid suggest rather the presence of some active agent than a passive process. Schiff showed that transplantation of the thyroid into the abdomen postpones death from removal of the gland from its natural seat; and Eiselsberg showed that removal of a thyroid so transplanted results rapidly in death. Horsley advocated transplantation of the thyroid in man; while the striking benefit of the administration of thyroid in some form to thyroidectomised animals or man, and to those suffering from tetany or myxœdema, was proved by Dr. George Murray.

Notkin isolated a substance from the thyroid (thyreo-protein) which, when injected into the blood-stream subcutaneously, or into the peritoneal cavity, produced in animals phenomena like tetany. Fränkel has succeeded in separating a basic product from the thyroid (thyreo-antitoxin) which, when administered to animals deprived of their thyroids, is capable of preventing the spasms, but is powerless to avert death. Baumann has isolated another substance (thyreo-iodin), but, according to Notkin, this, while capable of neutralising the poisons causing myxœdema and goitre, does not neutralise the poison of tetany; for tremors and convulsions resulted in thyroidectomised dogs in spite of its administration. Some work done by Theodor Kocher (jun.) in Drechsel's laboratory suggests that there are at least three active substances in the thyroid; Fränkel's base, identical with one separated by Drechsel and Kocher, a second base which they have succeeded in isolating, and Baumann's thyreo-iodin. Hutchison attributes the total therapeutic activity of the thyroid to the colloid matter, and chiefly to its non-proteid part—the part richest in iodine.

Gley and Masoin have found increased toxicity of the urine after thyroidectomy, which toxicity is said to increase considerably at the moment of the epileptiform attacks; these observations have, however, been called into question by Godart and Slosse.

It would appear, then, that the thyroid has several functions, and that it contains certain toxic injurious products, and others which act as antidotes to these. It further seems as if the toxic bodies must, in some way, be the products of metabolism, and that they are dealt with in the thyroid.

Von Jaksch's inoculation of rabbits with the blood of tetany gave negative results, as did bacteriological researches. That we have to do with an infectious disease is suggested by its epidemic and endemic character; that fever is often present; that hallucinations occur; that

several cases occur simultaneously in the same family or quarter; that it may remain absent from a place for years, and then suddenly spring up again; that in some years several cases occur, in others a few only; and that it occurs most frequently during certain months.

That toxic substances are capable of producing tetany we have proof in its occasional occurrence in ergot, chloroform, morphia, alcohol, carbonic oxide, lead and spermin poisoning; but as cases of the kind are relatively so rare, it seems that some other etiological factor must also be present in such cases.

Similarly, in the tetany of acute infectious diseases we cannot tell whether the spasmodic affection depends upon the poison of the primary disease, or upon some other factors.

Tetany during lactation and pregnancy is closely allied to the form which follows extirpation of the thyroid gland. Now in lactation and pregnancy metabolism is increased, and the thyroid may have to do more protective work. Enlargement of the gland is often seen in pregnancy. Fischer observed enlargement of the thyroid in a third of the cases of pregnancy under his care, and, according to Freund, the gland was enlarged in forty-five out of fifty cases of pregnancy.

Halsted found that partial removal of the thyroid in dogs did not result in tetany unless the dogs were pregnant; in which case tetany appeared one or two days before delivery. Again, several cases of tetany in pregnancy have occurred in women whose thyroid glands were atrophied. On the other hand, there are some points of similarity between this and the epidemic or idiopathic form; for instance, it is most common in certain towns, where it occurs most frequently during certain months of the year.

Fatigue, which appears to play so prominent a part in the etiology of some cases of tetany, has been found by Monari to be attended with the presence of highly toxic substances in the urine; an observation which Stolthagen has, however, been unable to confirm. In view of the increased metabolism under these circumstances, it is not improbable that such toxic products may appear in the urine, and, moreover, that their accumulation in the system may set up tetany; more especially when the system is further depressed by the cold and wet which so commonly accompany fatigue.

There are those, like Kassowitz and Escherich, who regard infantile tetany as derived directly from rickets, as the rickets and tetany curves rise together, and as phosphorus has a beneficial action in both affections; but probably the true relationship between rickets and tetany is that similar conditions favour the occurrence of both (Comby). Tetany is only met with in certain places, while rickets is met with all over the world; and cases of tetany have been recorded in which no sign of rickets could be found.

The balance of evidence is thus in favour of the toxic origin of tetany, but it would seem that more than one substance may act in this fashion upon the neurons.

Symptoms.—*Muscular spasm.*—The attack of muscular spasm is preceded, as a rule, by subjective sensory sensations, such as "tingling," "numbness," "burning," which may persist for a few hours or days before the objective motor phenomena show themselves. In rare cases headache, malaise, vomiting, and pain in the back precede the spasms; and in others there are no premonitory symptoms. The spasms are usually symmetrical and begin, as a rule, in both hands; or, if in one, the other becomes involved before any other part of the body. The feet are next affected, or, in rarer instances, the spasm begins in the feet, and is either limited to them, or spreads later to the upper limbs. In some instances the two limbs on the same side of the body are affected, the opposite limbs being free; in other cases one upper or one lower limb is affected alone: on still rarer occasions there is an alternation, the upper limb being involved on one side and the lower on the other. Rarely the spasm begins in the trunk muscles; still more rarely it begins in the face. The part affected becomes stiff and cramped, and so rigidly fixed that voluntary movement of it becomes impossible.

Most commonly the thumb is adducted and in close contact with the index finger, or flexed into the palm beneath the index and other fingers, which are usually flexed at the metacarpo-phalangeal joints, and extended at the phalangeal articulations; the outer and inner borders of the hand are approximated by spasm of the thenar and hypothenar muscles, so that the palm is hollowed and the fingers are drawn together, mainly by spasm of the interossei; thus, from the cone-like shape, it has been called "the accoucheur's hand." Occasionally the fingers are flexed at all their joints by spasm of the long flexors, so that the fist is tightly closed; and so powerful is the spasm sometimes that the nails may be driven into the skin, and sloughs produced.

The conical hand and the fist are both met with at all ages, and indeed both may be met with in the same individual at the same time.

Again, if the chief spasm is in the interossei and lumbricales, the hand may assume the bird-claw position ("main en griffe"). In very rare instances the fingers have been extended at all their joints, and widely separated from each other.

The wrist is as a rule slightly flexed, and the hand may be inclined to the ulnar side; but in rare instances the wrist has been extended. The elbow, if affected, is usually flexed, the forearm strongly pronated and folded across the chest, and the upper arm closely adducted to the side of the body.

The toes are powerfully flexed and adducted, the great toe being in some cases forcibly adducted below the others. The feet are arched so that the dorsum is convex while the sole is concave; and the foot is extended at the ankle and inverted, assuming the position of talipes equino-varus, the result of spasm of the sural muscles. Occasionally the foot has been dorsiflexed at the ankle instead of being extended, a position brought about by spasm of the anterior tibial group of muscles. Sometimes the foot is rendered immobile in the normal position.

The knees are usually extended, but in rare instances have been flexed; and the thighs are sometimes adducted so that the limbs come together and even cross each other: in rare cases they are flexed on the abdomen.

When the trunk muscles are included in the spasm, those on the ventral aspect of the body are usually affected; the head is bent forward by spasm of the anterior neck muscles, the sterno-mastoids stand out, and the chin may touch the sternum. Very rarely one or other sterno-mastoid is affected without its fellow, in which case the attitude is that of torticollis. The pectoralis major is especially prominent on both sides. The abdominal muscles become rigid, and the recti stand out under the skin like two cords. Spasmodic retention of urine occurs in some cases. Trousseau supposed that spasm of the sphincter of the bladder is the cause of it. Oddo observed a case in which this symptom was met with at the outset.

When in addition to the neck, thoracic and abdominal muscles, the diaphragm also becomes involved in spasm, respiration becomes gravely affected.

Less commonly the bulk of the spasm is in the dorsal muscles, the head is drawn back and the back arched in opisthotonos. The absence of this symptom in tetany was at one time regarded as a valuable diagnostic sign between this condition and tetanus, but that it is sometimes met with in the former condition is placed beyond question by the number of instances of the disease, otherwise typical, which have presented this symptom. Like spasm of the masseters, it has been regarded as one of the points in favour of trismus neonatorum being a form of tetanus rather than a form of tetany. But many cases of undoubted tetany have presented this symptom as a late phenomenon. When trismus occurs it is usually in cases of widespread spasm. Facial spasm produces a peculiar ghastly grin, the eyes being half closed and the angles of the mouth drawn outward. The spasm does not confine itself to the territory of the motor portion of the fifth and the seventh cranial nerves, for the ocular muscles may be involved, with the results of convergent or divergent strabismus, conjugate deviation, and even immobility of the pupils.

The tongue may participate in the spasm, and the consequent stiffness may cause difficulty of articulation. Swallowing may be difficult, owing to spasm of the muscles of the pharynx; and articulation from spasm of the laryngeal muscles. Noisy breathing and stridor naturally accompany this condition, and laryngoscopic examination during the spasm reveals that on attempts at phonation the vocal cords do not approximate, nor do they separate on deep inspiration.

The degree of spasm and the extent of its distribution vary considerably; it may be but slight, involving a single muscle or group of muscles, or it may be widespread. The hands may be affected alone, or the hands and feet; in other cases the whole of the limbs are involved; in others again the trunk and neck muscles are invaded by the spasm. Usually when there is further spread to the muscles of the face the spasms are severe,

but, on the other hand, facial spasm has been met with in mild attacks. In cases of still more widespread spasm, when the masseters, the muscles of the tongue, pharynx, and larynx become involved, and the breathing may become exceedingly difficult, the patient becomes cyanosed, and for a short time consciousness may be lost. These conditions may indeed result from fixation of the thorax alone, the muscles of the larynx being free. Participation of the muscles of the trunk and face in cases of less intensity is much more common in children than in adults.

The spasms are usually paroxysmal. Each paroxysm lasts from a few minutes to a few days; the muscular contracture then slowly passes off, but in a few hours or days recurs. In some cases the spasm never wholly passes off in the intervals, but persists in lessened degree in the arms, and less frequently in the legs. Even in cases in which the spasm appears to pass off, a feeling of stiffness remains in the muscles concerned. The paroxysmal character of the affection is less evident in cases of moderate but persistent, or but slightly remittent, spasm. If we may make three classes of intermittent, remittent, and continuous spasm, yet all sorts of intermediate grades are seen. The spasm is never so severe in the continuous form as in the paroxysmal. All these forms are met with at the various periods of life, though, as a rule, the remittent and intermittent forms are more common in adults, and the continuous in children.

The contracted muscles are very hard and firm, and considerable force has often to be employed in order to overcome the spasm; a procedure which, as a rule, causes the patient pain, but is sometimes attended with relief. As soon as the force is withdrawn the muscles generally become shortened again in spasm; so that if, for instance, the fingers and thumb are straightened, they return to their former condition of flexion as soon as they are released. Further, if in the intervals between paroxysms, when the spasm of the muscles is moderate, this be forcibly overcome, a much more powerful after-spasm results, which may become widespread and paroxysmal. Fibrillary contractions are sometimes seen in the muscles; and in rare instances clonic spasm has been the initial phenomenon of an attack.

The spasm of tetany may persist during sleep, though, as a rule, it lessens; attacks may occur for the first time during sleep. Not uncommonly minor degrees of tetany occur during sleep, especially in weakly women. The condition is bilateral, and the fingers are either in the characteristic position, or in the less usual one in which there is flexion at all the joints. The spasm is never severe, and is preceded by tingling which persists after the spasm has passed off. The affected parts feel stiff, and sometimes arrest of movement may last for a few minutes only, or may continue for an hour or two. Some patients of this kind have also slight attacks of tetany during the day.

Movement is hampered in proportion to the severity of the paroxysm; thus in severe spasm all voluntary movement may be impossible, or it may cause only a certain amount of difficulty and awkwardness. A feeling of stiffness, or a bruised feeling with tenderness on pressure, often persists after all

obvious spasm of the muscles has passed off. Sometimes a certain amount of muscular paresis follows the paroxysm of spasm, or alternates with it.

During the intervals muscular effort may evoke an attack; in dilated stomach to wash out the organ often has a similar result; sometimes the first spasm follows this procedure. Percussion of the abdomen may induce an attack; and Sir W. Gowers mentions a case of perforative peritonitis attended with a paroxysm of tetany. The phenomenon known as "Trousseau's symptom" is dependent on this power of evoking a paroxysm at will. Compression of the affected limb so as to impede the venous or arterial circulation in it, or pressure on the chief nerve-trunks of the limb, suffice to bring on the spasm in a large proportion of cases of tetany. Kussmaul found that pressure on the artery rather than on the nerve produces the phenomenon; but, as Gowers shows, the close neighbourhood of the nerves and the vessels makes it improbable that one can be effectually compressed without the other; slight pressure on the nerve, such as might well result when the vessel is being compressed, is more effective than severer pressure. It is, however, quite clear from a large amount of evidence that pressure on either the artery or nerve will evoke the spasm in a few minutes. When present the phenomenon is a valuable diagnostic sign, but it may be absent in some otherwise typical cases of tetany.

Mechanical irritability of the nerves and muscles.—There is a remarkable increase in the mechanical excitability of the motor nerves and muscles of the affected parts, commonly known as "Chvostek's symptom." The phenomenon can be demonstrated in the intervals between the paroxysms when percussion of the motor nerve to a muscle especially, or of the muscle itself, results in a well-marked contraction of the latter. This exalted excitability of motor nerves and muscles may be seen in any part of the body, but has been most frequently met with in the face, where a single tap on the trunk of the facial nerve in the region of the stylo-mastoid foramen, or on the pes anserinus, often causes a momentary contraction of all the muscles supplied by the nerve. This so-called "facial phenomenon" may also be evoked by a tap on the cheek just external to the angle of the mouth, or, in fact, on any of the branches of the nerve; and Schultze showed that the contraction could be elicited by passing the finger-nail rapidly down the side of the face from the temple to the cheek and jaw. Dr. Abercrombie found this condition invariably present in tetany of young children, in whom he could find no similar increased excitability to mechanical stimulation in the nerves of the limbs.

Mechanical excitability of muscles is less easy to demonstrate, but is characterised by idio-muscular contraction following percussion, pinching or traction of the muscle fibres.

Electrical irritability of nerves and muscles.—That a similar greatly increased excitability of the nerves exists to both the interrupted and constant electrical currents has been pointed out by Erb, who also called attention to the peculiar altered method of response to the constant

current met with in tetany. It consists in a more ready response with the positive pole (anode) when the current is closed or opened, than with the negative pole (kathode) when the current is closed. The contraction which results is not a momentary one, as in health, but is prolonged, so that tetanus results; and in no other condition has anodal opening tetanus been met with in man. The order of response to galvanism is therefore :— (i.) A.C.C., (ii.) A.O.C., (iii.) K.C.C.; or (i.) A.O.C., (ii.) A.C.C., (iii.) K.C.C., A.O.T.

This is not always the case, however, for, though the excitability to galvanism is increased, the kathode may still elicit the first response. Again, Thomas has recorded an instance in which, with increased excitability to faradism and galvanism, 2 M.A., through the nerve, with the kathode as the stimulating pole, tetanus resulted, and did not subside until the current was broken, when it ceased instantly. When the anode was substituted for the kathode no such tetanus resulted, even with 7 M.A.; and when fibrillary twitchings existed before excitation they became less marked as the current was increased.

Increased excitability to galvanism was met with almost constantly by Frankl-Hochwart; but increased excitability to faradism was much less frequently observed. All nerves are not equally prone to this exalted state of irritability, as was pointed out by Erb; the ulnar is peculiarly liable to show it, and electrical excitation of the ulnar nerve in a healthy person exactly reproduces the most common position of the hands and forearms in the spasm of tetany. The facial nerve so rarely presents any increased electrical excitability, that some writers have stated that it forms an exception to the rule and is never affected; in some cases, however, though rarely, it presents this exaltation of excitability. It is not a little curious that a nerve which so commonly shows so remarkable an increase of irritability to mechanical stimulation should so rarely show an increase of electrical excitability.

Sensory phenomena.—Pain is a prominent symptom in severe cases; the amount of suffering is sometimes intense, whether in children or adults. The pain is cramp-like in character and extends up the limbs, in the course of the chief nerves. Even when the spasm of the muscles appears to be continuous, the pain may be paroxysmal. In slight cases pain may be absent, or moderate in degree; it may be deep-seated or superficial, the former being either spontaneous or provoked by movement. The spontaneous, deep-seated pain is cramp-like, and occurs at the moment the paroxysms of contracture come on; this is the most characteristic pain, and only occurs when the contractures are sufficiently intense. Pains in the joints are not constant; they may accompany the swelling, heat, and redness of the peri-articular tissues. The pain may result from active or passive movements of the parts in spasm: the pains may occur in the joints also. Direct pressure on muscles, nerves, or joints of affected parts often produces pain, but less intense than that produced by movement. The superficial pains are almost exclusively limited to the neighbourhood of the fingers and dorsum of the hand, or, more rarely,

under the arch of the foot. They consist in formications, burnings, and so forth.

Subjective sensations, such as heat and cold, pins and needles, and similar paræsthesiæ, resembling those which may be the forerunners of the muscular spasm, may persist during the intervals, and may be attended by a moderate amount of blunting of sensibility to light touches, to painful stimuli, or to both.

Hoffmann has described a greatly increased irritability to mechanical stimulation in the sensory nerves, similar to that met with in the motor; the slightest pressure on them resulting in corresponding paræsthesiæ. The same observer has shown in them an increased excitability to mechanical and electrical stimulation; and that the anode more readily produces a sensation than does the kathode. The increased irritability of motor and sensory nerves to mechanical and electrical excitation is greatest when the affection is at its height; but usually persists for some weeks after the muscular spasm, and when "Trousseau's phenomenon" can no longer be elicited. Indeed it tells us whether the attack of tetany is really at an end or not.

Muscular sense is said by some writers not to be impaired; others have found it affected. In some cases the size and consistence of objects cannot be determined; and in walking the feet may have a false sensation of treading on a soft carpet.

Reflexes.—The knee-jerk is normal in some cases, exaggerated in others; in some again it is greatly diminished, or unobtainable. The last condition is probably often due to muscular spasm rather than to a central or peripheral defect in the reflex arc. In some chronic cases of spasmodic ergotism, however, in which the knee-jerks were absent, the posterior columns of the spinal cord proved to be sclerosed.

Vaso-motor and trophic phenomena.—Œdema of the dorsum of the hands and feet is the most characteristic of the vaso-motor and trophic disturbances in tetany, and is due to an infiltration of the cellular tissue. It is a solid œdema, and is often accompanied by diffuse redness and heat of the skin over the region. The œdema persists between the paroxysms, and disappears with the attack of tetany. It is nearly always bilateral, but it often predominates on the side of the severer contractions. Sometimes the joints are swollen, or the sheath of the extensor tendons. This œdema is much more frequent and intense in children than in adults. General anasarca, with or without ascites, has been met with, and that without albuminuria.

Other vaso-motor phenomena consist in flushing of the face, injection of the eyes, and redness of the ears. Evidence of similar vaso-dilatation within the cranial cavity is found in the giddiness, loss of consciousness, subjective sensations in the ears, and fleeting affections of vision. Vaso-dilatation also occurs in the extremities, redness of the hands being especially frequent, accompanied by elevated temperature, and sometimes by abundant sweating. Sweating sometimes terminates an attack of spasm so grave that the patient's life seemed in danger. In other cases

the skin is unnaturally dry. These phenomena disappear with the paroxysm. Cyanosis of the extremities occurs sometimes and likewise disappears with the paroxysm of contraction. Gangrene has been met with in cachectic children.

Eruptions of toxic characters, erythematous, scarlatiniform, morbilliform, and urticarial, may occur.

General symptoms.—The pulse is accelerated, breathing may be rapid, and the temperature, though usually normal, may be raised in severe and acute cases, though rarely over 101° F.

The urine is normal in the majority of cases, but polyuria has been met with by Mader, Hoffmann, Neusser, and Frankl-Hochwart; Oddo and Sarles have demonstrated a remarkable increase of phosphates in the urine of children suffering from tetany. Albuminuria is rarely met with, but more often in adults than in children; tetany, as a rule, is much more severe in adults, and elimination of large quantities of its toxic substances may injure the renal epithelium. Imbert-Gourbeyre, Delpech, Rabond, Löb, Dreifus-Brisac, Laprevotte, Bouveret and Devic and Miller, among others, have met with this sequence; and recently Bouveret and Cervesato found albumin in the urine in two cases of infantile tetany with fever, but without renal lesion. Loos found only a trace present in two cases out of seventy-two children affected with tetany. In some cases the renal affection had existed before, while in others it showed itself for the first time during the attack.

Mucinuria is met with in the variety of tetany which results from ablation of the thyroid, and is only one expression of the mucinæmia which exists in this condition.

Glycosuria has also been observed, but acetonuria and aceturia are met with more frequently than glycosuria.

Indicanuria is much more frequent and intense in children than in adults. So common is it in children, that it may be regarded as one of the symptoms of infantile tetany, which is intimately associated with gastro-intestinal disturbance.

Certain toxic bodies, of the nature of pepto-toxines, have been found in the urine by Ewald (*vide* p. 56).

Diagnosis.—Characteristic cases rarely present any difficulties in diagnosis; the character of the spasms, their onset in the extremities of the limbs, their restriction to certain groups of muscles, their symmetry, their intermission and reproduction at will, by pressure on the main nerve-trunks or vessels of an affected limb, form an unmistakable clinical picture. If, moreover, mechanical and electrical excitability of motor and sensory nerves be increased with the peculiar altered electrical response to galvanism, it is difficult to see how a mistake in diagnosis could be made.

It is otherwise, however, with many of the unusual or aberrant cases of the affection, which may be either so slight or so severe as to make a diagnosis difficult. In the slighter varieties, or earlier stages, the sensory phenomena (such as tingling, numbness, etc.) may be so prominent as to

attract the patient's attention almost exclusively; and a history of any muscular spasm can only be elicited on careful inquiry. Further, these are the very cases in which the additional aids to diagnosis, such as the Trousseau phenomena, the increased mechanical and electrical irritability of nerves, and the altered response to galvanism, may be absent.

It is in such slight or incipient cases that valuable assistance in diagnosis may be obtained by a careful search into the causes; such as lactation, pregnancy, dilatation of the stomach, diarrhœa, or fatigue.

Tetanus.—In unusually severe attacks in which, in addition to the muscles of the extremities, those of the trunk and face, including the masseters, are in a state of spasm, the diagnosis sometimes requires great care. These cases have been mistaken for tetanus, and conversely tetanus for tetany. In tetany the fingers and hands are the parts usually earliest and most affected, whereas in tetanus they escape; spasm of the masseters, if present in tetany, is, as a rule, a late phenomenon, while it is the earliest manifestation of tetanus; in tetany the spasm intermits, and the usual posture of the hands or feet is characteristic. The flexors, pronators, adductors, and internal rotators are in action in tetany; in tetanus the extensors, supinators, abductors and external rotators. In case of doubt search should be made for the tetanus-bacillus.

Tetanus-neonatorum occurs during the first days of life. There is a definite source of infection in the umbilical wound, and trismus is a prominent feature of the disease, the limbs only becoming affected when the spasm becomes generalised, and after the muscles of the neck and pharynx have been involved; the inverse of what obtains in tetany.

In *spinal meningitis* fever is more commonly present, and severe pain in the back; pain, if present in the extremities, radiates along the course of the sensory nerves, and is not, like the pain of tetany, dependent on the muscular spasms for its production, or limited to the muscles actually in spasm; the muscular spasms do not remit. "Trousseau's phenomenon" cannot be obtained, and the nerves show no increased mechanical and electrical excitability. The tingling and slighter pains of tetany, which may be present apart from any obvious muscular spasm, closely resemble the milder subjective sensations associated with spinal meningitis. In meningitis the parts affected by spasm are prone to become paralysed; and among other evidences of spread of the inflammation to the spinal cord are the affection of the sphincters and the liability to the formation of bedsores.

Tuberculous meningitis.—Tetany occurs in children chiefly between the ages of one and three years; tuberculous meningitis chiefly between three and five years. The long premonitory stage of tuberculous meningitis is wanting in tetany. Spasm, if present, is rarely prominent in meningitis, does not long resemble that of tetany, and is not repeated with the same constancy, or in the same order. Headache and vomiting are much more intense, and pain is much more in the skin than in the muscles. Paralysis of cranial nerves, inequality of pupils, or the presence of optic neuritis may leave no room for doubt. The pulse is quick in tetany, and

presents neither the slowness nor the irregularity met with in tuberculous meningitis.

Cerebral congestion.—Though accompanied by spasm, which may be transitory and repeated, cerebral congestion is preceded by much more pronounced premonitory cerebral symptoms than occur in tetany, among which may be mentioned headache, vertigo, and vomiting. The symptoms which accompany cerebral congestion do not present the localisation or evolution characteristic of tetany, nor is the causation the same.

Epilepsy, in which the spasm is tonic and bilateral, may resemble tetany; but consciousness is lost, the paroxysms are exceedingly short, and there is complete relaxation of the spasm in the intervals. Jacksonian epilepsy has been mistaken for tetany, but the conditions are widely different; in the former, tonic and clonic convulsions begin in one upper or lower extremity, or on one side of the face, and not on both sides at the same time; if they become general, consciousness is lost. When the spasm passes off, the part that was affected is left more or less enfeebled for a variable time. Headache, vomiting, and optic neuritis would be conclusive. It must not be forgotten, however, that epilepsy and tetany may be associated in the same individual.

Contracture, the result of *organic brain disease*, is often unilateral, and usually permanent; there is paralysis as well as spasm, and usually other evidences of cerebral defects.

Little's disease and infantile cerebral diplegias.—Tetany limited to the lower limbs in children may simulate these spastic paraplegias; in the upper limbs the latter may be confounded with generalised tetany. The great point of diagnosis is that the contraction in these conditions is permanent and continuous; in tetany it is essentially paroxysmal.

Hysterical contracture sometimes resembles the spasm of tetany very closely, and may be difficult to distinguish. It is generally unilateral, while tetany is but rarely so; yet certain cases of bilateral spasm have been designated "Hysterical tetany." Other indications of the existence of hysteria are usually to be found, while Trousseau's phenomenon and increased electrical irritability of nerves are absent; the latter, according to Schlesinger, being the most important point in the diagnosis.

The chances of confusing an attack of tetany with one of *acute rheumatism* must be very slight. Swelling and redness of the hands or feet in tetany may suggest rheumatism, but the peculiar position of the hands or feet, with the other characteristic signs of tetany, renders the diagnosis of this condition clear, while their absence renders the alternative diagnosis of rheumatism equally certain.

Prognosis.—The prognosis in tetany is as a rule favourable, except in thyroidectomy or dilatation of the stomach. Death may be prevented in the former cases by the administration of thyroid in some form or other; but in the latter variety remedial measures rarely prove successful.

Of other forms of tetany, that met with in very young children, whose power of resistance is small, must be regarded as serious, especially when spasm of the glottis or general convulsions supervene. As a rule, these

patients have been much exhausted by constant diarrhœa, which often persists, and is directly responsible for a fatal issue. Similarly, adults who are cachectic, or whose strength has been much reduced, may give cause for apprehension, death from exhaustion having resulted from the violence of the muscular spasm.

As a rule, adults succumb to the progressive character of the disease and the intensity of the poison; children more commonly die of asphyxia consequent on spasm of the glottis or respiratory muscles. Pneumonia may be the cause of death in some cases owing to interference with respiration resulting in congestion of the lungs.

It is by no means easy to forecast the duration of an attack of tetany. Mild attacks of continuous tetany are usually of short duration, or even where the affection is more severe; but if the attack is prolonged over several days the duration of the disease is likely to be comparatively short. When tetany occurs during pregnancy, it may usually be predicted, without fear or error, that the spasms will continue until delivery. If the patient has had tetany in the course of any previous pregnancy, its behaviour then is a fairly good guide in subsequent attacks. Those who have been attacked during pregnancy are liable to future attacks in subsequent pregnancies. Similarly, in other varieties of tetany, future attacks are prone to appear if the patient be exposed to one or other of the influences known to be intimately associated with the affection. It may safely be said that so long as the increased irritability of the nerves is present, the paroxysms of spasm may recur.

Complications.—Hysteria and tetany are sometimes associated; and Sir Wm. Gowers speaks of a case in which hysterical trismus preceded the tetany. Epilepsy and tetany have occurred together in the same patient; and in rare instances mental derangement has accompanied the spasms of tetany.

Patients who have recovered from this affection may fall into chorea; in other instances muscular atrophy has resulted, either slight and limited to the hands, or severe and general.

Treatment.—In France it was at one time invariably the custom to treat cases of tetany by bleeding, this line of treatment and cupping the spine being recommended by Trousseau. These measures abolished the spasm sometimes, even in weakly women, but more generally in men; the treatment, however, often failed where a tonic line of treatment proved rapidly successful.

If we exclude cases of thyroid origin, and include the kindred cases which occur in pregnancy, we possess as yet no antidote to the auto-intoxication in tetany.

The treatment of tetany due to removal of the thyroid gland is sufficiently obvious; the gland must be administered to such patients in some form or other. Thyroid treatment of cases of tetany of other origin, however, has not been attended with encouraging results, and it would be unreasonable to expect the same antidote to counteract more than one particular toxic cause. Yet there is a sufficiently close relationship between

tetany of thyroid origin and those of pregnancy and lactation to justify the adoption of this treatment in the latter class of cases; and in some of them, especially when the thyroid appeared to be atrophied, the results were successful.

Meanwhile we must direct our treatment to palliate spasm, to eliminate toxins, and to modify the conditions favourable to their generation.

In the subjects of dilated stomach, whether adults or children, an emetic should be administered at the outset, and should be supplemented in the former by washing out the organ with warm water, to which some antiseptic agent such as resorcin or naphthol may be added; while in the latter the emetic, if it achieve nothing, may be repeated in forty-eight hours. It is important, more especially in cases with gastro-intestinal disturbance in children, or those attended with constipation, that a purgative should be administered every second day, and, as a derivative and antiseptic, calomel answers best. Enemas of boiled water, to which naphthol or some such antiseptic may be added, are especially useful in children, flushing out the lower bowel and at the same time having an antiseptic action. Anthelmintic remedies should be administered at the outset if there be reason to suspect this source of reflex irritation.

Every care should be taken to promote elimination by the kidneys and skin; Turkish baths, the wet pack, or some similar means of free diaphoresis are of especial value in cases apparently due to exposure to cold and wet.

The second great object is to correct the dietary so as to lessen the production of toxic gastro-intestinal substances: in adults the diet should be liberal, nutritious, and at the same time easily digestible; and in children the most stringent rules should be laid down as regards breast or artificial feeding, regular intervals being strictly enjoined in both cases; and in the latter the amount should be carefully regulated in proportion to the age of the patient; the milk should be sterilised, and substituted for any solid food given prematurely.

An attempt should be made to rectify the gastric chemistry by the administration of acids or alkalies, according as one or the other appears indicated. Lime water or Vichy water is of especial value in hyperacidity in children.

In gastric dilatation of the adult, the stomach should be washed out systematically; and in the gastro-intestinal trouble of children the lower bowel should be regularly evacuated by means of enemas. Intestinal antiseptics, such as calomel, benzonaphthol, or subnitrate of bismuth, must also be administered.

The patient should be placed in the best possible hygienic circumstances, and all debilitating influences removed. Persistent diarrhœa must be checked by such astringents as opium and aromatic sulphuric acid.

Suckling must be stopped. Rickets must be combated by hygienic measures, suitable feeding with milk, cream, or raw meat juice, careful

regulation of the bowels, cod-liver oil, lacto-phosphate of lime, or of lime and iron, and so forth.

In both adults and children the patient's strength must be built up, the general nutrition improved, and the nutrition of the nervous system above all, by the administration of such remedies as cod-liver oil, malt, arsenic, phosphorus, and iron.

Every possible measure must be adopted to avoid the attacks of spasm. The room should be kept at an equable temperature, and the practice of bringing children the subjects of tetany to the out-patient departments of hospitals on cold days should be strongly condemned. Changes of clothes, whether of the body or bed, should be carefully warmed. Tepid water only should be used in washing, and all movements should be as gentle as possible; in feeding, especially in children, great care and precaution are necessary.

Of external applications for the relief of the contracture in tetany stimulating liniments are useful, and compresses of chloroform applied to the rigid muscles. Cold applications are sometimes successful, and Trousseau applied ice to the spine with advantage in some cases. For the relief of laryngismus stridulus, on the other hand, Trousseau preferred a hot sponge applied to the skin over the larynx.

The patient should be placed in a tepid bath as soon as possible after the spasm has begun; and, to diminish the number of paroxysms, baths should be given in the intervals three or four times a day, at a temperature of about 30° C., the patient being immersed for about ten or fifteen minutes at a time. Baths are especially useful in acute attacks of tetany with frequent paroxysms and some elevation of temperature; they are of no use in the chronic forms of the affection.

Electrical treatment of the nerves and muscles is useless. Faradism is never appropriate; but feeble descending galvanic currents with a large anode on the vertebral column, and the kathode to the nerve-trunks, are not without benefit in diminishing the irritability of the spinal cord; the method is indicated rather in tetany which is tending to become chronic.

Of drugs administered internally the bromides, chloral and urethan are better than morphia, which, while useful in some cases, tends to constipation and cerebral congestion. Great caution is necessary in administering opium to young children. Chloral, if given by enema to children, causes no increase of the spasm, such as results when a child is forced to take medicine by the mouth. In one case in which both bromide and chloral failed, Dr. Cheadle found that extract of Calabar bean was successful in doses of a thirty-sixth of a grain, increased gradually to an eighth, three times a day; but the patient was under treatment with cod-liver oil and iron at the same time. Belladonna is disappointing. Valerian and allied drugs may be given in conjunction with one or other of the sedatives. Tonnellé in some cases used enemas of assafœtida with advantage.

If death appear imminent from asphyxia, owing to spasm of the larynx, or of the respiratory muscles, or of both, inhalations of chloroform

must be employed. The greatest possible care is necessary in the administration of chloroform, as it may increase the spasm at first; but relaxation is usually obtained on complete narcosis. Unfortunately this mode of treatment does not prevent recurrence of the spasm; but Hauber, in two cases in which other methods of treatment failed, succeeded with inhalations of chloroform combined with energetic massage during the narcosis.

Rapid relaxation of the spasm of tetany may be brought about by the administration of a subcutaneous injection of pilocarpine; it sets in as diaphoresis is induced.

For nocturnal tetany Sir William Gowers finds nothing so good as a dose of digitalis given at bed-time. Bromide is, however, sometimes successful; and, whatever measure of this kind be adopted, a tonic line of treatment should be pursued during the day.

J. S. Risien Russell.

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In selecting papers for this bibliography from the extensive literature that has grown up around the subject of tetany, some have been chosen for their importance as general treatises on the subject; others because they deal specially with some part of it; many again have been selected, in part at least, because they contain more or less complete lists of the writings on tetany previous to the publication of the particular paper included in the present bibliography. The publications have been arranged in groups, as far as possible, according to the chief topics dealt with, in the hope that this may facilitate reference.

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PARALYSIS AGITANS

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SYN.—*Shaking palsy; Parkinson's disease;* Germ. *Schüttellähmung.*

Features.—A shaking of the limbs when they are not moved by the will; a loss of the strength that can be exerted by the will; a kind of stiffness which, although not great, tends to fix the frame in a certain posture, which can be changed less speedily than in health,—these are the characteristics of the disease which Parkinson distinguished, and to which he gave the apt name of "Shaking palsy," "Paralysis agitans." The name does not recognise the rigidity, which is a more frequent feature than either the tremor or the weakness; nevertheless, in the majority of cases the symptoms indicated by it are sufficiently prominent to make the "Shaking palsy" one of the best names that have been conferred on any disease. It is an instance of a name based on the simple features of a disease, independent alike of hypothesis that may be wrong and of circumstance that is accidental. It is a name that conveys knowledge, and has not the absolute blankness of a purely arbitrary designation. This fact is emphasised, because Charcot, observing that the designation is not entirely comprehensive, proposed to substitute the name "Parkinson's disease,"—to discard, that is, the excellent name which was proposed by its first discerner for one which conveys only a knowledge of an historical accident.

Shaking palsy is a disease chiefly of the early decline of life; but it is also met with in its middle period, and occasionally soon after the achievement of full development. Whatever anatomical changes may underlie the symptoms, they are too minute to be at present within the reach even of the microscope: so at least it would seem; the latest knowledge, however, suggests that we are only now learning where to look. It is a slow, progressive malady, apparently a true senile affection, a failure of nutrition of special character in special structures.

As such it would be unreasonable to anticipate that the change upon which it depends would be influenced by treatment ; and the anticipation is fully justified by facts.

The merit of Parkinson's observations consists in his recognition of the association of tremor at rest with other symptoms of the disease. The difference in the relation of tremor to voluntary movement (its occurrence thereon or at rest) had before been noted, but no one had perceived the peculiar associations of that which is related to rest. It is by these that the malady is distinguished alike from the simple tremor which may exist through life, from the senile tremor which may occur in old age, and from that which is due to toxic agents or to organic disease.

Causation.—Some inherited influence can be traced in not more than a sixth of the cases, by the occurrence of the same disease, or of more simple forms of tremor, in other members of the family. Men suffer twice as often as women. About half the cases begin between the ages of 50 and 65. Allowing for the diminished number living, the disease seems seldom to begin after the age of 65, while it not infrequently begins between 40 and 50. Before 40 it is rare, although a few typical and severe cases have been met with between 30 and 40, and even earlier. The only difference that can be discerned in the relative age at which the disease begins in the two sexes respectively is that before 40 it is confined to males. This might indeed be anticipated from its frequency in men ; but the number of such early cases is so small that it does not influence the mean age of commencement : this is practically the same in both sexes.

The chief direct cause that can be traced is prolonged mental emotion. It is found in about half the cases ; and the fact that this stress apparently enters into the causation of other degenerative diseases makes the causal relation probable, even when allowance is made for the frequency of anxiety and grief at the time of life at which paralysis agitans generally begins. The influence of emotion receives emphasis, on which too much stress may perhaps be laid, from the fact that it may be distinctly related to the acute emotion of fear. The influence of fear is indeed the only fact in the causation which can be called intelligible. Its direct effect is on the motor centres, to induce the movement necessary for escape, which seems to have made the term "movement from" a name for all such peculiar mental states,—"emotions." If that movement be impossible, tremor results, and thus we have the word to "tremble" as a synonym for fear. He who trembles is said to be "paralysed by fear," and he is, in fact, for the moment suffering from "paralysis agitans." The sudden tremor of alarm has indeed been known to persist, and to assume all the characteristics of the malady now under consideration. It may be chiefly through this mechanism that local injuries have been the immediate cause of the affection ; although in some cases an influence on the nerve-centres from the injured part seems to be associated with it, for in this part the tremor has more than once been known to begin.

In rare cases the disease has followed exposure to cold, acute diseases, and the influence of malaria; but the degree in which the malady has been the consequence of these antecedents is not clear. It is curious that the poisons which cause tremors do not cause paralysis agitans.

Symptoms.—The commencement varies according to the degree in which tremor on the one hand or rigidity on the other is predominant. Commonly one hand is found to shake a little at rest; the patient finds that it cannot be used so freely, and that slight tremor interferes with prolonged movement, such as writing. The tremor very slowly increases, and after six months or a year is noticed in the leg on the same side, although in very slight degree. As the tremor increases the hand assumes a fixed position, and by the time the leg is involved, if not before, both hands are habitually flexed slightly at all the joints of the fingers, sometimes, however, only at the metacarpo-phalangeal joints. With the tremor weakness comes on, seldom great; generally, indeed, there is more sense of weakness than actual weakness, because there is a peculiar slowness of movement. The face presents less play of emotional expression, and it wears a fixed look not readily varied. Speech also is less varied in tone, although the sentences are uttered quickly, as if to get them out and done with. There is often a slight forward stoop of the body, and the patient walks in shorter steps than before. Soon after the affection of the corresponding leg the opposite arm begins to shake. By this time the tremor in the hand first attacked has become much greater. Lastly, the leg of the second side is also found to shake occasionally. The tremor in the second hand soon reaches a much greater degree than in the leg of the side first affected; and, almost invariably, the tremor in the legs remains slight compared with that in the hands. This outline is true of the majority of cases; but the symptoms present considerable variation. Of these the most important is the relative prominence of the general rigidity; the muscles are not rigid to passive movement, but the state is one best described as an apparently increased tonicity of the muscles consequent on the sluggishness with which the volitional nerve impulses are evolved. It may be great when the loss of power is trifling, and even when the tremor is scarcely perceptible. The latter can indeed generally be detected on careful observation; but it may be so unobtrusive that the nature of the malady may not occur to the observer unless he has been impressed by the characteristic aspect of other cases, and is aware of this occasional predominance of the fixation over the other symptoms.

In some cases the shaking increases, to a high degree, in the limb in which it began, and therein it may remain limited for years before it spreads onwards. The tremor may begin in a leg instead of in an arm, and pass next to the arm on the same side, or to the other leg; but the arms ultimately display the chief manifestations of the affection. It may begin in the shoulder and descend the arm, although it always becomes greatest in the hand. The amount of strength which can be

exerted by the limbs varies much in different cases, and the weakness does not bear any direct relation to the amount of tremor.

Sleep generally stills the limbs; but the constant movement in the waking state becomes a source of great fatigue. With the tendency to tardy response to the will comes a peculiar restlessness, which increases until the patient is constantly desiring to change his posture, or to make some movement. Another common symptom is a sense of internal heat, not often well marked, and absent in a considerable minority of the cases; but when there is no distinct sensation of heat the sufferers like to be at a distance from the fire, and to have few bedclothes over them, even on a cold night. Now and then there is a sense of coldness instead of heat.

Some of these symptoms present features which need more detailed mention.

The tremor is a regular rhythmical contraction of the muscles, alternating in the opposing groups, and having a frequency of from five to seven contractions per second. It is greatest in the forearm muscles which move the fingers and wrist, and in the intrinsic muscles of the hand. It often preponderates in the latter so as to cause a movement like that by which the Arabs beat their small drums. The range of movement of the fingers varies from an $\frac{1}{8}$th to $\frac{3}{4}$ of an inch. In the leg it can only be discerned, as a rule, by placing the fingers on the muscles; the weight of the limb and the posture at rest may prevent visible movement. In the hand the tremor is at once arrested by any voluntary effort, but returns soon if this is sustained. Hence it causes the motion of the pen, in writing, to be irregular; lines which should be straight present minute zigzags. Nearly half a minute may elapse after movement before the tremor again returns; but the severer the case the earlier the return.

This relation to movement is not invariable. It is the common condition and has great diagnostic importance, as it presents a contrast not only to the wilder movements of disseminated sclerosis (which occur only on volitional movement), but also to simple tremor. Yet cases of true paralysis agitans are met with in which tremor is slight and confined to voluntary movement. The other symptoms — aspect, posture, and gait—sufficiently indicate the nature of the disease, in the cases in which the tremor is not spontaneous. Shaking of the head, so common in "senile tremor," is generally due, in paralysis agitans, to a communicated movement from the arms. But even in shaking palsy there is occasionally a primary tremor of the head, the result of contractions in the muscles of the neck.

The masseters are often affected in the late stage, and sometimes sooner. The tongue may likewise present tremor, either when at rest or on movement.

In cases in which one arm is affected in considerable degree before the other, a very slight and persistent increase of voltaic and faradic irritability has been found.

The *aspect* of the patient, as already mentioned, is most characteristic. It is partly due to the forward stoop, to the expressionless face, to the position of the arms—held in front of the patient—and to the fixation of the hands. The common position of the fingers is in the "rest" position, the phalanges are slightly flexed at all joints, or in the "interosseal" position, with flexion at the metacarpo-phalangeal joints, and extension at the others, from preponderant contraction of the interossei. These muscles have been known to become permanently shortened, but tissue changes are extremely rare in the muscles, and are not usually met with in other structures.

Gait.—Associated with the forward stoop is a tendency to take quick steps, as if running forward to save a fall. This "festination," as it has been called, was one of the symptoms which attracted Parkinson's attention. Its mechanism is obscure; especially because a patient who is made to walk backwards will then also present a similar tendency to move by short quick steps, and may have some difficulty in stopping himself: this symptom has been called "retropulsion." Yet it is curious to observe the ease with which a patient may be made to take proper steps. If some object, such as a sheet of newspaper folded to a narrow band, be placed on the floor, two feet in front of the patient, and he be told to put his right foot on it and walk across the room, he will do so with steps of full and uniform length.

Mental symptoms.—As a rule, the only mental change is the distress and depression produced by the continued discomfort; the restlessness which knows no relief; the fatigue which sleep imperfectly removes, and the depression due to the consciousness of a malady which is found, only too soon, to resist every effort to lessen or arrest it. But in some cases, mental failure—loss of memory, extreme irritability, and even a moderate degree of dementia—is associated with the physical symptoms of paralysis agitans. The occurrence of this associated failure of mind is not difficult to understand, if we conceive the morbid process to be a senile degeneration of the cortex; yet it gives rise to many mistakes in diagnosis.

Course and Termination.—As already described, the symptoms may remain limited to one limb, or may slowly or quickly become general. Their extension may be indeed so slow that several years pass before the patient experiences real disability. On the other hand, a distressing degree of intensity may be attained in the course of a single year. Whether speedy or slow in course, the malady is progressive. Occasional exceptions are presented by the cases in which the affection is limited in its seat, and reaches a considerable intensity without passing beyond the limb first affected, and those in which the general aspect and rigidity are absent.

Paralysis agitans causes death only by gradual exhaustion after long duration. It presents an illustration of the general rule that chronic diseases do not themselves terminate life. The part they play in causing death is to produce a condition in which some trifling inter-

current malady is adequate to snap the thread which has been reduced to extreme tenuity. The duration of the disease varies from two to twenty years, and is, as a rule, only too long.

Pathology.—The absence of known anatomical changes renders the pathology a matter of inference from the facts of physiology and the collateral suggestions of other diseases. It has been supposed to be a disease of the muscles; but contractions of this rhythmical character can only be produced from nerve-centres. The impulses which caused them must proceed immediately from the spinal cord; but this fact affords no reason for regarding the spinal cord as their source. Most motor impulses which pass to the muscles from the cord are the result of others which reach the spinal cord from the motor cortex of the brain. Reflex action we must, indeed, refer to the spinal cord, and also the influence on which muscular tone depends; yet all such spinal influence seems to be related to a corresponding higher action through the brain. This is illustrated, in a manner particularly apposite to paralysis agitans, in the phenomena of catalepsy. The hypertonicity of muscles which constitutes the latter affection may be induced by influences which act solely on the brain.

These facts compel us to regard the motor cortex of the brain, provisionally, at least, as the seat of the morbid process. To them, moreover, may be added some other facts of a more positive kind. The common distribution of the disease is unilateral, at least in the early stage; and in this it presents a marked contrast to the type of spinal affections. The implication of the face has no special significance one way or the other, because the bulbar nuclei are an intracranial part of the proximate centres of the cord. The occasional mental change must be added to the indications of a cerebral seat, and so also the festination, quickness of speech, and some other symptoms, such as the sense of heat.

Of like significance is the absence of definite muscular wasting, or of considerable change in electrical irritability. But it may be asked, "If the morbid process be in the motor cortex of the brain, why is there never any sign of disease of the pyramidal fibres, such as attends an organic lesion of the cortex; or a degeneration of the nerve-cells from which the pyramidal fibres proceed?" The answer to this question is instructive. Until the last few years, the only explanation of the absence of signs of destructive degeneration, even in the most severe cases, was that the malady depended upon a peculiar form of senile degeneration which did not go on to destruction. But the change in our conceptions of the function of nerve-cells, which has resulted from increased knowledge of the structure of the gray matter, diminishes the difficulty. We must consider the nerve-cells as having an influence only on the nutrition of the fibres, alike on the long process which conducts nerve energy from the cell, and on the short branching processes from the spongy gray substance which conduct energy to the cell and through it, by the fibrillary paths which pass without interruption to the chief nerve process. For the source of the nerve impulses we have to look

to the finely-divided nerve substance at the extremities of these short branching processes, and in these extensive nutritional change may occur and may be manifested by great alteration in function, without any change in the nutrition of the cells themselves, or of the fibres which proceed from them to the lateral columns of the spinal cord. With the disappearance of the notion that the nerve-cells are the sources of nerve energy, an essential distinction presents itself between the changes in the structures which govern the nutrition of the nerve elements and in those which influence their function. Many points in disease thus become clearer which before were obscure.

If these conceptions be well founded, as they appear to be, paralysis agitans must be regarded as a chronic senile change in the nutrition of the terminations of the branching processes of the motor nerve-cells (the dendrons or dendrites) of the cortex, causing the constant liberation of nerve energy to be increased, and also causing a change in its form. Uniformity gives place to rhythmical liberation. It is possible that in this the gray matter of the cord may co-operate, because there seems to be a correspondence between the reflex functions in the cord and in the brain. But this is to go far beyond our present knowledge and our present subject.

If we conceive the disease to be one of the cortex of the brain it is easy to understand the occasional deterioration of mental power, the occasional slight vaso-motor disturbance, and the curious disturbance of the sensation of body temperature, with and without actual change in it. All thermic sensations are of course perceived through the gray matter of the cortex, and we have long known that vaso-motor processes are within the influence of the same organ.

The actual nature of the change is unknown. It must be regarded as a premature senile alteration, which does not apparently belong to the extreme senile changes, but attends the earlier part of the descending course of life. It is not surprising, therefore, that the disease should sometimes occur during the middle and even in the early period of adult life; as does the decay of the hair follicles which so often precedes the proper "bald-pate" epoch. This analogy, indeed, may help us to understand that early paralysis agitans may be unattended with any other indications of degenerative change.

If the disease be of the dendrites, we can understand our failure to discover any changes that can be associated with the disease. Our attention has been fixed upon the nerve-cells, since to these we have been accustomed to refer the production of nerve energy; but apparently in the study of diseases manifested only by disturbance of function we must leave these entirely out of our scrutiny.

The minute anatomy of the normal spongy gray substances, and of the extremities of the branching processes within it, is not yet so far established as to permit the recognition of morbid changes of such a character as we must assume those of paralysis agitans to be. They may be, indeed, beyond the reach of observation.

Diagnosis.—The characteristic symptoms are the tremor at rest, combined with the general muscular fixation of face, limb, and posture. This fixation may, however, be absent when the tremor, although characteristic, is limited to one limb. When tremor is slight, fixation is usually present. It is important to remember that the usual relation to voluntary motion may not exist when the tremor is but slight; even in a case in which the general aspect is so characteristic as to leave no doubt of the nature of the disease, and in which the diagnosis is completely justified by its course, shaking may be seen only when the hand is moved. The occurrence of tremor on movement only, is a character common to "simple tremor," to "senile tremor," and to all the toxic forms of the affection. In these forms general fixation is absent, and error in diagnosis will be prevented if we remember that simple tremor often begins in youth, and that in it and the senile form the head is generally affected early, and the movement is always small in range.

The relation to movement, and the tremor of the head, have received too much weight as special diagnostic features. It cannot be too frequently urged that the important diagnostic symptom is the aspect of the patient. Once grasped, it is never forgotten and will never mislead. Cases in which this aspect is most marked, and of absolute significance, are sometimes mistaken, for many years, on account of the absence of tremor or its inconspicuous degree. Such an error is specially likely when there is some definite mental change, loss of memory, or slight and occasional wrong ideas. Such changes, indeed, seem to be rather more common in the cases in which tremor is almost absent.

Prognosis.—The course of the disease is progressive, slowly or rapidly, in a proportion of cases so vast that the exceptions cannot enter into practical consideration. Neither age, nor sex, nor causation seems to influence its rate. Only when the symptoms increase to a considerable degree in a single limb, and are confined to this, is there reasonable ground for expecting that it may not become general.

The energy of vitality is often possessed in different degrees by the many structures of which the human frame consists. The failure of vital nutrition seems to be altogether beyond the scope of treatment; and that it should be so is intelligible. The causes that bring about failure seem to be effective by reason of a disposition which is as much beyond our influence as is systemic death itself.

Treatment.—The peculiar character of the malady, regarded as a local senile degeneration unlike those which occur from other influences, is especially marked in its therapeutical relations. Even in the rare cases which begin before middle life the progress of the disease is not arrested by any treatment hitherto discovered. The statement is of course equally true of the cases which begin in the years that are called "the decline of life." Indeed, considerable doubt may be reasonably felt regarding the nature of rare cases in which recovery has been said to have occurred, and which have been called by the name of this disease.

But, as in all diseases of the kind, it is equally difficult to affirm that no good has been done by treatment. It is as difficult to discern whether treatment hinders the advance of a progressive malady as it is to ascertain whether it accelerates the disappearance of one which tends to pass away.

The subjects of shaking palsy sometimes assert with confidence that they are better for treatment; and occasionally their impression is confirmed by our own observation, although seldom in a degree which can be a source of satisfaction to the physician. Hence it is right to try to relieve and retard, and to persevere in so doing; especially since there is much difference in the tendencies of the disease, and therapeutical agencies which are powerless in one case may have some influence on another; or, again, those which are without effect at one stage may be distinctly useful at a subsequent period.

Electricity has no influence on the affection. Some years ago Charcot recommended static electricity, but no confirmation of benefit was obtained. Indeed, twenty-five years ago, at the suggestion of Sir Russell Reynolds, I made a careful trial of this agent, but I found it useless. All that massage can do is to give slight temporary relief. In the extreme degree of the affection the movement and discomfort in the hands may be relieved for the time by very gentle upward rubbing of the fingers and hands. It should be scarcely more than cutaneous rubbing, but the relief it affords at the time is very definite.

Mental tranquillity is as important as it is difficult to secure. The progressive affection, gradually enforcing the conviction of its incurability, maintains an influence like that which is the most common cause. From medicinal agents chiefly can we expect any good, and from them some effect can at times be perceived. Nervine tonics may be tried, such as we employ in other degenerative diseases; care being taken that the doses are at first sufficiently small to preclude irritation. The over-action of the motor nerve-substance is an example of the condition termed of old "irritable weakness"; and the agents capable of increasing its strength, if not carefully adjusted, may over-stimulate the too excitable tissue. Quinine, arsenic, strychnine, and the like may be tried. From phosphorus and nitrate of silver I have seen no good result.

Relief is perhaps more often obtained from nervine sedatives, especially if combined with small doses of tonics. Of these also it is wise to try successively those that seem to promise best. Indian hemp is one of these; the combination of Indian hemp, arsenic, and a very small dose of strychnine—sometimes with the addition of one-eighth of a grain of cocaine—is perhaps that which most frequently seems beneficial. Belladonna and physostigma are seldom useful. Of chloride of aluminium and piscidia erythrina all that can be said is that they deserve further trial.

More potent sedatives may be necessary to procure rest. In a malady so chronic, and in which the need is so recurrent, morphine

should be avoided. For sleep it is better to give successively bromide (with or without a little chloral), chloralamide, and sulphonal. Antipyrin and acetanilide or phenacetin, if given in small doses three times a day, sometimes give relief to the sense of distress.

But of all the degenerative diseases of the nervous system this is least amenable to therapeutic agents, and least capable of diversion from its progressive course, even by the powerful and varied influences. It is the shadow of that which has to come.

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MIGRAINE

SYN.—*Sick headache; Bilious headache; Megrim; Hemicrania.*

Definition.—A functional disease, characterised by paroxysmal attacks of headache, usually limited to one side, and associated with sickness, mental depression, affections of sight, and other nervous symptoms.

Although headache is the most prominent symptom, yet the disorders affecting other parts of the system give the peculiar features to this complaint. The accompanying mental lassitude and depression, the tendency to nausea and vomiting, the cold and shivering feelings that pass over the skin, the disagreeable affections of sight and other distressful symptoms combine with the actual pain in the head to render life for the time being miserable to the sufferers from this complaint, and to stamp the disease as a distinct and readily recognisable symptom group. As the disease is frequent amongst the highly educated and observant, and as many of the sufferers have been medical men, its symptoms have been fully noted and its features frequently discussed.

In a large number of cases the disease is undoubtedly hereditary. When it is thus transmitted the features of the complaint may be wonderfully alike both in parent and offspring. More frequently, however, each case has distinctive peculiarities of its own. Usually the disease manifests itself in the earlier decades of life, rarely appearing for the first time after the age of thirty. After forty-five years of age, sometimes earlier, the disease has a tendency to abate, the attacks becoming less frequent and less violent, till with increasing years it may finally

disappear; or, what is perhaps more usual, the gastric symptoms may disappear, the headaches remaining as a more or less irregular neuralgia. Migraine may, however, persist in its violence till late in life, and sufferers at seventy years of age are not uncommon. It has been suggested that persons of certain constitutions, such as the gouty and the hysterical, are more liable to migraine than others; and even that migraine is but one of the symptoms of these conditions. But, considering the universality of the complaint, it seems more reasonable to assume that there is no relationship of the kind, and that migraine is an independent manifestation of disease in a gouty or a hysterical subject. Women are undoubtedly more liable to the disease than men.

One of the most peculiar features of many of these cases is the periodicity of the attacks. Many patients know when an attack is due, although there may be no premonitory symptoms. They are also aware that during this period certain contributory causes, such as indiscretions in diet, irregularity in the routine of their lives, disturbing impressions upon their senses, breathing vitiated air, may suffice to induce an attack. After the attack is over, they usually feel extremely well, and may expose themselves to these contributory causes with impunity, being well aware that, for the moment, they are not liable to an attack. But gradually this immunity wears off and the liability returns, with its expected attack, again to be followed by another period of immunity. In many cases where the conditions of life are detrimental to bodily health, the period of immunity becomes so shortened that the patient is almost continuously suffering from a dull headache, with paroxysms recurring almost daily; the patient having passed into a "status hemicranialis."

Symptoms.—The attacks of migraine vary much in severity, not only in separate individuals, but also in the same individual at different times. Frequently there is some premonition. The patient may feel quite well but become suddenly aware of peculiar flickering lights of various forms in some parts of the field of vision, and in a few hours the headache invariably follows; or the patient wakes in the morning feeling dull or apathetic, with a foreboding that an attack is impending. Sometimes this feeling may last a whole day and pass off without further developments. Usually, however, a headache, slight at first but gradually increasing in severity, supervenes and persists with varying severity till the end of the attack. This is sometimes accompanied by a feeling of heat, affecting first, it may be, the ear of the side in which pain is felt, but gradually extending to the side of the head. The temporal artery of the side thus affected may be larger than its fellow on the other side. While the head feels painful and hot, some other parts of the body, as hands or feet, feel cold; and chilly sensations with goose-skin creep over the surface of the trunk. Certain areas of skin, as on the hand, may become anæsthetic, so that anything held in the hand may be dropped if the patient's attention be distracted from it. Tenderness of the eyes to bright light, or on continued use, as in reading, is frequent. More rarely there is insensitiveness of a certain narrow area of the field of vision,

affecting usually the central portion of both eyes, so that the patient cannot see the exact spot to which his attention is directed. Occasionally also the patient perceives in certain parts of the field of vision trembling movements of bright specks and zigzag lines variously coloured. Very rarely there is double vision. Gastric disorders are rarely absent. A feeling of nausea is the most common of them, often going on to violent retching. It happens not infrequently that after one or two violent attacks of vomiting the patient drops off to sleep and, after a few hours, wakes well and refreshed; on the other hand, the vomiting may persist at intervals for hours until the patient is quite exhausted and drops into a disturbed, uneasy slumber, awakened at intervals by the attacks of vomiting. Finally he succumbs to sleep, and the attack passes off, leaving him prostrate.

The foregoing gives but a bare outline of the various features of an attack of migraine. The symptoms vary much in intensity and sequence. They may be so slight as to exhibit little save the premonitory symptoms of mental lethargy. Some cases of hereditary migraine might seem never to advance beyond this stage. Again, patients subject to migraine may have temporary attacks of central scotoma lasting a few hours, or of disturbed accommodation, or of hemiopia, or of vertigo, accompanied by no other symptoms, or only by a little sickliness. So it may happen that various other phenomena may be present in this minor degree. On the other hand, the attacks may progress with extreme severity. The headache may be so severe that the sufferer rolls about on the floor scarcely conscious of what he is doing; drowsiness, amounting almost to stupor, may gradually supervene until he drops into a fitful sleep disturbed by paroxysms of pain; rarely complete unconsciousness occurs. There is almost always a certain amount of mental lethargy, and this at times becomes so extreme that ideas become confused, and the patient cannot express himself coherently. It would seem that occasionally a patient may fall into an aphasia, not being able to co-ordinate the muscles of speech; more rarely still there may be a slight and transient hemiplegic paresis. Temporary paralysis of certain of the muscles of the eyeball has been noted occasionally.

Causation.—In the absence of any demonstrable pathological lesion, speculations upon the causes of this complaint have been rife. But, although a close study of the symptoms may lead to a surmise of the agencies at work, it may be confidently asserted that the true pathology still eludes discovery. Inasmuch as the headache is often associated with evident disturbance of remote organs, such as the stomach, liver, or uterus, the symptoms have been attributed to disorders of these organs by various observers. But there is little doubt that these disorders either act as mere excitants to attacks of migraine in a system already prone to it, or are themselves but part of the manifestations of the migraine itself. The pain in the head differs materially from the referred pain set up in different parts of the body by disorders of the viscera. The pains in the latter case are due to a stimulation of the

central end of the nerves in the distribution of which the pain is felt. These sensory nerves in which such referred pains are felt are associated at their origin in the central nervous system with the nerves supplying the viscera. Not infrequently the skin or muscles supplied by these sensory nerves are acutely hyperæsthetic. Should visceral disease produce other reflex symptoms affecting other nerves, these symptoms are a manifestation of increased activity of those nerves; so that, in the case of muscular nerves, muscular spasms appear, or in the case of secretory nerves increased secretion, and so forth. The pain in migraine, on the other hand, besides varying in character from pain due to stimulation of a central nerve end, has several other different features. There is an absence of the acute hyperæsthesia; tenderness of the scalp may be present to a certain amount, but in my experience it never reaches that degree of acuteness which is so frequently present in herpes zoster and in the referred pains of visceral disease. Anything that increases the blood-flow to the scalp increases the pain. Heat, for instance, intensifies the pain; on the other hand, in the pain of visceral disease heat is usually soothing. Bodily exertion, which in an attack of migraine often induces very forcible beating of the heart, causes increase of pain with each pulse-beat. Compression of the carotid on the side opposite to that in which pain is felt intensifies the pain; on the same side it diminishes it. While thus evidently an increase of blood-flow intensifies the pain, it might be suggested that it does so by increasing the flow of blood to the nerve-centres; but I have been able to cause temporary easing of the pain by directly compressing the dilated temporal artery with the point of the finger; and the local application of cold has the same effect. For these reasons it is assumed that the pain is felt in the peripheral distribution of the nerves supplying the scalp. But, although I have repeatedly satisfied myself that the above symptoms have been correctly ascertained, du Bois-Reymond has noted contraction of the temporal artery during the pain of migraine, and in some cases pressure on the carotid of the opposite side has relieved the pain. Again, the pain in migraine occasionally attains such very great severity that it seems doubtful whether the peripheral origin of the pain is a sufficient explanation. To distinguish this pain yet further from that caused by visceral disease we have the peculiar fact that the associated symptoms are mainly those of depressed activity of the nerves affected; while, as I have already said, the symptoms accompanying visceral pain are mainly those of exaggerated activity.

If we group together the principal symptoms of an attack of migraine in the following order, the evidence of what I have called depressed activity will be more evident. When affecting the skin there is anæsthesia, when affecting the muscles there is paresis and loss of power of co-ordination; when affecting the stomach there is a delay in the digestive process, the food taken being rejected, long afterwards, undigested; when affecting the brain there is mental lethargy, confusion of ideas, and sometimes loss of consciousness; when affecting the sight there is partial blindness. To explain the occurrence of such varied symptoms

it has been suggested that there is a temporary spasm of the blood-vessels, diminishing the blood-supply to the nerve-centres governing those functions which are thus depressed. The fact that these conditions are evanescent shows that the cause producing them is but temporary, and we have abundant evidence that the sympathetic nerves are unduly excited during an attack of migraine. Thus, as evidence of the excitation of the sympathetic fibres, there are the waves of goose-skin passing over the body, due to stimulation of the pilo-motor nerves; the local contraction of arteries as evidenced by the extreme coldness limited to one foot or one hand, with the corresponding diminution of the pulse supplying the foot or the hand; the slight ptosis occasionally present, and the slight dilatation of the pupil. It may seem inconsistent to put the burden of these symptoms on excitation of the sympathetic, seeing that there is a demonstrable relaxation of the arteries on the side of the head affected by the pain, which I have assumed to be a probable cause of the headache. But a dilatation of the temporal artery and its branches may go hand in hand with a demonstrable arterial spasm elsewhere. Thus I have seen a patient complain bitterly of the coldness of the right foot while at the same time there was headache on the right side with dilatation of the temporal artery. In order to warm the foot he would sit before the fire, and while the heat to the foot was grateful and soothing, the heat to the head so increased the pain that he was obliged to move away even from the neighbourhood of the fire.

Our present knowledge, therefore, only justifies us in attributing the causation of this disease to a certain influence, probably toxic, which affects predominantly the sympathetic nervous system. This morbific influence is but temporary in its effect, and usually leaves the system unsusceptible for a varying period after an attack.

Treatment.—The frequency and severity with which migraine affects many of those pursuing sedentary or indoor occupations is in strong contrast to the rarity of the disease in out-of-door workers. Taking this observation as a guide to treatment, the first essential is to get the patient to take active and congenial exercise in the open air. When out-of-door pastimes are impossible, exercise in the open air should be insisted upon as far as the patient's circumstances will permit. Unfortunately the opportunities for such exercise are rare for those who suffer most from this complaint, such as housewives, dressmakers, or domestic servants; and too often the atmosphere in which they work and sleep is vitiated. It is difficult for them to accumulate that measure of bodily vigour which is necessary to combat the recurring attacks of migraine. In the next place, dietetic and medicinal rules should be adopted which may favour the development of more robust health. Careful regulation of the diet, so as to avoid the errors of feeding which are so common amongst the classes above specified, and the adoption of a dietary containing nutritious and easily assimilated food, will do much to lessen the frequency of the attacks. Medicines, such as quinine, iron, nux vomica, nitrate of silver, will be found beneficial mainly for their tonic properties. Any tendency

to constipation should be corrected. For those patients in whom the attacks recur with great frequency, and for those in whom the "status hemicranialis" is established, it is often necessary to employ remedies to give the patient some immediate relief. For this purpose nerve sedatives judiciously administered are beneficial; of these I have found the bromides, particularly the bromide of ammonium, most beneficial. In extreme cases the drug should be pushed until slight persistent drowsiness is produced. The patient not only sleeps better, but the attacks often disappear under its use. Then, after a week or two, the employment of tonic medicines and hygienic regulations lead usually to satisfactory results. When the attack recurs with each menstrual period, the employment of the bromide for a week before the anticipated attack often suppresses it. To relieve the attack when once it has begun, many remedies have been suggested. When the more severe attacks are impending, no remedies appear to be of any avail, whether in stopping the attack or lessening its severity. Frequently, however, the milder attacks may be cut short by this remedy or that, and the most efficacious of these is found in the class of drugs represented by phenacetin and antipyrin. The effect of these drugs is greatly enhanced if the patient will lie down for an hour or two after taking one of them, especially if a short sleep can be obtained. Among other remedies which have also been found beneficial in modifying an attack of migraine are caffeine, guarana, cannabis indica, and salicylate of sodium. Of local applications, cold to the temples while the body is kept warm has sometimes a very soothing if only temporary effect. Pressure applied over the dilated temporal artery sometimes affords relief. Soothing liniments, as of belladonna and aconite, occasionally give ease. The electrical current, constant or interrupted, has been found useful by some sufferers. Finally, when the pain is so severe as to be almost unbearable, relief can only be obtained by the judicious use of such exceptional and occasional means as inhalation of chloroform vapour, or the subcutaneous administration of morphia.

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HYSTERIA

I. Introductory.—The name "hysteria" has the sanction of widespread and long-established usage, and we adopt it chiefly on this account. The objections to it are obvious; not only that it has become etymologically meaningless, but also that to many minds it has the disagreeable connotation of a certain moral feebleness in the patient, and of unreality in the symptoms. Other names have been proposed, but they also are not free from objection. "Neuro-mimesis" lays too much stress on the resemblances, often superficial, between the symptoms of hysteria and of other diseases. To substitute the word "functional" for "hysterical," as is now often done, avoids, indeed, the unpleasant connotations, but introduces an arbitrary limitation of meaning; for it can be said of many diseases other than hysteria—epilepsy, for example—that they are functional in so far as we are ignorant of their organic basis; so that, properly speaking, while all hysteria is functional, all functional disease is not hysterical.

More important than the mere name is the definition of it. On the one hand, hysteria is no mere limbo wherein to thrust all ill-understood nervous cases; on the other, our definition of it is unsatisfactory, so long as our knowledge of its intimate nature is incomplete. Short of this, most physicians will admit that there exists indeed a natural group of cases to which this or some similar name must be applied; but that its limits are somewhat vague, and that cases constantly occur the classification of which must for the present be doubtful. Among French physicians, to whose labours in this field we owe so much, there has been a tendency to include more and more under the title of hysteria; while certain English authors incline in the contrary direction. Thus Dr. Buzzard (6), writing of the diagnosis between hysteria and organic disease, says that many symptoms considered characteristic of hysteria will eventually be relegated to disseminate sclerosis. Dr. Bastian, again, would subdivide the large class of palsies which are indifferently called functional or hysterical, and limit the term "hysterical" to those only which have such well-recognised characters as fits and emotional manifestations. There is, indeed, great difficulty in pronouncing upon the true nature of "functional" cases which do not present a full quota of hysterical symptoms; for we are bereft of the sure guide of morbid anatomy, and, unless we would adopt some arbitrary definition, we must be content with the resemblances and affiliations which they present to better-defined cases. A similar proposal is made by Dr. Head, who, with regard to cutaneous sensory affections, would limit the term "hysterical" to those of a "psychical" type. This would relieve us of much difficulty in the definition of hysteria, but would introduce clinical

limitations of this name which, for the purposes of the present article, we can hardly consent to observe.

Nevertheless, let us endeavour to make some general statements as to the characters of hysteria. We look both for the constant traits of an hysterical diathesis and to the very variable manifestations arising from it, and judge partly of the crop from the soil and partly of the soil from the crop. The diathesis is readily and generally recognised when the patient is a woman, adolescent or in early womanhood, emotional and impressionable, and inclined to such minor neuroses as palpitations, globus, headaches, and other pains. But since hysteria may exist in the opposite sex, and in patients of a different type, we must welcome the attempt—due chiefly to the physicians of the Salpetrière school—to find more precise bodily signs of the hysterical state. The signs or "stigmata" described by them are mainly three: to wit, (i.) the presence of anæsthesia; (ii.) concentric limitation of the fields of vision; (iii.) the presence of hystero-genetic zones. Of these I shall speak in detail later. Important as these signs are, there is often some difficulty in utilising them practically; for, first, they do not exist in every case; secondly, for the discovery of anæsthesia and of the field contraction a minute and skilled examination may be necessary; lastly, the hystero-genetic zones do not, at least in this country, commonly reveal themselves in a convincing form, but are usually reduced to mere areas of tenderness, the diagnostic meaning of which is not very clear. The hysterical diathesis, therefore, may be difficult to diagnose; and both for this reason, and for the still more cogent one that an hysterical patient may suffer from organic disease as well, we must next ask what are the characters of the various manifestations of hysteria. Much may be said of this in detail; not much, perhaps, that is at once distinctive and of universal application, but we may note the following general points:—

(*a*) Many of them are paroxysmal, leaving the patient entirely free in the intervals; of these the hysterical "fit" is the most eminent. Others, though not exactly paroxysmal, are prone to appear and disappear with extreme brusqueness. In particular, sudden and complete disappearance of a grave paralysis is suggestive of hysteria.

(*b*) Even when obstinate and of long standing they are susceptible, in the long run, of complete (and possibly sudden) resolution.

(*c*) They are far more dominated by mental and moral influences than are the symptoms of other, and particularly of organic, nervous diseases. Or they may seem to possess a sort of spontaneity, arising and departing without assignable cause. Or they may be subjected to some sort of artificial control (such as "ovarian" pressure) which would be impossible in organic disease. Sometimes the dependence of an obscure symptom upon some obviously hysterical state, as when a paralysis follows an hysterical fit, may reveal its true nature.

(*d*) Among individual symptoms, however characteristic, there is no regular train of sequence from which we can construct a typical course for the disease as a whole. Indeed there is often incongruity and want of

proportion among the symptoms themselves, as when a marked hemi-anæsthesia exists with little or no hemiplegia, or a severe paraplegia without sphincter paralysis, or when the symptoms seem inconsistent with the patient's general state.

(*e*) Lastly, there are no known organic lesions to which we can assign the symptoms. If such be found at a necropsy, it may be taken that the diagnosis of hysteria was so far wrong. This is not, indeed, as might be imagined, a wholly unpractical criterion during life; for it is on this ground that we hold certain symptoms known to be indicative of structural disease, such as optic neuritis and atrophy, or electrical reaction of degeneration, to be inconsistent with unmixed hysteria; and we may fairly extend this reasoning and say that the more closely any set of symptoms coincides with such as would flow from a known organic disease, the less likely are they to be hysterical. We do not, however, affirm the contrary proposition; namely, that symptoms are hysterical because they resemble no known organic disease; this is an assumption which often leads to error.

II. Etiology.—As to *sex;* it is hardly necessary to mention the greater prevalency of hysteria in women, seeing that it was long thought to appertain to the female sex exclusively: it is now, however, often recognised in boys, and not very rarely in men. Briquet's figures give 11 male to 204 female hysterics; and later French writers give a much larger proportion of males. As to *age*, the outbreak is commonest between the years of fifteen and twenty; but it is common enough in childhood (before ten), and may even take place in the very young. No *race* is exempt from it, and in the Middle Ages, as dæmonological histories show, it was as common and as severe as it is now. It is, therefore, no special appanage of modern civilisation, nor yet, we may add, of the upper classes of society. Its great *frequency* may be gathered from the statistics of Briquet, who found that of all his hospital patients about one quarter were hysterical; and, from the statement of Sydenham, that hysteric disorders constitute one moiety of chronic distempers (and one-sixth of all the diseases to which mankind is liable).

Heredity.—In the formation of the hysterical diathesis, the most potent, and some authors say the only essential factor is an hereditary nervous taint; and the disease may either be inherited as such, as, for instance, when a hysterical mother bears children who become hysterical; or the heredity may be more general, a neurotic taint, such as insanity, epilepsy, alcoholism, or some other neurosis, being manifested in the ancestry or collaterals.

Other *constitutional traits*, such as tubercle (Grasset), the arthritic diathesis (Laycock), plumbism, syphilis, have been noted in connection with hysteria, but probably have quite a subordinate place. There is no direct or special connection between hysteria and disease of the sexual organs.

Among the *proximate causes* of the disease we must first mention

depressing emotion, either of an acute or cumulative kind. Among the first kind rank terrors, as from the perils of fire, water, or violence; the unwonted sights of death, or accident, or convulsive fits; sudden griefs, as from loss of kindred; severe revulsions of feeling, as from seduction, desertion, or disappointment in love: on such shocks the hysterical symptoms may follow at once, or after an interval of variable length, during which it may be said the patient has "never been herself." Of the second kind are the trials of poverty; of family and business anxiety; ill-treatment by relatives or employers; unhappy marriages; the ennui and disappointment of a purposeless or misdirected life; courses of unhealthy excitement, spiritualism, or religionism. For a woman predisposed to hysteria the nursing of a sick relative is a particularly dangerous strain. Another set of causes appears to be more directly material — prolonged ill health of all kinds, and notably anæmia; amenorrhœa; pelvic troubles necessitating elaborate local treatment; tedious convalescence from typhoid or other acute disease; chronic intoxication with agents that specially affect the nervous system (the possibility of secret alcoholism is to be weighed when hysteria makes its appearance in middle-aged women); chronic organic nervous diseases, whereof hysteria may be a most puzzling complication. Physical injury is likewise a well-recognised cause of hysteria, though it may be hard in such cases to apportion the bodily and the mental factors (see later art. "Traumatic Neurasthenia"). Lastly, hysteria may be contagious by imitation, and thus take the form of an epidemic. This usually takes place in small and predisposed societies, such as schools, nunneries, remote and superstitious villages; and the phenomena are such as appeal strikingly to the imagination, such as religious ecstasies, strange forms of fits, saltatory spasms, and laryngeal noises such as bellowings, barkings, or mewings.

Hypotheses of hysteria.—What is the nature of hysteria? What lies at the root of all its manifold and strange manifestations? As yet no thoroughly satisfactory answer can be given. The ancient supposition that the symptoms were due to wanderings of the uterus about the body, absurd though it appears, was at least capable of proof or disproof. Anatomy disproved it; and by degrees it has become evident that the primary seat of the disease is to be sought in the nervous system. But no structural lesion has yet been found there, neither does it at present appear probable that it will be. In the absence of disease demonstrable to the eye, there remain certain other suppositions: one, a vaso-motor hypothesis, namely that the abnormalities of nervous function are due to spasm and relaxation of the arteries supplying the nervous system, is mainly calculated to explain palsies of definite localisation, and capable of sudden recovery; but seems inadequate to explain palsies which may last for months or years, or indeed many other symptoms of the disease. Secondly, we may suppose the disease to be due to defective nutrition of the nerve elements, whereby, though their structural aspect be unchanged, their chemical composition is so altered as to produce irregular or defective action.

And this seems probable enough; but in the absence of detailed support or application, it is at present no more than a hypothesis.

Looking, then, to the difficulties of a purely anatomical explanation, it is not surprising that recent writers should have changed the ground, and should approach the question from the psychological side. Briquet maintains that hysteria is essentially concerned with the emotions; it is a disorder of that part of the nervous system which subserves the emotional nature. He urges with much force the part that emotions play in the causation of the disease, and draws a parallel, perhaps less convincing, between the effects of violent emotion in the healthy, and the phenomena of an hysterical fit. But it is difficult in this way to explain more permanent hysterical symptoms—anæsthesias, palsies, and the like; neither is it by any means certain that all hysterical patients are of an excitable temperament. To explain such palsies mental processes other than those of emotion have been invoked. Thus Sir Russell Reynolds has said that certain paralyses are dependent on idea; the patient, if possessed with the idea that he cannot move, appears physically incapable of moving. Charcot, following this up, demonstrated analogies between certain hysterical palsies and those producible by hypnotic suggestion; and, applying this particularly to paralysis in traumatism, he says that just as an injury may produce in any one a state of temporary numbness and uselessness of an injured limb (local shock), so in the hysterical this state may form the basis, by suggestion, of a more declared and permanent motor and sensory paralysis. It is practically a generalisation from such observations to say, with Möbius, that hysteria is wholly "ideo-genic"; that ideas or representations which in the healthy are under the control of conscious reflection and volition, in the hysterical produce bodily actions or incapacities by an automatic process which lies beyond the control or even the knowledge of the patient. Thus hysteria would be a disorder of cerebral function, and might be called a sort of insanity. But to classify hysteric patients with the insane would be an obvious clinical error, as even the strongest advocates of its psychical origin would admit. Thus Dr. Donkin says: "In the majority of cases intellectual disorder is not conspicuous, and mental abnormality is mainly evidenced by exaggerated impressionability or tumultuous emotion"; and again, "The mental condition of many hysterics is only paroxysmally abnormal in times of excitement or stress," which indeed might be said of other than hysterical subjects. To put the psychical hypothesis of hysteria on a more definite foundation, and to specify the particular forms of mental disability which characterise the disease, is the object of Janet's interesting speculations. Starting from the facts of hysterical anæsthesia, this author remarks that to some instances of this a certain unreality attaches; that is, the patient has not indeed the consciousness of sensation, but yet all the elements of a sensation are present, except the personal perception of it. Similarly, with hysterical amnesia (on the frequency of which he is inclined to insist) memories can be shown to exist, but the patient cannot personally perceive or utilise them. The defect is not in the apparatus of sense or

memory, but is an inability so to appropriate the data supplied thereby as to make them part of the personal consciousness. It results from this defective power of psychological synthesis that, while a healthy mind can grasp and weld into one state of consciousness the numerous impressions which simultaneously pour in upon it, the hysterical cannot take in so much at a time; and there arises a "limitation of the field of consciousness" comparable to the well-known limitation of the field of vision. Burdened by such deficiency the patient ceases to attend to the impressions which concern her least till she becomes, in the sphere of sensation, anæsthetic; or, in the sphere of memory, anamnesic. And, since strong momentary impressions are thus less controlled by other present impressions or memories of the past, she becomes a prey to momentary impulse; and presents an apparent mobility and inconsistency of character, a susceptibility to external suggestion, and a seeming feebleness of will. Further, the habitual relegation of impressions to a lower sphere not only impairs and limits the higher personal consciousness, but tends to foster at its expense a "secondary" sub-conscious mental state. The elements of such a state exist in all of us; sometimes it can be brought into prominence by such processes as reveries, hypnotism, or somnambulism. In somnambulism, which Janet considers as closely allied to hysteria, the secondary consciousness takes control of the whole individual, to the exclusion of his "primary" or personal consciousness. The patient thus lives two lives in alternation, the normal and the somnambulistic; and though the events of the latter are forgotten in the normal state, their threads are taken up again whenever the somnambulistic state recurs. Hysterical fits, according to Janet, are virtually instances of somnambulism, parts of a drama played by the secondary consciousness, and reiterated at intervals independently of the patient's personality or of her actual surroundings. Further, these two mental states not only alternate, but coexist; hence, when the primary consciousness is feeble, and the secondary correspondingly obtrusive, a field is opened in the latter for the growth of fixed ideas, which, independently of the will and even without the patient's knowledge, may produce paralysis and other of the more permanent hysterical phenomena.

This, so far as we know, is the most precise and elaborately reasoned hypothesis of hysteria from the psychological standpoint. It remains to be seen whether it can be successfully pursued into further details. Why, for instance, to take anæsthesia, should the patient be specially prone to drop sensations coming from the left half of the body? Why should analgesia be common, seeing that the sense of pain is a most obtrusive and most useful form of sensation? How shall we explain the regular localisation of tender points? Can we reasonably regard a common hysterical fit, whose manifestations are very similar in many individuals, as representing the thread of the particular patient's sub-consciousness? It may be so in a special stage of the hystero-epileptic fit; but such cases are surely exceptional. These are minor points perhaps; but as to the "sub-consciousness" itself, which appears to be essential to the hypothesis

of paralysis from idea, is it not premature to base an hypothesis upon a condition of which we have so very little knowledge? Again, there are hysterical phenomena—visceral, vaso-motor, and nutritional—to which it is extremely difficult to apply any psychical explanation at all; for they appear to lie outside the sphere of those higher cerebral centres which are regarded as the organ of mind. Lastly, granting that it may be necessary, in consequence of our present state of ignorance of the workings of the highest cerebral centres, to speak of these in transcendental terms, yet psychology alone cannot supply an explanation of disease, which, to satisfy the physician, must be physical.

III. Symptoms.—The symptoms of hysteria may be usefully divided into those which are paroxysmal, and those which are not. Many of the "inter-paroxysmal" symptoms, however, are prone to fluctuations, which show that the distinction is not an absolute one.

A. Hysterical paroxysms.—1. *Mild form of hysterical fit.*—Paroxysmal symptoms are best exemplified by hysterical "fits." These may be represented by three types. The mildest form, popularly known as a fit of hysterics, is much as follows:—Either suddenly, or after a preliminary stage of malaise and disquietude, the patient is attacked by disagreeable sensations in the abdomen or epigastrium, by palpitation or "globus"—that is, the sensation of a lump rising to the throat and causing strangulation, or perhaps by dizziness and faintness; as her sufferings intensify, she sinks on a chair, pants for breath, tosses her hands in agitation and distress, till the attack ends, it may be, with sobs and weeping, or with meaningless laughter; or perhaps with eructation of wind. The fit is often followed by a copious evacuation of pale watery urine. Even these mild attacks may occur in a fragmentary form; thus there may be palpitation and globus without an overt fit, or the attack of agitation may occur without the aura. In such fits there is very evident loss of self-control, but no loss of consciousness; for the patient is not oblivious of her surroundings, may express her feelings by words or gesture, and afterwards remember all that has happened. But sometimes the fit takes the form of a "swoon," in which the patient simply sinks to the ground in apparent unconsciousness.

2. *Hysteroid fits.*—Such swoons form the transition to the second class of fits for which the name "hysteroid" has been proposed. These exhibit two additional phenomena, namely, loss of consciousness and convulsions; though either of these factors may vary much in severity. There may or may not be an "aura." A complete "aura hysterica" consists of the following stages:—First, pain in the abdomen, either in the iliac region or epigastrium; secondly, globus with attendant feelings of suffocation, of inability to swallow, and cardiac palpitations; thirdly, according to Charcot, cephalic sensations, such as dizziness, tinnitus aurium, dimness of vision, or pain on one side of the head, as if from a blow. Sometimes sensations may begin in the limbs, starting from the feet and passing upwards; or there may be a motor aura, such as twitchings of eyelids,

face, or limbs, usually bilateral, but in some rare instances unilateral, so as to suggest Jacksonian epilepsy. Thus there may be considerable variety as regards an aura; though doubtless abdominal sensations and globus are the most characteristic. Some patients have no aura.

In the fit the patient falls, apparently unconscious; but her fall is not so heedless or sudden as to result in serious injury. She may utter a cry of pain or terror, but not the inarticulate laryngeal noise that constitutes the epileptic cry. The face is not livid or contorted, nor the eyes staring; commonly the lids are closed, tremulous, and resist efforts to raise them; the corneal and pupillary reflexes are present. She may lie limp and inert, but more commonly she is rigid, the hands clenched, the limbs stiff and extended, the back arched. Such rigidity may last much longer than the tonic spasm of epilepsy. Convulsive movements may now set in, but these differ from epileptic convulsions. For whereas the clonic stage of epilepsy exhibits rapid alternation of muscular spasm and relaxation, producing movements of the limbs, head, and jaws which are mechanical and aimless, and rarely displace the patient's body as a whole, the hysterical fit consists not so much of muscular spasm as of co-ordinated purposive acts. These vary in character; but frequently a scene of violence is enacted, the patient dashes herself about, tears at her hair and clothes, struggles when held, bites, and screams. She does not bite her tongue severely, nor foam at the mouth, nor pass her excreta beneath her. The convulsions of a single epileptic fit rarely last more than a few minutes, whereas a hysterical fit may last even for hours. Moreover, it is peculiarly apt to relapse, so that a status hystericus is commoner than a status epilepticus. Between these two last-mentioned conditions there is, according to Charcot, the following difference: that in the status epilepticus the bodily temperature rises, and the general condition becomes grave from pulmonary embarrassment and the like; in hysteria this is not the case. Again, recovery from an hysteroid fit is more prompt and complete than in epilepsy; there is not the prolonged stupor, nor even the dazed and confused mental state. Indeed, during the fit itself it would seem that consciousness is less deeply affected; for whereas an epileptic is wholly out of relation with his surroundings, can be roused by no stimulus, and afterwards remembers nothing that happened, the hysterical patient rarely suffers injury, can be brought round by appropriate measures, and can sometimes recall the circumstances of the fit. Mental excitement, of whatever kind, is the commonest determining cause of hysteroid fits: and more commonly perhaps than in epilepsy does the fit follow immediately upon the action of such a cause. The night-time and the early morning, times of predilection for epilepsy, are not the common hours of hysteroid attacks.

Thus there are many points of difference between hysteroid and epileptic fits; nevertheless difficulties of diagnosis often arise; first, because the physician has often to depend on the accounts of friends for the characters of a fit; secondly, because both kinds of fit may occur in incomplete and aberrant forms; thirdly, because there is a description of

hysterical fit in which the features of hysteria and epilepsy appear to be combined.

3. *Hystero-epileptic fit, or "Grande hysterie."* — This, the third and severest type of hysterical fit, is elaborately described, by Charcot and Richer, under the title of "hystero-epilepsy," or "grande hysterie," as follows. The attack exhibits four periods :—

The first (epileptoid) period closely simulates a true epileptic attack, and begins with a phase of tonic muscular spasm, upturned eyes, distorted features, pallor followed by congestion of the face, and interference with respiration ; upon these follow clonic spasms, and then a phase of muscular relaxation with noisy or stertorous breathing. There may be foaming at the mouth ; it is apparently doubtful whether tongue-biting and involuntary escape of urine ever occur. The distinctions from epilepsy are so far very slight ; the neck is said to swell more, the tonic spasm is apt to take the form of opisthotonos, and may be preceded by large, slow movements of the limbs ; but the main distinction is said to be that the attack can be stopped by faradisation, or by pressure upon the inguinal region.

After a short interval follows the second period, that of contorsions or "clownism." The body is thrown into various strange positions—a favourite one being the *arc de cercle*, in which the back and neck are curved backwards till the patient rests on her head and the soles of her feet ; or that of "crucifixion," namely, body and legs straight, arms and hands outstretched at right angles to the trunk. After such posturing, some violent and extraordinary movement of the trunk or limbs begins, and may be repeated many times ; or there may be simply struggling, violence, and screaming.

In the third period (that of "attitudes passionelles") the movements are no longer meaningless, but dominated by some idea. The patient enacts some drama of her past life which has taken lively hold on her imagination,—incidents of terror, pleasure, or love, not infrequently those which led up to the first fit. She does not recognise her real surroundings, and reacts to her hallucinations only. This period varies much according to the natural powers and drift of the patient's imagination.

The fourth period, that of delirium, marks the decline of the paroxysm. The patient has now more or less regained sense of external objects, but may mistake them for the creatures of her imagination ; and about these she rambles disconnectedly, though she no longer acts her fancies. While in this condition she may suddenly become the prey of visual hallucinations, of rats, snakes, beetles, and the like ; this has been called "zoopsia." Lastly, as the fit passes off it may leave painful contractions of the limbs, or muscular startings, or hiccups, or borborygmi ; and these may be followed by the well-known flow of watery urine, or, more rarely, by secretion of saliva, or of vulvo-vaginal mucus.

The epileptoid period lasts from one to three minutes ; the whole cycle may occupy from a quarter to half an hour, but this varies, particularly when attacks are subintrant. The patient remembers nothing

of the epileptoid period, if roused from it; but she may retain more or less memory of her hallucinations.

Complete and characteristic fits of this kind are so extremely rare in this country that it is difficult to criticise the French descriptions. Perhaps we see enough to justify them in a general sort of way. Richer himself says that the events of each period may be emphasised, modified, or suppressed in different cases; so that the general aspect and tenor of the paroxysm may be variable. He maintains, nevertheless, that hystero-epilepsy is the full-blown manifestation of the hysterical paroxysm, of which the other forms contain only the germs. But if this be so, the abortive forms are far the commonest. Perhaps the most important point is the true meaning of the epileptoid period. Many physicians would hold that it is a manifestation of true epilepsy, and that the succeeding phenomena should rank as post-epileptic hysteria. To this the French authors object that the epileptoid stage may be preceded by an hysterical aura; that it may be cut short by artificial means, and that the recurrence of hystero-epilepsy does not entail the mental degeneration which accompanies chronic epilepsy. Consequently, while recognising that epilepsy may complicate hysteria, and hysteria epilepsy, in the alternation of distinct and separate fits, they maintain that hystero-epilepsy is hysteria pure and simple.

4. *Incomplete attacks.*—I have said that there may be incomplete hysterical attacks in which the aura, or part of it, occurs alone. The same thing happens in epilepsy. Paroxysmal vertigo in hysterical patients has been called hysterical petit-mal. But petit-mal proper, that is, lapse of consciousness so transitory as scarcely to interrupt the patient in what he is doing, and only manifested to the bystanders by change of colour, strangeness of look, and so forth, does not occur in hysteria. Epileptic automatism suggests analogy to the dramatic stage of the hystero-epileptic fit. The contrasts, however, are that in epilepsy automatic actions usually follow slight fits, while the corresponding hysterical condition forms part of a severe fit. The hysterical performances, at least in their most perfect form, are dictated by some delusion or emotional reminiscence; those of epilepsy usually consist of the trivial acts of daily life; or else, which is happily rare, appear to be the outcome of some blind and unreasoning fury. The epileptic never remembers his acts or feelings afterwards; the hysterical patient sometimes does.

5. *Other varieties.*—Other kinds of paroxysmal attacks may occur in hysteria, though they are comparatively rare. Sometimes the relation of these to the fits we have described may be made evident; either by the occurrence of an hysterical aura, or by the way in which the attack can be induced or controlled, or when it can be construed as representing some particular stage of hystero-epilepsy. Thus patients may have paroxysmal attacks of delirium, or of violence suggesting demoniacal possession; of prolonged sleep, lethargy, or apparent coma; of catalepsy, ecstasy, somnambulism, or double consciousness. Or motor phenomena of unusual order may occur without affection of consciousness; thus there

may be spasms limited to the ocular movements, to the movements of the head and neck, and so forth; or abnormal visceral and reflex movements, such as paroxysmal hurry of the heart, or of respiration,—sneezings, yawnings, or hiccoughings; or sometimes a series of co-ordinated gestures and movements constitute a regular terpsichorean display; or there may be paroxysmal pains, simulating angina pectoris, tic douloureux, and so forth. With some of these, however, it will be more convenient to deal later.

B. Inter-paroxysmal symptoms.—We pass now to the permanent symptoms of hysteria. Since some of these are generally to be discovered in the intervals of the fits, they may be called inter-paroxysmal; yet we must remember that hysteria is frequently manifested by these alone, without any fits. As they are varied, and have no fixed order of appearance, we can do little more than enumerate and describe them, endeavouring at the same time to follow a sort of rough physiological order.

Sensory phenomena. — 1. Anæsthesia. — Among sensory phenomena anæsthesia is extremely common, so much so that anæsthesia of the skin ranks among the "stigmata" of hysteria, and its persistence or disappearance has been used to measure the persistence or the wane of the disease. Doubtless there are hysterical patients who have no anæsthesia; still this cannot be predicated of them without careful examination, for it is a curious fact that such a patient may be as unconscious of his sensory defect as a normal person is of the blind spot on his retina. In organic disease the reverse is usually the case, and there are often subjective feelings of numbness, deadness, and the like, where loss of sensation cannot be demonstrated objectively. In mild cases of hysterical anæsthesia the skin only is affected; all forms of cutaneous sensation —namely, for touch, pain, or temperature—may be dulled or abolished together; there may, however, be "dissociation," one form of sensation being much more affected than the others, and the peculiar dissociation characteristic of syringomyelia, in which there is early and marked thermal anæsthesia, has been observed sometimes in hysteria. To loss of cutaneous sensation may be added anæsthesia of the deeper parts. Sense of position (so-called muscular sense) may be abolished; so that the patient, with eyes closed, cannot .tell the position of the affected limb, nor copy its position with the corresponding sound limb; presumably because the cutaneous anæsthesia has spread to the muscles, fasciæ, and joints. Similarly the deep structures may be analgesic, so that muscles may be pinched or faradised, or the bones jarred, without pain. The mucous membranes, where these can be tested, may also be found anæsthetic; and some further symptoms, such as anorexia, or retention of urine, may possibly be adduced as evidence of anæsthesia in the visceral mucous membranes. Certain modes of distribution of anæsthesia are highly suggestive of an hysterical basis. A well-marked definite hemianæsthesia of face, trunk, and limbs, particularly if it involve the special senses, is commoner in hysteria than in organic disease; and the left side is more often attacked than the right. Secondly, when confined to the limbs, the

anæsthesia is often distributed by segments. Thus in the upper limb it may involve the fingers only; or the hand to just above the wrist; or the forearm to just above the bend of the elbow; or the upper arm to the limits of the scapula: in the lower limb there may be a similar distribution. Such a segmentary anæsthesia could not be produced by lesion of either the cord, nerve-roots, or nerve-trunks. When unilateral, it is indeed comparable with the anæsthesia ascribed to some lesions of the cortex of the Rolandic area; but this is usually of slight intensity, the hysterical is more marked. When bilateral, again, confusion may easily arise between this and the "stocking anæsthesia" or "glove anæsthesia" of peripheral neuritis; and the diagnosis would have to be made on other grounds, unless it should happen that the anæsthesia involve a proximal segment, leaving a distal one free (say the forearm without the hand), which would suggest hysteria rather than peripheral neuritis. Thirdly, hysterical anæsthesia may be patchy, scattered about in irregular islets and areas, particularly upon the trunk. Lastly, in rare cases general anæsthesia of the whole body has been observed. Among all these varieties it may nevertheless be affirmed that anæsthesia, which definitely follows the distribution of a particular nerve-trunk, is not likely to be hysterical.

We shall speak of anæsthesia of the special senses (sensorial anæsthesia) presently: it may be mentioned here that this often accompanies anæsthesia of the skin; thus in what may be called a perfect hysterical hemianæsthesia the skin is anæsthetic, say on the left half of the body, face and limbs; and the patient cannot smell with the left nostril nor taste with the left half of the tongue; the hearing power is deficient in the left ear, and the left eye sees less well than its fellow. Sensorial anæsthesia has, however, been observed sometimes on the side opposite to the cutaneous hemianæsthesia. In other cases, where there is affection of special sense without any hemianæsthesia, a relation may still be traced between the special sense and the superficial structures of its neighbourhood. Thus in hysterical deafness there may be anæsthesia of the pinna, meatus, or membrana tympani; and, in blindness, of the lids or cornea. It is true that this relation is said not to be constant; but when present it may aid in the diagnosis of hysterical sensory defect.

Hysterical anæsthesia may appear suddenly after a fit, excitement, or emotion; or may come on gradually; or may exist, as I have said, unknown to the patient. It may vary much from week to week. It is common to find hysterical paralysis of movement and of sensation combined. Briquet regards anæsthesia as an index of somewhat severe and chronic hysteria; Charcot, as one of the common marks of the disease. The following curious observation may sometimes be made in cases of hysterical anæsthesia; and it is used by Janet to show that the patient really retains sensation, though she does not consciously perceive; and is analogous to the prism experiment on vision which we shall mention hereafter. Say that a patient is completely hemianæsthetic, feeling on one side neither touch nor prick. Now let the mode of testing be

varied a little, and instead of asking her "Do you feel it?" when each touch is made, ask her to say "yes" when touched, and "no" when not touched. Some patients will then as regularly reply "no" when touched on the anæsthetic side, as they do "yes" when touched on the sound side. One is tempted to think they are shamming, but against this, among other objections, may be urged the fact that the anæsthesia exists during sleep. Thus an hemianæsthetic girl, who answered in this seemingly ridiculous way, could not be waked at night by a prick on the hemianæsthetic side of the face, while a prick on the sound side roused her.[1] Still, from many patients no such sign of recognition can be obtained; and some, of course, would see at once the contradictory character of the proposed answer.

2. Hyperæsthesia.—(α) Pain.—It may be doubted whether hyperæsthesia, in the sense of exaltation of sensory function, occurs in hysteria. Hyperalgesia is common, whether it be in the form of spontaneous pain or in that of tenderness. Frequent as hysterical pain is, I cannot profess to give any precise canons for its diagnosis other than the general hints upon hysterical symptoms already made. Common forms are—pain in the head, of which the well-known clavus is an example, namely, a fixed boring pain in a limited spot, commonly one temple; pain in the back; in the side of the chest; at the epigastrium, and in the abdomen. In the hysterical affections of the breast and of the joints, which will be referred to later, pain is the leading symptom. With many of these pains cutaneous tenderness is associated. Pains about the head, in the teeth, and so on, may often be called neuralgic; a true neuralgia—pain, that is, limited strictly to a given nerve district—is rare, according to Briquet; though recent French authors describe such cases (12).

(β) Tenderness.—Tenderness is even commoner than spontaneous pain. It may be extreme, so as to be provoked by the mere contact of the dress, or the slightest unusual touch; or it may be discovered first during medical examination. Such tenderness may be either cutaneous, or subcutaneous (perhaps muscular), requiring in this latter case somewhat firmer pressure, or movements of the parts underlying the skin, to bring it out; or, thirdly, it may require quite deep pressure. It has several points of predilection; the commonest are the inguinal region, the epigastric, the infra-mammary, and the vertebral column, or points closely adjacent to it. Tender points about the head are rather less common, and upon the limbs very infrequent. Except when mesially situated, as upon the epigastrium and vertebral spines, they are commoner or generally better marked on the left side of the body than on the right. In certain cases (more frequently, it would appear, upon the continent of Europe than here) these tender points acquire an increased importance from the fact that it is possible by pressure upon them to produce or to control an hysterical fit. This seems to show their essential connection with the hysteria (though it is not to be denied that areas

[1] But three other patients, examined for me quite recently by Dr. Edwin Bramwell, did wake when pricked on an anæsthetic part.

of cutaneous tenderness may arise from other causes). They are then called hystero-genetic zones. The best-marked hystero-genetic zone is to be found in the left inguinal region, and was at one time supposed to be connected with the ovary; but this can hardly be so, for similar results can sometimes be obtained by pressure on the same area in hysterical men.

Hysterical affections of the organs of special sense I shall discuss later.

Motor phenomena.—Varieties of paralysis.—Motor affections are also common in hysteria; and if not more frequent than the sensory, at any rate force themselves more upon the notice of the patient and physician. Under the rough heading of paralysis we may distinguish several varieties. First, though the limbs retain their muscular power, the patient may be unable to use them for such functions as standing or walking. This may be due either to a simple disability, of which no further account can be given, or to the occurrence, when the attempt is made, of pain or of tremors or of irregular ataxic movements. Inability to stand or walk properly, coupled with preservation of muscular power, may suggest the diagnosis of tabes; but the presence of knee-jerks and of normal pupillary action will generally negative this. The diagnosis from incipient cerebellar disease may be far less easy. Secondly, there may be the symptoms of true paralysis. Such paralysis may be called simple when the patient appears incapable of exercising proper muscular force, and the limb is therefore either feeble or motionless but in other respects normal—that is, there is neither contracture, nor wasting, nor alteration of tendon reactions, nor of electrical irritability; a condition perhaps most comparable to that which obtains in a hemiplegia of organic origin when quite recent. But sometimes (not commonly, I think) there may be wasting of muscle. When this occurs, especially if accompanied (as may happen) with blueness and coldness of the skin, it is important to distinguish such paralysis from that due to anterior poliomyelitis, or to neuritis. Hysterical muscular wasting does not pick out particular muscles, but involves the limb as a whole, or by segments; there is no fibrillary twitching; the tendon reactions are not annulled; electrically there is no reaction of degeneration, though there may be a simple reduction of irritability. The wasting is usually not extreme; it may come on (and disappear) with comparative rapidity.

Contracture.—Lastly, hysterical paralysis may be of a spastic kind. Contracture or rigidity is indeed common in hysteria, so common that the liability to its occurrence under slight provocation has been regarded as one of the distinctive marks of the disease. Sometimes this is manifested in the mild form of increased tendon reactions; the knee-jerks are exaggerated, and a single tap on the tendon makes the patient start all over; or repeated taps throw the leg into more or less permanent extension. An attempt at ankle clonus—a few short irregular jerks—is often to be obtained, but whether definite ankle clonus occurs in hysteria is a moot point. Sometimes there is permanent contracture, resembling in many respects that which accompanies degeneration of the pyramidal tracts in the cord. The limbs may be fixed in various

positions, but the most common (as in contracture from organic disease) are—for the upper limb, flexion of the fingers, wrist, and elbow, with possibly adduction of the humerus (but, according to Gilles de la Tourette, these statements are liable to exceptions); for the lower limb, extension of the hip and knee with adduction of the hip: the foot is often in the position of equino-varus. The contracture affects all the muscles, flexors and extensors, alike, but preponderates in one of these groups so as to produce the given posture. Paraplegic rigidity of both lower limbs is a common form, or contracture of one upper limb; or sometimes of individual segments—toes, ankle or fingers. Multiple contractures accompanied with much pain are described. Less commonly, perhaps, parts other than the extremities are affected; for example, the muscles of the neck, causing torticollis; or the trunk muscles, causing spinal curvature; or the masticatory muscles, causing trismus, and so forth. Charcot suggests that certain features distinguish hysterical contracture from that of organic disease, as follows:—(i.) Its onset is much more rapid, it may also disappear rapidly, and recur again, and its appearance may be determined by causes (for example, mental shock, slight injury to the limb itself) which could hardly have produced cerebro-spinal degeneration; (ii.) the contracture may be extreme, so that the nails may be driven into the palm, or the leg may feel like an iron bar, while attempts to overcome it cause the patient much pain and alarm; (iii.) it does not amend during and after natural sleep; (iv.) anæsthetics, unless they are pressed far, do not produce resolution. With respect to this last point it may be noticed that in some old-standing cases of hysterical contracture, even when muscular relaxation has been obtained by chloroform, there may be a further obstacle to mobility of the joint in the shape of fibrous adhesions, which must be forcibly broken down before movement is possible.

The distribution of hysterical paralysis may be varied. There may be a "monoplegia"—paralysis of one limb, or part of it. This but rarely results from cerebral disease; while from the monoplegia of spinal or neural origin the hysterical form differs in the absence of electrical reaction of degeneration, and in the distribution of the anæsthesia which may accompany the paralysis. Hysterical hemiplegia is a well-recognised form. The distinction from hemiplegia of organic origin rests on several points. Thus there may be an absence of all conditions which lead up to cerebral disease, such as lesions of the heart or vessels, and of the signs of cerebral tumour; while other hysterical symptoms may be present, and among these notably hemianæsthesia. The more marked and definite the hemianæsthesia in comparison with the paralysis, the more likely is the case to be hysterical; and when the hemianæsthesia affects the special senses in the manner already described the probabilities in favour of hysteria are very great. A difference in gait was pointed out by Todd; the hysterical hemiplegic drags the leg after her like a lifeless appendage, in organic disease it is circumducted with the object of clearing the toes from the

ground. The same physician states that in hysterical hemiplegia the face and tongue are not paralysed. This is the general rule, but one to which there may be some real, as there certainly are some apparent exceptions: by apparent exceptions, I mean cases where the face is distorted and the tongue deviates, but where this is due not to paralysis, but to spasm affecting the opposite side of those parts. Hysterical paraplegia is common and may give rise to very great difficulty of diagnosis. Paraplegia of the flaccid type, due to organic disease, whereof peripheral neuritis affords the commonest example, is characterised by absence of knee-jerks and usually by alteration of electrical reactions which easily distinguish it from hysteria. Much less easy is the distinction from those forms of organic disease which give rise to paraplegia of the spastic type; say from a transverse dorsal myelitis, or still more from disseminate sclerosis. Where dorsal myelitis is in question, the following points should receive careful attention:—(i.) The limits of anæsthesia, if this is well defined. In myelitis the upper limit corresponds to the level of the cord involved, and the anæsthesia affects all the skin below this level; in hysteria the anæsthesia is more likely to be distributed on the plans we have already described. (ii.) The condition of the sphincters. Retention of urine is of course common enough in hysteria, but incontinence either of urine or fæces is exceptional. (iii.) The presence of bedsores or cystitis, which point to myelitis. (iv.) The condition of the reflexes. Increase of knee-jerk helps us but little: the presence of a definite ankle clonus, especially if this have been observed to increase gradually and steadily, militates, I think, against hysteria. Dr. Buzzard points out that a certain combination of reflexes is highly suggestive of hysteria; namely, when the knee-jerks are increased, and the plantar reflexes are absent, or are at any rate so sluggish that they can only be obtained by prolonged tickling of the soles. Investigations upon the plantar reflex, which have an important bearing on the diagnosis of hysterical paralysis, have recently been made by Collier, Babinski, and others. They find that, in the normal state, gentle stimulation of the skin of the sole is followed, first by a contraction of the tensor fasciæ femoris, next by a *flexor movement of the toes*. This holds good for cases of functional paralysis; in some cases, as described by Dr. Buzzard, the toe movement does not occur, but the contraction of the tensor fasciæ can still be made out. But where there is any organic lesion involving the pyramidal tract, the type of response is apt to be different; *extension of the toes*, of the great toe specially, is the prominent feature. And although with a normal (flexor) reflex we cannot altogether exclude organic disease, yet where the abnormal (extensor) reflex occurs we may confidently, they say, affirm that organic disease exists. (v.) The mode of onset. An acute transverse myelitis in which there is a sudden appearance of characteristic symptoms offers little difficulty; neither, perhaps, does the subacute meningo-myelitis, commonly due to syphilis, which is marked by the incompleteness of the motor paraplegia, with disproportionate exaggeration of tendon reflexes, trivial sensory affection, and distinct affection of

the sphincters. In the more chronic forms of myelitis a gradual but steady advance of the paraplegia, painful cramps in the legs, jumping and drawing up of the legs at night, tell against hysteria and for organic disease. In some instances the diagnosis between hysterical paraplegia and that of disseminate sclerosis may be almost impossible; for the characters of the paraplegia itself may be such as to give little aid, and the history of the disease and the general condition of the patient may be misleading, unless some symptom can be discovered which definitely points to organic disease.

The course of hysterical paralysis is by no means uniform. It may appear suddenly, as is the case when it follows an hysterical fit. If the nature of the fit be clear, this throws much light on the nature of the paralysis: but the nature of the original fit may be obscure; thus an hysterical hemiplegia may succeed an attack of hysterical coma, and so the sequence of events suggests organic disease. Shocks of all kinds, whether mental or bodily, are a potent influence in producing hysterical paralysis, which may either follow at once or after a period of latency. Thus, when an injury to a limb determines an hysterical paralysis of the part, there may be a few days' interval, marked perhaps by a sense of discomfort or numbness, before the paralysis appears. Or, lastly, the onset of hysterical paralysis may be gradual, and its exciting cause uncertain. The paralysis may also disappear suddenly, and under influences similar to those which provoked it—fits, emotions, and the like. Recurrences may take place. Or, again, improvement may come slowly, possibly only after much persistent treatment. Paraplegia is apt to be the most obstinate form. Or, lastly, hysterical paralysis may endure for years, a reproach to treatment and a disappointment to prognosis.

Reflex phenomena.—The condition of the various reflexes is a subject which naturally follows that of hysterical paralysis. Simple matter of observation as this may seem, yet it appears to be one on which opinions differ. As to the tendon reactions, I hold that total absence of knee-jerk is never caused by hysteria pure and simple. Exaggeration of knee-jerks (or of any tendon reactions) gives us no such diagnostic criterion, for this may be found both in hysteria and organic disease. (It is not uncommon for hysterical and neurasthenic patients, when the patellar tendon is tapped, to jump and start as if frightened or hurt.) As regards ankle clonus, I think that where this is persistent and well established the fact tells against hysteria; but I acknowledge that imperfect ankle clonus and spurious clonus, which may be difficult to distinguish from the true, are not uncommon; there is no reason at first sight why true ankle clonus should not occur in functional disease.

Next, as to the superficial reflexes. I have referred to Dr. Buzzard's observation that in hysterical paraplegia the plantar reflexes are often absent, and this, as it would appear, whether there be anæsthesia of the feet or not. Again, it is common knowledge that the fauces in hysterical patients often show great lack of irritability. Does hysterical anæsthesia of the skin affect the condition of the skin reflexes? If, as Janet holds,

such anæsthesia is psychical, the skin reflexes should remain; and he affirms that they do. Other authorities, equally distinguished, maintain the reverse. Dr. Head distinguishes two groups—the "psychical" cases, wherein the reflexes remain, despite anæsthesia; the "cerebro-spinal" cases, in which they disappear. Further observations, therefore, are desirable, and particularly of those cases where an anæsthetic area on one side of the body can be contrasted with a corresponding normal area on the other. On the other hand, it is generally allowed that anæsthesia does not interfere with such processes as the raising of a blister, the reddening of the skin by irritants, or the reaction on stimulation of erectile tissues. The reflex action of the pupil to light remains unaltered in hysteria.

As to the functions of micturition and defæcation, retention of urine is well known to be a fairly common occurrence in hysteria. This symptom may stand alone, or it may be associated with paraplegia. It is apt to appear and disappear irregularly. It does not, as a rule, cause distress or entail serious consequences, albeit Brodie narrates a case where fatal cystitis followed. In extreme distension the catheter may be necessary; but if there be no urgent need for this the patient should be induced, either by dint of some local application, or by insistence, to empty the bladder voluntarily. It seems probable that hysterical retention of urine is mostly due to an anæsthesia of the bladder which prevents the patient feeling the need for micturition; but there may be other factors, such, for instance, as spasm of the sphincter. The condition known as irritable bladder consists in suprapubic pain and distress with frequency of micturition; the symptoms differing little from those of cystitis, except that the character of the urine is normal. This may be ascribed to an hyperæsthesia of the bladder. True incontinence of urine is admitted on all hands to be rare. It is not denied that involuntary evacuations may occur from time to time; but persistent incontinence, like that of organic paraplegia, is not a symptom of hysteria.

Similar statements may be made about the function of defæcation. Constipation is common, either as a constitutional condition, or, in severe cases, from anæsthesia or inactivity of the bowel, or in association with spasm of the sphincter. "Irritability" of the rectum, resulting in small frequent stools, has been described by Weir Mitchell; but paralytic incontinence of fæces is not known.

Involuntary movements.—A. Tremors.—Though paralysis and contraction are the commonest forms of hysterical motor disability there may be others. Of hysterical tremors there are several varieties; the commonest, in my opinion, consists in a rapid, fine vibratory movement, usually seen in the hands, and most noticeable when the patient stretches them out for examination. The head and tongue may also be tremulous. This resembles the tremor of general paralysis, alcoholism, or Graves' disease. Another form is a coarser, slower, rhythmical movement, commonly of the wrist or forearm, on both sides or on one, or affecting the legs as well; and present both when the limb is at rest and when it is in use.

The flapping movement of the hands thus produced may recall an advanced stage of paralysis agitans; but there is not the finer "cigarette-rolling" movement of the fingers, and voluntary movement increases rather than checks the tremor. French authors describe a third variety in which the limb is more or less steady when at rest, but on attempts at use becomes subject to coarse, irregular movements resembling those of insular sclerosis or mercurial palsy: this I have never seen. The following aids to the diagnosis of hysterical tremors may sometimes be invoked: such tremors may appear (or disappear) directly after an hysterical fit; they may intermit or disappear without known cause; they may be associated with hysterical contractions.

B. Rhythmical spasms.—Another class of involuntary movements has received the name of rhythmical hysterical spasm; these are of a more elaborate and purposive character. Thus a patient may be constantly making bowing movements (salutation spasm); or hammering (malleation); or when placed on her feet may be forced to progress by a series of springing movements (saltatory spasm). Such rhythmical spasms are not infrequent in the domain of the respiratory and phonatory muscles, as we shall presently see. The general characters of these rhythmical hysterical spasms are thus stated by Pitres: they are commonest in children or young adults; they generally appear suddenly after a distinct exciting cause, probably traumatic or emotional, or it may be after an hysterical fit; they keep to the same type throughout their course, the same form of spasm recurring with monotonous iteration, and at regular intervals; they cease during sleep, and may sometimes be stopped by pressure on hysterical "zones," by occupying the patient's attention, or by employing the muscles concerned in the spasm in some other way. They are apt to be contagious by imitation. Yet the same author warns us that they are only to be distinguished from non-hysterical spasms by careful examination of the patient and of all the accompanying circumstances.

C. Relations of hysteria to chorea. — The rhythmical monotonous character of such movements is enough to distinguish them from genuine chorea. Yet that genuine chorea should sometimes be seen in hysterical subjects is not surprising, when we consider the close connection that both diseases have with nervous heredity and emotional influences. The two affections would thus either simply coincide, or at most own a common origin. Still it must be admitted that from time to time cases do occur in which the development of ordinary choreic movements is so closely bound up with hysterical manifestations as to justify the diagnosis of a true hysterical chorea. But the term "hysterical chorea" is more often, and perhaps with more etymological propriety, applied to a species of fit, in which the patient goes through some elaborate performance of dancing, leaping, gesticulation, and so forth. This is the so-called chorea major, as distinguished from Sydenham's chorea, or chorea minor (*see* arts. vol. vii.).

Ocular symptoms.—1. *Motor.*—Eye symptoms, of both a positive and negative kind, are of importance with reference to hysteria.

As regards the motor apparatus of the eyes, there may be a sort of ptosis, in which the eyelids (for the affection is usually bilateral) spontaneously close, and the patient is unable to reopen them. Although this condition may strongly resemble a paralysis of the levator oculi, it is probably due in most instances to a spasm of the orbicularis (blepharospasm). Obvious blepharospasm is often seen; either persistent, in which case it is often associated with photophobia, or, still more frequently, during the hysterical fit. The eyes are then shut, or semi-closed, there is often a nictitation of the lids, and attempts to raise the lid with the finger produce increased spasm. As to the other external ocular muscles, I incline to say that there is never a pure and simple paralysis either of single muscles or of muscles supplied by a single nerve-trunk; if this be true, a paralytic squint excludes hysteria. But a squint may be caused by spasm affecting in unequal proportion the muscles engaged in a conjugate movement; such conjugate spasm is, of course, seen in the facial contortions of an hystero-epileptic fit, and may perhaps occur independently of an overt fit. As to paralysis of conjugate movement, possibly this may occur, but certainly not often. Monocular diplopia, that is, the seeing of two or even of more (polyopia) images with one eye, is sometimes complained of by hysterical patients; and this Charcot ascribes to a spasm or paralysis of the ciliary muscle, coupled with irregularities in the refracting power of the lens. These latter give rise to secondary images, which in health can be neutralised by the action of the accommodation, but which appear when the ciliary muscle is no longer under control. He finds support for this supposition in the fact that micropsia, or macropsia, may be associated with this monocular diplopia.

To return, however, to facts more common and easier of observation. I think that nystagmus proper does not occur in hysteria; neither is the reflex action of the pupil to light abolished; and an "Argyll-Robertson pupil" (that is, a pupil which reacts during convergence, but does not react to light) is evidence of organic disease.

2. *Visual.*—Next as to vision itself. Acuity of vision is not increased, though abnormal sensitiveness to light (photophobia) is common enough. Subjective visual sensations may occur as auræ in hysterical fits, or as visual hallucinations in the later stages of the hystero-epileptic fit. Attacks resembling ophthalmic migraine—that is, paroxysmal pain in the eye or temple, associated with phosphenes, scotomata, or even, it is said, transitory hemianopsia—are described by French physicians. But hysterical defects of vision are more common and important. Complete blindness may occur, though it is not common; perhaps it is more usual in one eye than in both. Such unilateral blindness has been made the subject of some interesting observations by means of prisms and other apparatus. It has been found that a patient who avers that she can see nothing with one eye, yet sees two images when a prism is put before either eye, which (like the experiment on anæsthesia already mentioned) appears to indicate that she really sees without recognising the fact. More often the loss of vision is partial, and the most characteristic form of this is "crossed

amblyopia"; that is to say, one eye—usually the one corresponding to the side on which there are other paralytic phenomena, and particularly hemianæsthesia—sees very badly, while the vision of the other eye, though imperfect, is much less affected. Or, again, there may be loss of vision for colours; or imperfect distinction of colours, distributed in a similar way. All these cases of blindness or imperfect central vision may be regarded as the exaggeration of a visual defect which is very common in hysteria, namely, reduction in the extent of the fields of vision. Perimetric observations show that frequently the fields of vision are narrowed, generally for both eyes; though it may be more for one than the other. This narrowing is concentric, that is, the fields preserve their normal shape, their size only being altered. The colour-fields are reduced proportionately to those for white, though whether this proportion holds throughout is uncertain, for Charcot regards it as almost characteristic of hysteria that the colour-field for red remains disproportionately large. Concentric reduction of the visual fields he regards as so common in hysteria that it may be ranked as one of the "stigmata" of the disease. Another point with respect to the visual fields, upon which much stress has been laid, is the effect of fatiguing the vision. If perimetric observations be repeated, within short intervals of time, they disagree with each other, in the sense that the first observation gives a wider field than the second; but if a sufficient interval be allowed before a third observation, the field will be found to have regained its original size. It is argued from this that peripheral vision is more easily tired out in hysterical than in normal individuals. There are, however, certain defects of the visual fields which are extremely rare in hysteria, and, except as transient symptoms, almost unknown; to wit, central scotomata and hemianopsia; at any rate, the discovery of them should lead us carefully to reconsider the possibility of organic disease.

Auditory symptoms have been less completely studied. Noises in the head or ear, and vertigo (if this latter may be counted as an auditory symptom), may occur as the aura of an attack, and hallucinations of hearing as well as of vision may occur in the course of an hystero-epileptic fit. Hysterical deafness has been described. Apparently it may be complete, sudden in onset, and transitory; and, in paroxysmal deafness of this kind, patients have been known not only to lose their hearing, but also to become deaf-mute. Another and perhaps a more common form is that in which the deafness is incomplete, and either unilateral or more pronounced on one side than on the other. This may form part of a sensory and sensorial hemianæsthesia; or there may be a limited anæsthesia of the auditory meatus and membrana tympani; or there may not be even this. We should expect hysterical deafness to be of the central form, that is, that the perosseous hearing should be affected step by step with the meatal; and that Rinne's test should give a positive result (25). And, looking to the frequency of middle ear disease, care should be taken to ascertain the condition of this part before definitely pronouncing a deafness to be hysterical.

Organs of phonation, speech, respiration.—1. *Aphonia.*—The functions of speech and of respiration are liable to frequent disturbance from hysteria. The best known of these aberrations is hysterical aphonia. The patient cannot speak above a whisper; but there is no interference with articulation, nor any sort of aphasia; simply tonelessness of voice. The cough, however, retains its natural tone. Inspection with the laryngoscope shows that the structure and colour of the larynx are normal, but that the vocal cords are incompletely approximated during phonation; either from imperfect action of their tensors, in which case the edge of each cord remains slightly crescentic in shape and a chink is left between them, or from an additional inaction of the adductors, in which case a small triangular aperture is left at the back of the larynx. Such aphonia may appear and disappear suddenly, often from some emotional cause; or, it may be, in connection with the appearance of the menses: and it can be quickly, though temporarily, dissipated by the application of sharp faradism or of static electricity to the larynx. Such cases are often extremely easy to examine with the laryngoscope, owing to a lack of irritability in the fauces, which is, as I have already said, a common phenomena in hysteria.

2. *Mutism.*—Far less common is hysterical mutism. There is here an additional disability, for the patient cannot speak at all, and is thus aphasic as well as aphonic. Indeed the inability to speak is even more complete than in aphasia from organic disease; for in the latter case the patient can generally utter a few words, syllables, or noises, whereas the hysteric may be completely mute. Another difference is usually (it would appear not invariably) to be noticed, namely, that in organic disease agraphia commonly accompanies the aphasia, whereas the hysterical mute expresses himself in writing easily and correctly. Like other hysterical paralysis, the attacks of mutism are apt to be capricious in appearance and disappearance, or dependent on psychical influences and variable in duration; speech may return suddenly, or during recovery stammering may take the place of complete mutism.

3. *Cough, etc.*—There are irritative affections of the phonatory and respiratory apparatus which strictly fall under the head of rhythmical hysterical spasms (Pitres). Foremost among these stands hysterical cough; this is a harsh obtrusive cough, absolutely monotonous in its pitch and character, which goes on with a regular and wearisome iteration during the day, but ceases during sleep. There is no expectoration, and examination of the lungs and larynx furnishes no clue to the cause. It is commonest in young people. Other laryngeal noises are sometimes produced, which may recall the cries of the lower animals; such as squeaking like a guinea-pig, barking like a dog, bellowing like cattle, mewing, and so on. Epidemics of these strange performances have been witnessed. Again, such normal respiratory acts as sneezing, yawning, hiccoughing, may occur in paroxysms lasting for days or longer. There is an hysterical dyspnœa, or rather tachypnœa; the respirations are hurried, even to an extreme degree, and short and laboured, so as to suggest pneumonia or some

other acute lung affection; but there is no rise of temperature, no cyanosis, no morbid physical sign in the chest, and the respiration becomes tranquil during sleep.

Organs of digestion.—*Dysphagia, vomiting, anorexia, etc.*—In the district of the digestive organs there are several affections to be noticed. There may be a spasm of the œsophagus, causing difficulty in deglutition sufficiently severe to simulate an organic stricture, and requiring the passage of a bougie for purposes of diagnosis. The ordinary hysterical globus is sometimes explained as being due to paroxysmal spasm of the pharyngeal muscles; if so it is by far the commonest hysterical affection of the throat. Hysterical vomiting is not very uncommon, and has been explained variously. In the best-marked form of it, the food gives no pain, but is rejected at once, without much effort, unchanged in quality, and in such quantity that it would seem none had been retained. Probably this is not really so, for a patient may go on vomiting copiously, and yet retain the appearance of good health and nutrition. Yet the use of the scales has shown that weight is actually lost; and it should be remembered that such vomiting has been known to lead up to grave and even fatal nutritional disturbances. So too with derangements of appetite —capriciousness, perversions, or diminution; these should not be treated too lightly, for they may advance so far as to constitute a serious disease. In this, the "anorexia nervosa" described by Lasègue and by Gull, the patient feels less and less inclination for food, and possibly vomits what she does take; at first she exhibits an abnormally restless activity of mind and body; but eventually languor and emaciation set in, she takes to bed, and rapidly becomes a mere skeleton, eating nothing, and with all her bodily functions reduced to a minimum. This state is fraught with danger to life, unless judicious and energetic treatment be adopted. Out of such material, where the friends and surroundings supply the elements of fraud or credulity, are made the fasting girls, who from time to time become notorious, and whose exploits have been known to terminate in death. Other abdominal manifestations of hysteria are flatulence, borborygmi, and eructations of wind; and their nature is indicated by their frequent connection with hysterical fits. When there is much distension of the abdomen coupled with pain and tenderness, and perhaps vomiting, confusion may arise with acute peritonitis. There is not, however, the wiry pulse or the hippocratic facies; the tenderness is more superficial, and the distension will disappear under chloroform.

So-called "local hysteria."—Sometimes hysteria appears to concentrate itself upon organs—such as a joint, the spine, the mamma—which come more under the notice of surgeons than of physicians. The local nature of the disease is more apparent than real; still such affections have been particularly described by surgeons first (Brodie, Teale, Skey, Paget), and more lately by the physicians of the Salpetrière school, and in America by Weir Mitchell.

1. *The joints.*—So-called hysterical joint disease is mainly characterised by pain which is intensified by any kind of movement, tenderness to

touch, and contraction of the surrounding muscles which has the effect of immobilising the joint. Commonly a single large joint, as the knee or hip, is affected. Apart from general conditions, such as the constitution and history of the patient, the disproportion between the local distress and the general health, the mode of onset and the like, the following facts may help us to a diagnosis. There is no shortening of the limb by measure in hysterical hip disease, although the position assumed by the patient, if she can stand, may suggest such shortening; the tenderness is largely cutaneous and spreads beyond the region of the joint itself, for example, on the abdomen, producing "ovarian" tenderness; there is no painful jumping of the limb during sleep, and when chloroform is administered in sufficient quantity to relax the contracture, no organic joint disease is discoverable. On the other hand, we must remember that certain physical alterations in the surrounding tissues do not necessarily preclude hysteria; thus there may be some muscular wasting of the kind already described, some vaso-motor disturbances, as coldness, blueness, œdema of the limb (*vide infra*), perhaps paroxysmal heat and tension of the joint, particularly at night, or even a brawny thickening of the connective tissues around it (Weir Mitchell).

2. *The spine.*—Pain in the back, and, still more, tenderness over and by the side of the vertebræ, are common in hysterical patients. They may constitute the leading symptom and give rise to the suspicion of vertebral disease. The very intensity of these symptoms, and particularly of the tenderness, is an index of their nervous origin; for, with the notable exception of cancer, vertebral disease is not acutely painful. The tenderness is often superficial; there is neither distortion nor loss of mobility of the vertebræ, nor any swelling characteristic of abscess or tumour.

3. *The breast.*—The hysterical breast is not common. Here too there is a concentration of pain and tenderness upon one of the mammæ. A local examination may reveal nothing to account for these symptoms: but sometimes small movable swellings can be felt in the gland substance, which do not necessarily indicate organic disease; and sometimes, it is said, the whole breast may be swollen, and the skin covering it reddened or discoloured, while yet there is no more than a neurotic basis for the symptoms. A local injury not infrequently starts such hysterical affection of the breast.

I have already stated that hysterical contracture of muscle may produce club-foot, torticollis, and apparent curvature of the spine.

Circulatory system.—1. *Palpitation, cardiac pain.*—In the sphere of the circulation, palpitation is the only common symptom; the heart's action is increased in frequency and becomes at the same time painfully evident to the patient. This, like the "globus," may form part of the aura of a fit, or may occur without any fit upon slight exciting causes; or again there may be paroxysmal attacks of palpitation and rapid pulse, even of considerable duration, for which no cause can be assigned. Attacks of pain, spreading from the region of the heart, particularly if accompanied by feelings of faintness or suffocation, may raise suspicions of angina

pectoris; but we shall usually be guided to a diagnosis by looking to the patient's age and sex, the physical condition of the heart and vessels, and the circumstances under which the attacks arise.

2. *Dilatation of arteries.*—Vaso-motor phenomena—namely, abnormal throbbing with dilatation—are to be seen in the arteries also of neurotic subjects, and these may be so localised as to raise the suspicion of aneurysm. This condition is oftenest seen in the abdominal aorta; but Paget remarks that it is not rare in other arteries, such as the carotid, subclavian, innominate. He also points out certain facts which are useful in the diagnosis of a "nervous artery" as against an aneurysm; namely, the absence of lateral expansion; the preservation of its tubular form; the diminution in the pulsation when the soft parts covering it are relaxed (for example, when a patient with abdominal pulsation is made to sit up); the softness and compressibility of the vessel; the absence of paroxysmal pain; the stationary size of the tumour during months or years.

3. *Ischæmia and hæmorrhage.*—Hysterical patients may present curious symptoms in the domain of the arterioles and capillaries. Limbs that are paralysed or anæsthetic may exhibit also "ischæmia"; that is to say, when cut or pricked, they bleed less freely than normally, or not at all. This is commonly ascribed to a vaso-motor spasm. The opposite condition, spontaneous hæmorrhage, is less easy to explain; yet apparently this may happen, even after we have made all deductions for possible fraud and cultivation of the marvellous. That subcutaneous hæmorrhage may be caused by a purely nervous disease is shown by certain rare instances of tabes dorsalis, where minute or even massive subcutaneous ecchymoses have been known to follow the bouts of lightning pains. The stigmata of the mediæval saints may possibly have had a neurotic origin; and, at any rate, modern examples of such subcutaneous hæmorrhage have been recorded, without the religious element. Bleeding from the mucous surfaces has been described, as from the nose and from the ear; hæmoptysis too (commonly thought to proceed from the throat or mouth rather than from the lungs), and hæmatemesis. Obviously the mere possibility of hæmorrhage owning no organic cause may give rise to great difficulty in diagnosis: but for practical purposes we must remember that such occurrences are very rare, and not to be diagnosed as hysterical unless other causes can be certainly excluded.

4. *Œdema.*—Hysterical œdema, again, would appear to be an unlikely occurrence. Yet the description of it dates from Sydenham. Hysterical swelling of the ankle differs, he says, from dropsical swelling thus—it is greatest in the morning, not in the evening; it does not pit on pressure; it commonly attacks one ankle only. Brodie refers more than once to the swelling which may follow severe pain, and specially mentions a diffuse swelling of the hand and forearm, without redness of skin, which accompanied prolonged hysterical pain in these parts. Under the title of "blue œdema in hysterical patients" Charcot draws attention to the fact that the swollen parts are cyanosed, that is, blue in colour, sometimes showing scattered spots of red, and are cold to the touch. Higier, again, maintains

that some hysterical swellings exhibit a red colour and a raised temperature. Hysterical swelling is no doubt rare, and usually there are other hysterical manifestations in the parts attacked by it, such as pain, anæsthesia, or paralysis; and this may aid in the diagnosis from certain other forms of swelling which may come on without obvious cause.

Nutrition and secretion.—1. *Statements as to general and local nutrition.*—The consideration of vascular phenomena leads us to the subjects of nutrition and secretion. Under the head of local nutritional disturbance stands the wasting of muscle, to which I have already alluded. Certain other phenomena, such as decoloration of the hair, falling out of the hair and of the teeth, and skin eruptions, such as pemphigus, herpes, eczema, and even cutaneous ulcerations and gangrenes, have been described. Cases of this kind need minute individual study before they can be pronounced hysterical. There is no one general type of nutrition which invariably accompanies the disease. Laycock, indeed, emphasises the embonpoint of hysterical women, which he apparently connects with some supposed abnormality in the sexual sphere. Yet we have seen that anæmia, or the exhaustion and emaciation which follow some acute or accompany some chronic disorder, may determine an outbreak of hysteria; and, again, that hysterical anorexia may be the starting-point of a severe and even fatal marasmus.

Certain rare disorders of secretion have been described, such as excessive secretion of sweat, of saliva, of urine, or of milk—this latter even in the virgin. As the commonest example, I may point to the copious flow of limpid watery urine which may follow an hysterical fit.

2. *Composition of urine after fits.*—In connection with this last fact I must mention the researches of Gilles de la Tourette and Cathelineau upon the composition of the urine in hysteria. They state that whereas the urine of hysterical patients in their normal condition, that is, apart from any sort of fit, does not differ from that of a healthy person, yet the occurrence of a fit, or of any paroxysmal phenomenon which is the equivalent of a fit, produces distinct changes in its composition. Thus if the urine of twenty-four hours, reckoned from the beginning of a fit, be collected, it is found that the total fixed residue, and with this the total amount of urea and of phosphates, is small in amount, and that the ratio of the earthy to the alkaline phosphates is increased. This ratio is in normal urine about 1 : 3, but in the post-paroxysmal urine of hysteria the proportion of earthy phosphates rises, so that the ratio may even become 1 : 1. After epileptic fits, on the other hand, the fixed residue of the urine is increased, and there is no alteration in the "formula of the phosphates." These statements have not been verified in this country, so far as I know; but if correct they are of importance, both because they direct our attention towards the corporeal and chemical side of hysterical fits, and because they would supply important aid to the diagnosis of obscure kinds of paroxysm.

3. *Hysterical anuria.*—Suppression of urine—"hysterical anuria"—is a truly strange phenomenon, the reality of which has not unnaturally been

called in question, but is attested by such observers as Laycock and Charcot. From Charcot's case it would appear that there may be complete anuria for as long a period as eleven days, and a very scanty secretion of urine for still longer periods, without deterioration of the general health, or any other consequence than vomiting. Such vomiting appears to be compensatory, since urea has been found in the vomit. It has been suggested that minor degrees of such anuria may be more common than is generally supposed, seeing that, unless complete and prolonged, the condition might pass unnoticed.

Hysterical fever.—It may be taken as a general rule that in hysteria the bodily temperature is not raised. And to this we must always have regard in the diagnosis of doubtful cases; particularly when arthritis, meningitis, peritonitis, or deep-seated inflammations of any kind come into question. Again, in persistently recurrent convulsions (*état de mal*) the temperature may constitute a distinction (not perhaps an invariable one) between the status epilepticus and the status hystericus. Nevertheless, from time to time instances present themselves which seem to show that the temperature of an hysterical patient may rise without assignable organic cause. And, indeed, if we remember how the temperature of sick children and of convalescents may rise from slight causes and even mere emotional stimuli, the occurrence of such "nervous fever" in hysteria will appear less improbable. By fever I mean here simply rise of temperature, as measured by clinical thermometry; I do not assert that there are in such cases corresponding alterations in tissue metabolism. Such fever may come on either in the course of severe hysterical disease, or with comparatively slight affections, such as joint pains, abdominal pains, and so forth; in this latter case itself constituting the leading symptom. It may last for days, weeks, or, it is said, even longer; or be paroxysmal. Unlike most other fevers, no definite course or type can be assigned to it. The temperature may run up to an extreme height (for example, 106°, Debove; 109°, Micrzejewski; 111°, Sciamana; 118°, Teale), such as would be fatal in other forms of disease, yet without serious affection of the patient's health; oscillations of very wide range and rapidity may take place (11° in twenty-four hours, Micrzejewski); or the temperature as taken in the different parts of the body may differ absolutely (108° in one axilla, 98° in the other! Drummond). As to the concomitants of this temperature, no general rule can be laid down except perhaps the negative one, that they are not in proportion to the temperature itself. Headache, thirst, frequency of pulse, hurried breathing may occur with little or no rise of temperature—this has been called pseudo-fever; or very high temperatures may be recorded without any of these things, and even without sweats or burning heat of skin. But delirium appears to be not uncommon. Further, the temperature, though refractory to ordinary antipyretic measures, may come down spontaneously, or under influences which might be classed as mental rather than physical. Need I add that two precautions should be taken, when the temperature rises in an hysterical case? First, since these facts are very rare, to exclude

all possible organic disease; secondly, since they sometimes border on the physiologically marvellous, to exclude malingering and manipulation of the thermometer by the patient.

Mental symptoms in hysteria.—1. *General mental state.*—I have discussed the theoretical importance of the mental state in hysteria, and need here only mention the more obvious mental perversions. No doubt most hysterical patients are unduly impressionable, both as to feelings—in that they react with abnormal readiness and in abnormal ways to emotional stimuli, and intellectually—in that they too readily adopt ideas forced on them from without. This must contribute to instability of character, and hinder a patient persevering effort. Nevertheless, I doubt whether defects of this kind are universal, and whether every hysterical patient is to be stamped as "varium et mutabile." This, however, is the least part of the indictment brought against them: it is often added that they are vain, egotistical, prone to deceit; and that their complaints are more or less assumed for the purpose of attracting attention. We may dismiss the supposition that hysteria is "humbug." There may be malingering here as among any other class of patients; sometimes perhaps the shamming and hysteria may have developed side by side, as is shown by the "confessions" of hysterical women, published by Weir Mitchell; but for the bulk of cases this is no explanation. How can a patient sham symptoms of which she has never heard, with groupings and limitations which would be unknown to any malingerer; or assume contractions which may persist during sleep, or anæsthesia of which she is totally unaware? And to go further, we think that hysterical patients are credited with a far greater power of voluntary control over their symptoms than they actually possess. It does not follow that because a paralysis, for instance, disappears suddenly under some powerful incentive to action, that it was previously under voluntary control; and once released from the necessity of finding a motive for the appearance and disappearance of symptoms, we may fairly doubt whether facts warrant us in ascribing vanity, egotism, or deceitfulness to hysterical people more than to others.

2. *Amnesia.*—Passing to conditions more distinctly pathological, I may mention two which appear to be rare. Hysterical amnesia, described chiefly by French authors, occurs usually after a fit or some emotional disturbance. A whole section of the patient's past life may be blotted out, so that she may forget, say, the beginning of her illness and all subsequent events, even for an interval of many months. Sometimes this mental deficiency continues, so that she cannot appropriate or remember events as they pass before her in the present. Or, again, the lack of memory centres not round a period of time, but round some person or set of circumstances, so that she forgets them, remembering everything else.

3. *Double consciousness.*—Double consciousness is another rare condition, no doubt allied to amnesia. The patient appears to possess two personalities between which she alternates, being at one time her natural

self, at others apparently thinking and acting like some second being. In each state she remembers only the events of the life which corresponds to her present state, and forgets that of the other.

4. *Insanity.*—Is there an hysterical insanity? That hysterics should sometimes become insane is no more than we might expect, considering the absolute frequency both of hysteria and insanity; and, more than this, the fact that both diseases own a common origin, namely, hereditary nervous taint. Nor would it be surprising if insanity, complicating hysteria, were tinged with the colours of the previously existing neurosis. But apart from this we do not know that there exists any form of permanent insanity, which by its mode of origin or special characteristics can be justly described as insanity "ab hysteriâ." Subject, therefore, to the correction which further study of this subject may bring, we are disposed to adopt the French view, that the only true hysterical mania is delirium, transitory in duration, sudden in onset and disappearance, and essentially the same as the hallucinatory stage of the hystero-epileptic fit.

IV. General remarks on diagnosis.—It would evidently be impossible to discuss all the diagnostic problems to which hysteria may give occasion: we must limit ourselves to some general remarks, and to a mere reference to the conditions which are likely to give most trouble. Hysteria may be mistaken for organic disease, or conversely; or, again, both states may coexist, and the one may mask the other. To overlook organic disease may do grave injury to the patient and bring discredit on the physician; to treat hysteria as organic disease may prolong and intensify the hysteria. To avoid the first, and more serious, of these errors we should look carefully for any of those symptoms which tell—some absolutely, some less strongly—in favour of organic disease. Such, to recapitulate, are:—in the sphere of the eye—optic neuritis, optic atrophy, palsies of individual muscles or of muscles supplied by individual nerve-trunks, nystagmus, palsies of the pupil, persistent hemianopsia or central scotomata; in the sensory sphere—anæsthesia in the district of special nerve-trunks; in the motor—paralysis and atrophy of individual muscles, or of muscles falling under special nerve districts, and well-defined electrical reaction of degeneration; in the reflex sphere—absence of knee-jerks, well-defined and persistent ankle clonus and perhaps the modification of the plantar reflex previously noticed, and incontinence of urine or fæces; in the sphere of nutrition—bedsores, which are partially dependent on nerve conditions. If all these signs are absent, still the case may or may not be hysterical; the former diagnosis is rendered probable by the discovery of any hysterical "stigmata," such as anæsthesia of the segmentary or hemiplegic form, hystero-genetic zones or tender points, visual troubles of hysterical character, fits, globus, and the like; and, if we can establish a connection between such admittedly hysterical symptoms and those which are under discussion, it is confirmed. If positive indications in either direction fail us, we can only look to

the course and development of the symptoms—have they progressed steadily and after the manner of any known organic disease? or do they fluctuate in response to mental and moral influences or without apparent cause? Lastly, we must look to the vaguer characters suggested either by the general grouping of symptoms or by the temperament of the patient.

It is obviously in its beginning, when symptoms are few and ill developed, that organic disease is most likely to be mistaken for hysteria; and in diseases other than those of the nervous system, pain and tenderness are the symptoms which will probably come under discussion. The mere fact that we can discover no cause for a pain must not tempt us to call it hysterical; such possibilities as deep-seated inflammation, aneurysm, tumour, or bone disease ought never to be forgotten. The reaction which these, or may be even the pain arising from them, cause in the general condition of the patient, as contrasted with the well-being of many hysterical subjects, is perhaps the best criterion, if we cannot afford to wait and to trust to time for diagnosis. The same remark applies to cases where hysteria simulates disease of internal viscera (by pain, functional disturbances, or perhaps even hæmorrhages); yet not universally, for hysterical disturbances of digestion may produce deplorable and even fatal malnutrition. The difficulties in diagnosis from many nervous diseases are still greater. It is here that wide knowledge and experience are indispensable; and these qualities, if they cannot always ensure correctness in judgment, will at least ensure caution. We may enumerate among these diseases:—epilepsy, where the fits are mild or aberrant, or known to us only in the descriptions of friends; meningitis, when simulated by headache, photophobia, or cerebral irritation; intracranial growths in an early or quiescent stage; peculiarities of gait such as may arise in cerebellar disease, in ilio-psoas palsy, or sporadic cases of Friedreich's ataxy; some forms of tremor and of chronic spasm; paraplegia of all kinds, and particularly the paraplegia of disseminate sclerosis. In disseminate sclerosis there are many opportunities for error. First, because the manner and general appearance are often such as is commonly called "hysterical"; next, because, as Dr. Buzzard has shown, disseminate sclerosis, as seen in practice, often varies widely from the abstract type of the text-books. The characteristic tremor and the staccato speech may be absent, and the symptoms may be reduced to mere paraplegia with increased tendon reactions. And, what is still more important, the advance of this disease may be characterised by transient paralysis, transient loss of sight, first in one eye, then in the other, and other indeterminate and fluctuating symptoms which are sure to suggest hysteria. Add to this that the outbreak sometimes follows a mental shock, and it will be apparent how great the difficulty of diagnosis from hysteria may be.

There are other conditions, due to general nervous break-down rather than to organic disease, which it may be difficult to distinguish from hysteria. Here, perhaps, it is more a question of distinction than of

practical diagnosis. Some such conditions are rare, such as the "akinesia algera" of Möbius and Erb, and the "paramyoclonus multiplex" of Friedreich.

"Neurasthenia" is a name of comparatively recent origin, which is now extending its denotation so as to cover all functional neurosis whatever. If that be permitted, then "hysteria" is but a subdivision of "neurasthenia." But neurasthenia in its original and more limited sense describes a state which older physicians might have called hypochondriasis, and which presents the following contrasts with hysteria. It is commonest in men; it begins usually in middle life or later, and often owes its origin to overwork, anxieties of business, and consequent intellectual strain; the symptoms are less varied in character, and more purely subjective—vertigo, insomnia, dyspeptic feelings, and cerebral and spinal "sensations" being predominant—yet they are more persistent and more refractory to treatment, and reduce the patient to a state of mental depression rarely seen in hysteria. Still in some cases the line cannot be drawn; and even Charcot, who sharply distinguishes the two conditions, admits that they may coexist. And one cause, namely, injury with nervous shock, is capable of eliciting either of them, so that a "traumatic neurosis," as it is sometimes called, may be either hysterical or neurasthenic in its mode of manifestation. However, for a full discussion of neurasthenia, and of its differential diagnosis, the reader is referred to the articles on the subject in this volume.

V. General remarks on course and prognosis.—We can scarcely speak of a definite course for hysterical symptoms, so irregular are they in themselves, and so largely dominated by external circumstances. This much we may say (and the mere possibility of truthfully and persistently asserting it is an aid to treatment), that however grave and severe they may always get well. But the diathesis is in bad cases very permanent; that is to say, where there is a marked nervous heredity, or where, from adversity of circumstances, hysterical tendencies have become deeply ingrained, symptoms will be hard to treat, and subsequent relapses likely. The likelihood of relapse is all the more evident, when "stigmata" such as anæsthesia, "ovarian" tenderness, and so forth, persist. Yet it would appear that the advance of old age may sometimes ameliorate even a bad hysterical diathesis. In mild hysteria, such as frequently occurs in young people, we need not take so gloomy a view; many women, who have had fits and other symptoms in earlier life, subsequently attain to perfect health.

The disease is said to present different features in different classes of patients. Thus in grown men hysteria is said to depend less on emotional causes than in women, and more often on traumatism; and its symptoms to be less manifold and fluctuating, but more difficult of cure. There is also a tendency to mental depression rather than to the exaltation and vivacity which we are apt to associate with hysteria. Men of effeminate or sedentary habits are not more liable to it than the working-

man. In children hysterical symptoms are commonly less persistent and more easily treated than in adults. Charcot thinks, too, that in children the usual stigmata are often absent, and the disease is "monosymptomatic"; some striking symptom, such as rhythmical movements, paralysis with contracture, a false arthritis, or mutism, standing perhaps alone. In the hysteria both of children and adult men it is said that nervous heredity is generally a prominent feature. Perhaps the race and country may introduce modifications from the type of the disease. Thus severe hystero-epileptic fits appear to be less common in this country than in France, and the hysterical stigmata work out with less regularity here; similar observations have been made by American authors.

Does hysteria ever cause death? Strange as it may appear, we must answer, yes. Sometimes, as I have already said, death is due to exhaustion and inanition,—this may happen in cases of hysterical anorexia, or of œsophageal spasm; sometimes again to violent convulsive seizures, especially, as it would appear, to seizures in which dyspnœa is a striking feature; sometimes in thrombosis of the cerebral sinuses or other abrupt ways. Briquet gives a list of some twelve fatal cases; Charcot mentions that he knew of four; Dr. Weir Mitchell had seen three. Still, a fatal result is so rare that, except perhaps in cases of severe progressive inanition, it need not materially overshadow our prognosis. Such prognosis, to recapitulate, is good in the main (for recovery from any hysterical condition is always possible); but should be tempered by the remembrance that some symptoms are extremely obstinate, may last, in fact, for years; and that, unless the diathesis be mild, or the circumstances uniformly favourable, relapses are probable after apparent cure.

VI. TREATMENT.—**A. Preventive.**—With regard to the prevention of hysteria, one principal factor, namely nervous heredity, is at present beyond the control of the physician. So long as lunatics, epileptics, and drunkards can propagate their kind without restraint, so long will the broad basis of this and of other neuroses remain. But no doubt the neurotic tendency may be minimised by a wise education and upbringing, since the direct antithesis of hysteria is the "mens sana in corpore sano." The hygiene of youth has been dealt with already in the first volume of this work; nevertheless, I must here emphasise the importance, for children of a nervous disposition, of proper feeding from infancy upwards, of country air, outdoor occupations, regular and early hours, and abstinence from luxuries and unwholesome stimulants of whatever kind. In a happy and well-regulated nursery or schoolroom, with healthy companions, the seeds of hysteria do not grow apace; but where the parents themselves supply the source or the example of nervous instability, the conditions of health must be sought elsewhere than at home. The mental education must be prosecuted, but must on no account be allowed to outrun the physical. It should be calculated to provide intelligent interests for the present and the future, and to necessitate active attention and application of the mind; and, without being dull, should be

austere rather than sentimental. Long hours of mechanical fingerwork, or of occupations that leave room for solitary reverie, novel-reading, or even the exclusive study of poetry or art, are not advisable. And, to touch a higher sphere, we may say that few things are more opposed to hysteria than the trustful, patient, altruistic spirit inculcated by Christianity, and few things more conducive to it than the terrorism, revivalism, mysticism, or self-concentration which sometimes pose as religion. Certain periods of life need particular care: namely, those of the first and second dentition, when eclampsia, night-terrors, sleep-walking, and other nervous manifestations are apt to occur; that of puberty, when the nervous system is being modified to meet the bodily changes of sexual development, and the period which follows it, when (as Janet well says) the correlative mental development is being carried out, and the individual has first to face the great problems of sexual, social, and religious life.

B. General treatment.—In dealing with declared hysteria, the diathesis or general condition will be our principal object of attack, though we may have also to reckon with particular symptoms. Further, as the disease itself, so the treatment presents both a psychical and a physical side, which it is difficult to separate. Nearly all that I have said concerning preventive hygiene may be transferred, *mutatis mutandis*, to treatment. Not only must healthy conditions of bodily life, proper food, good air, employment, and regular hours be secured, but the inner life must also be regulated, and such exciting causes as fears, anxieties, misery, ennui, and depressing emotions of all kinds must be removed. Obviously this may be sometimes impossible; we may, in fact, be unable to fathom, much less to remove them. The restoration of the general health, when this is impaired, is a matter of great importance. Indeed, it may be said that when there is some bodily ailment, which can be efficiently and speedily removed by simple methods, the prognosis of the hysteria is better than when we have no such tangible thing to treat. Of this anæmia offers the best example; difficulties and irregularities of menstruation another. Sometimes hysteria occurs in connection with symptoms of local disease, generally pelvic disease; and we have to face the question which is the predominant factor, and whether local treatment will do good by removing a source of irritation, or harm by encouraging a chronic invalidism. The general physician would then be wise to obtain an authoritative opinion of some well-known (and not too special) specialist, remembering that what can be done quickly and thoroughly will probably be beneficial, and prolonged peddling the reverse.

The question of marriage, which is likely to be mooted in some cases, really falls under the head of general conditions. Marriage is no specific cure for hysteria; indeed, some of the worst cases occur in married women. It is of advantage when it brings beneficial changes in the physical and mental environment, and the reverse when it entails anxieties and adversities.

The relation of the physician to his patient is important. First, she must believe in his superior knowledge and skill, and that he possesses the clue to the puzzle of her symptoms. We know the advantage of this faith in the treatment of any disease; but in hysteria it is essential that there should be no wavering assertions, no vacillating directions. What, then, is to be done in those difficult cases where certain diagnosis between hysteria and organic disease is impossible? Something must here depend upon the character of the patient; there are those whose mental needs can be met by nothing less than vigorous assertion (wherein we take the risk of error); others to whom we can truly and sufficiently say, that we can discover no reason why they should not recover. Doubts must be expressed to the friends only, or kept to ourselves. Of course, should the diagnosis lie between hysteria and some disease that calls for immediate and special treatment, such as a surgical operation, the case is different, and we must make up our minds at any cost; but luckily this is not often the case.

Secondly, however sure we may be that symptoms are hysterical, that is, that they rest on no organic basis, may at any time clear up, and are worse in proportion as attention is directed to them, we must not treat them as mere nonsense or matter for ridicule. This would merely put us out of touch with the patient; we must enter into her point of view in order to convert her to ours. And it is safest not to attempt too sudden a conversion; for though there may be exceptional physicians who can tell a paralysed hysteric to arise and walk, and exceptional patients who will obey the command, yet a failure only makes future treatment more difficult. Time and steady pressure are more certain agents, and, indeed, there are patients, as Weir Mitchell says, who must be "urged and scolded, teased, bribed, and decoyed along the road to health." Another matter of prime importance is the influence upon the patient of home and friends. In mild and recent hysteria, when the conditions of life are rational and happy, and when the relatives are capable of exercising firm and wise guidance, things may well be left alone; but circumstances are often not so favourable, friends, in particular, are apt to be over-anxious or weak, or in some cases the best friends may be thoroughly baffled by the persistence of the disease. In such instances, the patient must be removed from home, friends, and the conditions wherein the complaint has grown and flourished, and be placed under some wise and competent surveillance. This alone may do much; but it may be necessary to carry out a more complete isolation, namely, to keep her in solitude with her attendants, shielded from disturbing influences, and accessible only to those which we calculate will aid recovery. Such treatment is best carried out in a recognised "home" or hospital, and is usually combined with some drastic form of physical treatment, such as I shall presently describe. Evidently, then, the general treatment of hysteria may be no easy matter: it may imply considerable command of circumstances; on the part of the physician and his coadjutors it requires penetration, tact, firmness, and kindness; on the part of the

patient a confidence and self-surrender peculiarly hard for her to exercise.

Special modes of treatment.—1. *Plan of Weir Mitchell and Playfair.*—Special modes of treatment have often to be adopted. Foremost among them is the plan devised by Weir Mitchell, and introduced by Playfair to this country; the essential points of it stand thus:—The patient is removed from home and friends, and placed in seclusion with a suitable nurse. At first she is absolutely confined to bed, and put on milk diet. Next, passive muscular exercise by means of massage and faradism is begun; and, as increased metabolism is thus ensured, the diet is also increased till the patient takes a large quantity of mixed food as well as milk. In about six weeks the patient may begin to sit up, and then be gradually restored to normal conditions of life. To travel for a time, with her nurse as companion, may form a good prelude to her return into home life. It may be useful to give details of this treatment, which I take from an article by Dr. Playfair (24). It is better carried out in a medical home or hospital than in lodgings. The choice of a nurse is most important, she must be kind, sensible, and firm, and in education and manners a suitable companion for the patient; probably she will have enough to do without undertaking the massage and electrical treatment. Further, if the patient, rightly or wrongly, is unable to get on with a particular nurse, it is best to make a change. In severe cases confinement to bed, without any physical exertion whatever, is required, say, till the fifth or sixth week of treatment, when the patient may begin by sitting up for an hour or two, next to go out for a short walk or drive, and so onwards. Massage is begun on the second or third day, and given twice a day; each administration lasts a quarter of an hour to twenty minutes at first, and is gradually increased to one hour or one and a half; by the time this maximum of two or three hours a day is reached the patient should also be taking the full diet. In fact the capacity for food is the test of the massage; if in a week or ten days the patient is unable to assimilate the food given her, the massage is ineffective, and the operator should be changed. About ten days is the time in which full diet and full massage are reached, but with feeble, delicate patients a longer time may be required. After each massage an hour's complete rest in the blanket, in a darkened room, is advised. When, towards the end of treatment, the patient begins to sit up, the afternoon massage is stopped, and thus by degrees it is discontinued altogether. Electricity, in the form of faradism to the principal muscles, in applications lasting from twenty minutes to half an hour daily, is sometimes used as an adjuvant to the massage; this may be begun when the patient has been about two weeks under treatment. At first the nurse must feed the patient. Three ounces of fresh milk every three hours are then given; in a day or two five ounces, and then ten ounces. She will now be having a quarter to a half-hour's massage twice daily. Next, solid food is begun; at first some breakfast, then a fish dinner, then a minced chop, till by degrees the full diet is

reached (in favourable cases this is attained in about ten days). If any dyspeptic troubles result from the over-feeding,[1] solid food must be stopped for twenty-four hours, and then resumed. The surest test of progress is the weight; an emaciated patient may gain at first 5 or 6 lbs. per week, and afterwards 2½ lbs. per week; and if a patient do not gain at least 2 lbs. per week, it may be assumed that she is not doing well. This method of treatment succeeds best with patients who, by dint of long-continued hysterical paralysis or anorexia, have fallen into a state of chronic helplessness and emaciation; and its success depends partly on the moral influences involved in removal from home—in the steady help and encouragement given by doctor and nurse, in the demonstration of daily improvement—partly on the tissue renovation effected by the passive exercises and over-feeding. The results are less favourable in those who are not emaciated, but unduly fat;[2] in those who appear in good bodily health; and in those whose complaints are not so much of helplessness and paralysis as of pains, headaches, insomnia, and other symptoms of a subjective type.

2. *Electrical treatment* may often be employed with advantage, both for the relief of special symptoms and for the general condition. Static electricity is convenient and efficacious: the patient is charged from one pole of an influence machine, and the charge is either allowed to dissipate itself gradually, or may be taken off from any part of the body, in the form of sparks if a brusque effect be desired, or as an electrical douche (obtained by breaking up the spark by a suitable electrode) if a milder stimulation be required. Or general faradisation may be given, either in the form of a bath or in the usual way.

3. *Hydro-therapeutics* are recommended by the French physicians; and the essential part of such treatment appears to consist in the bracing effects of cold water followed by a good reaction. This is most effectively secured, according to Gilles de la Tourette (in whose work detailed directions will be found), by applying a douche of cold (say about 50° F.) or chilled water for five, fifteen, or twenty-five seconds, according to the temperature, to the trunk and limbs, avoiding the head, and avoiding any

[1] Dr. Playfair gives the following specimen of full diet:—

Breakfast.—Plate of porridge with a gill of cream, fish or bacon, cocoa or café au lait.

At 11 A.M.—Cup of beef tea, with two teaspoonfuls of beef peptonoids.

Luncheon at 1.30.—Fish, cutlets or joint, with a sweet, such as stewed fruit or a milky pudding.

At 5 P.M.—Beef tea and peptonoids as at 11 A.M.

Dinner at 7 P.M.—Soup or fish; joint or poultry; sweet.

In addition it must be remembered not less than 80 ounces of milk (10 ounces every three hours), sometimes 100 or 110 ounces, are being taken.

[2] Abnormally fat patients must be subjected to a preliminary process of thinning as follows (details here also from Playfair):—Confine patient strictly to bed; diet with skim milk; at first 2 quarts per diem, given in small quantities every two hours; after a day or two lessen this gradually, till not more than a pint per diem is taken. If the patient's strength fail unduly under this, some beef tea or soup may be temporarily substituted for the milk. Under the minimum diet the weight gradually lessens about ½ lb. per diem (the patient should be weighed daily), and when some 14 or 20 lbs. have been taken off, pure milk may be substituted for skim, and the treatment as detailed in the text pursued.

hyper-sensitive zones. The douche is to be followed by brisk friction. Or in delicate and sensitive patients the douche may be begun with warm water, which is rapidly cooled down. Other forms of cold-water bathing may be used, provided always that reaction be obtained.

4. *Drugs.*—Unlimited physicking is to be deprecated; still drugs are often beneficial, and it has yet to be shown that their effect is purely moral. Tonics are most generally useful, particularly metallic tonics, iron above all; also zinc, which may well be given as the valerianate, and arsenic. Narcotics, such as opium, morphia, chloral, sulphonal, and the like, are best avoided, but may be required to meet emergencies. Briquet, it is true, recommends a course of opium for some cases; but we must remember the great danger of producing a drug habit. Bromides, however, may be given in small doses (gr. x. ter die) for a considerable time, and may be combined with hyoscyamus or valerian; or with tonics, such as iron, arsenic, or nux vomica. A combination of bromide and digitalis (pot. bromid. gr. x., tinct. digitalis ℥x.) is often particularly useful in reducing the number of hysteroid attacks; but larger doses of bromide have not nearly the same potency in this direction as they have in epilepsy.

5. *Hypnotism.*—As to the treatment by hypnotism, I have very serious doubts. There are so many similarities between the hypnotic and hysterical states, that in hypnotising for the cure of hysteria we may be said to favour the very condition we want to eradicate. At any rate we produce a dreamy semi-conscious state, in which the subject's mental activities are removed from his own control; not a good training for an hysterical patient. I admit that this is an *a priori* objection, subject to correction by experience, and further, that some symptoms may be so urgent as to require removal at any cost; still, I notice that the tide of treatment by hypnotism, which in some quarters has flowed so high, shows signs of ebbing; and eminent authorities declare that useful therapeutic suggestions may be made quite as well without hypnotism as with it. The latest application of hypnotism to hysteria may be noticed, though it is open to still greater objections; it is advocated by Drs. Breuer and Freud, and is based upon their special hypothesis of hysteria. They hold the very prevalent view that this disease and many allied states are mental disorders, and the symptoms of them indicative of what is going on in the "secondary," or sub-conscious, mental life of the individual. But hysteria, they say, has this special characteristic, that it originates in some shock or disagreeable feeling experienced in connection with the sexual emotions. The patient suppresses this occurrence, not merely keeping silence about it, but also banishing it from conscious remembrance. But it remains in the lower consciousness as a permanent source of disturbance ("foreign body"), and reigning there, unmitigated by the wear and tear of the daily conscious life, asserts itself from time to time by the production of fits and other hysterical phenomena. The events of the secondary consciousness can be recalled, they say, during hypnotism, and if the patient be then made to

give to her interlocutor a full account of the original occurrence, she obtains mental relief, and the hysterical symptom disappears for good. This curiously revives the old theory of the sexual origin of hysteria, and of the efficacy of the confessional; but in this novel confessional the doctor is the priest, listening to subjects of extremest privacy, while the penitent does not even know what he is about to confess, and his confession (a sceptic might add) may be purely the result of imagination or of suggestion received from without.

Treatment of symptoms.—The treatment of hysterical cases must be mainly directed against the diathesis; by attacking each symptom as it arises we run the risk of perpetuating the series. Yet the control of individual symptoms may be advisable or even necessary, both for the relief and encouragement of friends and patient. It would appear, too, that in some chronic cases a symptom may persist, as it were by habit, after the hysterical diathesis has largely subsided.

1. *Of fits.*—Mild hysterical fits are best left alone; if restraint be really necessary, it should be applied in some quiet but effective way; against a mere show of force the patient will struggle all the more. There are many devices for cutting a fit short, which mostly consist in the sudden production of some painful impression. Cold affusion to the face is often effective; one way of applying this without drenching the patient is to pour a small, well-directed stream from a little height upon the face, and to direct it, when the mouth opens, back upon the fauces; or the face and neck may be smartly slapped with a wet towel; or the supra-orbital nerve may be compressed where it emerges from the notch; or best of all, if it be available, a sharp faradic current may be applied with a wire brush. Other plans are to stop the mouth and nose till the "besoin de respirer" becomes insupportable; or to exercise firm pressure on some tender area, particularly the so-called "ovarian" region. As soon as the patient begins to recognise her surroundings she should be encouraged, and commanded to wake up and gulp down some cold water. But it may often be best simply to watch the patient through the fit, or to let her severely alone; and in any case, alarm or fussiness on the part of the bystanders tends only to make matters worse. To terminate such paroxysmal states as trances, catalepsy, and the like, the faradic wire-brush is probably the best means, unless it be possible to control them by pressure upon some hystero-genetic zone.

2. *Of pain, anæsthesia, paralysis, etc.*—I doubt whether local treatment of painful and hyperæsthetic parts is generally advisable: still it may become a necessity sometimes. For tender joints and spines Paget recommends sponging with water as hot as can be borne; cold he believes to be mischievous. Yet Briquet recommends cold application for hysterical pains; or, better still, counter-irritants of various grades—friction, mustard, iodine, blisters. Perhaps cutaneous faradisation is the best counter-irritant, as it can be repeated at will. There can be little harm in giving drugs of the antipyrin class for temporary treatment of headaches

and neuralgic pains. For anæsthesia, especially if it be limited to the surface, faradism with the wire brush is an efficient remedy. So is faradism of the muscles for many of the milder forms of paralysis; and the instantaneous effect of faradism applied to the larynx is particularly striking in hysterical aphonia. But there are obstinate and inveterate palsies, of which hysterical paraplegia most often affords an illustration, whereof we can hardly expect a rapid cure. Here massage, passive movements, and faradism must be applied persistently; and when the least voluntary movement returns, the patient must be encouraged towards daily progress, however slight, and each advance demonstrated to her as an earnest of complete recovery. For many such cases, indeed, it is best to adopt the Weir Mitchell method in its entirety from the beginning.

3. *Of contracture.*—Contracture may be difficult to deal with. In the earlier stages, and more limited forms thereof, we should avoid surgical treatment, remembering that such contracture is in fact often produced by splints and immobilising apparatus. We shall limit ourselves to general treatment, coupled with massage of the limb and frequent passive extensions, painful though these may be. With inveterate and severe contractures the case is different. It may be necessary then to administer an anæsthetic to determine the condition of the muscles and of the joints; and, if adhesions be found, to break them down, or to perform tenotomy, with the object of rectifying or preventing dislocations of the articular surfaces; and to follow up these measures by mechanical extension, either by way of splints or weighted lines. Weir Mitchell maintains that the pain which sometimes exists in the lower limbs, where these are rigidly flexed at the hips, is due to pressure on the sciatic nerves, and can be relieved by tenotomy. But surgery has indeed a very limited scope in the treatment of hysteria; for evidently hysterical disease of the joints of the spine, of the breast, etc., concerns the surgeon only as regards the diagnosis.

4. *Of digestive symptoms.*—Hysteria and dyspepsia are often hopelessly intertwined. The ordinary stomachic drugs, such as bismuth, bicarbonate of soda, rhubarb, and the like, are then useful; nux vomica and iron as soon as they can be given. Assafœtida, once the supreme antispasmodic, finds its best applications for eructations and flatulence. In some cases of hysterical vomiting it seems probable that the regurgitation comes from the œsophagus, and it may be well to try feeding by a stomach-tube. In severe hysterical vomiting it may be necessary to feed per rectum; but as a rule, some food is retained by the stomach, and it is wisest to insist upon feeding by the mouth. Nevertheless in dieting all cases of hysterical disorders of digestion we must ensure that a sufficiency of really nutritious food be taken (impairment of nutrition being certain to prove the beginning of a downhill course), and avoid therein two extremes, that of insisting on a full diet which may be acting injuriously on a really weak stomach, and of restricting (or allowing the patient to restrict) the diet till she rejects everything. The latter course may be

the beginning of the grave disturbance of digestion and nutrition called "anorexia nervosa," which should be promptly met with isolation and enforced feeding under the care of skilled nurses.

J. A. Ormerod.

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References are given only to a few principal works, upon which the above article is largely based; for more ample bibliography the reader is referred to the excellent papers by Dr. Michell Clarke in *Brain*, vols. xv. xvii. xix., and to the very complete work of M. Gilles de la Tourette.

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J. A. O.

LATAH[1]

AMONG the natives of the Malay peninsula, of Java, and of the neighbouring islands,—in some localities more than others,—examples of a peculiar mental affection, locally known as Latah (a word signifying nervous or ticklish), are not uncommon. It occurs more frequently in women, especially young women, than in men; children are rarely affected. It persists for years, and is seldom recovered from.

Although there may be considerable variety in the particular symptoms and in their intensity, in all instances the characteristic features of this psychosis are the same; they depend on an abnormal and exaggerated susceptibility to the influence of suggestion.

Under ordinary circumstances the subjects of latah appear in no way different from their neighbours. But on the occurrence of some sudden and startling impression, such as a loud sound or anything calculated to produce a vivid impression, or on witnessing particular movements, or on hearing particular sounds, or in response to some overt suggestion by word, movement, or facial expression on the part of an experimenter, they pass into a peculiar mental state in which they involuntarily utter certain sounds or words or execute certain movements. In other instances they will imitate words and movements, or yield themselves to suggestions coming from others or even from the phenomena of external nature. During this hypnotic-like state, which in some may last for a few moments, in others for an indefinite time or until removed by a contrary suggestion, although consciousness and intellect are clear, and although strenuous effort may be made to resist suggestion, the victim is at the mercy of his prompter, and will inevitably follow any lead indicated, no matter the consequences.

Although the manifestations of high degrees of latah may be followed by signs of exhaustion, and even by swooning, as a rule nothing of the kind occurs. There are no stigmata by which these people can be recognised. Their infirmity is discovered by accident. Subsequently, although the fact that a particular individual is latah soon becomes known to the neighbours, it is not held to disqualify him for employment in any ordinary capacity.

Swettenham, basing his description on personal experiences, gives a graphic account of this disease. At one time he was in command of a small body of native police, two of whom were latah. To pass the time the companions of the latah-struck men amused themselves by taking advantage of this circumstance. On one occasion an inspector saw one

[1] This curious malady is described here as a good contemporary example of the "psychical" diseases, which, whether they be generated in crowds as dancing manias, under religious excitement as corybantic processions or camp meetings, or otherwise, or again as isolated cases of fanaticism, have been observed in their various degrees at all times and in all parts of the world. This description is perhaps sufficiently illustrative of the nature of them all.—ED.

of the latah men on the top of a cocoa-nut tree. On being asked what he was doing there, the man replied that he could not come down because there was a snake at the bottom of the tree. In reality there was a bit of rattan round the stem; on this being removed the man came down without hesitation. The inspector ascertained that the other police had ordered the latah man to climb the tree; this he did, and then, out of sheer devilry, some one taking in his hand a rattan, and saying, "Do you see this snake? I will tie it round the tree, and then you can't come down,"—tied the rattan round the tree. The man was there from 10 A.M. till 4 P.M. "Speaking generally," Swettenham says, "it was only necessary for any one to attract the attention of either of these men by the simplest means, holding up a finger, calling them by name in a rather pointed way, touching them, or even, when close by, to look them hard in the face, and instantly they appeared to lose all control of themselves, and would do, not only whatever they were told to do, but also whatever was suggested by a sign." Thus, at the word of command, or even on witnessing an action suggestive of a dive, they would plunge into a river regardless of the danger from crocodiles. If told to strike another man they would do so; and if the person struck resented the blow, they would say, "It is not I who hit you, but that man who ordered me." On another occasion one of these men on being told that a roll of matting was his wife embraced it with every sign of affection; and when the other latah policeman was informed that the same roll of matting was his wife likewise, he too embraced it, and the two men fell to the ground struggling for possession of the lady. Similar stories are current about latah people throughout the Malay country.

Not infrequently the latah man or woman, if startled by an unexpected touch, noise, or sight, will not only show all the signs of a very nervous person, but, almost invariably, will fire off a volley of obscene expressions having no reference whatever to the particular circumstances of the moment. As a rule, in order to elicit the fact that they are latah, it is necessary to startle them. They are conscious of their infirmity, and in most instances dislike and try to avoid its manifestation.

Latah folk are favourite subjects for the practical joker. Children and even grown-up people cannot always resist the temptation to bait them; for one reason because it is exceedingly easy to do so, for another, because these unfortunates are inclined, on the spur of the moment, to do ludicrous things or to say something of which, under ordinary circumstances, they would be ashamed. Fortunately for their tormentors, latah people are generally good-humoured and rarely resent such liberties; in a few instances, however, they object to being made a show of and may become dangerous.

Pathology.—Latah seems to be akin to a class of emotional diseases which, in their kinds, are common in all barbarous and semi-civilised countries; nor are they wanting among the superstitious and weak-minded of more advanced nations. Among the many forms of this type

of psychopathy there are several which closely resemble the latah of the Malays; such, for example, is an affection prevalent among the Samoyeds, known as "ikota." According to Schrenk, ikota is confined to married women. In its milder form it declares itself by inarticulate sounds which are emitted whenever the affected person sees something repugnant to her, or if she is teased about her peculiar susceptibility. In its more severe form the patient becomes temporarily maniacal, resuming the appearance of sanity when the paroxysm is over. In latah, and in ikota, the individual manifestations are induced in similar ways; in both they are paroxysmal, evanescent, and recurring; and in both the liability to the attacks is more or less permanent.

To the same class of psychopathies belong such affections as the "possession by devils" of the ancient Syrians, and the "tigretier" or the "boudda" disease, and "zarr" of the modern Abyssinian. Such-like psychopathies are by no means confined to one or two peoples; wherever there is a lively belief in the existence of a personal devil, or of evil spirits, or in the possibility of "possession," there, under a variety of local names, these and like maladies are sure to be found.

Allied to, but somewhat differing from, these are those curious epidemics of religious ecstasy which, during the Middle Ages, swept over many parts of Europe, and which, even in modern times, are apt to break out during what are known as "seasons of revival." Such were the dancing frenzy and the children's crusades of mediæval Germany; the tarantismi of Italy of the fifteenth and seventeenth centuries, the "preaching disease" of Sweden; the "jumpers" of Cornwall; the "barkers" of the United States; the eccentric sects of Russia, and many similar absurdities, which have been and are perpetrated under the names of religion or freedom.

These religious and social epidemics differ somewhat in their essence, as well as in their course, from the type of psychopathy represented by latah and ikota. In the case of latah the individual attacks are sudden in their manifestation, supervening immediately on the inducing shock or suggestion, are not voluntarily induced or sought for, and cannot be controlled; moreover, the condition may be permanent and is not readily communicated to large numbers. In the religious and social psychopathies the morbid condition is more evanescent, it supervenes gradually, may be voluntarily induced, is often voluntarily submitted to, can often be controlled, and is readily communicated to large numbers. Latah and the like seem to be diseases of the intellectual reflexes; the religious and social psychopathies are rather diseases of the emotions. The former may be said to behave as an endemic disease, the latter as an epidemic. This dissimilarity in their natural histories is owing, probably, to underlying differences in the psychical elements involved.

These differences apart, such psychopathies have many points in common. In none of them is there any gross physical lesion. Unless by accident they are not fatal. In all of them there is an underlying

and personal emotional temperament; an implicit belief in certain superstitions; a strongly marked susceptibility to the influence of example, with a corresponding impulse to imitate; and, most probably in some instances, at all events in the early stages, a hysterical craving for sympathy, a desire to excite curiosity or wonder, or a wish for a certain kind of personal distinction. Possibly in some cases of latah there may be nothing of this kind, or no consciousness of it; but undoubtedly in many instances hysteria plays a part in the earlier stages. What at first may have been a bad habit only crystallises by and by into second nature; a consummation which may be further led up to by a desire to appear consistent and to live up to an acquired reputation.

The particular form these psychopathies assume depends in great measure on the superstitions and customs of the country in which they occur, and on contemporary ideas and influences. Hearsay, tradition, and example determine, as a rule, the endemic types much in the same way as they determine the national or local methods of revenge or of suicide. Thus, whilst the disgraced and despairing Englishman will shoot or hang himself, the Japanese in similar circumstances will rip his belly open, the Malay run amok. So custom contributes to determine the fashion of the Abyssinian tigretier, the Samoyed ikota, and the Malay latah. In the case of the religious and social epidemic psychopathies the particular form assumed will depend in a measure on the fashion set by the originating apostle, or, perhaps, on the plans of designing leaders.

In the religious psychopathies the emotional exaltation, though in the first instance confined to purely spiritual matters, tends to spread to other emotional centres, and may thus lead to wild sexual and even homicidal orgies.

Gimlette calls attention to the medico-legal aspects of this disease. Fortunately, examples in which latah has been shown to play a part in crime are rare or unknown. It is conceivable, however, that under the influence of suggestion an affected person might be induced to kill, or commit some other crime. In such circumstances it might be difficult to assess or to fix responsibility.

Treatment.—Of the various forms of "possession," latah is one of the most rebellious. Devils, spirits, and wild beasts may be exorcised by the resources of priest-craft, by music, by drugs reputed to have special virtues, by other strange and often repulsive means,—in other words, by an appeal to those superstitious and emotional elements that raised them. Latah, however, has the reputation of being incurable; the reason for this special rebelliousness is not easily discerned.

The prophylaxis of these psychopathies, whether endemic or epidemic in type, manifestly lies in judicious mental and physical education.

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P. M.

CATALEPSY

SYN.—*Morbus attonitus* (Celsus); *Hysteria cataleptica; Trance.*

Definition.—A neurosis in which sensation and mobility are suspended, and consciousness is more or less modified; in some cases being absent for a considerable period. The predominant symptom is a peculiar condition of the muscles, marked by the ease with which the limbs can be moulded in any form desired by the operator, and by their remaining in the same position for an indefinite time; the patient presenting, in some instances, a strikingly statuesque appearance.

Description.—The muscular condition above mentioned is generally described in the text-books as one of *rigidity;* but there are two totally opposite conditions of the muscles, in one of which the term, it is true, may be correctly employed, while in the other (by far the more frequent) there is *plasticity.* The typical symptom of catalepsy, known as *flexibilitas cerea*, cannot be correctly described as rigidity.

(i.) Catalepsy pure and simple, except when artificially induced, is exceedingly rare; and it will generally be found that writers on the disease illustrate it by instances which probably occurred in the last century. I have notes of a case admitted into St. Bartholomew's Hospital diagnosed as simple catalepsy. The patient had been in service, and one evening did not answer the parlour bell. Her master came downstairs in a rage, and found her standing in the kitchen motionless, and with her eyes open and fixed. With the exception of an occasional "yes," she was speechless, and continued to be so for long after. Within two days she was brought to the hospital; and, when I saw her, she stood in the ward with her arms raised, which on examination were found to be cataleptic. The suddenness of the attack, her blank expression, her attitude, the ease with which her arms were placed in any position, and so remained, presented an excellent example of this neurosis. Further it was found, on questioning her subsequently, that she had not been conscious of her master's approach, and was oblivious of what was going on around her. While in the hospital it was difficult to feed or dress her. When told to nurse a baby that was in the ward she instantly obeyed, but automatically. At that time hypnotic "suggestion" had not been recognised as it is at the present day, but no doubt the patient would have implicitly responded to such commands. She gradually improved, the attacks being intermittent; now she was sensible, then she relapsed, from some trivial cause, into the cataleptic condition, when, if an arm were raised, it retained its

position, without the will, for a very considerable time. To test the volitional factor a weight was attached to the outstretched arm by a cord, which, after closing her eyes, was suddenly cut. John Hunter was the first, as far as I know, to employ this test, but it must be owned that although, if the limb do not start up when released from the weight, catalepsy is fairly well proved, it would not be safe to infer malingering in all cases in which there is some upward movement of the limb. In about three weeks the patient was allowed to return home. A complete permanent change took place shortly after her return, and on being visited by me she spoke and acted in a natural manner.

I give this case as an illustration of what was to all appearance an example of pure catalepsy, and was probably as true an example as the cases recorded by medical writers. At the same time, on careful examination I found that the patient was not altogether free from delusion, and that while in the hospital she had thought our apothecary was, from his name (Wood), to be the means of burning her.

(ii.) I proceed to those cases in which catalepsy is associated with unquestionable mental disorder.

In some instances it is of a much more marked character than in others; and, in the blank facial expression, the modified consciousness, and the motor and sensory signs, presents the symptoms already described.

Out of the large number of cases of catalepsy connected with insanity, I have not seen a more typical case than the foregoing; in the vast majority of cases the condition may be described as *cataleptoid*. Thus in mental stupor without the extremely well-marked expression, or rather want of expression, presented in the foregoing instance, it very frequently happens that on raising the arms they remain unchanged in position for a long time; but usually the condition of *flexibilitas cerea* is very slightly evident, if at all.

Causation.—In some instances catalepsy has been suddenly induced during a battle. At the time of the Franco-German war it was no unusual circumstance to find soldiers killed by gunshot wound in remarkable positions; sometimes, for instance, leaning against a tree, as if alive and presenting the phenomenon of *flexibilitas cerea*. This condition of catalepsy, or rigor mortis catalepticus, is due, according to du Bois-Reymond, to a lesion of the cerebrum or the medulla spinalis; others hold that the peculiar state is dependent upon a rapid loss of blood, and is not associated with any definite seat of lesion.

Treatment.—Former attempts to relieve the ordinary cataleptic patient by heroic remedies, especially by cruel means, have, happily, passed into oblivion. Some forms of shock, however, may be beneficial and permissible. Shower-baths, the galvanic battery, and possibly the plunge-bath, may break the spell under which the patient labours. But this form of treatment is more likely to succeed, and is more welcome, in cases in which the catalepsy is not linked to a delusion; when, in fact, the mental condition is probably allied to that of hysteria, and may call for similar treatment. It is moral rather than physical in origin, and the

nvironment and the character of the therapeutic forces employed must be directed by a recognition of the hysterical nature of the malady under which the patient, probably a woman, labours. It is needless to say that catalepsy may be simulated; and a mistake in diagnosis must therefore be carefully avoided by the physician. An ex-patient informs me that he succeeded with ease in deceiving his medical attendant by pretending to be unconscious and allowing his limbs to be placed in any attitude the doctor desired. For two days he continued this deception; then, wearying of it, he simulated recovery with equal success.

Pathology.—Inhibitory action appears to be paralysed, while certain motor centres are excited by reflex action; others appear to be in the same state of suspended function as the general condition of the nervous system; the direct reverse of that which is observed in sleep-walking, in which all the motor system is so remarkably active. To a definite pathology we do not seem able to attain as yet. Necropsies do not assist us. One thing is certain, that in catalepsy induced by Braidism, the condition is purely "dynamic"; no disease of nervous tissue could be detected by the microscope.

D. Hack Tuke.

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D. H. T.

NEURASTHENIA

I. General Description.
II. Traumatic Neurasthenia.

Professor Horsley kindly undertook to write, as part of this chapter, a section on Traumatic neurasthenia; this section, besides its great value to those readers who may be concerned with railway accidents and the like, has the advantage of displaying the definite features of the disease in cases which take their beginning from a definite and simple cause. On consideration of the traumatic cases the reader, if he were inclined to regard neurasthenia as an indefinite medley of inconstant symptoms, may be converted.

We are too apt to think that a disease is engendered in mankind about the time of the first description of it. We do not realise the prodigious recent development of our powers of clinical observation; or are we too modest to acknowledge it? But while, on the one hand, we do not forget that in military societies nervousness would have had short shrift, and that neurotic stocks would hardly have flourished; that the manners of

ruder peoples would have counteracted such proclivities; and that neurasthenia is indeed often the product of stresses upon the functions of the mind, yet, allowing for all these provisions, we cannot suppose that the symptom group to which the name of neurasthenia is given is in any exclusive sense the product of our own times. As insanity and epilepsy, so neurasthenia had no doubt its sphere in all ages; but, unlike the sufferers from the two former diseases, which had somewhat of a sacred character and thus enjoyed a certain protection, neurasthenic persons would be harshly thrust aside and escape even medical recognition. Were this the place to enter on such an inquiry, it would not be difficult from ancient records to adduce evidence of morbid states resembling neurasthenia, even if we do not go so far, let us say, as to recognise in the restoration of sexual capacity to Iphiclus, by means of a course of iron rust exhibited by Melampus, a rehabilitation of a "sexual neurasthenic." Suffice it to say that, if instead of searching into past time we travel into present space, we shall find not only that the citizens of the United States, in spite of their claims, are no more neurotic than other urban peoples, but that neurasthenia, in its pronounced examples, is common enough also in the wage-earning classes of England; it is frequent in the West Riding, especially, I think, among colliers. Such patients are a grievous trial to the medical officers of friendly societies. It occurs also in societies—Oriental and other—which are at once mentally undeveloped, and yet of sufficient stability to admit the diseases of peace. We read again that it is a frequent disease in Finland, where stress of mind is probably no common peril. That neurasthenia is chiefly fostered by weight or intensity of business, at any rate in any eminent degree, is not obvious, however likely this notion may be. To test the claims of the American people to a bad eminence in nervous instability, I spent two hours of one day with a distinguished student of such diseases in the street cars of New York, in order to watch the multitudes of people who passed through the cars; for I had formed the opinion that, instead of a prevalent lack of nervous control in the American people, I had noticed in them a remarkable steadiness of demeanour; and this was admitted even by my friend, rather to his own surprise. By their marvellous organisation of business, and in virtue of the elasticity and optimism of the national temperament, the American is no more worn by his town life than are our own citizens, but indeed less so. The truth is that neurasthenia is found no more in the market-place than in the rectory or in the workhouse; no more in busy citizens than in idle damsels; development of the higher nervous centres makes for control, while, on the other hand, listlessness, frivolity, and adversity are not confined to any one rank of life.

Throughout this work we have decided, reluctantly, to discard all mere historical matter; but I must say briefly that to Beard of New York we owe the first complete and accurate description of neurasthenia as a symptom group. In his work on neurasthenia, published at Leipzig in 1885, Arndt gave an interesting historical survey of the gradual advance of our knowledge of the disease, and to this essay the student is referred.

Arndt attributes the first approach to a true conception of the clinical group to Fernel, who, in a work entitled "*De abditis rerum causis*," published in 1540, attributed neurotic perturbations to poisoning of the brain by suppressed seminal, menstrual, or lacteal discharges. Under the name of "The Vapours," functional nervous disorders, as the reader well knows, were more or less confusedly and fancifully described by medical writers of the seventeenth and eighteenth centuries. To that remarkably endowed physician Whytt (1765) we owe the first division and segregation of such disorders into Nervousness, Hysteria, and Hypochondria—a division which at the present time is of fundamental importance. Unfortunately Whytt's essay soon fell into neglect. In the first half of our own century "spinal neurasthenia" was frequently described, both at home and abroad—as, for example, by the brothers Griffin—under the name of "Spinal irritation"; and thus the subject came more and more into the light until, in the year 1850, Bouchut published his celebrated treatise "*De l'état nerveux aigu et chronique, ou nevrosisme, appelé nevropathie.*" If Bouchut did not put the last touches to the picture, if he did not clearly delineate the disease in its finer features, we have at any rate to thank him for making the chief advance in this direction in our own day. Then came Beard's work on *The Nature and Diagnosis of Neurasthenia* (*Nervous Exhaustion*), which was published in New York in 1879. The communications on the subject to medical periodicals by this industrious observer are too many to be enumerated here. To him and to other physicians, some antecedent, some subsequent, we owe also the various subdivisions of neurasthenia, such as the cerebro-spinal, the gastric, the cardiac, the sexual, and so forth; as will presently appear.

A brief summary of my own opinions on a part of the subject were contained in the Goulstonian Lectures for 1884. My attention was first drawn to the subject by the enormous number of railway accidents which at that time, before the introduction of interlocking points and signals, were wont to occur in the neighbourhood of Leeds; upon which city no less than six principal railway companies converge. Many such cases came to trial at each assize; and for every claim which reached a jury, two at least were settled privately, in great part on medical evidence.[1] Hence the experience of the Leeds medical men was exceptional, and was often cited by the judges. With the willing and honest aid of the medical officers of the companies we soon arrived at the conviction that most of these cases were at once independent of patent injury, and yet genuine enough nevertheless. That recovery would often follow compensation did not blind us—nor, as I would add, the judges or the leading members of the bar—to this genuineness. Furthermore, we on the spot, being able to follow these cases after trial or arbitration, assured ourselves that the alleged recoveries, many as they were, were by no

[1] In all these and like cases we insisted, almost from the first, upon consultations between the medical men called for both sides,—a rule which, I regret to say, consultants from a distance were sometimes tempted to elude, and which solicitors nearly always resented and opposed. I proposed a formal resolution at a meeting of the British Medical Association enjoining such consultations, which was unanimously carried.

means always complete, perhaps not even for years afterwards. Again, from time to time we observed injured persons to whom compensation was a matter of comparative indifference, or even unsought, yet in whom the tale of subjective symptoms would take a like form. And with these railway cases we learnt to compare the effects of like injuries caused by other accidents, as in one remarkable case in a patient of my own—a lady of calm, well-balanced nervous system, well nourished and of healthy stock, who, in lifting her child from the top of one of the loose stone walls of the Yorkshire moors, fell backwards some few feet upon her hinder parts, and from that day fell into a neurasthenia, in its classical form, which lasted a considerable time. Thus were our minds prepared for Beard's doctrine; and, somewhat surreptitiously or half unwittingly, we assimilated a teaching which in the eighties was held in some scorn as an American fad, and as a bid for notoriety. Now Beard is avenged, and neurasthenia holds the field as a definite symptom-group—one not too fanciful indeed for the positive mind of the surgeon. To look back now on the earlier cases of railway injury in the Assize Courts, and to remember the crude and confident allegations by honest medical witnesses of spinal meningitis, of hæmorrhage, of cerebral softening; and the prophecies, no less crude, of paralytic and even of fatal sequels, seems like peeping through a glass into a past century instead of into a time which seems otherwise but the day before yesterday.

If there are still amongst us, as I suspect there are, medical men who regard neurasthenia as in part a sham and in part a figment of complacent physicians, I trust that a perusal of Professor Horsley's chapter and my own may prove to them that neurasthenia in its several forms is not only a frequent but also a uniform and consistent malady. That this symptom-group should lead by occasional transition into other groups—into hysteria, for instance, hypochondria, or insanity—is a tendency which it has in common with every other disease to which mankind is heir.

Symptoms.—Neurasthenia is, then, no mere hotchpot—no limbo into which odds and ends of unconsidered neurotic trifles are to be thrust away for lack of definite affinities. Yet it is to be admitted that the varieties of the disease, and the wheels within its wheels, are so many, and in apparent diversity so bewildering, that the essential unity of the process long lay hidden, and its features long eluded analysis and classification. Neurasthenia signifies a wide generalisation drawn from a world of particulars; particulars which are apt to gather in sub-groups, forming fairly consistent and uniform maladies subordinate to the main disease; and the nature of these several lesser constellations of symptoms was revealed only by a subtle analysis and a training in exact clinical observation which were scarcely at the disposal of our forefathers in physic.

Now if neurasthenia be the name of a tribe, how are the several subordinate family groups to be designated? We may err on the side of subtlety or on the side of breadth; the following divisions will, I trust, be of practical service:—A. Cerebral; B. Spinal; C. Cardiac and vaso-motor; D. Gastro-intestinal; E. Sexual neurasthenia. Like neurasthenia

itself these subdivisions are no water-tight compartments, but are in frequent communication one with the other; yet, as all classifications are but devices for the convenience of the fallible human mind, they will serve to indicate more clearly the various aspects of neurasthenia, and, often confused, as in practical experience they are, one with the other, to aid in their recognition. For descriptive purposes, then, these divisions, though not of the subtlest, will serve us well enough.

A. *The cerebral form.*—This form of the malady may and often does exist alone; the patient being corporeally robust, active, or even athletic. One of my patients, a man of neurotic family history, who suffers from the cerebral form of neurasthenia, can tire out most of his friends in hunting and shooting. One of the most characteristic features of cerebral neurasthenia is the "weary brain." The sensation is familiar enough to any fagged man, especially if he be short of sleep. Impressions seem to go half into one's head, and there to fall into a woolly bed and die. Voices sound far off; the lines of a book run one into another, and the meaning of them passes unperceived, or, if for a moment perceived, is dissipated. Doors bang and windows rattle as they never did before; if but a shoestring break an imprecation is upon the lips; and to the fretful skin the touch of the gentlest hand may be torture. Business matters are in a conspiracy to go wrong; letters are left unopened, partly from want of will, partly from a senseless dread lest they contain worries or ill news. If this fretful man be otherwise healthy and wise he will go off on a Saturday to a comfortable inn far enough from home, swallow in place of dinner half a pint of good soup, or a couple of raw eggs with a glass of wine in half a pint of warm milk, and go to bed at half-past eight, leaving especial orders that he is not to be awakened in the morning. He will wake of himself at nine or ten o'clock, eat his breakfast like a wolf, repeat the same treatment on Sunday night, and return home fit for the world again. But unhappily it is not given to a all men thus to sleep. Let us take it that the poor mortal thus exhausted, instead of sinking into slumber, tosses on a thorny bed, beset by all the cares which come with the darkness, and lies there restless, or pacing his bedroom till dawn, when some fitful filmy slumber may bring peace rather than recreation, and the weary day has to be faced anew with no renewal of strength; now this man is on the brink of neurasthenia. Either he is utterly undone by excessive mental stress, in which case there is still much hope for him, or he comes of a neurotic family and is entering on his inheritance.

Headache, in its more local and definite forms, is of course consistent with neurasthenia, but not very characteristic of it. Some of these sufferers complain of a never-ending diffused headache of which they often cease to complain, unless questioned about it; it is occipital rather than frontal, and seldom acute enough to assert itself prominently. "Oh, I always have a headache," is the reply. But complaint is rather made of strange sensations in the head; it feels leaden or wooden, empty or full; there is a heavy weight upon it, or a tight band or cap about it (casque

neurasthénique); or it is too light, it opens like a lid, it hums, or little explosions take place in it. When headache is persistent, defects of refraction may be detected; but too often such search is vain, and by the aching, probably with some insomnia, the patient, who may or may not be vigorous enough otherwise, is disabled for bookwork. Tenderness of the scalp is often present, and not in cases of headache only.

The psychical symptoms are among the most characteristic of the phenomena of the malady, and, although they vary in different cases, they preserve much consistency, differing in degree rather than in quality. Of these features loss of memory is eminent, sometimes distressing; in the severer cases it is wider and deeper than mere inattention can explain. In the matter of extent it differs from the losses of memory in hysteria: in neurasthenia the loss of memory, capricious as it may be, is continuous; but in hysterical loss of memory a certain interval of time is often cut out as with a knife, while things current may be remembered well enough; or the defect is definite and particular, not general. In neurasthenia, no doubt, the loss of memory is due in part to the "malady of not marking withal"; the patient has lost interest in life, is self-centred, and not only so, but also inattentive, from sheer lack of power of application, of mental attack and endurance. On the first effort of thought the brain flags, and is felt to flag—"it goes empty." With these defects are bound up the loss of volition, of self-control, and of initiative so manifest in these cases; it is, indeed, but a different aspect of the same mental failure. It is often difficult, for instance, or indeed impossible, to rouse the patient to the thought and decisions necessary to the treatment of his own case; he cannot face the business arrangements, he cannot set himself to pack his portmanteau. In the case of a son or daughter these duties can be enforced or done by friends; but in the case of the head of a family, the physician must be on his guard not to be put off from urging change of scene, or places of cure, by protestations of hindrances which in health would have been superable enough, or even trivial. Even with the help of older friends it is often a matter of great difficulty to persuade a young man or woman to submit to isolation treatment, or to go away from home at all; and this from sheer self-distrust, and vacillation of purpose. With such persons gentle but unflinching persuasion has to be used. In others, again, loss of control is seen in the consuming haste with which ideas must be realised in action. The patient suddenly conceives the idea of seeing some person who lives many miles away, and he does not rest till he has sought out his friend, often for no important purpose; or some project or purchase must be carried out instantly, although indeed of no urgency. And when these hasty schemes miscarry he is much put about.

In manner and temper neurasthenic patients vary very much. I may hint at three types of them: first, the man of healthy, even robust frame, and well-coloured face and lips, one who, but for a certain characteristic look of preoccupation and moodiness, might pass for healthy and vigorous; secondly, the voluble, restless haunter of consulting-rooms, the connoisseur

in specialists, "l'homme à petits papiers" of Charcot, always spare of frame and sallow of face, petulant rather than sulky, and concealing under a mask of energy and promptitude the same caprice of judgment and purpose; and, thirdly, the silent patient, rather blue than sallow, with limp and clammy hand, always brought more or less against his will by doctor or friend, miserable or morose, shifty or mulish rather than unstable in temper, sometimes reticent and shrinking, but sometimes possessed by secret or unreasonable resentments; this third patient is as likely to drift into melancholia as is the second to end in "paranoia." Both the latter patients are usually under weight, but scarcely perhaps to be called emaciated unless food be fitfully or persistently refused ("anorexia nervosa"), in which case the sufferer, hollow-eyed and with dried-up hair, may look like one raised from the dead; such cases occur rather in women. Neurasthenic patients are apt to be suicidal, especially those after the third type; but for the most part the "tædium vitæ" stops short of this depth of despair.

Although I have to indicate the dangers of insanity in neurasthenia, the transition is not one of ordinary anticipation. At the same time, insanity is frequent in the families of these patients, and in the later years of life they may themselves lapse almost insensibly into incurable delusion or settled melancholy.

Certain mental perversions, not unhinging the mind as overt insanity, are prone to occur in neurasthenia, are even significant of it: these are peculiar dreads and oppressions which do not tincture the whole being as insanity does; they are more or less arguable, more or less kept in their place by the judgment of the sufferer, who does not lose all sense of relative values. These dreads or "obsessions" are besetting thoughts, impulses, or anxieties which have their origin within, and are not reflections of any sufficient external causes. Such are false apprehensions of evil, fears of fears, recurring besetting impulses; or, again, peculiar bodily oppressions or disturbances—cardiac, respiratory, pelvic, and so forth—which have not the fixity, and have perhaps some more real organic substratum than the possessions of hypochondriasis, and are more remediable by ordinary medicine. Of the obsessions which seem to take their origin in the viscera I shall speak under other heads. Amongst those which appear to have a psychical origin, I have already spoken of the sense of brooding evil; and although a dread of formless evil cannot well be described, it is none the less harrowing in that it stretches forth from the unknown. If these vague and illusory fears stiffen into delusion the case passes from the sphere of neurasthenia into that of insanity; and some of the besetting apprehensions of neurasthenia come perilously near insanity, especially the dread of committing crime. A fear of doing some wrong returns until it possesses the mind, the besetting thought looms larger until it assumes the garb of a temptation; so long as the patient keeps on the hither line of insanity he is safe, and the large majority are thus preserved from harm: still there may be a streak of insanity in the patient's family, and no responsibility of the physician and counsellor is

graver or more difficult than his course in such cases. For instance, a young lady, devotedly attached to an invalid father, dwells on the presages of death, begins to doubt if her strength will endure as long as his sufferings, and to fear that his life is rather a curse than a blessing to him; then perhaps she wakes suddenly in the night, as from a dream, and solitary and overwrought as she is, shudders to think she has wished for his death. Not daring to betray her horrible sin, she lies under its spell, drawn nearer by its fascination, until at last she accuses herself of a temptation to poison her father; and the poor torn little soul is taken to a physician who has to decide whether all this passion be the factitious result of stress and solitude or the grim reality of a homicidal impulse. The physician, may have a definite opinion; but while he is quietly extricating her from her bondage he cannot avoid an anxious doubt whether the case be indeed one of mere neurasthenia, or of insanity in its most ghastly form. Another common kind of obsession is remorse. Remorse is at best but a wasteful passion; repentance bears sin on into hope—remittimus irremissibile. The patient who can lift his eyes to the future will recover; he whose thoughts writhe in the past is on the broad road to lunacy.

Less degrees of obsession are seen in the petty doubts which beset a man as to whether he had wound up his watch, locked his outer door, or omitted to touch a certain post in Fleet Street. These obsessions, however, seemingly trivial, lie actually nearer to the confines of insanity.

I cannot omit two curious conditions characteristic of neurasthenia —phenomena which indeed pertain rather to it than to insanity; namely, "*agoraphobia*" and "*claustrophobia*." I am not concerned to defend these names as names; they are accepted, and that which they signify is familiar enough to those who see much of neurasthenia. Claustrophobia is more of an obsession: of agoraphobia the patient's imagination is usually free until the dread falls upon him as a wide space opens before his eyes; of claustrophobia he is always more or less conscious, perhaps its conditions are more continually about him. The dread of being shut up in a church, in a theatre, in any closed apartment, even in a friend's drawing-room—especially if crowded with people—may be intolerable. Some of the obsessions, as I have said, are associated with visceral sensations of a more or less oppressive kind; thus claustrophobia is apt to formulate itself as an oppression at the chest, a panting, or a heart constraint, or a disposition to diarrhœa. Still it is essentially independent of visceral sensation; it is a sort of panic, an impulse to a flight which might be impeded.

Agoraphobia, on the contrary, is an impulse to seclusion, a fear of empty space as such. The "giddiness" which possesses some big strong men in high places, or on ladders and the like, is peculiar, and not to be confounded with vertigo or with ordinary "funk." It is incomprehensible even to a timid climber who is free from it. Now agoraphobia, like claustrophobia, is common in neurasthenia, and is, I repeat, a mark of this malady rather than of insanity. A young athletic schoolmaster, suffering from cerebral neurasthenia and sleeplessness after influenza, was

bewildered and ashamed to discover that he dare not, with whatsoever self-command, cross the market-place of his little town. But, as I have said, agoraphobia is not only a matter of market-places, but also of any unhelpful space,—of a space, that is, in which there are no easy steps for the eye. A neurasthenic lady, to whom I had recommended the bicycle, came to me almost with tears in her eyes, for she had quickly and gladly taken to the exercise, and found great benefit in it, saying that when she turned into a spacious and unoccupied road she was seized with panic; in narrow or winding lanes, or in broad thoroughfares full of traffic, she was quite happy. A sturdy Yorkshire clothier (one of our railway cases) was amazed to find that, after his accident and while suffering from insomnia and other consequences, he could not face the broad road from his house to his office, unless, indeed, when blocked with traffic. He would turn into a cottage, complain of fatigue, and send for a cab; and for a time he was constrained to go about his work in a carriage. I suppose he got over the difficulty; for my part I lost sight of him. In consultation with skilful oculists I have often tried to find an explanation of this dread in some disorder of adaptation of the ocular muscles, but without success; the defect seems to lie in some lack of mental grasp of space relations.

The vertigo of neurasthenia is quite independent of agoraphobia. It is a very characteristic and common symptom, and much good may be done simply by reassuring the patient, who conceives it to mean some grave cerebral peril. Although often associated with tinnitus, it is not to be confounded with aural vertigo, there is no kinship between the two affections; the neurasthenic vertigo is generally independent of any aural symptom, and indeed it is not the lurch or gyration of aural disease, but a lightness of the head with a sense of failure of the legs. It is never very severe, never so severe as the graver aural vertigo, and is usually of brief duration. Like other kinds of vertigo it is apt to occur on rising from a chair, tying a shoe, or other rapid or awkward change of position. It has nothing to do with vision.

Insomnia, in its degrees from cat-sleep even to "nuits blanches," is almost a universal feature of neurasthenia; it is indeed one of the links of the vicious circle in which the victim is enchained. On the other hand, not a few patients complain of that kind of heavy, unrefreshing sleep which is apt to precede a megrim. "I sleep, and even doze wearily and late, but I am none the better for it," is no uncommon complaint.

With the insomnia is too often the torture of acute hearing ("hyperacusis"). The hater of cocks is a neurasthenic. In spite of cotton wool or even of wax in the ears, in spite of double windows and thick nightcaps, the accursed noises, even of a sleeping world, drive the sufferer to distraction. Whether these sufferers hear positively more than persons in health, whether sound vibrations penetrate farther into consciousness, or whether the same quantity of hearing is less tolerable, it is hard to say. I have thought that in some cases there is a positive excess of acuteness in the sense; one lady assured me that she could measure the stages of

her recurrent malady by the distance at which she could detect the approach of wheels on the road at night. Yet it may have been no more than "expectant attention" improved by practice; we medical men are apt to hear wheels at nights with exorbitant acuteness. In the main, probably, the suffering is no true extension of the faculty, but an extravagant susceptibility. It has happened to me on more than one occasion to be called to the fortress of one of these neurasthenics, for whose unattainable peace a hushed family circle had boarded up the windows, stretched cords across the thickly carpeted passages, awed the children into dreadful silence, tied up the door bell, and banished dog and fowl from the parish. The doctor is implored by the vigilant wife or daughter to enter the room, if enter he must, with velvet feet, and to speak with the still voice that guides tell us to use under the séracs of the Géant. In his turn the patient beckons you to his lips, and confides his tale to you in a feeble and broken whisper. This is not only for fear of noise; in neurasthenia a feebleness of the voice is another characteristic symptom: it enfeebles rapidly, and will drop into undertones. A longer talk than usual leaves such a patient exhausted; and towards the end of it his speech may become very slow, or somewhat aphasic; or he may lose the thread of conversation.

Boarding up the windows, no unusual freak of these patients, is not done for the ear only; they often shrink as much from light (photophobia) as from sound. Both perception and accommodation soon cause fatigue. As he reads the patient complains that the lines, even of a well-printed book, run into each other, although careful search into optical conditions reveals no abnormality, or none which is not already counteracted. Möbius has pointed out that if the patient be told to converge upon a near object the convergence is quickly exhausted. In testing for Romberg's sign the patient does not, as in ataxy, shut the eye firmly, but he half shuts the eyes, blinks, and opens them again. The pupils, in my experience, are sluggish, or disposed to dilate, but otherwise normal; some authors have recorded inequalities of the pupils, a sign possibly of transient importance, but surely not one to be readily accepted as such; it might, for instance, be an early indication of general paralysis of the insane. In uncomplicated neurasthenia the visual fields are of normal extent, but the retina fatigues so quickly that the spot on the perimeter must be pushed not too slowly from periphery to centre; if it be pushed slowly from centre to periphery, perception may die out and part of the field be declared absent. In discriminating between neurasthenia and hysteria this is an important point.[1] König (*Arch. f. Augenheilk.* 1890, Bd. xxii.) has gone very carefully over this subject and has come independently to the same conclusion.

Many years ago I drew attention to a *hemiparesis* of a temporary and

[1] The reader will note that herein my experience, which is founded upon the examinations of a large number of cases, often in association with ophthalmic surgeons, differs from that of Professor Horsley (p. 170). I leave my sentences as they stand, for the subject needs further investigation.

functional kind, prone to occur rather in women, and in the left arm and leg—*neurasthénie dimidiée* of the French school. This I believed to be cortical, and I still think so; it is often unattended with anæsthesia, and the arm is worse than the leg. The dynamometer usually shows considerable defect of motor power. In some cases, however, substantial muscular power remains, but the patient declares the limbs are heavy and floppy; and indeed they seem to be rather clumsy and prone to flag even when the attention is diverted from them. Pins and needles make themselves felt in such extremities.

These are the cerebral features of neurasthenia; the other divisions of the disease will not occupy so large a space.

B. *The spinal form.*—The chief features here are weariness of the legs and pains in the back; these patients are always weak or good for nothing in body. The pains in the back are a dull, diffused ache, or an acuter pain with tenderness, especially at certain spots; namely, in the upper dorsal spine, between the shoulders, and across the pelvis, the tenderness then being in the lower lumbar spine or in the sacro-iliac synchondroses: this latter site, I think, is especially frequent in traumatic cases, usually without any apparent connection with the seat of the injury. The coccyx, again, in these patients, especially in women, is apt to be the seat of acute and inextinguishable pain. These spinal pains and aches must be very galling; they give rise to bitter complaints. I have noticed in myself that at times of weariness I become too sensitive to pressure in the region of the fourth or fifth dorsal vertebra, so that to lean back in a hard chair becomes somewhat painful. Spinal neurasthenics often lament that "no new spines are to be had," as if a new backbone were wanted in some mechanical sense.

Under this subdivision are to be described the various perverted sensations of which these patients complain—of feelings in the legs, such as numbness, tingling, formication, and remarkably of coldness, even of icy coldness, as if water were poured or trickled down the back, or as if the legs were standing in cold water. The limbs die or "go to sleep" very readily when overlaid or otherwise pressed upon. Even the tongue is not infrequently the seat of numb or strange sensations, whereby arise fears of cancer and so forth. The gait may be, and often is, very slow, feeble, and creeping; but, unless in the hemiplegic form or in association with hysteria, is never paralytic or in any definite sense ataxic; this I venture to say, well knowing that such symptoms have been attributed to neurasthenia. I have never seen in pure neurasthenia the definite anæsthesia of hysteria.

In neurasthenia the reflexes are never absent, on the contrary they are prone to excess; at times even a triceps reflex is to be obtained, or that transient ankle clonus which appears only to vanish, and is obtainable with care in many healthy persons. If it pass beyond, let us say, three vibrations of small excursion we must suspect organic disease. Of certain irritabilities of the bladder and sexual organs I shall speak presently under "Sexual neurasthenia."

The cerebro-spinal form, common as it is, needs no formal description, being a compound of some or many of the symptoms significant of cerebral and spinal neurasthenia respectively.

C. *The cardiac form.*—In this form the heart's action is ordinarily rapid, or at any rate very easily quickened. Very rarely it is slower than normal. The patient is too conscious of its action and of the pulsation of the arteries, even of the small vessels of the extremities. The pulses of the chest and neck may be as visible to the physician as they are perturbing to the patient himself. In some cases the arteries are relaxed, and pulsation is visible in the episternal notch, in the carotids, and in the abdominal aorta; or they may be relaxed and constricted in turn; the ears may glow, and blushes of the face or neck, often in separate patches of sharp contour, may be conspicuous; or the extremities are the seat of these instabilities, such as "local syncope" and the like; and the urine may run short, or flow in profusion. Sometimes vaso-motor disturbance is seen in profuse sweats, either by night or on the least exertion. These sweats are often very difficult to get rid of. In some cases I have observed great instability of the vascular compensations for gravity; thus in one case, in a young man of about thirty years of age with a sense of great exhaustion, pallor of face, and general debility, I found the pulse when he was standing to be 116 and thereabout; but on ordering the patient to recline at full length, the pulse, after three or four well-marked oscillations, dropped with remarkable decision to 76. This observation was frequently repeated. After a long and beneficial sea-voyage the patient was put repeatedly through the same tests with normal results.

We are often told that the heart stops or is "gone"; the finger on the pulse at such moments may detect no change, but, at other times or in other persons, I have noticed a crimping up of the arteries with grayness of the face; the radial seems to contract to half its volume, and as the attack passes off it expands again. In neurasthenia in its uncomplicated forms there are no cardiac murmurs, hæmic or other; but a marked tenderness on pressure in the region of the apex is common and characteristic.

Palpitation is of course very common, and often awakens the patient from sleep, or prevents sleep. Irregularity or intermittence of the pulsations, or both, are also far from uncommon; though any contingent cause, such as tea or tobacco, should be carefully considered, or such an incidental disorder as dyspepsia or gout. The arterial blood-pressure is nearly always below the mean; it may be above it, but if so, some other disorder or disease is to be suspected. The attacks known as pseudo-angina pectoris (vol. vi. p. 32) are apt to occur in neurasthenic as in other states of nervous exhaustion; that attacks indistinguishable from true angina pectoris may occur in young neurotic subjects I will not venture to assert, but so I am disposed to think. Such patients recover, but after a hard time of pain and bondage.

Panting pseudo-asthma is more common in hysteria than in neur-

asthenia. But in two or three patients I have a note of a curious arrest of respiration, either during sleep or on its borders, which is alarming to the sufferer. "Every time I composed myself for sleep," says one of them, "I was awoke by having stopped breathing, and having to do the blowing myself. . . . As I wander again towards dreamland I am again aroused by the same sensation. Involuntary breathing is shallow and wants to rest." In this individual case the symptom replaced great cardiac irregularity with intermittence, which by its attacks had prevented sleep. The intermittence looked like excited vagus; the flagging respiration like the reverse, as if the medulla were insensitive to the normal stimulus of carbonised blood. It is said that in these conditions the temperature of the body falls a degree or two below the mean; and, as we should expect, the vaso-motor, cardiac, and respiratory symptoms tend to appear either together or in concatenation.

D. *The gastro-intestinal form.*—For full descriptions of gastralgia and neurotic dyspepsia the reader is referred to other parts of this work (vol. iii. p. 462). In this form of neurasthenia, pains, sinkings, and acidities of the stomach are frequent; and even in patients who recover on general tonic treatment the tongue is often coated, the epigastrium tumid, and the fæces scybalous. Digestion is usually slow, often occupying seven hours; in other cases it is alleged that the food leaves the stomach too quickly. The gastric juice may be normal, perhaps usually is so, the common defect being in the motor function; or, again, it may be deficient in hydrochloric acid, or the acid may be in excess. I do not find that from a practical point of view these distinctions are of much importance; indeed, I think we know too little as yet of the fluctuations of free hydrochloric acid in healthy people to rely on such comparative estimates in neurasthenia. The bowels are often capricious, sometimes loose, most frequently constipated; not rarely, however, they are irritable, and diarrhœa coexists with constipation. Such states may be misunderstood. The diarrhœa of such patients—"church diarrhœa," as we might call it—often coexists, for various reasons, with a dread of closed apartments (*vide* p. 141), and is allied to the nervous diarrhœa of candidates under examination. It is not lienteric nor slimy, but consists of slack fæces. The curious alliance of membranous colitis (vol. iii. p. 944) with neurasthenia—not with the mere exhaustion of a chronic and enfeebling disease, but with neurasthenia in its most unmistakable form—is unexplained, but it would seem that there is some kinship between the two disorders. Of the host of abdominal and pelvic discomforts of which these patients loudly complain it would be tedious to treat at any length; for some further reference to them I may refer the reader to the articles on "Enteroptosis" (vol. iii. p. 587) and "Nephroptosis" (vol. iv. p. 338). On one only of the rest will I detain the reader, namely, on the intimate association with neurasthenia of what seems to be partial spasm of the colon; I say an intimate association, because the persistence of the general disease seems often to hang upon our success with the bowel disorder. In these cases, which are more often cases of the melancholic variety of neurasthenia, we

find in the right iliac fossa, it may be, or in the splenic or in the sigmoid flexure of the colon, a sausage-shaped tumour having a peculiar pulpy consistence. It is usually somewhat elusive, so that the observer palpates the part again and again before deciding that something abnormal is under the hand; after all, perhaps, he records the observation with some doubt. At some visits he is sure there is "something there," at others he is doubtful, or changes his mind. In two of such cases, both of the right iliac fossa, I have seen abdominal section performed with negative results in respect of static mischief, but happily with the effect of the complete and inexplicable cure that often follows nephrotomy in aching kidney. In the cases under discussion the motions are characteristic if not peculiar; the fæces, in spite of blue pill, colocynth, and the like, are persistently scybalous; no sooner is the gut emptied, or appears so, than these fæcal balls begin to form again. In size they vary from that of a hazel nut to that of a walnut, and when broken up are dry like soft chalk, and in texture friable. Such patients complain dolefully of intestinal malaise and of depression of spirits. They are sallow and weak, but not emaciated, or only so in the first degree. Another and different condition is a windy distension of larger parts of the bowel. This "meteorism" generally occupies the transverse colon, which may, indeed, be permanently dilated and simulate dilatation of the stomach (*vide* vol. iii. p. 509).

In other cases there may be extreme emaciation and wilful refusal of food; these cases, which approach the type called "anorexia nervosa," or even coincide with them, are described in the third volume (p. 474).

Patients of another class, neurasthenics with substantial gastric disorder, if neurasthenic indeed they be, present problems of peculiar pathological interest, for they raise the debated question of "auto-intoxication" as a factor in neurasthenia; in more than one of these cases I have been strongly tempted to see some evidence that perverted katabolism may be at the root of this mysterious malady. The resemblance is probably only superficial; but I will briefly outline two such cases without comment:—

Mr. X., aged 26, tutor, had been subject to constipation "ever since he can remember." Of late it has been worse and more prolonged. Purgatives have failed to secure substantial relief. Has no dyspepsia, strictly so called, but must avoid rich and highly-seasoned foods. Tongue clean. During an attack he gets pain behind the eyes and yellowness around them; extreme lassitude takes possession of him, he lacks initiative and energy, and at times becomes almost aphasic. These feelings vanish when the bowels are open; and they do not always return with the constipation, or at any rate not for a time. The rectum was found normal. Under a course of carefully regulated diet and laxatives, with salol at intervals, and the use of Turkish baths when regular exercise was out of the question, he has kept himself in better health. That his miseries do not always come on as the bowels close, seems to indicate that the constipation is not a result of some previous shutting off of nervous steam.

Mr. Z., aged 36, had some anxiety six years ago; since then he has complained of headache, especially above the eyes; and the following attacks seize him:— Of a forenoon he finds himself rather suddenly unable to work; no strength,

no go; cannot see a client, is utterly flat, and unwilling to do anything. If he pushes himself through this he feels much worse as soon as rest arrives, but admits that this sensation may be but an increased attention to himself. He never has collapsed in the midst of work. The attack lasts some three to seven days, when as suddenly the enjoyment of work and reading returns again. When ailing he sleeps long and stupidly. His appetite also becomes excessive and difficult to control; to ward off exhaustion he must keep eating. His bowels are constipated at such times. He has lost no flesh, but is of spare build. The family presents neurotic tendencies. He is under an attack when seen, and I find his tongue very dirty all over, especially at the back. By dining too well he can produce more or less of the morbid state almost at any time. On examination some dilatation probably with catarrh of the stomach is plainly to be recognised; the greater curvature lies at the navel, and splashing of a characteristic quality is to be obtained; the organ is prominent in the epigastrium. This patient had got into the way of taking small doses of a bromide (gr. v.) during his cloudy states, and with relief; he assured me (in answer to some objections of mine) that such a dose thrice a day made him not more dull but lighter, and this his very intelligent wife testified to also; his sleep was thus made less heavy, less torpid, dreamy and muttering; he was more easily aroused, and awoke more refreshed. This patient had obtained the opinions of distinguished physicians, who had one and all diagnosed "neurasthenia." On a course of treatment for dilatation and catarrh of the stomach I believe he recovered his health.

E. *The sexual form.*—These cases are as full of vexation for the physician as they are of wretchedness for the patient; and in many of them the moral tangle is bewildering, or even inexplicable. They are also the most incurable of all, and are apt to end in chronic delusional mania. In many of the patients the suffering is genuine, and is independent of moral degradation; sometimes it has been intensified or even engendered by the indiscretion of a medical adviser, or by the wiles of a quack. The urine should always be examined carefully; not especially for albumin or sugar, but for less radical changes. It is often alkaline or neutral; or phosphaturia, oxaluria, or azoturia may throw some light on the case (*vide* vol. iii. p. 250, and vol. iv. pp. 298-99). The last drops of it, in man, may be tested for spermatozoa and centrifuged for casts: in the absence of cardio-vascular changes a very few casts with minute traces of albumin may not be of grave consequence; such traces of albumin, at any rate, I have often found in anæmic, slinking youths in whom masturbation is to be suspected. Irritable bladder is a common symptom, especially in men; micturition is smarting, attended with shiver, and may end in a jet of mucus. This jet is often followed by a sense of exhaustion which is as difficult to explain as it is consistent in its recurrence; it can scarcely be mere fancy.

The catamenia offer no peculiar feature; in any debilitated woman, of course, they may be scanty or absent. Ovarian tenderness is not a special feature of neurasthenia, and it has been described with the nervous symptoms of some other pelvic disorders in the *System of Gynæcology* (p. 225). Hösslin (1) has well observed that neurasthenic patients of either sex, men

more especially, are apt to become shameless in the description of their symptoms; they will talk of secret disorders or perversions without even a show of reticence; or a gastric neurasthenic will treat his physician to a specimen of his eructations. In sexual cases this blunting of the sense of decency is often offensive, and may at times be wholesomely checked by the physician, for it is a part of that loss of self-control which we seek to repair. It is not to be assumed that all these patients who complain of discomforts about the genital organs are masturbators or debauched; complaints of weight or dragging in the pelvis, of coldness or numbness about the scrotum or buttocks, of impotence real or imagined, of pollutions, or of faulty coitus are often made by masturbators, present or past; but such symptoms occur also in patients of moral habits, and indeed of cold temperament. Many happily married men have told me, with disgust and vexation, that when afflicted with neurasthenia they are weakened by pollutions unknown to them in health. Such sufferers may fall into a melancholy, and are in some peril of suicide, especially if under engagement of marriage; but the masturbator is in my experience more prone to delusional mania. In some men, old abusers of themselves, the penis and spinal centres become so irritable that a thought, or a touch, even of the clothing, will produce an emission; when such a man turns coldly from his wife, impotent awake, potent only in dreams, that man is on the borders of lunacy, if not already within its domain. I need scarcely warn the young physician never to allow himself to advise marriage to an abject creature of this kind; by such measures two people may be made wretched instead of one. On the other hand, many good fellows fall into sexual dreads, and are beset by obsessions—as of impotence and the like—which by their very importunity and stress may set up neurasthenia in greater or less degree, and may even create in them a false aversion from women. Patients of this class may be cured promptly if a discreet medical adviser, clearly discriminating the mere self-tormentor from the abject, urges the former to marry some kindly woman. Furthermore, we shall encourage the former patient to pour out all his sorrows, but we shall turn a deaf ear to the dirty confidences of the latter; for by listening to his confessions we breed in him a morbid vanity in his own degradation. I fear that some of our "criminal psychologists" are encouraging many sorts of prurient debauchees by dignifying the tales of their vice with the name of science, a course of conduct which is in the worst interests both of these persons themselves and of our own profession. It were a curious inquiry how it comes that sexual perversions are so "scientific" a study, while the brutalities of the thieves' kitchen or the wiles of other pests of society lie in comparative neglect.

Impotence is the rule in neurasthenia, yet sometimes sexual activity is retained; I remember in one of the most prostrate cases of the kind I ever saw the patient boasted of his prowess, for he founded thereon a sure presage of recovery. Such was his perseverance in this promise that he compelled his wife to have connection with him daily as he lay upon a sofa from which he was unable to rise. This fanaticism, which probably

aggravated his prostration, was not the chief cause of it; his was an eminent example of neurasthenia, and his personal and family history was full of neuroses. In some cases, however, I have found that uxorious men, or men unaware of the proper limits to this kind of indulgence, may bring themselves into a somewhat similar state of debility, which, however, in persons of otherwise healthy constitution is soon cured by due abstinence. Such persons, often robust enough in appearance, may complain of attacks of exhaustion associated, as the doctor discovers, with a retarded pulse.

Causation.—Into the causes of neurasthenia I need not enter at length; many of them are implied in the foregoing paragraphs. The interest of the traumatic cases lies in their dependence on a simple series of antecedents; "compensation cases" apart, contingent causes may be few or absent. If it be true that in many such persons the nervous organs seem to have fallen short in capacity, it is no less true that a mechanical cause can induce the same phenomena in persons originally of full nervous capacity. Perhaps in persons originally endowed with ample nervous volume a dislocation of neurons, a sluggishness of the ancillary processes of these systems, or some such retrogressive state of nutrition as Hodge and others have demonstrated in the nerve-cells of overworked wasps, may be equivalent to an original defect of capacity. On the other hand, as rest, massage, and high feeding cure a large number of patients, even in cases of traumatic origin, it would seem as if the pathological condition were not a mere solution of continuity; or, if so, that the feeding and the other means promote a growing up of the gaps. The apathy induced by the Weir Mitchell treatment may give the parts the quiescence they require for assimilation and readaptation. But this is mere speculation.

The attribution of abnormal irritability or "over-excitability" to nervous structures in disease is absurd. No nervous matter was ever too excitable: to be excitable is its business; in "over-irritability" a racehorse differs from a jackass. The more excitable our nerves the quicker and higher our life. Of nervous matter instability is the peculiar virtue; the fault in neurasthenia is that the vibrations of the sense organs, instead of being absorbed into the larger harmonies of the nervous system, take to "short circuiting," whereby their energy is wastefully dissipated. In many of the inherited cases I suspect that the nervous centres, however high and various in quality and complexity, are deficient in volume or in blood-supply.

Bodily, mental, or emotional strain may produce neurasthenia with the suddenness of a traumatic cause; young persons fagged by long mental application, by prolonged muscular exercise, performed for a time perhaps without a sense of undue fatigue, or, again, by the continual harass of ill fortune, may show no patent effect of the kind we are contemplating until the condition reveals itself all at once. Yet again the effects may come about gradually and almost unperceived. Or sudden neurasthenia, often of a most obstinate kind, may set in without any obvious cause; but in such cases there is almost always a strong family bias towards nervous disease.

"Ne devient pas neurasthénique qui veut," as Charcot was wont to say. Young women are much more prone than young men to break down in this way, and almost without warning; many women never get over a long and ambitious term of study, or a long course of athletic exercises; after some considerable duration of stress, borne for a time with apparent ease, the breakdown may occur very suddenly, and resist the remedial powers of nature or of the physician. Such an one for a few years may live a full life in the eye of the world, to disappear all at once into the twilight of invalidism. Many a brilliant student or vigorous athlete has been thus wrecked, perhaps for life—especially among women. An intimate friend of my own tells me that some twelve years ago he was persuaded, when he had gone out of training, to take a vacant place in his college boat in the May races. Each day's race was a hard one, and the stress so told upon him that he has never been able to withstand any hard mental or bodily work since that time, though his general health is excellent. Sometimes I am tempted to exaggerate this peril when I remember the many women, and not a few men, who, having taken high honours at the universities or elsewhere, out of their own circle are never heard of again. I am no obscurantist in this matter; on the contrary we must try to enlarge our knowledge of the precise natural conditions under which immature or unstable persons must work if their distinctions are to be more than a transitory glory. Happily it is true on the whole that to cultivate the highest powers of the body and mind is to strengthen self-control and that subconscious inhibition which govern us in our habits of life; but if we overdo the highest nervous centres and empty their reservoirs—quis custodiet? It is very hard for the physician to say when emulation, vivacity, and self-devotion are consistent with a solid and quickening development of the precious structure and functions of nervous matter, and how far the demand may be carried without exhaustion. The eye may have a brightness of teeming life or the false gleam of failing control. Yet an error in our calculation is almost irremediable; even if cured after a while the convalescent has lost his youth and his first openings in life.

Of the **pathology** of neurasthenia—in the sense of morbid anatomy—we know nothing. That it is often accompanied by vaso-motor instability is true, but it is far cry to announce that herein lies the primary pathogeny of the disease. That the arteries of the brain are subject to vaso-motor fluctuation seems at present very doubtful, but that the phenomena of cerebral anæmia may throw some light on those of neurasthenia will be admitted by the reader who turns to Dr. Leonard Hill's article, pp. 261, 262. Mr. Barnard, working on the same lines with Dr. L. Hill, attributes "many neurasthenic troubles" to a lax abdominal wall in a person with a naturally low blood-pressure. "The blood leaks into the capacious portal system," and the heart is ill filled. To talk of "Paratrophie," "Hypotropische Zustände," "Neurosis arthritique," and so forth, seems to me to be mere trifling. The state seems too enduring, too ingrained, to depend upon the accumulation of the "fatigue products" investigated by

Mosso, Michael Foster, and others. Yet perhaps the most promising direction for further investigation is in the chemistry of the body.

Diagnosis.—I repeat that, like all other diseases, neurasthenia melts by infinite gradations into other morbid groups, and that it is especially apt to partake of the nature of hysteria, of delusional insanity, and of melancholia. Moreover, neurasthenia is prone to supervene in organic diseases of the nervous system, and otherwise, wherein mental distress and disappointment are wont to enter. Much good may be done in chronic organic disease, such as tabes or rheumatoid arthritis for instance, by clearing away neurasthenic accretion, as well as the acquired slackness of unexercised parts, and thus reducing the malady to its lowest terms. This is the secret of the partial success of certain systems of treatment in such cases. In distinction from hysteria, neurasthenia does not connote contraction of the visual field, nor definite anæsthesia; the indefinable "numbnesses" of neurasthenia of which the patient is conscious, even too conscious, do not resemble the odd patches of tactile anæsthesia which the physician reveals to the hysterical patient, often to her surprise. Hysteria, again, in persons over the age of fifteen, is, broadly speaking, a disease of women; neurasthenia occurs quite as frequently in men.

The following contrasts, modified from a table drawn up by Hösslin (1), will be of service to the practitioner:—

Hysteria.	Neurasthenia.
Chiefly in women; in adult life always.	As frequent in men as in women.
Sudden onset, perhaps with some sort of fit.	Onset, unless traumatic, usually gradual.
Capricious, irregular course.	Course more or less monotonous.
Hallucinations.	Absent.
Clavus.	Absent.
Globus.	Absent.
Definite areas of anæsthesia.	Absent.
Concentric abolition of visual fields.	Only present as described on p. 143.
Contractures, etc.	Absent.
Neurosis of joints.	Absent.
Palsies of groups of voluntary muscles.	Absent.
Hysterical fits.	Absent.
Disposition to exaggerate malady and to crave for sympathy.	Disposition to melancholy and hypochondriasis.

I would add that in hysteria to make persistent efforts to fight against the disability is nearly always beneficial; in neurasthenia it is usually injurious.

Alcoholism and morphinism are to be remembered as possible complications; but drunkenness is not very common among neurasthenics: in most of them alcohol, even in small doses, produces flushing and other deterrent discomforts. Tobacco vertigo and the other nervous consequences

of the weed resemble those of neurasthenia; as also do those of tea and coffee; these sources of error must be remembered and excluded in all cases. The cardio-gastric distress, insomnia, and "shattered" nerves of chronic coffee poisoning may very closely simulate such forms of neurasthenia. Tea may produce severe and persistent gastralgia. Nervous symptoms, including vertigo, are wont to occur in certain cases of high blood-pressure, but these come on gradually in later life [*vide* art. "Senile plethora," vol. vi. p. 338].

I need not say that mere anæmia and mere debility are not neurasthenia; but anæmia, if present, may intensify it. The headache and inability to read continuously which belong to disorders of refraction are often attended with much mental anxiety and with some sleeplessness; in this way, and the more as such persons are drawn from the ranks of students liable to be overworked, neurasthenia may well be engendered; it is scarcely necessary to add that in all cases, whether attended with headache or not, the eyes must be carefully examined by a skilled oculist. Errors of refraction are apt to bring about strange consequences.

It is often difficult to discriminate between primary dyspepsia and neurasthenia; indeed, a vigilant observation of the results of treatment may be necessary before a definite diagnosis can be given.

The extraordinary and abiding prostration which may follow influenza and, more rarely, typhoid fever, are often of the nature of neurasthenia, and may be diagnosed as such.

Larval Graves' disease is often an alternative which we may find it hard to accept or to reject. Many young women have slight enlargements of the thyroid, and a pulse which quickens, at any rate under examination. Gastro-intestinal irritations may be compatible with either alternative, and the sign of tremor is not worth much. The difficulty may not always be soluble, at any rate at once. In such cases I have arrived at some provisional conclusion by ascertaining whether the pulse were persistently over 100 or 110 when passing causes of excitement were inoperative. I remember one case, however, in which several visits and long observation by myself and a medical colleague were necessary to decide, in a lady with neurasthenic symptoms and a rapid pulse, but without proptosis or thyroid enlargement, that the patient was in truth labouring under Graves' disease. Yet prognosis and treatment depend in great measure on the distinction. Agoraphobia, or claustrophobia, is a strong argument for neurasthenia in a doubtful case of any such kind.

Dilatation of the stomach, if definitely present, would take the case, in large part at any rate, out of the diagnosis of mere neurasthenia. The physical signs, with or without syphonage, should settle this question. It is to be remembered that the squelchy stomachs, as I have called them (vol. iii. pp. 475 and 505), of many neurasthenics may be taken for dilated organs; but the distinction should be easy, especially if the motions of the diaphragm be disordered in the manner described in the chapter referred to. I may add that neurasthenics, although they may ruminate, do not often vomit. The diagnosis of neurotic dyspepsia from

ulcer, chronic gastritis, and so forth, has been considered fully in the third volume.

I will not trespass upon the section of traumatic neurasthenia further than to say that the two most difficult cases of neurasthenia which I have had to decide upon were suggestive of traumatic meningitis and of "sunstroke" respectively. The first case was in the person of a vigorous young man, of insane family history on the one hand, but, on the other hand, of a family of great sportsmen, of which he himself was not the least. On riding across country he was thrown; no one quite saw how, but he fell on his head with considerable violence. He "became unconscious," was carried home to bed, and repeatedly visited by his own medical man, by an eminent surgeon, and myself. We saw him time after time, yet we found the greatest anxiety and difficulty in determining the state of the case. He complained of intense headache, of photophobia also so intense as to call for the darkening of the room, and of no less aural hyperæsthesia; moreover, he was disturbed by odd jerks and temporary muscular inabilities. Thus he lay sleepless with agonising headache by day and night, almost refusing food. On account of the distress and the darkness it was difficult to be sure of the pupils, or of the precise state of the mental functions. To have decided prematurely that the case was one of neurasthenia, and this on negative grounds only, might have proved disastrous. The diagnosis grew rather than was made, but the patient, in spite of this relatively favourable interpretation, made very unsatisfactory progress.

The other case was in a young lady, also of neurotic family, who was certainly exposed for some hours, and without due protection, to a blazing sun. She suddenly complained of pain in the head and giddiness, and was taken indoors. When I saw her she was suffering from paroxysmal but incessant headache, with nausea and occasional vomiting. Her temperature, though not excessive, was above normal. Here again an immediate diagnosis was impossible, or at any rate the alternative to neuralgia was too grave to be hastily set aside. That phenacetin gave relief, not once only, but repeatedly, was in favour of neuralgia due to fatigue; this and the negative symptoms after a while determined the diagnosis in favour of acute neurasthenia, and this course the case subsequently followed, the patient being cured after some months by appropriate means.

Dysuria may be nervous, micturition being frequent, straining, and with aching at the neck of the bladder. The quantities of urine are also very irregular. Oxaluria, baruria, phosphaturia will be distinguished on the principles set forth in the third volume (p. 250). No blood or pus should be present, nor any excess of oxalates. If there be albumin it should prove postural ("cyclical"). Glycosuria is said to occur in neurasthenia without the symptoms of diabetes, and almost as I write these lines such a case has fallen under my notice in a middle-aged man suffering from the cerebral form of neurasthenia. The sugar had appeared at intervals during the past two years; it was little influenced by diet, or not at all. He informed me that Dr. Pavy had assured him

he was not diabetic, and I concurred in the assurance. I am told there has been no sugar in the urine now for many months, although there has been no restriction of diet. In these cases some confusion may arise between neurasthenia and "gouty neuroses."

In respect of chronic disease of the brain or spine the reader is referred to the several sections on these diseases: close observation will be made of the state of the pupils, including their reflexes; the nature of any pareses, of the state of other reflexes, especially of ankle clonus; any marks or history of syphilis or other arterial disease will be duly weighed; the management of the lips and of articulation will be watched, as likewise the states of the intelligence; in elderly patients the state of the heart must be ascertained as far as possible, especially in cases of vertiginous or faint feelings; in gastralgic cases ulcer of the stomach must be remembered.

Hypochondria is a fixed delusive idea of a particular disease or local suffering, not mere arguable apprehensions now of this and now of the other disease, like those of the young student of medicine ("nosophobia"). Melancholia is a mental disease attended with delusions. I have said it may complicate or follow neurasthenia; suicide may occur in either malady, though of course far more frequently in melancholia. Delusional insanity, again, may be engrafted upon neurasthenia; and, as in the case of melancholia, transition cases between the typical states are often seen.

To discriminate between the fears and obsessions of the neurasthenic, the fixed convictions of the hypochondriac, and the perverted, unreasonable mental processes of insane delusion, is rarely difficult. The mind of the mere neurasthenic is open to argument, and his heart to hope.

In the second volume of this work (p. 887) I have referred to a case of adhesion of the wall of the stomach to the parietal peritoneum, whereby continual distress was produced and attributed to hypochondriasis, neuralgia, and so forth; in such cases as these, of course, diagnosis is almost impossible, but the occurrence of a few instances in the experience of a medical man will make him cautious in ascribing subjective symptoms to fancy or malingering. I may give another example: A gentleman of highly neurotic temperament complained of pain in his rectum, and had done so for some time. Among other medical men he consulted me; I likewise found his rectum perfectly healthy to the finger, and I rallied him on his fears, and on so long a duration of pain without ill consequences. A year later I met his medical attendant, who told me that some months afterwards a puffy area was perceived high up in the rectum, which gave way and freely discharged some fluid, like chyle; the pain ceased at once. Slowly the part refilled, and likewise discharged itself, the patient remaining in good health; and this process has recurred again and again. It would appear that the pain had been due to some slowly increasing stagnation in the absorbent vessels, ending in rupture with relief of the weight and discomfort. Yet we were all convinced that the case was one of hypochondriasis, and this the more on account

of the patient's highly nervous disposition. It is only by a large experience of men and their ills that the physician is enabled to form approximately true judgments in such cases.

From the early stages of disseminate sclerosis and of tabes the distinction of neurasthenia is to be made according to the symptoms described above, and the rules to be found in the previous chapters on those diseases.

The possibility of the presence of tænia in a case of obscure visceral discomfort must not be absent from the mind of the physician, especially in butchers, cooks, or children who have been fed on raw minced meat.

It is said by Dr. J. K. Mitchell that a useful sign in a doubtful case is that in neurasthenia the pulse is sent up enormously by slight movements. Thus merely to clench the fist while the patient lies on his couch will greatly increase the rate. There is a distinct interval between the action and the acceleration.

Prognosis.—It must be remembered that in some persons neurasthenia seems rather to be the expression of a permanent and hereditary quality than an intercurrent disease. One of my patients, whom I have known for thirty years, has been neurasthenic from youth up. Endowed with a keen intellect, exquisite taste, inextinguishable curiosity in matters of science and art, and punctual business habits, he has made a considerable mark in the world; yet it is true that he has scarcely ever known a month of continuous health. The keenness and intensity of his nervous life have indeed more than made up for the intervals of exhaustion which inevitably follow his periods of feverish exertion; but thus he has divided more than threescore years between periods of brilliant effort and intervals of exhaustion, apathy, irritability, depression of spirits, and bodily suffering. To speak of cure in such a case is to confuse the value of words.

On the other hand, there are many men of fervid temperament and keen intelligence who are apt to overwork themselves, or are naturally subject to phases of reaction. It must not be assumed that every "Temperament-Mensch" is liable to neurasthenia; many such persons show remarkable endurance and tenacity, and even an extraordinary power of throwing off fatigue. Indeed, some such persons seem to me to be anæsthetic of fatigue, declaring that they do not know what it is to be tired; this is a misfortune, for they wear themselves out before the world is ready to part with them.

In no case can the phases of neurasthenia be calculated as we calculate those of an infection; on the other hand, the disease is not irremediable in the sense that most of the organic diseases are irremediable. Nor can neurasthenia be said to shorten life, though it may empty it of achievement. As in certain cases to which I have referred, neurasthenia may not only be regarded in its active phases as a malady, but in its passive intervals as a colour of the individual constitution or temperament. Such a hereditary complexion is not to be washed out; and when in hereditary cases we speak of cure we are understood to speak only

of relief of the attack on hand. The natural capacity of the nervous reservoirs can never be enlarged, but happily the quality of the nervous stuff in such incapacious persons is often excellent. It is very important to form an early prognosis in children and young persons in whom a hereditary proclivity to neurasthenia is detected. Among the poor, hereditary neurasthenia, breaking down industry and even character, is apt to issue in the shiftlessness and perversity of the crew of incapables and malingerers who infest our hospitals, our asylums, and our gaols. In children, neuroses, such as headaches, night terrors, sleep-walking, or defect of self-control, should be noted even more for that which they presage than for themselves. As set forth in later articles, the education of such children, physical and mental, needs exceptional care.

Sleepless patients in the difficulty of cure come next to those of strong neurotic inheritance.

Again, much depends on the means of the patient by which he is enabled to provide for his cure, or for his support if cure be unattainable. Neurasthenia, like phthisis and not a few other diseases, is a costly mischance; not only in the damage it does, but also in its demands. The means of cure often include long absences from home under expensive conditions, and, especially in the cases of young women, such measures are difficult and costly to carry out.

The spare, weary, aching patients, who are fit for the Weir Mitchell method, may receive a more confident prognosis of amendment than the robuster and more active-bodied patients whose symptoms are more exclusively cerebral. It is doubtful whether any specific means can be relied upon to dissipate the "phobias" or the obsessions; though obsessions which are of recent growth and due to positive causes, such as overwork or distress, may be got rid of in convalescence, or possibly sooner. Much, as I have said, depends on the means of the patient to make use of appropriate methods. When the mind is perturbed the suggestions of friends of tact, decision, and cheerfulness, and the opening out of new spheres of interest, are essential means of cure. It is no small part of the prognosis of neurasthenia to be aware that the patient who has undergone an attack and recovered has learned a useful lesson. Thenceforward he knows how to husband his forces, and how to avert the early symptoms of relapse; but unfortunately the tendency to relapse increases with each attack.

Complications with insanity, with hysteria, with Graves' disease, and the like, add of course to the gravity of the prognosis.

Treatment.—The difficulties of treatment vary with the class of case to be treated. In a large number of patients the course to be followed is definite, and fairly sure. In persons of either sex in whom the nutrition of the body is reduced, the Mitchell-Playfair method works wonders, and with some certainty. In many cases of apparent failure either the case did not belong to this category, or the method was not duly carried out. The latter fault is common; too often we find on inquiry that the method was not efficiently put in force. It is to be prescribed

in its completeness if we are to give any promises of success. Now the three legs of the tripod are isolation, full feeding, and massage; without all three legs it cannot stand. Yet one patient is submitted to massage without isolation; or to another massage is applied without that rest which is a condition of its use, for even a healthy person would find it hard to undergo daily massage and, concurrently therewith, to go about his ordinary work. The massage is as much as a weakly woman can bear in the way of muscular exertion, or indeed of any exertion, mental or bodily. It must be remembered that a neurasthenic patient is usually made worse by a determined effort to fight against the debility, whereas in hysteria such efforts are beneficial. Unfortunately the former patients are often but too ready to make such efforts, while the latter are not.

Again, the feeding has to be calculated on a special scale, having regard, of course, to the needs of each case: this calculation, too, calls for much skill and experience, on the part of both the doctor and attendants. No case of any severity can be cured in the midst of the fuss and fidgets of home by the family medical man assisted by an ordinary rubber. Even in apartments devoted to this system it is difficult to find rubbers endowed by nature with the delicate physical qualities necessary for their art, and with the temperament necessary for the management of the class of patients they have to deal with. These difficulties, and the considerable cost of the method, are a great embarrassment to us in dealing with cases of neurasthenia in persons not well-to-do. Even if a cure could be absolutely guaranteed, it is a great responsibility to press the expense upon persons of small means. Again, an inexperienced operator, or one inattentive, or of unsympathetic temper, may disgust the patient and spoil the whole thing. Of whatever social degree, a successful massor (if I may coin a word we stand in need of) of either sex must have gentle manners and a delicate touch, together with considerable muscular strength and endurance, and a healthy and hopeful temper. It is not in the power of any shopman or housemaid who is tired of service to "take up massage"; moreover, as in all functional nervous maladies so in neurasthenia, the success of the cure largely depends upon the powers of suggestion, the moral ascendency, and the attractive manners of the attendant. So far as we can see, then, the method must be an expensive one. However, if the means can any way be found it is cheaper to be well than ill, for the interminable expenses and losses of illness may mount up in time to a more considerable sum.

In certain cases, namely, in debilitated and emaciated persons, a cure by the Mitchell method may then almost be promised, especially in women; moreover, the cure in most of these cases will abide unless indeed some new cause of stress overpower the patient again; in the class of persons I have indicated, that is, in cerebro-spinal, cardiac, and gastric forms in ill-nourished subjects, no other method can approach the Mitchell method in the comparative certainty and permanence of its results. But

unfortunately these are by no means all the patients we have to treat. Many of our patients have not fallen into neurasthenia by way of innutrition, but by stress of work, or of care; or by the effects of heredity acting in a constitution otherwise healthy. I have now under my eye a case of cerebral neurasthenia, attended with insomnia and incapacity for thought and attention, and so forth, in a man who, being a great horseman, has been amusing himself in his enforced idleness of mind by riding matches with his friends. Such persons may try the Mitchell treatment if they have the money to spare, but they do not derive the same striking or abiding benefit from it; indeed, other means are far more agreeable, and equally hopeful.

Cases of this last kind are more frequent in men; I scarcely remember a case of neurasthenia in a woman attended with good physical health, although many neurotic women are far from emaciated; they may be fairly nourished or fat. Fat neurasthenic women are not unfit subjects for the Mitchell method, but they must be placed in very careful hands; first the fat, which may be a sign of sluggish metabolism, has to be "rubbed off," after which process rebuilding on a securer basis is undertaken; the process is a difficult one, and one by no means so certain in its results as in the lean. I should add that the Mitchell method answers best in cool weather. Irritable heart is no bar to it; indeed rapid action is calmed by it.

In cases where the abdominal walls are lax, and the splanchnic venous system over-full, Mr. Barnard recommends abdominal massage, followed by certain exercises, and the adaptation belts to support the feebly acting walls.

Local massage for the cure of local disorders is often very important, as in those cases of intestinal spasm which I have described on p. 147; specially skilled operators are, of course, required for these methods. Internal massage, in my experience, has never proved very useful, and it tends to fasten the attention of the patient injuriously upon particular organs; uterine massage is as futile as it is morally revolting.

What are the other means at our disposition? none cheaper, I fear. If we divide the cerebral cases into two subdivisions—those in which the corporeal condition is good, and those in which it is below par—we shall remember that for most of the latter the Mitchell method is useful, at any rate as an adjuvant. In selected cases Ling's resistance gymnastics may be useful. Electricity, hydrotherapeutics, and ordinary changes of air and scene often do excellent service. Health resorts at high altitudes, that is over 1000 feet, present no advantages for pronounced cases; on the contrary, such airs as that of the Upper Engadine often reduce sleep, irritate the nerves, and exacerbate respiratory or cardiac symptoms. Nor is the sea generally beneficial; sea-air is often "irritating," and bathing in the open sea is injurious to all but the mildest cases. On the other hand, the irritating effects of the sea are soon evaded by removal from the coast, it may be but for a couple of miles. I have found the east of Scotland, not too near the sea, very suitable in many cerebral and cerebro-

spinal cases. Malvern, Buxton, and Harrogate are restorative airs, and have the advantages of hydrotherapeutic means at hand. Some persons, I admit, do well at the sea, and even with sea-bathing; but, I repeat, these are the milder cases, and this means of cure can be tested only by experiment in each instance. Dyspeptic and so-called "bilious" persons, speaking generally, do not do well at the sea.

Although I should restrict the use of sea-bathing, except in convalescence, to a few cases, yet warm brine baths are often of great service, even in severe phases of the malady.

Hydrotherapeutics.—Wet sheets, packs, sitz-baths, and douches are of great value in neurasthenia, and, if judiciously used, in all kinds of it. But, as with the massage cure, the judgment with which the method is used, the particular applications and graduations of it in individual cases, are conditions hard to secure. Too often posts at these establishments are accepted by young physicians at the outset or in the intervals of general practice, who have little experience of the niceties of the system. It would not be becoming in me to advert to any one of these establishments either at home or abroad; the medical attendant must make his choice on the facts and information within his reach.

Electricity may be applied in one way or another with considerable advantage; but I must repeat that neurasthenics are "kittle cattle," and here again, especially in cases where hope and confidence are to be awakened, much depends on the tact and experience of the operator. Of the application of the continuous current to the head or spine in cerebral and spinal cases I can say little: I have never had time to apply it myself for any length of time, nor is the clinical evidence in its favour as yet very strong; however, the method has ardent supporters, and may often bring some relief at least by way of "suggestion." Of more service in my limited experience is the faradic bath, the use of which is described in the first volume (p. 370). Used for about twenty or thirty minutes, not so far as to produce muscular spasms but a prickling of the skin, it will soothe the nerves, bring sleep, and improve the appetite. Of the application of the continuous current to the neck in cardiac cases I can speak also with some encouragement; either of these processes can be carried out at home without difficulty. It is most useful in muscular debility and weariness, and the family attendant after a few sittings will not find it difficult to entrust the operation to others. It will, of course, form but a part of a more extended treatment prescribed according to the other requirements of the case. At best, indeed, the part of electricity in the cure of neurasthenia seems unlikely to be more than subsidiary. The electrostatic or Franklinic method is not gaining ground in the practice of those who are best able to judge of its value.

Hypnotism may be occasionally useful in sleeplessness, or in phases of irritation, or of morbid mental proclivity. But that hypnotism, speaking broadly, can promote self-control does not at first sight seem likely, unless it be that in cerebral cases the highest centres, being thrown out

of gear for a time, can feed at leisure. Out of mere prejudice, perhaps, I have shrunk hitherto from recommending its use.

Drugs are not to be forgotten in the treatment of this malady, although their part is a subsidiary one. In relief rather than in cure their place is to be found; and, within the latter sphere, many drugs are of great service. The bromides, from an extreme of excessive administration, have now fallen into discredit, yet we should do ill without them. The secret of success with the bromides is to use them in small doses and for brief periods of time. Their place is chiefly, of course, in the management of cerebral cases, or of the cerebral symptoms of all cases. In spinal cases with great leg weariness their use is very restricted. In sleepless and fretful persons the bromides are very helpful, and my custom is to prescribe not more than five grains of one of them with a little hydrobromic acid and a grain of quinine. Strychnine is rarely appropriate in neurasthenia; or if prescribed occasionally, as in atonic dyspepsia, its use should not be continuous.

In gastric cases arsenic is invaluable; it must be used with care, of course, but for a period of some weeks' duration, the doses being gradually increased until at least five drops of Fowler's solution are taken after each of the three principal meals. A coated tongue is no bar to its use. Many gastric cases of long standing are cured by the use of arsenic alone.

The hypophosphites of soda and lime have seemed to me to be of no small service in some cerebro-spinal cases.

Drugs—such as iron, for instance—which may be needed for particular and incidental states, need not be enumerated here; in their use we shall be guided by ordinary rules. Above all, the action of the bowels must be vigilantly seen to. In some cases of vaso-motor relaxation ergot appears to be of service; in vaso-constriction the nitrites seem to be of no value, they give little help even in "pseudo-angina pectoris."

Valerian is an old-fashioned remedy too often forgotten in neurasthenia, where it may be of great service. In cerebral cases, with loss of memory, vertigo, vague sensations of incapacity or confusion, and the like, it often gives much relief, as also in visceral discomforts and perturbations. It is best given in the form of the ammoniated tincture and in liberal doses. Few patients object to it if they are warned beforehand that it is as valuable as it is nasty; indeed, I often think that neurotic patients are especially tolerant of the drug, or find compensation in the comfort it gives them. There are, of course, many other drugs of subordinate value which I need not enumerate.

Opium cannot be wholly set aside because of the perils of abuse; the physician, keeping the drug in his own hands, and prescribing it under cover of such names as Dover's powder or Soap-pill, may avoid the peril and secure invaluable help. In severe gastralgia, for example, a pill containing, say, a grain or two of oxide of silver with a fractional dose of opium is a means we could ill spare. Opium thus carefully used is often helpful against the "dreads" also. I need not say that the opium is to be suspended as soon as possible, and codeia may at times take its place.

Cocaine often gives a sense of well-being which for the moment is cheering, but the effect is very transient and heavily paid for in the reaction which follows. Hyoscine is occasionally needed in cases of mental agitation. Phenacetin is perhaps the best remedy of its class for the relief of nervous pains. Camphor monobromide is often helpful, especially in pelvic irritation; in these cases it is best administered in the form of suppository. Caffeine relieves headache, but is rather an irritant to nerves on edge, and must never be used in cases of insomnia. Local aches (myalgias?) are often much relieved by a well-devised pad with belt or brace.

Hypnotics, then, are to be used, if at all, with the greatest precaution, and never placed in the hands of the patient himself. All other means of procuring sleep must be tried first. The physician will do well indeed to assure himself from independent testimony that the sleep is as defective as is alleged, for to the patient a few dreary hours of nocturnal vigilance seem interminable. Patients who awake and lie awake at 3 or 4 A.M. will often find that to take a little food, left at the bedside overnight, will be not only a comfort, but a restorer of sleep. For farther help in the treatment of insomnia the reader is referred to the special article on the subject (vol. vii. p. 748).

Diet.—Into the large question of dietetics I need not enter except to indicate certain special applications of the subject. In cases of atonic dilatation of the stomach the diet must be regulated as is explained in the article on these cases. Again, in cases of disorder of the digestive tract, as in that mentioned (p. 148), the diet will receive proper attention. But we must not be too careful in these respects, for a dirty tongue may mean rather indolent than vitiated digestive functions, and a decided if cautious enlargement of the diet is often justified by results. For it must not be forgotten that in nearly all cases —in all except the strong and well-nourished men with good appetites to whom I have already referred—our chief indication is to push feeding as far as the patient can bear it, much farther than many patients are willing to accept. In women there are few exceptions to this rule; most of these patients have been shirking food for years, especially meat; and I have notes of a large number of them in whom a cure was effected simply by stuffing them with food, even in quantities apparently excessive. In health, women need food more frequently than men do; we all know that the secret of making an excursion go off well is to see that the women have frequent meals, however small they may be. Of anorexia nervosa—the worst kind of this deterioration—I have spoken in its own place. Even in gastric cases a cautious advance to a more liberal diet is generally to be attempted from the outset of treatment; for the most part these patients have spared their stomachs until they will not perform any sufficient work without resentment.

For some fat neurotics a diet must be prescribed in which starches and sugars are reduced. Alcohol is to be allowed very sparingly, if at all. A little light wine or dilute spirit may perhaps be admitted, but no malt

liquors; indeed, the least possible fluid should be granted with meals to these fat patients, but one or two pints a day of an alkaline mineral water should be taken on the empty stomach—say, on rising in the morning, at noon, and at bedtime.

Suggestion and the personal ascendency of the physician enter so largely into all methods of treatment that, to speak honestly, we find great difficulty in making much way with old disillusioned patients. The only chance with them is to put them in some institution under a strict and imposing system of life which they cannot evade.

In conclusion, I would impress upon the reader the importance of searching for any vicious circle of function, and, if any can be found, of cutting any link of it whatsoever. The stretching of the sphincter ani in one lady patient of mine restored her to herself after months of nervous restlessness most wearisome both to herself and her friends. In neurotic persons a floating kidney, a disorder of the uterus, a chronic rhinitis, or some other local irregularity, trivial enough perhaps in itself, may close and perpetuate the vicious circle of disorder. The treatment of every case must therefore begin with a minute search for any such local factor, and the cure of it must be the first step in the treatment. The reader will do well to consult Dr. Playfair's article in the volume on Gynæcology (p. 220).

T. Clifford Allbutt.

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T. C. A.

TRAUMATIC NEURASTHENIA

Introduction. — The synonyms for traumatic neurasthenia sufficiently indicate the meaning of this name. Such synonyms are "nerve shock," "nerve weakness," "nervous exhaustion," "concussion of the spine," "spinal irritation," "strain of the spine," "railway spine," and so forth.

In all cases there is a certain shock or injury, and this is followed either immediately or after a certain interval (the incubation period of Charcot) by the symptoms of neurasthenia, which symptoms, since they are practically identical with those of simple neurasthenia, must be regarded as forming with it a pathological entity which can be recognised clinically with great ease, and must be clearly distinguished from malingering, inasmuch as these cases so frequently form the basis of litigation.

It would seem advisable to divide the subject into two parts—first, that which includes a small class of cases in which the symptoms begin immediately after the infliction of the cause; and, secondly, that which embraces a much larger number in which the symptoms come on gradually.

PART I.—ACUTE TRAUMATIC NEURASTHENIA.—This class includes cases in which a person receives a severe shock or concussion without any actual structural change that can be detected. The patient may be in one of two opposite conditions: he may be dazed and inattentive to what is going on, but perfectly capable of answering clearly when spoken to, and of giving a connected account of what has passed, showing that at no time had there been any enduring loss of consciousness; or the patient may be in a state of excitement and restlessness, alternately laughing and crying, as in a so-called hysterical attack; but in this case the patient is equally capable of recall to himself when properly addressed, and he also can narrate what has occurred.

Moreover, it is common in acute traumatic neurasthenia for the person to pass in a few hours from the dazed condition into the excited condition, and so remain for several days or a week, during which time subsequent further conditions may manifest themselves, as will be explained directly.

The two states just described may be modified by complication with symptoms due to structural mischief, but there will be no difficulty in separating the influence of the latter.

We will now take up the immediate symptoms of the acute condition, and will treat them briefly, because in most respects they closely resemble those of the chronic form.[1]

[1] It is so important that these traumatic cases should be recognised as acquired neurasthenia that the editor has purposely admitted some repetition of the symptoms already in the preceding general description of neurasthenia. In his own article, however, he has kept that of Professor Horsley in view, and he believes that of mere repetition not

A. **Functions of highest centres.** — The patient is incapable of concentrating his attention on any subject requiring careful thought, or if he attempts to do so such effort rapidly brings on headache; thus his memory for recent events is very defective, and is constantly perverted. The emotions are all exaggerated, especially fear and apprehension. This, though a milder condition, is analogous to the night terrors of children. There is always a certain degree of insomnia, especially of sleep short and broken, accompanied by nightmare and dreams in which animals very commonly figure. This feature is parallel, indeed is in point of fact identical, with the zoopsia of hystero-epilepsy.

B. **Functions of the lower centres.** — (i.) *Sensation.*—The special sense centres are all hyperæsthetic, and the patients complain of various non-existent odours in the room. They desire to be in the dark because the light "hurts the eyes"; they require people to move about the room very quietly; they ask that all accessory noises should be hushed; and they feel acutely the negative sensation of cold in the skin.

(ii.) *Motion.*—The patient is capable of performing all movements, but they are executed in an impulsive way, simulating incoördination and with little force. Fatigue is a very prominent and early phenomenon.

(iii.) *Reflexes.*—If the condition is but a moderate one, the reflexes are exaggerated; if severe, they are very early depressed, or temporarily lost.

General Symptoms.—(*a*) *Circulatory symptoms.*—Under this heading there is almost invariably a functional excitability of the rhythm of heart, the commonest forms of which are acceleration and palpitation; irregularity is a rarer variety. The pulse is often very small, but this must be in the main accounted for by the vaso-motor constriction which often occurs, and which leads to the so-called feebleness of circulation (or depressed circulation, as it is sometimes denominated) seen in the extremities in these cases, and which is attributed, almost always erroneously, to weakness of the heart muscle.

(*b*) *Alimentary system and nutrition.*—Acute dyspepsia is frequently notable, and this is the cause of a loss of weight which is sometimes found in cases of acute neurasthenia; a loss of weight, however, which is not comparable to that observed in the chronic form. In fact, in many cases of the acute condition there is no defect of nutrition.

Pyrexia.—A not infrequent and noticeable general feature in acute neurasthenia is a rise of temperature without the other concomitant symptoms of pyrexia. Although, as a rule, the temperature does not rise above 101°, and may within two days become normal, the patient may even suffer from hyperpyrexia (as estimated by the temperature), the highest yet observed having been 113°.[1] I have myself seen a case where the temperature rose to 111°, in which, however, there were also subjec-

much will be found, while in some cases there is a difference of point of view which may prove instructive.

[1] In Mr. J. W. Teale's well-known case of acute traumatic neurasthenia, a case watched with unusual shrewdness and vigilance, the temperature rose considerably higher than 113° on more than one occasion.—ED.

tive symptoms passing into delirium. In such cases the patients feel hot, and the skin is usually flushed, but there is no loss of weight comparable to that which would be produced by high temperature due to septic causes. During the pyrexia headache is not a constant phenomenon, and vomiting is rare. This pyrexia is a true neurotic fever, and is exemplified also in so-called hysteria. The temperature-curve has an invariable character—namely, a rapid rise, an exceedingly brief fastigium, and a very rapid fall. Its speedy and certain amelioration by cold sponging shows it to be a nervous phenomenon.

The **treatment** of acute traumatic neurasthenia is fortunately in many respects the same as that which would be adopted in severe concussion of the brain or any other organic mischief resulting from the traumatism. The patient should be kept absolutely in bed; and if there be hyperæsthesia of any of the special senses, this should be particularly guarded against during the first ten days—that is, until the treatment adopted has begun to show some result. For this reason for the first few days it is as well to have the room but moderately lighted, a full and careful system of diet adopted, and a mild degree of massage treatment and warm douches instituted.

According to the degree of severity of the case, this treatment should be short or prolonged.

PART II.—CHRONIC TRAUMATIC NEURASTHENIA.—(i.) **Causation.**—The causes of chronic traumatic neurasthenia must be regarded as proximate and direct, or more remote and contingent; the latter consist in the special circumstances of the case, which determine the degree and very often the duration of the mischief. Among the direct causes the commonest is a concussion or shock of the whole body, such as the shock of a railway collision, a fall from a horse, and the like. Even the concussion of a bucking horse has been enough to set up what used to be called spinal irritation in sufficient degree to call for active treatment.

The remoter causes are (i.) a neurotic family history; (ii.) previous history of acute illness in the individual, notably influenza or typhoid fever, the importance of the latter being emphasised by the recent additions to our knowledge of the direct effect of typhoid fever upon the spinal cord centres; (iii.) nerve fatigue from overwork.

(ii.) **Latent period.**—In traumatic neurasthenia it would seem to be the rule that a period of variable duration should intervene between the incidence of the shock and the first serious manifestation of symptoms, very often between it and the occurrence of the first symptom. This interval is usually about a week, but if the symptoms are extremely slow in manifesting themselves it may be prolonged for several weeks before the condition interferes with the patient's life and occupation. This interval of time, which is so essential a characteristic, has been greatly misunderstood in the past, and has actually been advanced as a reason for supposing that the symptoms had nothing really to do with the

original injury, whereas the interval is a proof of the genuineness of the condition.

(iii.) **Alterations in intellect and memory.**—The patient gradually finds that he has to make special effort to do things which he has regarded previously as almost unconscious parts of his work—to write a letter, for instance, or to consider the bearing and meaning of a document. He finds it impossible to concentrate his attention, or, ultimately, to take any share in serious or responsible work.

Often there is a feeling that the intellectual activity of the cerebrum is hindered by "a kind of oppressive fog," as the patient describes it. The analogy is often closer by reason of the fact that when the condition improves the "fog" lifts, and the patient feels as bright and clear for work as in a normal state, and very often this occurs almost suddenly.

(iv.) **Alteration in the emotions.**—The functions known as the emotions are considerably affected in chronic traumatic neurasthenia. The commonest change noticeable is that the patient is apprehensive and pessimistic, that he is unable to do what before was a matter of ease to him; and this increases to such an extent that he gradually neglects his work, and finally says that he is unable to do it at all. At the same time he becomes irritable and hypersensitive. (See also alterations of sensation.) Small incidents cause notable worry and excitement, so that the patient cries or laughs too readily.

(v.) **General intracranial conditions.**—Sleep is very easily disturbed in traumatic neurasthenia, and the disturbance commonly takes the form of the patient waking too early, then at irregular intervals during the night, until at last he gets little more than an initial hour or two hours after going to sleep. This form of insomnia is accompanied by dreams, which very commonly (in some cases invariably) are unpleasant. Very rarely the patient may be also somnambulistic.

Headache. — The headache of traumatic neurasthenia is a most interesting and important subject. There are several sharply-marked varieties of it which clinically can be definitely recognised; no clear explanation can be formulated of any one of them, although they may be considered here in the following categories:—(*a*) topographical localisation; (*b*) character; (*c*) seat of reference.

(*a*) Pain situated at the vertex or bregma. It is described as a pressure, with or without dull aching and, relatively rarely, a stabbing sensation. The top of the head becomes both objectively and subjectively hot; occasionally there is the further secondary symptom of tenderness when the head is brushed. The pain is strictly referred to the bregmatic region, and very rarely extends to the back of the lambda.

(*b*) The headache is sharply marked in the area of the distribution of the posterior division of the second cervical nerve. The character of the pain is that of a dull aching. Very often the neck feels a little stiff as the head is moved; sometimes this is very pronounced, and is then accompanied by a distinct click heard (? felt) by the patient but not by the bystanders; this click is the accompaniment of severe stabbing pain,

and is undoubtedly connected with the movement of the head. The patient refers the pain most commonly to the superior curved line of the occipital bone, but it may be extended forward and become connected with the bregmatic region. Similarly the pain sometimes extends down to the neck, and is referred by the patient to the spine of the *vertebra prominens* and the first two or three dorsal vertebræ. The whole course of the second cervical nerve is found to be tender in such cases, but chiefly opposite the occipital fossa. As in the case of the bregmatic pain, the skin is frequently hot, and not infrequently puffy. I have even known it to be supposed that this puffiness signified a collection of fluid, for which an incision was performed.

(*c*) A form of headache much less common than the first two is the temporal. The seat is about opposite the pterion on each side. The character is almost invariably that of a stabbing pain, frequently severe, and occasionally shooting along the side of the head.

In addition to these classical forms of traumatic neurasthenic headache, the patient may, and often does, complain of a certain degree of common frontal headache, especially after any intellectual exertion.

Sensory conditions.—(A.) *Subjective sensations.*—(*a*) Smell and taste.—Subjective sensations affecting these special senses are very rare in traumatic neurasthenia, and are probably to be associated with some structural mischief (for example, hæmorrhage) in the neighbourhood of the cribriform plate of the ethmoid, which is a very common effect of concussion.

(*b*) Vision. — Visual phenomena in traumatic neurasthenia are extremely interesting, and of the greatest importance. The first is subjective asthenopia. When the patient is fatigued he complains that the whole field of vision becomes somewhat misty, also that a sensation of fatigue is caused when, in consequence of the asthenopia, the attention is more closely directed to an object (*vide* objective motor visual symptoms). Subjective colour sensations, again, are not uncommon, and appear as blue or red flashes or patches in the visual field, most commonly towards the left side. A peculiar pain, which is always referred to the back of the eyeballs, may be here mentioned; it should properly be included in the remarks on algesia or analgesia, but it is intimately connected with the use of the eyes. This pain is of a dull, aching character felt at (that is, referred by the patient to) the back of the orbit. Sometimes it spreads upwards over the margin of the orbit, but not strictly along the supra-orbital nerve, and very commonly outwards along the temporal fossa, but again not according to the distribution of the temporo-malar or any other sensory nerve.

(*c*) Audition.—There are two prominent auditory subjective symptoms—first, a buzzing noise described as being heard in both ears, and not infrequently as being heard inside the head in the centre of a line joining the two ears. The note is practically always a dull, low one, and is not distressing, like tinnitus from peripheral ear trouble, but it sometimes becomes annoying. The other phenomenon is that of giddiness. These patients do not suffer from true vertigo, but from "swimming" in the

head, which may be greatly exaggerated, so that they feel, as they describe it, that the top of the head becomes very light.

(*d*) Tactility.—The usual fundamental subjective perception is numbness and "pins and needles," coupled with a deadness and a sensation in the limbs as if they were extremely heavy; the patients say the limbs feel like lead, and that they cannot lift them. The formication is worse whenever the patient becomes fatigued, and is often worse at night. It is very uncommon for the patient to experience the subjective tactile anæsthesia on the trunk or face, it being almost always restricted to the limbs: the commonest localisation by the patient is the finger-tips and the soles of the feet, constituting an example of acro-paræsthesia as regards the long axis of the limbs. In the upper limbs it affects the post-axial border (ulnar distribution) much more frequently than the pre-axial. In the lower limbs it affects the corresponding area on the antero-external surface of the thigh, extending from the crest of the ileum often as far as the knee; and it concerns the area of distribution of the external cutaneous nerve.

(*e*) Thermæsthesia.—There are two disorders of subjective sensation of heat or cold; the first is general, the second is local. In the first case the patient frequently feels cold all over, and may have a sharp shivering attack without being objectively cold; in the second, local sensations of cold in patches are felt along the spine, and again in the hands and feet; in the latter distribution these sensations of cold are closely connected with objective conditions, such as vaso-constriction and hypersensitiveness.

(*f*) Muscular sense.—Subjective loss of knowledge of the position of the limbs occurs only in very severe cases where there is a considerable degree of analgesia; in other words, it is proportional to the general loss in the general senses. Such patients do not accurately know where their limbs are at night, but there is no affection of equilibration.

(*g*) Algesia.—The subjective sensations of pain have been dealt with in part in speaking of headache; but the pains in the limbs have a specific character, and very often a kind of localisation; moreover, there are several well-known painful points in the trunk of great diagnostic importance, the non-recognition of which has often led to serious error in regard to the condition of the patient, especially when the case is brought into the law-courts. The pains in the limbs may be discussed first, as being of least importance, in the upper limb. Herein the commonest seat of pain is in the pre-axial border (contrast the commonest seat of pain in subjective tactility); in fact the patient describes the shooting and aching pains as following very fairly the course of the musculo-spiral nerve from the upper third of the arm to the metacarpus. In the lower limb the pains are most commonly referred in a general way to the distribution of the sciatic nerve, and appear to be connected with, or in a vague way continuations of, the pains in the spine and pelvis, to which reference is immediately to be made.

It is not possible to realise correctly the meaning of subjective painful spots and character of the pain experienced in traumatic neurasthenia

without having first studied the similar painful spots (in respect of localisation and character) found in so-called severe hysteria. The observations of Charcot have made clear beyond all doubt that there are certain regions of the trunk which are especially prone to become the seats of pain. In speaking of spots it will be understood, of course, that not only does the patient subjectively feel pain thereat, but also that on pressure and other modes of stimulation the same points are found to be tender. The following is a list of the commonest of these points :—

Spine.—The regions of the first dorsal, the sixth and seventh dorsal, the twelfth dorsal and first lumbar, the first sacral vertebral spines, and of the coccyx.

General parts.—The region immediately under the left breast (very rarely the right side is the seat of this pain); the ovarian point, that is the point in the abdominal walls opposite to the ovaries; the posterior superior iliac spine and the neighbouring portion of the iliac crest which gives attachment to the latissimus dorsi, and often in addition the inferior posterior iliac spine.

(*h*) Apart from the usual coexistence of atonic dyspepsia in a very large percentage of cases, there is anorexia and a strong subjective sensation of nausea. In very severe cases this becomes accentuated, and the patient may suffer from so-called hysterical vomiting, which may become a symptom of the utmost gravity, but does not require any further consideration here.

(B.) *Objective changes in the special senses.*—These are so often dependent upon gross lesions, that they must be examined with great caution; this especially applies to the first of the following two.

(*a*) Smell and taste.—Loss of smell and diminution of taste are frequently complained of; it is exceedingly difficult to exclude the very frequent injury to the sense of smell by the antero-posterior line of concussion of the skull and consequent damage to the olfactory bulb and its branches.

(*b*) Vision.—The most interesting, important, and striking symptom is that of contraction of the field of vision, both for white light and for coloured light. Commonly this is present on the side on which there is also hemianæsthesia of the tactile sense and hemiparesis, so that it is in effect a crossed amaurosis. In severer cases the contraction of the field is bilateral. This contraction of the field of vision may be very pronounced, and yet under suitable treatment in a short time (that is, a few weeks) it may disappear. Hemianopsia, however, when it occurs, is much more permanent, and has been repeatedly known to continue for many years after the disappearance of the other neurasthenic symptoms. The line passes through the fixation point.

(*c*) Audition.—Objectively audition is affected in two ways; thus when there is a considerable degree of hemianæsthesia, for instance, of the left side, there is a corresponding dulness of hearing referred to the left ear, but in well-marked cases only; by far the commoner condition is hyperacusis, the patient complaining of the painful effect of noises.

(*d*) Tactility.—The tactile sensation and the localisation of the same is occasionally altered, but is not in proportion to the subjective sensation of tactility; the distribution of the anæsthesia differs according to whether it is of the cerebro-cortical projection type or of the spinal nerve root type. The former is by far the more frequent, and in the unfortunate absence of pathological investigations it is a little doubtful how far the spinal root type can be said to be purely a neurasthenic condition, unaccompanied, that is, by organic lesions.

(*e*) Thermæsthesia.—The appreciation of changes in temperature in traumatic neurasthenia is a very difficult problem, because the psychical judgment of the temperature of any body that the skin comes into contact with is notably modified by the condition of the vessels of the part; and the calibre of these is strikingly altered by the vaso-constrictor or vaso-dilator influences which are brought about by the condition under discussion. In a well-marked case, however, it can be ascertained that there is the same diminution of appreciation of heat or cold as of touch.

(*f*) Muscular sense, including sense of position.—The muscular sense is very rarely objectively lost, but doubtful instances can occasionally be found on careful testing.

(*g*) Algesia.—The presence of pain—that is, of tenderness to external pressure on objective examination of the patient—is a very important subject; and the spots whence it can be elicited correspond, as already stated, very closely with those originally described by Charcot as the hystero-genic zones of the neurasthenia of severe so-called hysteria. At each or any of these spots not only pain of a peculiar depressing, aching character can be evoked by touch, but also by the movement of muscles which drag on such spots; for example, the attachment of the erector spinæ muscle to the posterior superior iliac spine causes frequent pain when the patient stoops forward and passively stretches the part, or when he rises and causes a similar stretching by the contraction of the muscle. It is further to be noted that a sudden jar, such as stepping off the kerb, will cause a stab of pain in the hyperæsthetic spots of the spine.

It is not necessary to elaborate further the description of these symptoms, but in view of the fact that they are so frequently believed to be indicative of structural disease of the vertebral column, this mistake in diagnosis must be especially guarded against.

Motor conditions.—A. *Over-action.*—Instances of motor over-action are best considered under the following headings of tremor, spasms and contracture, and hystero-epilepsy.

The tremor in traumatic neurasthenia is chiefly of the kind which is often called purposive or intention tremor, by which is meant that all deliberate voluntary acts are performed with a certain amount of trembling. This trembling varies from slight fluttering of the muscular contraction to distinct jactitation of the limb. If the patient be observed, or his agitation in any way increased, the tremor at once becomes more marked, and is not dependent, as in sclerosis, on fatigue which may take a long time to produce.

Spasms and Contracture.—Without in any way resembling Thomsen's disease, the muscles in traumatic neurasthenia easily pass into a condition of spasm when they are purposely innervated; and in very severe cases spasm and contracture may occur, and persist independent of any voluntary contraction of the muscles concerned. As regards such spasm, so far as it affects the head, the facial muscles usually escape; but the tongue is frequently involved in the way pointed out by Charcot and Richet, which is in effect the movement described by Dr. Beevor and myself on the excitation of the cortex, in which the tongue is heaped up on the same side as that on which the excitation is applied. The tip of the tongue is sometimes deviated also slightly to the opposite side. Spasm and contracture of the limbs is very much more common. As regards the joints of the limbs involved, the digits are most frequently flexed and the foot inverted with plantar flexion; the wrist is usually fixed midway between flexion and extension, but sometimes one or other of these movements may be displayed. The elbow and knee are both most commonly extended. The shoulder and the hip as a rule are not affected.

Hystero-epilepsy.—A few patients are the subjects of hystero-epilepsy, if the cause of the injury be sufficiently exciting. In hystero-epilepsy a patient can be shown during the attack to have a certain degree of dulling of the different sense perceptions, and this may proceed to complete unconsciousness; but such unconsciousness is not attended with the usual loss of sensitiveness of the conjunctivæ. For the study of this rare condition, so uncommon in this country and so common in France, the reader must be referred to the article on hysteria, for there is nothing special in that form of it which is evoked by traumatism.

B. *Defect of action.*—In traumatic neurasthenia defective action must be divided into the headings (*a*) general paresis, (*b*) local pareses.

(*a*) General paresis is a most marked phenomenon of all these cases, whether for sudden action or for continued action; and it is indicated by every possible method of objective examination, as by the dynamometer and by the early occurrence of marked fatigue. In short, the general paresis of traumatic neurasthenia very closely resembles the general paresis present in cases of cerebral tumour and other organic lesions of the central nervous system. It is often expressed popularly in the patient's words—that he has not the ordinary amount of nerve-energy, even for a thing he is personally anxious to accomplish.

(*b*) Local pareses.—Localised paralysis in traumatic neurasthenia is customarily monoplegic, and concerns chiefly the lower limbs, to a less degree the upper limbs, and the face extremely rarely. As regards the trunk muscles, I have only once seen the respiratory muscles affected locally, though of course the trunk and abdominal muscles generally share in the general paresis. As regards the two halves of the body, Richet's statement that the left side is affected three times as frequently as the right is undoubtedly correct, and is to be compared to the equally frequent occurrence of left-sided anæsthesia, which of course suggests, in accordance

with the ideas first promulgated by Claude Bernard, that the defective condition of the afferent portions of the nerve-centres accounts for the condition of the efferent.

C. *Reflexes.*—(*a*) Superficial reflexes.—These are universally heightened in traumatic neurasthenia, including those derived from the special sense organs; thus the patient starts at noises and sudden lights. In very severe cases, however, the superficial reflexes may be diminished, and where analgesia has been established the reflexes are abolished.

(*b*) Deep reflexes.—The first stage of alteration of these is invariably exaggeration, and where the left-sided symptoms of paralysis of motion and sensation are most marked, the knee-jerk or elbow-jerk of that side is also greater than that of the other side. This first stage of alteration is the most common. The second stage, through which the case may pass, is that of a diminution of the force of the deep reflexes. The third stage, which may ultimately be arrived at in a very severe instance, is that of loss of the deep reflexes to all ordinary stimulation, but they—the knee-jerks, for example—may always be elicited by applying Jendrassik's reinforcement.

(*c*) Ankle clonus in connection with concussion of the spine is not uncommon, and though for a long time it was regarded as symptomatic of organic mischief, it is now recognised as an occasional accompaniment of the simple neurasthenic state. A rectus clonus is extremely rare; yet in a few cases there may be not only rectus clonus, but the whole body may be clonically shaken as by a coarse shivering movement; the same being produced by efforts of voluntary movement on the part of the patient. These cases have been described under the misleading name of traumatic sclerosis. They usually occur in patients of low type of intelligence.

Changes in the systems subserving organic life.—(i.) *Circulatory system.*—(*a*) Heart.—The rhythm of the heart is always accelerated in neurasthenia, the other physical conditions remaining normal. The disorder of the action is usually most intensified when the patient lies down at night, and may be so marked as apparently to shake the bed; occasionally the heart executes an asymmetry of movement which gives rise to the sensation popularly known as "turning over."

(*b*) Blood-vessels.—The condition of the blood-vessels is interesting: first, because of their important influence on the condition of the circulation in the limbs and extremities; secondly, because of the altered condition of their walls as regards the transudation of fluids. In the first place, all neurasthenic patients complain of cold extremities, which they ascribe to a feeble circulation, an explanation not infrequently adopted by their medical advisers. The skin of the hands and feet is pale and cold; but this is due to a general increase of vaso-constriction, and is not in any way dependent on the blood-pressure; further proof of this is afforded by the fact that the condition is improved by local treatment which has no influence on the heart. The second point, the alteration of the walls, leads to what has been called (in reference to

allied conditions suggestive of a neuritis) angio-neurotic œdema. This, however, is never seen with the first-mentioned common condition of vaso-constriction. It is not a symptom of over-action, it is a paralytic phenomenon, and follows local dilatation of the blood-vessels, leading to heat and redness of the parts supplied. Thus a congestion or paleness is most usually found in the area of scalp supplied by the great occipital nerve, but may also be observed in the limbs, especially if one member has been over-used after the incidence of the general neurasthenic symptoms.

(ii.) *The respiratory system.*—Usually there is no change in respiration beyond that of acceleration; but one case, under my own care, of functional paralysis of automatic respiratory movements on one side of the chest, has been published.

(iii.) *Alimentary system.*—As in the so-called idiopathic neurasthenia, atonic dyspepsia is extremely common, and requires special attention, as, if not dealt with early, it may lead to gastric dilatation and fermentation. Intestinal paresis and constipation are frequent, but almost as frequently the exact opposite is seen—namely, what is called "nervous diarrhœa."

(iv.) *Renal system.*—The urine shows most important alterations. Generally the quantity passed in twenty-four hours is increased, and there is a corresponding decrease in the percentage of solids; therefore the specific gravity is notably decreased. This is a valuable objective symptom which might perhaps be imitated by an astute malingerer, but fraud can be easily detected by suitable watching. The frequency of micturition is notably increased.

Treatment.—The treatment of traumatic neurasthenia must of necessity vary with the degree of the disease. Those cases must be looked upon as the most troublesome in which the sensory disturbances are strongly marked; secondly, those in which any remnants of organic injury exist, such as can be reasonably supposed to cause the prominency of the symptoms. This second condition is easily dealt with where some definite lesion exists; but it is not easily met when it is present as the vague condition called sprain of the back; it being understood that the nature of the accident renders it extremely likely that there has actually been strain or stretching of ligaments and muscular fibres. Such cases are frequently treated by apparatus, spinal supports, braces, or splints, all of which methods are very bad, as they lead to disuse of the muscles and consequent lack of support to the spine and trunk, so that more irregular tension is thrown on the damaged parts. Such rest as is necessary in dealing with these conditions is only properly obtained by the confinement to bed—the rest-cure treatment described hereafter.

Cauterising the back in some patients undoubtedly relieves the pain temporarily, but it is doubtful whether in any case the cure is effected thereby, or the sensibility of the hystero-genetic points ever permanently removed. Occasionally some results are obtained by the use of the ordinary counter-irritant agents, such as iodine and the like.

Leaving now cases of this class and turning to the cases of pure trau-

matic neurasthenia (that is, without any obvious local injury), considerable discretionary power must be exercised in the recommendation of any definite methods. As a general rule, it may be said that the tendency of the present time, unfortunately, is to minimise the probable duration of the symptoms, and to put too much trust in the efficacy of drugs and change of scene.

Practically the two alternatives to put before the patient are (A) drug treatment; (B) rest-cure treatment. (A) Drug treatment.—A very moderate case may unquestionably be greatly benefited for a long time by the administration of iron, arsenic, phosphoric acid, nux vomica, and so forth; and were such treatment restricted to these or similar remedies, more success would be recorded. Unfortunately it is too frequently the custom to treat the headache and the general pains of these patients with bromide of potassium, and their symptoms of physical inefficiency with stimulants. Yet both bromides and alcohol are most injurious, and very greatly inhibit the natural recuperative power of the nervous system. Especially is this the case with bromide of potassium, the physiological effects of which upon the central nervous system and the vaso-motor nerve apparatus are an exact counterpart in essential particulars to the more objective signs of traumatic neurasthenia. The reason of its injurious effect is therefore sufficiently obvious. Another traditional course of treatment is to send the patient away to travel. As a rule the patients who are thus sent on a voyage or a journey are so far tired by travelling that they come back in very much the same state as that in which they started; whereas if by suitable treatment they had been built up to a certain degree beforehand, the change of scene secured by the travelling would have been of real service to them.

A wide experience of traumatic neurasthenia shows that no case can be expected to end in recovery, if the symptoms be severely marked, unless treated by the Weir Mitchell method of counteracting ordinary idiopathic neurasthenia. The absolutely essential factors in this treatment are: (*a*) complete and absolute isolation for at least the first month of the treatment; (*b*) general massage, with a special massage of the chiefly affected part, for a minimum period of six weeks; (*c*) high feeding, beginning with two days' restricted milk diet. If for any reason this line of treatment cannot be followed, then something can be done by ordinary treatment with tonics; but progress is extremely slow. This consideration opens up a very important question in regard to the treatment of this sort of case in hospital practice, for the general hospitals do not contain isolation wards, as a rule, suitable for the treatment; and at the same time these cases, which are seen in numbers in the out-patient room, and which are often called "strained back," etc., of necessity do not improve as they ought to do, because they cannot get adequate treatment.

Prognosis.—The prognosis in a case of traumatic neurasthenia depends upon (*a*) the previous occurrence of serious disease in the patient's life (especially zymotic); (*b*) the occurrence of nerve disease or neurosis

in the patient's family ; (*c*) the severity of the symptoms caused by the accident ; (*d*) the patient's age. These are the circumstances on which an opinion must be founded. The prognosis on the whole is of course favourable ; but the lasting effect of an injury on the general efficiency of the patient's nervous system must be recognised. Prominently among possible after-effects is the chance, if there be mental trouble in the family, of the injured person falling into a disordered mental state which is usually of an excited character (such as traumatic mania). Further, the frequent tendency to relapse which these cases exhibit, and which may be caused, not by another accident, but by anything that may produce depression of the activity of the nervous system in the patient, such as overwork, shock, and the like, is to be borne in mind. Finally, if any proved sensory loss exists, hemianopsia, for instance, its disappearance under treatment cannot be safely promised.

Malingering and points of medical jurisprudence. — It is a regrettable fact that, owing to their causation, cases of traumatic neurasthenia are frequently rendered unnecessarily complex by issues which have nothing to do with the case, such as recovery of damages for injuries and loss of service. When the condition is made the subject of a process in a court of law, the legal advisers for the plaintiff exaggerate every symptom, while those for the defendant minimise to a like degree the actual disabilities which the plaintiff has incurred. In this way a jury, not possessed of any expert knowledge, is in too many cases made the judge to discriminate between these conflicting accounts, with the unfavourable results which might be expected. The evils of this system, which undoubtedly leads to malingering on the part of plaintiffs, causes a greater evil in that the medical men who are called in as experts on either side are only too easily induced by a skilful counsel to give evidence which is not so much a recital of scientific facts as an involuntary representation of the situation in the light most favourable to the side which has invited their opinions. It is a great pity that the Judicature Act, which allows the parties of such a suit to submit the matter to a court consisting of a judge of the High Court with medical assessors, as in the case of the Admiralty Court, is practically a dead letter. Partly to obviate the evils of the existing system, it is advisable that all medical consultations and examinations of the plaintiff should be attended by the medical advisers on both sides before the case is taken into the court, as recommended by a formal resolution of the British Medical Association (*vide* p. 136).

VICTOR HORSLEY.

MENTAL DISEASES

(*Edited with the kind help of Dr. Savage*)

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MENTAL DISEASES

INTRODUCTION

THE following division of this work is devoted to the consideration of unsoundness of mind and of insanity, which, as I shall point out, are not the same thing: for there is much unsoundness of mind which does not seriously affect the relationship of the individual to his circumstances, and which cannot therefore be considered as insanity; and though insanity is always believed to be connected with some disorder or disease of the nervous system, it will be seen in the study of moral insanity that in those suffering from this and some allied forms of disorder, little change in the ordinary intellectual processes can be demonstrated.

Insanity is such a disorder or disease of the nervous system as prevents the individual from reacting normally as a member of the society to which by birth and education he belongs.

Unsoundness of mind may arise from some defect of the nervous system which interferes in a minor degree with the normal reaction of the patient to his circumstances, but which need not affect his social life in any important way or degree.

Great difficulty is found in distinguishing the normal and the abnormal reaction of the individual to his circumstances, and hence also in arranging and classifying such reactions. Classification, as we shall see later, is, and for the present must be, provisional, and meanwhile must rest mainly upon considerations of custom and convenience.

The legal test of insanity is found in conduct; mere disorder of mental processes has little weight as a legal test, as will be seen when we study the relations of insanity and crime.

The insane, out of harmony with their social surroundings, are not necessarily in opposition to them; the criminal, on the other hand, is in direct antagonism to the laws of social life. Another important distinction between insanity and crime is that the criminal is supposed to be conscious of the nature and quality of his acts; to know that they are

injurious or noxious, and worthy of punishment; and to be able to control them. An insane person may cause the same injury to society as a criminal; but, seeing that he is not able to control his act, or is impelled by some false idea for which he is not responsible, or is ignorant of the nature and quality of his act and its consequences to himself and others, he is not punished. In the one case the person is supposed to be able to recognise right and wrong, and to act accordingly; in the other case he is not able so to distinguish and to decide.

Though criminality and insanity may approach each other, yet it must not be supposed that all insanity is allied to crime; and I think serious harm still comes of the prevalence of the legal view of insanity. Some mentally degenerate persons are insane, and some are criminal. Unhealthy circumstances, including bad education, may lead to one aberration or the other; yet many of the insane are as far from being criminals as are the most healthy-minded.

Insanity and sanity being relative terms, the standard to be applied cannot be a general one, it must be individual. The sanity of the conduct of a person must be gauged by his course and circumstances. Insanity has in most cases to be reckoned as a deviation from the ordinary line of conduct; the person is not "himself," he is no longer able to understand and respond to stimuli in the way he did. Sanity, then, is a question of time and degree; the patient may conduct himself reasonably to-day and insanely to-morrow. Insanity, so far as it depends on disease of the brain, is related to changes in the fore-brain —that is, of the highest cortical centres; it may be due to alteration of structure in these centres, or it may follow temporary alteration of nutrition in the same areas; these alterations in nutrition may arise from bodily disease, the highest nerve-centres being the signal points of the disease; or the malnutrition may come from poisons generated in the body, as in uræmia or septicæmia, or from poisons derived from without, such as alcohol, lead, or malaria.

Insanity may depend on defective power of accommodation of parts of the nervous apparatus to their surroundings; in these cases there is not exactly disease of organ or tissue, there is simply unfitness for the work. Such unfitness may be due to original defect, or to insufficient or improper education; in such defects of accommodation may lie moral, sensory, or physical incapacity.

Insanity, then, may be associated with disease of the brain, or with disease of the body indirectly affecting nutrition or growth of the brain; the insanity in this case being the mental expression of the bodily disease: or it may be due only to maladjustment of the individual to his surroundings.

It is generally assumed that though any one may suffer from the coarser forms of brain disease, such as tumour, certain persons only, the so-called "neurotics," can become insane. This is not true without qualification. It is probable that in the neurotic the nervous system is more likely to be disturbed by general diseases than it is in others; such

persons are certainly more liable to delirium with febrile diseases, and I believe are more likely to have brain syphilis than the stable: on the other hand, persons of highly neurotic instability do not always tend to insanity, and in the neurotic who become insane only special forms of insanity arise (*vide* art. "Neurasthenia," p. 140, etc.) Many highly neurotic persons become permanently invalided by hypochondriasis or hysteria, yet do not go mad. Neurosis, again, may be acquired by the individual if exposed to its proper causes.

What is meant, then, by neurosis, and what is its relation to insanity? I consider a neurotic person to be one whose nervous instability causes him to react unduly to stimuli, the undue reactions being called mental or nervous symptoms. Neurosis arises under certain conditions of general and nervous degeneracy; as a tendency to nervous weakness it may be transmitted, and it may vary greatly both in form and in degree.

Hereditary neurosis generally originates in some physical weakness in the parents, such as insanity, epilepsy, intemperance, old age, wasting diseases (phthisis and cancer), damage to the higher nervous system by injury or by rapid and premature exhaustion of nervous energy, marriages contracted between aged parents, or between parents widely differing in age. Mere consanguinity, when both parents are healthy, is not enough of itself to generate neurosis.

Neurotic children may exhibit their nervous weakness in various ways: there may be want of brain mass, or there may be some inability on the part of the brain or some of its parts to develop; there may be sensory loss of one kind or another which hinders or prevents healthy nerve-stimulation from without; and such neurotic children may present degrees of idiocy or imbecility.

A minor degree of neurosis may be seen in a restless reaction to all stimuli from without which prevents storage of perceptions, and thus modifies or arrests mental growth from defective memory of experience; neurotic weakness may also be seen in "impulsive" reaction to outside stimuli, which may even cause convulsions. The restlessness of the neurotic is well marked throughout the years of growth and development; and is seen in loss of control, want of power of application, lack of moral sense, somnambulism and night terrors, and a tendency to automatism. Though restlessness, loss of control, and undue tendency to react to stimuli are the most evident symptoms, those most dangerous socially are the moral defects and perversities; some neurotics have no sense of truth or honesty, and no altruism; they are cruel, destructive, and sensual. In some such patients special aptitudes appear to be developed at the expense of the other faculties: of such aptitudes are the memory for isolated facts; the power of musical reproduction, and of rapid mental calculation; thus many musical prodigies and calculating boys are weak in mind, or without moral sense.

The neurotic youth, who may have exhibited some of the abnormalities described, may later exhibit noteworthy and characteristic pecu-

liarities of his own. He is alternately exalted and depressed, full of plans which never come to anything; he is self-asserting and conceited; then will-less, self-indulgent, and indolent. With the period of exaltation sexual desire becomes dominant, and may lead to immoral and filthy habits.

The neurotic and nervously degenerate, who become insane, exhibit a special tendency to recurrent insanity, and to the various forms of systematised delusional insanity. The natural tendency of highly neurotic families is to extinction; and though a slight amount of neurosis in a family may be associated with brilliancy, a little more leads to destruction. Neurosis may be overcome or modified by healthy marriage; if modified it may reappear as chorea, asthma, diabetes, gout, and, probably, in an undue susceptibility to fevers and toxins.

Genius and eccentricity are said to be allied to insanity. Genius, of some kinds, is not infrequently met with in neurotic families, and occasionally a man is at the same time a genius and subject to insanity. Poets, artists, and those concerned chiefly with works of the imagination are most liable to symptoms of insanity, the blaze of brilliancy being often followed by a gloom of nervous exhaustion. Here again the genius of insanity is not the genius of hard work and steady application, but of uncontrolled reaction to stimuli. Little genius indeed, if any, is met with in asylums, at any rate among the chronic lunatics. The insane have no remarkable powers, either bodily or mental; they may disregard general opinion, or may be so self-absorbed as to appear to be gifted with undue powers; but essentially all insanity is weakness. Thus some persons, in bursts of unreasonable excitement, expend their nervous energy in a short period, leaving themselves for a time nerve-bankrupt. Genius is in some cases associated with moral defects of various kinds, or eccentricity; though this is by no means the rule. The eccentric person is regardless of the smaller conventions of society: he is not injurious to society, and he is not ignorant of the nature of his acts; he is more isolated than the normal, but less so than the insane. Just as genius does not connote eccentricity, so eccentricity connotes neither genius nor insanity.

The eccentric person is often of neurotic stock, but, in the majority of cases, he does not pass into insanity. In some cases, however, the conduct of the eccentric person is such that for his own sake he needs especial care, and to this extent he may be regarded as insane.

The relationship between criminality and insanity is specially treated hereafter. I shall at once proceed, therefore, to the classification and causation of insanity.

Classification.—Though the basis of any scientific classification should be the pathological changes in the nervous system which give rise to mental disorder, we are not yet advanced enough in nerve pathology to be able thus to classify insanity.

There may be classifications by general similarity of symptoms, such

as mania, melancholia, or dementia; classifications by general causation, such as alcoholic, puerperal, adolescent, or senile; and classifications on mixed principles, such as that adopted by the Royal College of Physicians, in which the form of the insanity is qualified by the ascribed cause—thus, Mania—puerperal, alcoholic, etc. Though this last method has some advantages, we think the classification suggested by Drs. Clouston and Mercier for the Educational Committee of the Medico-Psychological Association is better. It is as follows:—

1. States of mental weakness—(*a*) primary, idiocy and imbecility; (*b*) secondary, dementia. 2. Stupor. 3. Depression. 4. Exaltation and excitement. 5. Systematised delusions with hallucinations. 6. Impulsive and moral insanity. 7. General paralysis.

Causation of insanity.—The causes which give rise to insanity vary greatly with the individual. Probably nearly all insanity depends on some alteration in the most developed parts of the fore-brain.

Causes cannot be clearly divided into physical and moral. The usual division of causes is as follows:—Predisposing and exciting; physical and moral (that is, psychical); simple and complex.

Similar insane courses of conduct may depend on disease of different kinds affecting the same parts of the nervous system. The brain, like other organs, has its own ways of expressing disease; so that various causes may produce identical forms of insanity. Mental disorder may arise from temporary malnutrition of the fore-brain; it may follow decay of the same parts of the brain, or it may depend on incapacity to accommodate, without anything in the structure of the brain to be called disease. Temporary alteration in the finer structures of the brain may arise from direct injury or local change in the brain itself; or it may follow toxic influences derived from without,—as in fevers, alcoholism, or from within,—as in anæmia, uræmia, and the like.

Insanity may follow decay of the brain from age or premature decay, or coarse changes resulting from tumours, apoplexies, arterial changes, and the like.

Remoter causes of insanity are either general or special. Among the general causes we have to consider whether particular races are more liable to mental disorder than others. It is clear that, as insanity is a deviation from the normal mental standard, this deviation will vary according to the state of civilisation of the time and place. With developing complexity of society there will be increase of mental disorder, not necessarily from increased mental work but from increase in the variety of relationships. Insanity is not more common among the southern and more excitable races than among the more phlegmatic. The habits of a nation have more to do with the tendency to disorder than the race. Those living more simple temperate lives suffer less than those living in cities who take much animal food and alcohol. Though country life is more free from some causes of insanity than city life, yet in the country there are other and special causes of mental stress. Solitude and lack of external stimulus tend to mental disease.

Some forms of cerebral disease, such as general paralysis of the insane, are almost unknown among those who live away from cities, who take little animal food, and who are less liable to syphilis.

The religion, as part of the civilisation of a nation, plays some part in colouring the insanity, and to a smaller extent has an influence in producing it: the Protestant religion, for instance, has its special mode of colouring melancholic feelings.

Whether there is any marked and serious *increase in insanity* in England is a question continually asked; and I think it must be admitted that there is an increase, but not to an alarming extent.

At present there are in England about 32 recognised persons of unsound mind per 10,000 of the population (30·00 males, 33·84 females). The nominal increase greatly depends on the accumulation of chronic cases; on the collection in asylums of many harmless dements who formerly would have been retained in workhouses; and on the reception into county asylums of many harmless persons who, but for the increase in number and comfort of asylums, would be kept at home. A considerable number of patients belonging to the upper and the middle classes are still kept at home, and are thus not recognised by the Commissioners in Lunacy. The increase reported by the Commissioners, in their 1897 report, was 504 males, 1223 females—total, 1727. The relative frequency of the disease at the various ages is seen in Table XIV., p. 185.

Sex.—There is a larger number of insane women in England than of insane men, but the proportion of women to men is larger; and, again, the men being more subject to incurable forms of insanity, do not provide so many recurring cases as the women do. For instance the male general paralytics die, whereas the puerperal patients generally recover and may relapse.

There are special conditions, both physical and moral, which dispose to insanity; in women, menstruation with its irregularities, childbirth, and change of life are potent influences. The stress of poverty and ill-treatment fall most heavily on them; and women who become widows are exposed to misfortune. In looking through the returns we find that over half the insane are married (see Table XVIII.)

The relationship of *age* to insanity is well marked; any form of mental disorder arising in childhood tends to arrest mental growth, and therefore to produce idiocy or imbecility.

Though rare, acute insanity may arise in early childhood. I have seen cases of acute mania in children under seven; and it is not uncommon to meet with precocious development of sexuality leading to mental disorder in very young children. Melancholy is not very rare in children of from ten to fifteen, and may end in suicide. Stupor is also met with at similar ages, though this is rare. Hallucinations of the senses occur in very early youth, and may be the starting-point of organised delusions; such cases almost always come of very insane stock.

TABLE XIV.—The Number of Patients in County and Borough Asylums, Registered Hospitals, Naval and Military Hospitals, State Asylums, and Licensed Houses, who were living in those Institutions on 31st December 1896.

Under 5		5–9		10–14		15–19		20–24		25–34		35–44		45–54		55–64		65–74		75–84		85 and upwards.		Total.	
M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1	1	148	79	524	317	1074	807	1984	1770	6697	6623	8294	9238	7357	9352	5176	7324	2752	4113	774	1395	55	147	34,836	41,166

TABLE XVI.—Showing the Number of Patients admitted into Institutions for the Insane in England and Wales in each Month during the Year 1896.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.		
												M.	F.	T.
1592	1378	1418	1520	1649	1578	1543	1352	1374	1409	1298	1484	8512	9083	17,595

TABLE XVIII.—Condition as to Marriage.

Condition.	M.	F.	Total.
Single .	8,716,363	8,908,665	17,625,628
Married	4,851,548	4,916,649	9,768,197
Widowed	484,990	1,124,310	1,609,300
Total .	14,052,901	14,949,624	29,002,525

TABLE XXII.

Yearly average of the number of cases in which the attack of Insanity was stated to be the first.			Yearly average of the number of cases in which the attack of Insanity was not stated to be the first.			Proportion (per cent) to the Total of the Yearly Average number.					
						First Attack.			Not First Attack.		
M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
5926	6087	12,013	2280	2723	5003	72·2	69·1	70·6	27·8	30·9	29·4

52nd REPORT 1898.

Increase of 2607 in officially known lunatics of 1898 over 1897. Increase of 2919 in officially known lunatics of 1897 over 1896.
32·48 per 1000 of population = 1 for every 308 of population.
The ratio of admission to 10,000 of population is 6·07, or the same as in 1896. In 1888 it was 5·25.

Dr. Clouston has described adolescent general paralysis of the insane; this in my experience is always associated with parental syphilis. There is ground for thinking that heredity plays an important part in the early onset of insanity. I think persons coming of very neurotic stock tend to insanity, and especially at the critical periods of life; that is at puberty, adolescence, reproduction, the climacteric, and in senility: such persons also tend to systematised delusions and recurring insanity.

It will be seen from the Commissioner's reports (Table XXII.) that of fresh cases 70 per cent were first attacks.

The largest number of cases of insanity occurs between the ages of twenty-five and fifty, that is during the period of greatest mental activity. Both puerperal insanity and general paralysis occur chiefly between these ages. The true delusional cases are, as a rule, first brought under notice about the age of thirty. With the climacteric there is in the neurotic a special tendency to break down, and this is true of those who have had other attacks, more particularly those who have had mental disorder connected with the reproductive function.

In some families the nervous system has a special tendency to wear out; the members of such families as a rule becoming either demented or melancholic in old age. In extreme old age, however, as in childhood, mania or stupor may occur.

The *social position* may act in some ways as causative of insanity. Occupations which interfere with healthy sleep, or which keep the nervous system always on the strain, tend to produce insanity; thus Stock Exchange and similar work is injurious, but it is hard to know how much depends on the excitement and how much on the free living. In England I have recently seen many patients in whom the worry of unprofitable farming seemed to be the cause; a constant anxiety as to the future, more particularly when nothing can be done to prevent mishap, may lead to sleeplessness, indigestion, and nervous break-down.

The position and the profession of the individual will colour the nature of the insanity: a doctor tends to hypochondriasis, a parson to remorse; a man is more egotistical, a woman more altruistic in her morbid bent. The life of a governess in England tends to produce insanity; but here again we have to recognise that governesses are often gifted with active and unstable nervous systems; moreover, their lives in too many cases are narrowed out of proportion to their powers and to their desires. Beggars are not very liable to insanity, but prostitutes provide a large number of lunatics.

Solitary confinement has been credited with the production of a good deal of insanity among prisoners, but this has not been proved. The criminal classes are nearly allied to the insane, and it is not astonishing that a good many prisoners should become mad. Prisoners differ among themselves in their insanities, but I believe that in them there is a great tendency to organised delusions, such as those of persecution.

The *season of the year* may have something to do with the incidence of the disorder. In England the largest proportion of admissions to asylums is in the early summer, but this does not necessarily imply that these cases began then (Table XVI.)

There is no known relationship between the phases of the moon and insanity.

Heredity.—Insanity in a parent may reappear as insanity in a child; the insanity in a mother tends to reappear most commonly in the daughters; that in the father tends nearly equally to both sexes, but is not so potent as that of the mother.

Insanity in a parent may reappear in the children, as idiocy or imbecility; or physical or mental defects which have been described as degenerative—such as epilepsy, chorea, asthma, or irregular nervous discharge of one kind or another. It is in the upper classes that heredity is most commonly traced as a cause of insanity. Mere consanguinity, as I have said, is not a cause of idiocy or insanity unless there be disease or degeneracy in the family. Neurotic and insane heredity cause eccentricity, moral obliquity, tendency to delusions, imperative ideas, and recurring attacks of various forms of insanity. I believe that in fully one-third of all the cases of ordinary insanity a history of insanity is to be detected in the family. In the case of general paralysis of the insane, however, this is much less marked.

Insane persons may have perfectly healthy children; and it is very rare to meet with whole families of idiots or insane whose parents were actually insane. The danger to the children, as a rule, is directly in relation to the recency of the insane attack; thus a father, having begotten healthy children, has an attack of insanity, and, while still insane, or shortly after the passage of the acute symptoms, begets a child which becomes insane; but later he may beget healthy children. Again, the child of a mother who has an attack of puerperal insanity may be insane, though the mother did not become actually insane till after the birth of the child. The child of a degenerating parent, such as one in the early stage of general paralysis of the insane, or one suffering from senile mental changes, is likely to be idiotic or unstable.

The relationship of drunkenness in the parent to insanity in the child is not quite clear; but no doubt a drunken parent not infrequently begets a weak-minded, idiotic, alcoholic, or criminal offspring. It has been said that a child begotten during drunkenness runs a special risk, but I can hardly accept the evidence on this point. In some cases the form of insanity seems to be transmitted directly; this is seen in some cases of melancholia, and in some of systematised delusional insanity; in these latter instances similar minds living under similar conditions originate similar delusions.

The neuroses are in most cases interchangeable, so that one form of neurosis may appear in the parent, another in the child; an insane parent may have an epileptic child, or an epileptic parent an insane child. There

seem to be certain alternations; thus a neurotic parent may have diabetic offspring, or conversely. Megrim, asthma, and gout may alternate in a similar way. In strongly inherited insanity there is a tendency to sudden outbreaks of disorder, and a tendency even to a certain toleration of attacks; so that a highly neurotic person may have dozens of attacks of acute mania from which the non-neurotic person would not have mentally recovered. Remissions and recurrences are common. Neurotic heredity tends to delirium, somnambulism, moral perversity, and general nervous instability.

Education, if properly conducted, never leads to insanity. Spoiling may cause some insanity, but as a rule the spoiling itself consists in organic defect. In premature mental effort the danger is rather in interfering with future growth. The education of the present day may do harm in immature youths who come up to a city, where they live a narrow life, cram themselves during their few spare hours with the rudiments of a modern language and with shorthand; they become sleepless, dyspeptic, and break down with depression or delusions, but fag and cram are not education. Too bookish an education, again, may be harmful when the general hygienic conditions are bad. Generally speaking, "overwork" is work on too narrow lines. I have seen overwork of the following kind do harm:—A parent sets her clever daughter to learn everything at once; to study science, languages, music, art, dancing, riding, and the rest; and, to balance all, encourages bicycling and hockey in order that, by the diversion of nervous force, energy may be conserved; but over physical training has its dangers also, and I think I have seen over muscular training in unsuitable subjects act as the starting-point of neurosis.

Broad and general education does good; but it must be remembered that the neurotic child needs special and individual education: as a rule such children have to be kept back and not forced, the great purpose of their education being less to acquisition and more to inculcation of habits of order and steadiness in disorderly minds.

Such, then, are the general and special remoter conditions of insanity, which prepare the way for the proximate causes which may act variously, some directly on the brain itself, others on the general nutrition; some act instantly—this is rare; others by prolonged strain; others, again, by frequency of recurrence.

No essential difference can be made between moral and physical causes; for instance, either a mental shock or a blow on the head may produce a similar disorder of nutrition. We all know how a fright or a blow may arrest the heart; so it is with the rest of the body: a fright, it is said, may affect the mother's milk so that it injures the child; and similarly the brain nutrition may be injured by a shock, such as reception of bad news, or by the prolonged effect of a constant dread of impending evil.

The more immediate causes of insanity as registered by the Commissioners in Lunacy, are tabulated as follows :—

Causes of Insanity

Moral

Domestic trouble (including loss of relatives and friends).
Adverse circumstances (including business anxieties and pecuniary difficulties).
Mental anxiety and "worry" (not included under the above two heads), and overwork.
Religious excitement.
Love affairs (including seduction).
Fright and nervous shock.

Physical

Intemperance in drink.
„ sexual.
Venereal disease.
Self-abuse (sexual).
Over-exertion.
Sunstroke.
Accident or injury.
Pregnancy.
Parturition and the puerperal state.
Lactation.
Uterine and ovarian disorders.
Puberty.
Change of life.
Fevers.
Privation and starvation.
Old age.
Other bodily diseases or disorders.
Previous attacks.
Hereditary influence ascertained.
Congenital defect ascertained.
Other ascertained causes.
Unknown.

But few remarks on these causes will be necessary. Domestic anxiety falls most frequently and most heavily on women, business anxiety on men ;—though many women suffer as much or more than men from the stress of business, as they are less used to it. The *domestic anxiety* is frequently met with in women under such conditions as these :—A wife nurses a paralysed husband night and day for some years ; then, as a result of nervous exhaustion, she can neither sleep nor eat, becomes full of notions that she might have been more attentive, or that some slight duty was neglected, and that this led to his death : or a daughter nurses her mother till she dies ; then, left alone to think over the illness, she thinks she had wished for her mother's death, and so perhaps hastened her end. The sudden reception of ill news may cause stupor, melancholia, or acute mania ; or, soon after the shock, acute delirious mania may come on.

The *worry of business* affairs is generally associated with defective digestion, want of sound sleep, and imperfect respiration ; these lead to defective nutrition of the brain and a liability to further upset. Repair of brain cannot go on normally under these conditions, and either progressive degeneration or temporary acute disorder may occur.

Religious excitement is like the match to tinder ; given nervous instability, religious excitement may easily start disorder ; but in England very little insanity nowadays springs from this cause. Religion often colours delusions and gives rise to insane sayings or doings ; but the disorder is rooted in other causes.

Excitement or *shock*, either of a painful or, more rarely, of a pleasant nature, may suddenly upset the nervous balance, and may start general disorder which may lead to insanity. Fright may lead to stupor or to acute delirious mania; joyous emotions in excess occasionally tend to mania or to stupor. Emotional disorder is always associated with some glandular disturbance.

Among the more obvious causes of insanity *intemperance in alcohol* is given as the most common. It is found that insanity among the working-classes increases rather with abundant work and free living than with poverty and privation. Those who have had previous attacks of insanity are more easily upset by drink than others who have not had previous attacks. Some neurotic persons may be driven mad by a sudden bout of drinking; others are upset after long series of debauches. Any cause of delirium may be a cause of insanity.

Love affairs have very serious effects on some persons. I am in the habit of pointing out that a very large number both of men and women are upset for a time by marriage engagements. It is certain that premature sexual desire and excessive pondering on sexual matters tend to many nervous evils. In many cases, however, the so-called love affairs, which are alleged as causes, are delusions. Men, but more particularly women, who have not exercised the reproductive function before middle life, tend to special forms of mental disorder of a delusional kind. Seduction leads in not a few cases to temporary mental disorder, but not so frequently as might have been expected; for the kindly plea of insanity in many infanticides, like the verdict of temporary insanity in suicide, is a pious fraud.

Excess in *sexual indulgence* is so difficult to measure that I always feel inclined to regard excess as a symptom rather than as a cause. In some recently married persons such excess produces profound hypochondriasis or stupor; in others a morbid and insatiable eroticism. It is common as an early symptom of ordinary mania and of general paralysis.

Venereal disease produces insanity in some instances by the mental worry of it; in others syphilis causes marked mental disease of various forms, such as syphilophobic melancholia; or there may be a morbid self-consciousness due to some syphilitic lesion which has left its scar visible: it may lead to tabes dorsalis, with various insane interpretations of the symptoms of this disease; or it may give rise to degenerative changes in the arteries, causing organic dementia or progressive (general) paralysis. Congenital syphilis may give rise to epilepsy, idiocy, or adolescent general paralysis. Syphilis is the chief cause of general paralysis of the insane.

Self-abuse is one of the most commonly cited causes of adolescent insanity; it certainly is an accompaniment, and occasionally the cause of such disorder. It occurs very frequently in both sexes, and the more sensitive the person the greater the danger of the practice; not so much from the physical harm of it as from the notion of its being debasing and unnatural. The indulgence itself is of less moment, except in the

very young or very weak; the thoughts about it are more harmful. In some cases, in which the habit began in infancy and was continued to mature years, there is a defect of true sexual desire, or indeed an inversion or perversion of this feeling. Most of such patients belong to neurotic families. Precocious sexuality with masturbation interferes with normal mental growth; and such youthful indulgence produces loss of memory, moral perversion, hypochondriasis, systematised delusional insanity, stupor or hysterical instability; but, to speak generally, too much importance may be attributed to the habit as a cause of insanity; and I prefer to look upon it, in many cases at any rate, as a symptom rather than as a cause. At the climacteric in women the habit is a very marked symptom, and leads to great moral depression. In puerperal insanity, too, this symptom is common and may retard recovery. With senility it is not uncommon, and tends to further moral and physical decay.

Over-exertion is not often met with as a simple cause of insanity; but in some immature persons training for athletic sports and racing, whether on foot or on bicycles, has led to mental excitement or to mental weakness.

Sunstroke is not, as a rule, looked upon as an efficient cause of insanity in England; but I have no doubt that during the summer months this alone, or combined with over-exertion, excitement, and alcohol, may start mental disorder. In the tropics various forms of insanity follow insolation. Various degrees of mental weakness may follow an over-exposure to the sun; this may range from simple loss of recent memory to stupor or dementia. The symptoms resemble those met with in early general paralysis of the insane, and are not always easily distinguishable from those of this disease. The prognosis, however, is often very favourable.

Accident or injury may be local or general. The shock of a railway accident or a shipwreck may cause stupor or set up acute mania; injury, or blood-loss in predisposed subjects, may cause a recurrence of insanity. The shock of a surgical operation may be a cause of insanity (*vide* art. p. 318). Local injury to the head in drunkards may start a delirium which may persist; or an unconsciousness which may give rise to some permanent or temporary loss of memory, so that the patient has no knowledge or recollection of his whereabouts. Injury to the head may give rise to mania, to partial or temporary dementia; or it may be the starting-point of general paralysis of the insane.

Pregnancy. — Parturition, the puerperal state, and other Epochal Insanities are discussed in subsequent articles (*vide* p. 295).

Uterine and ovarian disorders, though so frequently met with in general practice, yet have in my experience a very small effect in the production of insanity. Amenorrhœa is a frequent symptom in melancholia, and in allied states of physical and nervous depression; this may give rise to such a delusion as that the patient is pregnant; that she is an immaculate but pregnant virgin; or is pregnant by the devil, and so forth. With amenorrhœa in the insane there is constantly disorder of feeling; the

patient complaining of being unnatural, dead, or without human feeling. In many cases these symptoms pass with the return of the menses. With uterine and ovarian diseases there may be hallucinations of smell. Insanity is met with in some cases of ovarian disease, but there are no special symptoms of this condition.

Fevers may set up delirium, which may pass into acute delirious mania or simple acute mania; more commonly, however, we meet with mental weakness following fevers. This is often well marked after typhoid fever; in this case partial dementia is the most common, with loss of recent memory. This may pass off completely or may leave permanent mental defect behind. The higher the temperature, and the more marked the delirium, the greater the danger of mental disorder. In some cases a form of chronic delirium persists, which may be called chronic mania. Any febrile disorder giving rise to delirium may cause maniacal excitement, or mental weakness. A febrile disorder may relieve or mask mental symptoms already existing. Cholera may leave behind it profound depression, melancholia, or stupor. Influenza is a specific nerve poison which may set up any form of mental disorder; as a rule it gives rise to sleeplessness, and to various forms of nerve and mind pain, such as neuralgia or melancholia. It is a frequent cause of suicide. It tends to great loss of power of attention, and affects the memory. It frequently causes relapses and starts recurrence of attacks in chronic or recurrent insanity. In the already degenerating it accelerates degeneration, and in such persons it leads to dementia; in early general paralysis it accelerates the acute symptoms.

Privation and starvation are rarely seen singly as causes of insanity: we can only say that such causes acting on young persons may interfere with physical and mental development; in middle age they may cause nutritional defects leading to depression, and favour more rapid degeneration and senility. In times of great social anxiety and distress there is no parallel increase in the amount of insanity.

Old age is associated with special forms of mental disorder. Old age is relative, and depends more directly upon the state of the arteries than upon lapse of years. In some families age is marked by nervous disorders, so that in succeeding generations similar symptoms of decay are met with in individuals about the same age; such symptoms are generally melancholia or mental weakness. With age, symptoms similar to those occurring in youth may reappear; such as loss of self-control, hysteria, and sexual faults. Though age, with signs of distinct mental loss, indicates an unfavourable prognosis, yet, if no such loss be manifest, old age is not necessarily a bar to recovery.

Other bodily diseases or disorders may give rise to insanity. The brain, like a master with many servants, may be badly served by one of them. It is not possible in this place to refer to all the *bodily diseases which may cause insanity*, and I must content myself with referring to groups of disorders and to their effects.

Coarse brain disease may give rise to mental disorder, though, as a

rule, the chief mental symptoms of such diseases as tumour, cerebral apoplexy, and the like are those of progressive mental weakness. In some cases of secondary malignant growths in the brain the symptoms resemble those of general paralysis. Syphilitic and other thickenings of the membranes may cause degrees of dementia, or may simulate general paralysis.

Insular sclerosis may lead to progressive mental and physical weakness hardly to be distinguished from general paralysis. An intracranial growth often gives rise to some degree of mental weakness, but occasionally more acute mental symptoms may be present.

With tabes dorsalis, which frequently occurs in neurotic subjects, there may be various delusions, generally of the "persecutional" kind; the patient attributing his pains and aches to the machinations of his foes.

With epilepsy there may be various forms and degrees of insanity (see p. 331); the tendency to dementia varying rather as the frequency than as the severity of the fits. With paralysis agitans there may be a marked tendency to mental weakness, while at the same time there are irritability and ideas of persecution and annoyance. With chorea there is almost always some mental weakness, which may pass into a very profound degree. Chorea in early years may leave permanent mental defect. Acute delirious mania may originate in chorea.

Disease of the sensory organs may lead to insanity. Deafness is not infrequently associated with suspicion, and with the notion that persons are referring to, talking against, or maligning the sufferer. Imperfect sight likewise may lead to illusion and delusion; hyperæsthesia may give rise to false ideas of space, and thus a patient may believe himself to be of prodigious size.

Diseases of the respiratory tract may give rise to insanity, or be associated with it. Asthma may alternate with mental disorder, generally of a melancholic kind.

Phthisis is so distinctly associated with a particular form of insanity that this has been described as phthisical insanity (p. 307). In this form there is marked suspicion with fancies that the food is poisoned; in some cases as the lung disease increases the mental symptoms are mitigated. It is probable that a phthisical and neurotic union gives rise to very degenerate offspring. Any acute lung disorder may give rise to delirium, and this may engender acute mental disorder.

Diseases of the circulatory system are frequently met with among the insane, but that there is any very direct and distinct causal relation between them seems doubtful. In some cases of neurotic instability a rapid weak pulse seems to be related to the restless instability of the nerves. A man's mental power and ability must be considered as the resultant of the brain and the circulation, and hence defective heart's action must be considered as an efficient cause of mental disorder. This disorder, however, will be found to vary greatly with the age and circumstances of the patient; in one instance, perhaps, the result is morbid self-consciousness, in another restless ill-considered action. I think that

with heart disease which has already begun to affect the general circulation in neurotic subjects, there is often an exaggerated "self-feeling," which may give rise to hypochondriasis, or to false ideas of self-importance. In some cases anxiety and a feeling of impending ruin are associated with cardiac failure. Anæmia and chlorosis are often associated with defective will-power, loss of higher control, and morbid self-consciousness leading to melancholia.

Disorders of the reproductive organs have been already noted: in women such disorders tend to defect of feeling and to ideas of unworthiness; in men similar disorders lead to jealousy and to the notion of impotence, the former being dangerous from a homicidal and the latter from a suicidal tendency.

Kidney disease bears no recognised relation to insanity; in fact it used to be thought that in the insane kidney disease is not apt to occur. This is not true; but, although in Bright's disease there is a tendency to mental depression, there is no established connection between any form of insanity and kidney disease.

Diabetes often occurs in neurotic families; it may alternate with attacks of insanity, or it may be present as a result of progressive degenerative brain change. Temporary glycosuria may occur in puerperal insanity, and in some other forms of acute bodily disease.

Gout, like diabetes and asthma, may be replaced by an attack of insanity, generally of the melancholic form. Gout may be preceded or followed by mental disorder of a temporary kind.

Cancer has been supposed to occur very frequently in neurotic families. I cannot give any statistics to prove or disprove this statement, but I very often meet with the association. Cancer may give rise to secondary brain disease, and thus to mental symptoms; and concealment of it, it may be for years, added to worry, pains, exhaustion, and sleeplessness, have often paved the way for an attack of melancholia in women.

Rheumatic fever may be associated with insanity; thus during an attack of rheumatic fever the rheumatic symptoms may be replaced by insanity, which may again pass off to be replaced by the rheumatic fever. Rheumatic fever in the hyperpyrexial form may give rise to acute delirious mania.

Chronic rheumatoid arthritis is not uncommon in neurotic families, but I know of no connection between the diseases by way of insanity.

Any febrile state may upset the mental balance and may lead to mania; and any febrile state may leave mental weakness.

Toxæmia, whether due to external poisons, or to changes in the body itself, may give rise to symptoms due to more or less grave loss of higher control; and the symptoms will depend on the amount of change produced by the poison in the nerve-centres.

Influenza, malaria, typhoid, cholera, syphilis, and the like may produce insanity of various forms and degrees. Similarly uræmia and cholæmia may cause nervous disorders. In some general diseases, such

as myxœdema, disorder of the mind is well recognised. In myxœdema there is slowing of perception and reaction, defect of memory, and loss of judgment, which may result in simple mental weakness; or the malady may give rise to false ideas of personality, or of self-importance.

With Graves' disease there may be exaggerated self-consciousness, with fancies that persons are noticing the facial peculiarity; or with great fretfulness or mental depression. On the other hand, not very infrequently, acute attacks of mania occur during the course of the disease, and may lead to a fatal issue. Some or all of the symptoms of this disease may recur with recurring attacks of insanity, and with general paralysis of the insane exophthalmic symptoms may be present.

Skin disease of one form or another may be associated with insanity, leading through exaggerated self-consciousness to delusions of being watched or noticed, or that the sufferer is noxious to others.

Disorders of general nutrition and of digestion, by pain, worry, and sleeplessness, may give rise to mental disorder. But I am often surprised that so many of the causes of general malnutrition are not also more active as causes of insanity. The sufferer from gastric ulcer and the hysterical patient with anorexia nervosa as rarely become insane as the confirmed hypochondriac.

Malignant disease of the stomach may give rise to delusions of persecution, or to the belief that the bowels are closed. As a rule the insanities which may be called reflex—that is, depending on organs other than the brain—are either mental weakness the result of malnutrition, or delusional, depending on false interpretations of sensory impressions.

Most bodily diseases indeed have certain mental features which may become so well marked as to interfere with the ordinary mental life, and to take their place as characteristic symptoms of the particular disease.

G. H. SAVAGE.

APPENDIX

As exercise in classification, if carried on in touch with pathological and clinical research, is an exercise of our faculties in the detection of more and more intimate affinities, I subjoin without comment the last effort of the kind, transferring the description of it, by permission, from the columns of *The Lancet* of the 20th May 1899.

In the *Journal of Mental Science* (April 1899) Dr. Lloyd Andriezen, at the close of a long contribution on the "Bases and Possibilities of a Scientific Psychology and Classification in Mental Disease," propounds a classification of the insanities which is stated to be "based upon fundamental facts of evolution, upon deep-seated affinities in connection with pathological findings, and upon facts of both etiological and clinical import." This classification is said to be "a natural one and at the same time practically useful," and it is as follows. There are five main groups of

insanity, and the words made to designate them explain themselves, namely :—

1. *Aphrenia.* — Arrests of cerebral (psychical) development, with absence or deficiency of evolution of personality. (*a*) Idiots of vegetative grade ; helpless, wet and dirty, not educable. (*b*) Idiots of medium and higher grade (many microcephalic, cretinoid, epileptic, partially paralytic, or simple genetic idiots) ; slightly improvable and educable.

2. *Oligophrenia.*—Enfeeblements of cerebral (psychical) development, with a parallel enfeeblement in the evolution of personality. (*a*) Imbeciles of low grade ; not educable. (*b*) Imbeciles of medium grade ; partially educable and improvable. (*c*) Imbeciles of higher grade ; partially educable and improvable ; often with anti-social instincts. (*d*) Feeble-minded children ; partially educable and improvable ; often with anti-social instincts.

3. *Paraphrenia.*—Anomalies and perversions of cerebral (psychical) development, with corresponding irregularities and perversions in the evolution of personality. (*a*) *Paraphrenia mitis.* Disharmonies of psychical development with an unbalanced disposition of the ego ; the so-called borderland cases between sanity and insanity—for example, eccentrics, cranks, mattoids, some types of revolutionists, mystics, etc. (*b*) *Paraphrenia gravis.* Grave anomalies and perversions of mind and personality. This includes eight groups — namely, (i.) with mental obsessions and irresistible impulses (for example, agoraphobia, folie du doute, dipsomania, kleptomania, etc.) ; (ii.) with delusions of rudimentary type (for example, psychopaths of the litigious, erotic, and jealous, mystico-religious and other types) ; (iii.) with predominant perversion of moral and sexual nature (for example, moral insanity, uranism, masochism, saidism, etc.) ; (iv.) with predominant criminal instincts (for example, congenital criminals of the active and of the neurasthenic types) ; (v.) with hallucinations and systematised delusions and transformation of personality (for example, various types of "paranoia") ; (vi.) with cyclic or periodic attacks (for example, circular insanity and folie à double form) ; (vii.) associated with and modified by grave neuroses (for example, epileptic, hysteric, choreic, hypochondriacal, and neurasthenic types) ; and (viii.) associated with the evolution of puberty and adolescence (for example, hebephrenia).

4. *Phrenopathia.*—Morbid conditions or derangements occurring in brains of nearly full development and of apparent previous health, with corresponding morbid alteration of the personality. This includes eight types—namely, (i.) vesanic type (for example, melancholia, mania, stupor, acute mental confusion, and asthenic confusion) ; (ii.) toxic type (for example, alcoholic delirium tremens, mania e potu, chronic alcoholic insanity, lead encephalopathy, morphinism, cocainism, ergotism, and pellagra) ; (iii.) febrile micro-parasitic type (for example, some puerperal insanities, delirium acutum, and the grave delirium of influenza, scarlet fever, acute cerebral meningitis, tuberculous meningitis, etc.) ; (iv.) diathetic group (for example, myxœdematous, goitrous, acromegalic and possibly diabetic insanity, post-syphilitic pseudo-paresis, etc.) ; (v.) chronic

meningo-encephalitis of progressive type (for example, general paralysis of the insane); (vi.) involutional type (for example, climacteric insanity and the chronic cerebral atrophy and senile insanity of middle and old age); (vii.) traumatic type (for example, the "cérébraux" of Lasègue); and (viii.) neoplastic and thrombotic type (for example, of cerebral softenings, gliomata and other neoplasms, etc.)

5. *Lipophrenia.*—Terminal conditions of mental dissolution secondary to previous insanities. These comprise many and varied types and groups with different antecedents but with one terminus and goal to which they all tend.

The basis of the above classification is the principle that abnormalities (morbid changes and alterations) may and do occur "at all stages in the evolution of the brain and of its formation, from the fœtal (vegetative, somnolescent) to the sexually mature (adolescent) stage," with corresponding variations in the evolution of personality, of bodily conformation and appearance, and of conduct and capacity for intellectual, social, and ethical life. Thus studied it is found that insanities fall into five groups which assume a serial and tree-like arrangement. At the lower end of the series, where hereditary fœtal and intrinsic vice of organisation preponderate, we find Groups 1 and 2; namely, the profound arrests (*aphrenia*, idiocy) and enfeeblements (*oligophrenia*, imbecility) of cerebro-psychical development. At the other end of the scale are grouped the morbid conditions which affect brains of nearly full cerebro-psychical development and of apparent previous health. These comprise the various types and classes of the *phrenopathies*, Group 4. Between these extremes comes a "degenerative" group with anomalies of evolution in the sense alluded to and classified under *paraphrenia*; that is, Group 3. Fifth and last comes the group which includes the wrecks and remnants of previous mental disease, "chronic derelicts after storms, deprived of their mental equipments and reduced to low grades and levels of mental life—a highly motley, artificial, and lumber-room group really—the chronic dements." These constitute the terminal Group 5, which for uniformity of nomenclature is termed *lipophrenia*. It will be seen from the details given above that, while some of the groups are sharply marked out, others constitute grades and types having close affinities with allied groups, and that some types must of necessity overlap or blend with others, as indeed is found in practice to be the case; finally, it must be borne in mind that occasionally two or more mental morbid conditions may coexist, as combined morbid conditions exist in other parts or organs of the body.

G. H. S.

DULL, DELICATE, AND NERVOUS CHILDREN

It is well known that brain action is in some way connected with mental action and its expression, that brain defect and disease are associated with mental deficiency, and that conditions of ill health may temporarily lower mental ability. So generally is the mental function of the brain now recognised, that some persons seem to assume that the only function of the brain is mental action; yet we learn most of brain action by studying all the relations of its motor functions (8).

A careful and detailed study of the points observed in cases of brain disorder has rendered it possible, by systematic observation and record, to discriminate cases of brain disorder among the mass of children in schools. By such mode of selection nearly all the dull and backward children may be grouped. At the same time we obtain records of the children who present indications of nervous disturbance or incoördination; and of those who are pale, thin, and delicate. The means of describing such cases have been sought in the observation of certain physical points or signs, and of the modes of brain action; while, by analysis and study of such observations, we are enabled to determine the causation and the treatment of mental dulness (16). This article deals with the subject of mental dulness and nervous disturbance after the manner of other departments of medicine.

It is in observation of the body, and by record of motor signs, that we shall study the brain; just as in a clinical description of hemiplegia, paralysis agitans, epilepsy, or chorea (11). My descriptions and remarks are mostly based upon the records of 100,000 children whom I examined individually in 169 schools during the years 1888-94. [*See* Report (6).]

In a school it is impracticable to handle the child during examination, and usually it is not desirable to ask him questions. The method of inspection only remains.

The points observed are of two kinds—First, the form, proportion, and other indications of the mode of development of the body; secondly, the balance, postures, and other movements which indicate the status of the nerve-centres, and their reaction and co-ordination under stimulation. I usually let the child, as he stands, look at an object held in my hand. This fixes his eyes. Looking at the head and the individual features, in profile and in full face, we observe any defects in physiognomy, and the details of facial expression. Tell the child to hold out his hands before him, and show him the action momentarily. His response, the balance of the spine, arms, and hands may then be observed, as well as any twitchings in the fingers. In my cases for each child presenting deviation from the normal in any particular a written description was made, and the

teacher's report as to mental ability was added. After thus inspecting every child in a class or standard the teachers were asked to present any dull or backward pupils not previously selected by observation.

The defects may be arranged in four classes—

Class A.—Defects in development of the body, and its parts, in size, form, or proportion. Such signs seem to indicate inborn and fixed constitutional tendencies.

Class B.—Abnormal nerve-signs.—Certain abnormal actions, movements, modes of response, and balance or postures which indicate brain disorder, or disorderly or incoördinate modes of brain action—due in a great measure to want of efficient training, but also largely associated with a brain inapt for good mental work. To a large extent these states are remediable by wisely-conducted education.

Class C.—Low nutrition.—The children are thin, pale, or delicate. This appears to be the least numerous class of defect, and the least frequent factor of mental dulness. It is necessary to note indications of nutrition of the body, not in the face only, but also in the limbs. The body-weight, in relation to age and height, is also a valuable indication.

Class D.—Dull and backward children.—It appears that could State Medicine render these defects in bodily development less frequent, and were public education more actively and definitely directed towards the prevention and removal of ill balances of the body and inexactness in movement, we should have fewer dull children in our schools, fewer children liable to brain disorder, and a general increase in the average mental power. At the same time, it must be clearly stated that there is a small class of dull children who present no other observable indications of defect; and again, that a considerable proportion of children with the signs described are not mentally dull.

It is among the children with defects in bodily development that we find the largest proportion of the pale, thin, delicate children (class C), whose tissue delicacy is connected in causation with the defective symmetry of features and parts of the body. Both conditions appear to be inherited.

As the methods of studying mental dulness here proposed depend upon the observation of physical signs, these must be described in sufficient detail for present purposes.

Physical signs.—*Class A.*—Congenital defect of brain (and congenital causes of), mental dulness, and low nutrition are very commonly associated with (class A) defects in development, size, form, and proportion of the body, the head, and the several features. The more common of the defects are as follows :—

Defect of cranium as to size, form, proportions, or ossification. The hand placed upon the head is a good measure. In a well-developed child of good capacity the head circumference at the ninth month is 17·5 in., at twelfth month 19 in., at seven years 20 in.; but few infants in hospital medical practice come up to this standard. The head may be too large, independently of hydrocephalus; there may be bosses or pro-

tuberances or out-growths at the sites of the ossific centres of the frontal or parietal bones, at the site of the fontanelle, or elsewhere. These are usually symmetrical, but not always. The forehead may be narrow, shallow in vertical measurement, or small in all dimensions. The vertical suture between the two halves of the frontal bone may be the site of a bony ridge. This may be prolonged backwards in the course of the interparietal suture. Indications of rickets in the skeleton should be looked for in all such cases. All these forms of cranial defect are much more common in boys than in girls. Small heads, however, were more common among girls than boys—boys 476, girls 1254, among 53,171 boys and 46,856 girls seen in schools.

A small head, independent of the size of the body, frequently renders the child delicate, but by no means necessarily indicates feeble mental power. The small head, with narrow forehead presenting marked inter-frontal ridge—the prow-shaped cranium—indicates the worst pathological type. Defects of cranium have the highest correlation with mental dulness of any individual signs of defect of body.

Defect in form of palate is the next most important sign. It may be contracted laterally, or narrow; or it may be V-shaped, pointed more or less sharply anteriorly, the alveolar processes being nearly straight lines, meeting at their anterior extremities at an acute angle. The palate may be arched or vaulted, with a high-pitched Gothic roof; the palate may be cleft.

The external ear may be large and outstanding, usually with absence of the fold of the antehelix; or the rim may be absent. In these cases the cutaneous covering is usually coarse, often with dilated venules, and red. This defect is three times as common in boys as in girls.

The features may be defective, coarse and flat, lips thick. The several features may be large and ill-proportioned; the nasal bones wide, sunken, indented, or remaining flat, as in the undeveloped condition of babyhood; the forehead may be hairy; there may be large frontal veins connected across the bridge of the nose, and joining the angular veins of the orbits which connect them with the cerebral circulation. The openings of the eyes and mouth are more often too small than too large.

Growth may be stunted, and the child short for its age. Other defects in body less frequently met with, but not of less importance when present, will be described in reference to defective children (2).

Nerve-signs.—*Class B.*—These signs or points for clinical observation indicate the status, activity, and balance of the nerve-centres, their mode of response under stimulation, and capacity for co-ordination. The conditions thus indicated may be temporary; but more frequently they are repeated on re-examination during long periods. These visible nerve signs represent brain action as much as the sounds of the heart indicate the action of its valves and of its muscular walls. I have shown elsewhere that abnormal nerve signs, taken as a group, or taken individually, are largely correlated with (class A) defects in development and with (class D) conditions of mental dulness. Ill-balanced nerve-centres are

inapt for normal co-ordination in movement, and do not perform good mental function.

The face is the area in which the state of the nerve-centres is most directly and finely indicated; and in the action, co-ordination, and tone or relaxation of its muscles we see depicted many conditions of brain corresponding to mental states. There may be want of changefulness in expression, vacancy, fixed expression, or blankness. Such points are well seen in many cases of advanced paralysis agitans, and in general paralysis of the insane. On the other hand, in chorea the face may be distorted by grimaces without loss of its expression. Among examples of coarser muscular action—action in greater quantity—are the following:—The frontal muscles may be seen in almost incessant over-action, producing horizontal creases on the forehead. Sometimes these muscles are seen working under the skin in vermicular fashion, with an athetoid movement; in other cases the action is fine—less in quantity—producing dulness of the forehead. This sign is very much more common in boys than in girls. Of children with this sign 41 per cent of the boys and 46 per cent of the girls were mentally dull. It is characteristic of the boys in poor-law schools. The vermicular action or athetoid movement under the skin may be almost constant, except under mental impressions, as when the boy is interested in conversation; on the other hand, the action may be so slight or fine as only to produce minute wrinkling and dulness of the forehead.

Corrugation.—Knitting of the eyebrows, drawing them together, and producing vertical creases in the forehead is often due to over-mental action, a fixed idea, an illusion. In some cases this is a coarse action, considerable in amount, the muscular over-tone producing deep creases; and it may be associated with the frontal muscles in a general athetoid movement of the muscles of the forehead. The two last-mentioned signs are usually bilateral and symmetrical. *Grinning* or coarse upward and outward movement of the angles of the mouth is frequently asymmetrical.

It has been said that the whole tone of the muscular area in the face may be lessened. The orbicularis oculi is particularly liable to loss of tone. This thin muscle encircles the eyelids; its tone gives sharpness of outline to the lower lid, so that its convexity is seen. When this muscle is relaxed fulness or bagginess appears under the eyes. This will disappear in laughter. It is frequently seen in states of fatigue, want of sleep, migraine, and so forth.

Eye movements may be badly performed. When an object is moved at a distance of 2 feet in front of the face the eyes in following it should move normally. In some children the head always turns towards the object, while the eyes are kept still in their orbits. This is a result of want of training, and leads to imperfect observation and inaccuracy in work. In nervous cases fixation of the eyes is a bad sign. There are uncontrolled movements, mostly in the horizontal direction, sometimes vertical, removing the object that should be seen from the field of vision. This appears to be a frequent cause of mental confusion in learning.

Passing from observation of the face, let the child hold out his hands in front of him, and let us observe the upper limb as an index of the state and reaction of the brain which acts upon it. Normally the hands are held on a level with the shoulders, the arms straight, and held the width of the chest apart; all parts, including the digits, being straight and in the same plane.

Weak hand-balance.—In this kind the wrist is slightly drooped, the palm is contracted laterally, and the digits are slightly flexed. The posture is seen when a limb hemiplegic without rigidity is passively held horizontal, or in an arm thus supported during deep sleep; drooping is due to lack of energy from the brain.

Hand-balance nervous.—In the child convalescent from chorea, but still in a nervous condition, in children who are bad sleepers and teeth grinders, and in those who suffer much from headache, another hand-posture is suggestive. The wrist is drooped, the palm is slightly contracted laterally or narrowed, the thumb as well as the fingers are extended backwards beyond the straight line at their junction with the palm. This hand-balance is often accompanied by finger-twitches, which may be either in the direction of flexion and extension, or lateral. The latter are produced by smaller muscles, and are more indicative of neurotic status. In weak children, those who are listless and wanting in energy, the hands are often held lower than the shoulder, the left arm usually being the most drooped.

Lordosis.—When the hands are held forward the balance of the spine may be altered with the shifting of the centre of gravity; the lower portion of the spine may arch forward, while the upper part of the back between the shoulders is thrown back. This indicates want of tone in the muscles of the back. It is more common in girls.

The head-balance should be erect; the head may be inclined to either side, or drooped.

The clinical significance of the abnormal nerve signs, as with all physical signs, is to be gathered by grouping cases in which certain signs are combined. Research has shown that they point in three directions—(i.) Signs expressing a weak state; the nerve-centres, which are not well subject to co-ordination, tend to separate and spontaneous action, a condition characteristic of healthy infancy and of the neurotic condition in later life. Of this class the nervous hand-balance, finger-twitches, and uncontrolled movements of the eyes are characteristic. (ii.) Signs expressing exhaustion, inaptitude for action, or lowered brain force (14). The principal signs of this class are lack of bright and changeful expression, fulness under the eyes, asymmetrical head-balance, the "weak hand-posture," and lordosis. (iii.) Indications of a defective brain are—a blank expression, with athetoid action of the muscles in the forehead, grinning, and the signs of brain weakness given above—want of aptitude for co-ordinate action in response to a command or in imitation. These indications of deficiency will be more fully dealt with in speaking of defective children.

The value of the nerve signs described lies in the fact that they indicate to us the action of nerve-centres or foci of nerve-tissue; thus affording evidence of action in the brain mass. The time and quantity of a motor act are its observable attributes: the former is seen during the act; the quantity of action is often best estimated by the position of the parts resulting from the movement; hence we study movements and postures. Analysis of movements enables us to study action of nerve-centres, combinations and series of neural acts, their relations in time and quantity, the force stimulating and controlling them, and their interaction. We may learn thus to arrange the modes of brain action corresponding to mental acts. The postures or attitudes of the body imply the balance or ratios of action in the nerve-centres corresponding.

TABLE I. — (50,000 Children seen 1892-94). Showing Percentage of Children with the main Classes of Defects, and their Combinations, who were also Dull Mentally.

	Percentage Dull.			Percentage Dull.	
	Boys.	Girls.		Boys.	Girls.
All development cases (class A)	38·4	44·9	Development cases only .	17·1	19·4
All nerve cases (class B) .	41·8	42·6	Nerve cases only . .	24·3	24·2
All cases with low nutrition (class C)	43·1	40·5	Cases with low nutrition only	8·4	6·9
All development cases with nerve signs (A, B)	45·5	51·6	Development cases with nerve signs only	36·4	38·1
All development cases with low nutrition (A, C)	45·7	44·1	Development cases with low nutrition only	24·3	25·7
All nerve cases with low nutrition (B, C)	47·8	44·4	Nerve cases with low nutrition only	25·2	20·8
All development cases with low nutrition and nerve signs (A, B, C)	53·6	50·6	Development cases with low nutrition and nerve signs	53·6	50·6

TABLE II. — (50,000 Children seen 1892-94). Showing Percentage of the Dull Children with the main Classes of Defect, and their Combinations.

	Percentage of Dull Children presenting the Defects.			Percentage of Dull Children presenting the Defects.	
	Boys.	Girls.		Boys.	Girls.
Defects in development (A)	42·8	44·4	Defects in development only	19·0	19·2
Abnormal nerve signs (B) .	57·6	52·6	Abnormal nerve signs only	33·9	29·8
Low nutrition (C) . .	15·5	19·9	Low nutrition only . .	3·0	3·3
Defects in development and nerve signs (A, B)	19·5	18·5	Defects in development and nerve signs only	15·6	13·7
Defects in development and low nutrition (A, C)	8·2	15·1	Defects in development and low nutrition only	4·4	6·7
Nerve signs and low nutrition (B, C)	9·1	9·1	Nerve signs and low nutrition only	4·3	4·3
Defects in development with low nutrition and nerve signs (A, B, C)	3·8	4·8	Defects in development with low nutrition and nerve signs	3·8	4·8

Percentage of the dull children who presented no other main class of defect:—Boys, 16·0; Girls, 18·2.

Table I. shows the percentages of children with each main class of defect who were mentally dull. The percentages on the first line show the proportion of developmental cases, whether with or without classes B, C, who were dull; on the second half of the same line is given the percentage of the developmental cases, without classes of defect B, C, who were reported dull.

It is noteworthy that children presenting two or more main classes of defect mostly present a higher percentage of dull pupils.

Table II. shows the percentage of dull children with each main class of defect. The percentages on the first line show the proportion of dull children presenting defects in development, whether with or without B, C; on the second half of the same line it shows the percentage of dull children who presented defects in development without classes of defect B, C.

Of all children with defects (classes A, B, C) 25 per cent of boys and 25 per cent of girls were reported as dull or backward. The placing of pupils in the educational standards indicated the same thing; for among the children with defects, the same proportion as above were placed in standards where they were over the average age; a fact which in itself indicates them as backward pupils.

In some schools there is a standard 0 or primers for dull and backward children too old for the infant school, and too backward for the first standard in the upper schools. Of these children, 33 per cent of the boys and 31 per cent of the girls presented signs of defect, classes A, B, C.

Certain schools have been recognised as labouring under special educational difficulties on account of the kind of children attending them. Here all the main cases of defect were found in higher proportion than in ordinary schools.

Referring again to defects, class A; such signs indicate congenital conditions of body much associated with a low brain status and low mental aptitude, as well as with low nutrition. This is especially well marked when more than one such defect is present in the same child: a few examples will illustrate this point—

TABLE III.—(50,000 Children seen 1888-91). Showing Percentage of Cases with Defect named who were also Dull.

	Percentage reported as Dull.	
	Boys.	Girls.
Cranial defect alone or in combination .	41·4	45·5
Palate ,, ,, ,, .	40·7	43·3
Epicanthis ,, ,, ,, .	37·3	35·1
Defect of cranium and palate . . .	50·2	45·1
,, ,, epicanthis . .	52·8	35·4

These lines of argument might be carried into much further detail from material arranged, but I think sufficient evidence has been advanced to show that ill-proportion in growth and development of the body and its parts, and defective conditions of balance and movement in the face, limbs, eyes, and so forth, indicate, in a large proportion of cases, a want of capacity for good co-ordinate brain action, and are much associated with the brain conditions producing mental dulness. We thus approach the study of mental dulness as a clinical and pathological investigation, as we study headache or chorea; and I hope to place upon a satisfactory basis methods of describing mental cases by means of physical signs which directly indicate states of the body and the brain; by studying conditions in the body which affect mental action and its expression rather than the influence of the mind over the body.

The accurate accumulation and arrangement of facts concerning a large number of children have clearly indicated that the bodily and cerebral conditions differ much among boys and girls respectively, and that the reactions of the sexes to the environment are so different as to necessitate their separate consideration in many practical problems. The principal facts noteworthy in this direction are:—more boys than girls are found dull, and presenting defects in development and abnormal nerve signs; there is a larger proportion of delicate children among girls; but, of the children with no defect in development, the proportions of boys and girls seen to be thin, pale, or delicate were equal.

When we examine the conditions correlated with defects in development (class A), we find more girls with low nutrition and mental dulness, but rather a larger proportion of boys with signs of nerve disorder.

We may now proceed to *the clinical study of dull and backward children.* In the inquiry among 100,000 school children 8 per cent of the boys and 6·5 per cent of the girls were reported by the teachers as below average ability in school work; the proportion of these cases with the main classes of defects is given in Table II.

In examining a child said to be mentally dull, or dull in some particular kind of work, we look to his bodily condition for indications of health, growth, and general nutrition, including the body weight, which should be compared with age and height, and some simple anthropometric measurements (2). Defects in development, and abnormal nerve signs present, may then be looked for, giving special attention to the groups of signs indicating incoördinated action, exhaustion, and defect of brain development.

In looking for signs of a pathological condition, we should always bear in mind the type of normal healthiness as indicated by a good build of body and proportion of the features, exact symmetrical balance, and accuracy of movement with a lively countenance and good response. Intelligence must be estimated by mental tests, and mainly by simple questions on such points as name and address; day of the week, and date; the time, as seen by the clock; description of home life, or of lessons at school. The extent of vocabulary, the appropriate use of words, and the general character of speech are important; slowness of speech is not necessarily a defect in children. So much for the direct and immediate expression of mental status; its modes of working are indicated rather by the facts of memory, and in the power of making inferences and performing calculations, such as may readily be made in sorting coins as to colour, counting their number, and adding their values.

The examination of a child as to mental dulness consists mainly in observation, and in the application of tests of normal brain action in the performance of movements and in mental action; these two modes of brain action are different, and they must be studied separately.

Imitation of movement.—Standing before the child, tell him to look at you, and to do as you do. Set him to imitate movements of your hands and of the separate fingers,—the instinctive tendency of a child is to imitate your right hand with his left; perform slow and precise movements with individual fingers, watching to see that the child's eyes are fixed on your hands and not on your face; notice with care whether movements are equally well imitated in time and in quantity by either hand (*see* hemiplegia, p. 211). The child who cannot imitate movements of single fingers may do so when all are opened or closed together. A cause of defective imitation may be non-fixation of the eyes. Let the child also repeat certain words after you as he looks at your mouth, not at your eyes.

Control through eye and ear.—In imitating movement, action is controlled solely through the eye, by sight of the body imitated. In pro-

ducing movements by word of command, note if they be accompanied by extra movements, like those to be described under "reinforcement"; such frequently occur in nervous children. Memory is indicated by performance of movements previously taught by imitation through the eye. Response may be slow, accurate, or inaccurate; it may be long delayed, and continued too long.

Reinforcement of movements or superfluous movements. Any stimulus such as looking at the child—that is, sight of the examiner, or the sound of anything said to him—may produce a series of irregular incoördinated movements. There may be shrugging of the shoulders; turning the head away, or inclination; much lateral movement of eyes; twisting of the spine; movements of the hands and fingers, or of the feet, with variation of action under different circumstances in many small parts, particularly the eyes and fingers. Such superfluous movements are of the choreic type; others to be mentioned are of the athetoid type, and more indicative of a defective brain. There may be uniformly repeated inclination of the head in the same direction; protrusion of tongue whenever spoken to; repeated over-action of the frontal muscles, or grinning.

Muscular sense may be tested by directing the child to squeeze your hand, hard or lightly as directed; by the discrimination and estimation of the difference of weights, say an ounce and half-ounce, coins, etc.; estimation of length on a measure; guessing lengths by moving the eyes from end to end of an object; estimation of height and proportions of the room. Well-developed muscular sense appears to indicate mental ability of a certain kind, if not thinking capacity. The child who can obtain information through his muscular sense is more easily trained than the child in whom such faculty is wanting.

Absence of spontaneity.—A face fixed, expressionless, blank; the child standing statuesque and motionless, literally doing nothing, and without indication of mental action. Such cases are of poor prognosis.

Defects of speech.—In all children speech needs to be carefully cultivated in distinctness of utterance, in control of voice, and in the use of words. Impediment of speech, or stammering, is most frequent in boys, and is quite consistent with good intellectual power. It has been said that defect of speech is much associated with defect of palate; this is undoubtedly often the case, but I doubt if a defective form of palate is often the mechanical cause of the speech defect, except when the palate is cleft. All varieties of defect of palate appear to be compatible with good speech; the commonness of palate-defect among cases with defect of speech appears to be largely due to its correlation with some degree of brain deficiency. Among fifty-one deaf and dumb children, whom I examined with Dr. Fletcher Beach, the palate was shallow, arched, or narrow in 7 cases (5). Probably defects of the teeth produce directly more cases of indistinct utterance than misshapen palates. Conditions of speech may indicate the mental defects more immediately. The intervals between words—the spacing or order in time of utterance—may be irregular; the accentuation or quantity of vocal and articulate sound

may be badly distributed, or quite uncertain and irregular; and it may not be well controlled by circumstances, and therefore be inappropriate; a reply may be long delayed after the child is spoken to. The question put may be repeated without any further reply; this is an example of pure aural imitation without any true mental action, a form of imitation not infrequent in imbeciles. Or the question may be followed by a large number of irregular and asymmetrical movements and postures without verbal reply; superfluous movements or reinforcement, that is, without mental expression.

The physical indications of brain-disorder, corresponding to phases of mental dulness, are to be found in the abnormal nerve-signs, and in their grouping; these signs were selected for this purpose, and their correlation with mental dulness has been demonstrated (14).

In studying mental dulness and its causes we must glance at the evolution of mental faculty in the earliest stages; some mental defects appear to be reversions to childish conditions, while others are due to arrest in development. A healthy infant, when awake, is constantly in movement; this is seen in the limbs, especially in the digits (15): the movements are slower than most of those in adults, and less forcible, but are almost constant, though occurring in no apparent order. At first they are not controlled through the senses; but a spreading area of more forcible movements (reinforcement) may occur on special stimulation, as in crying. At this stage there is no direct indication of mental action. At the age of four or five months some control of movements through the senses appears, and the head moves towards a bright light. A little later, conditions change greatly; control of movements through the eye and ear is seen; the muscles are stronger, the head is held erect, and turns towards a light or bright-coloured object; the eyes are directed to it, and it is seized by the hand. There is, however, an interval between the time when the head turns to the object and the act of stretching out the hand—this is a new phenomenon; spontaneous movements are arrested, co-ordination of the nerve-centres for subsequent action is inferred, as a new series of acts follows, thus the hand seizes the object. This latent period (period of co-ordinated or diatactic action) is the first indication of anything like a mental act. In the further stages of evolution we see an increasing number of examples of co-ordinated (or controlled) acts performed with increasing exactness and quickness, indicating the building up of further aptitude in the infant brain (8). These phenomena of the control of spontaneous movement (micro-kinesis) by sight and sound are absent in imbeciles (15).

The corresponding neural action appears in the earliest stages to be free, spontaneous, uncontrolled action of separate small nerve-centres; later appears their control through the senses for series of acts; and still later, this new faculty, that now outward expression by movement is arrested while the centres are co-ordinated, or brought into a union, for subsequent action (diatactic action). Neural arrangements are built up for the performance of new series of acts, which would not occur but for the previous impres-

sion made, and the changes which occurred during the momentary arrest of spontaneous action; such appear to be the simplest neural acts corresponding to attraction of the child's attention, and a voluntary act in its earliest manifestations. In the growing child the visible series of acts that correspond with those normal for the age, are signs of mental potentiality; and upon such we base the methods of examining an infant brain. The capacity of brain-centres to be formed into (diatactic) unions, or combinations for action and series of acts, by slight stimulus appear to be the foundation of mental action. According to this view, intelligence is not a property of mere brain tissue, it may not be demonstrable structurally; and as a mode of action it cannot be correlated with physical force or energy. Brain tissue may be healthy in persons devoid of average intelligence; its mental function depends upon the controllability of individual centres for combined or serial action under slight stimulation, and retention of impressions received: the normal character of co-ordinated action depends upon its being similar to that of intelligent individuals, and is largely dependent on the training received, but also in part upon inherited instinct (inherited impressions). The value of nerve signs lies in the fact that they indicate the action of nerve-centres or foci of nerve-tissue, thus affording evidence of action in the brain mass: the exciting cause of the movement is a part of the causation of action in the nerve-centre. All expression of mental action is by movement, whether in speech, gesticulation and facial expression, or by writing, which is a result of movements. It is by logical analysis of the neural action corresponding to such visible movement that we may hope to demonstrate the kinds of nerve action which correspond to mental states (12).

Resuming the examination of children said to be mentally dull, it is clear that we must do more than note the expression of their brain action in movements; we must study the finer expressions of co-ordination (diatactic action), as indicated by analytical study of the mental states. It appears that in many cases the abnormal nerve-signs and errors in mental action both depend upon similar modes of neural action; sometimes a direct causal connection may be shown. Eyes too much moved necessarily lead to incomplete visual impressions and mental inexactness in making observations; if a large number of superfluous movements follow the sound of a verbal question, they are likely to be accompanied by inexact mental action, and confusion.

Talk to the child; show him an object—say a flower or a key—and let him describe it, noting his replies and remarks, as they may indicate mental order or confusion (18). Ask him the day of the week, he replies with the day of the month; ask upon what river London stands, he says on the North Sea. Take care that the question is fully heard before an answer is permitted; repetition of the question, uttered slowly, may produce the correct answer: be equally careful that an object is looked at, the child's eyes being fixed upon it, before any attempt at description is allowed. The answers may indicate mental confusion rather than mental dulness; mental action, though disorderly and not sequential to the

question put, being distinctly indicated. In such cases there may be indications of excess of spontaneity of nerve-centres for movements, and fidgety, incoördinate twitchings; look for spontaneous, uncontrolled movements. The mental confusion or disorder is often due to want of training, which is the principal means of bringing the nerve-system under control of the environment, whereby the two factors come into harmony.

Mental confusion, sudden and almost unaccountable, may arise and interrupt a series of mental acts previously sequential, owing to the intercurrent activity of some habitually acting mental centres—the intervention of a "fixed idea." Uncertainty and hesitation in action are almost the same thing as mental confusion, but are perhaps less frequently accompanied by superfluous movements. In its mental aspects it is a doubt what to do; no quick or distinct sequential choice, founded upon experience, is made: this results from want of previous control, or training.

The answers of the child may indicate slowness of mental processes, or backwardness, rather than deficiency; indeed it is not uncommon to find this in children above the average in mental ability. The slowness is observed in the use of words or other mode of expression; there may be an excessive number of mental acts, much mental spontaneity as yet uncontrolled, an infantile condition of mental disorder. Training and regular systematic mental guidance may put this right. The expression of pleasure at a correct expression of thought is an important indication of ability; there may be evidence of mental action correctly performed other than full expression in words. Sometimes the expression of mental processes is so long delayed that a partial answer to a former question is obtained when a second and totally different question is put. Readiness with words is no necessary indication of mental ability; and want of readiness does not necessarily indicate want of mental action. Confusion and slowness in mental processes may be studied by their expression, and by the indications of modes of brain action as seen in movements.

Among the causes of mental inaptitude must be placed the habit of introspection, which is not uncommon in children. This phrase implies the habit in a child of thinking its own thoughts over and over again, in place of receiving mental impressions from others, or from objects around; self-stimulated thoughts in place of those implanted from without—possibly philosophising or imaginative thoughts. Such a habit is exhausting and may lead to brain and mental debility. Systematic routine and intellectual occupation are the best means of correcting this habit.

Intellectual faculty and good mental action in a child, or their defect, are not to be inferred solely from a physical examination and verbal questioning; it is necessary to a complete diagnosis either to observe the child under varying circumstances, or, as is more usually practicable, to obtain a trustworthy history of his actions under varying conditions; the child may display good intellect, and yet be very deficient in social and moral sense.

The brain that cannot acquire new combinations of movements by

imitation is usually incapable of acquiring good vocabulary and orderly mental action. An inferior brain is often characterised by waste of motor energy in making many attempts before arriving at the proper answer to a question, or before framing an intelligent form of utterance; such patients are very liable to fatigue.

While conducting an examination by verbal interrogation it is useful to watch the mental action in the child, its irregularities and also the associated motor expression of brain state, tracing the corresponding neural action.

It is instructive to consider together the modes of brain disorder, as indicated by abnormal nerve-signs, and the corresponding mental irregularities thus:—Mental confusion is often accompanied by superfluous movements, produced by cerebral reinforcement, in place of well-controlled action. Want of the faculty of orderly, co-ordinated, or logical thinking is often accompanied in children with much incoördinate movement.

General feebleness of mental power may be accompanied by weakness and slowness in all modes of action; or, carried a stage farther, the absence of mental power may be associated with absence of all spontaneity of action.

Dull children are in social habits often solitary (7). Nervous children appear to be gregarious, and like each other's society; they are often bright and quick children.

Dull children, as it will be shown, are in large proportion delicate also; this is especially the case among the girls (9).

The clinical examination of children known to be dull and mentally deficient should include an examination of the brain and its mental action. In addition to the points previously enumerated, examine carefully for hemiplegia; which in these cases by no means implies that the arm and leg are motionless. Look to the co-ordinated movements of each hand—in imitation of your separate finger action; note if they be performed equally well on each side, both in the degree and in the time of movement; observe if there be any alterations or spontaneous repetitive movements of the digits, such as commonly accompanies congenital hemiplegia; this may extend to the face, causing a repeated grimace, and may to some extent be increased by any stimulation. In congenital hemiplegia the bones of the limbs on the paralysed side are often shortened. There may be general muscular rigidity, or stiffness, in the limbs when passive movements are made, owing to hypertonicity analogous to that which characterises the later stage of paralysis agitans, and some cases of ordinary hemiplegia. It may affect all the muscles, and be unaccompanied by increased reflexes. Spinal curvature, both lordosis and lateral curvatures, are frequently seen in these defective children; in all these cases we shall inquire for epilepsy, and into the action of the sphincters. Among the bodily defects not previously mentioned, the following congenital conditions are not infrequently met with. The skin may be coarse, not easily picked up as a small fold from

the subcutaneous tissues; it may be rough, brawny or distinctly ichthyotic, as seen on the face extending to the ears, and on the limbs and trunk; there may be an excess of subcutaneous tissue, and general flabbiness and want of shapely form in face and limbs, while the hands are splay, blue, cold, and liable to chilblains. The prognathous type is almost confined to males, the lower jaw being large and heavy, or underhung; the superior maxillary bones may also be large, and the masseter and temporal muscles strongly developed, while the calvarium is small. In another class of physiognomy—the infantile type—the face is small and the features remain childish, often accompanied with an infantile voice; sometimes the testes remain small, while in the female there is the painful dysmenorrhœa which often accompanies an ill-developed uterus. The palpebral fissures may be small, their axes sloping outwards and upwards, or outwards and downwards; and in such cases the mouth also is often small.

Coincident defects are very frequent in young children; the heart should always be examined carefully, for cardiac defects are frequent in stammerers. The eyes should be examined ophthalmoscopically; the hearing being tested, and the throat and nasal passages examined, as obstruction is frequently met with. Hernia is not infrequent in boys of defective development. In these cases defective teeth often call for much attention (13).

Cases requiring exceptional training.—Taking all the pupils reported by the teachers as dull or backward, they may be arranged in graded classes from the children without positive defect downwards to the imbeciles. It is difficult to define what conditions, apart from mental tests, indicate that a child is unfitted in mental capacity for the usual methods of education; an arbitrary attempt to do so must fail. Children with defect in mental power short of imbecility appear to be many (4).

Children mentally feebly-gifted.—Children distinctly deficient in mental power who cannot be certified as imbeciles. Children may be placed in this group upon evidence observed, combined with the results of mental examination; this class has been recognised and reported on by the Royal Commission on the Blind, Dumb, etc., and special provision is made for them in London Board schools (1), and in some others.

Imbeciles, or children who might be certified as mentally imbecile and transferred to an asylum. Speaking generally, these are less hopeless cases than the idiots, and more educable under industrial training. Some of these cases are the result of disease, not of congenital defect (7).

Idiots.—This group includes children who, on account of their bodily and brain defect and the absence of mental power, might be certified under the Idiots' Act (3).

Exceptional children.—A class including all children whose physical or mental conditions place them at a permanent disadvantage in social life. This group includes idiots, imbeciles, children feebly-gifted, children defective in moral sense, epileptics and those with history of fits during school-

life; the dumb and children crippled, paralysed, or maimed, as well as others for whom special educational arrangements may be required. This composite group includes about 1·5 per cent of our school population (4).

It has been shown that in many particulars dull and backward children need careful supervision in health as well as in education; including suitable training in co-ordinated and well-controlled action, such as may render the brain more capable of easy and accurate control through the eye and ear. Such modes of training are all-important in dealing with brain disorder and with brain deficiency; though the final purpose may be to cultivate mental faculty. The organised environment of the social life in which the child is placed, and in which he takes a part, tends to produce many mental impressions; in part by the things seen, but in greater part by the actions of other persons whose words and doings he tries to copy. For this reason life in town is sometimes more stimulating to mental action than life in the country; the result of my inquiry tends to show the advantage of home and day school training, where possible, in place of institution life. Teachers trained for the special care of dull and backward children are necessary, both for individual cases and for classes in schools.

Delicate, pale, thin children.—In the clinical examination of such cases the condition of the chest, the digestion, the mucous membranes, glands, and so forth, must be ascertained. It will be found, however, that in many delicate children such examination does not explain the delicacy; and we pass on to conditions of development, and the signs of nerve-status. The thin child may be well fed, the organs and tissues may be healthy; its condition of low nutrition and want of good nerve power may apparently depend upon congenital, or as it is often called constitutional conditions, due apparently to inherited tendencies. Table V. shows that half the number of delicate boys, and a still larger proportion of the girls, present defects in development; the proportion with other classes of defect is also shown, and the percentages of association are high. These facts show that delicate children require attention in several different directions, especially the girls (18).

TABLE IV.

TABLE IV.—(50,000 Children seen 1892-94). Showing Percentage of Children with the Main Classes of Defect, and their Combinations, who were also Pale, Thin, or Delicate.

	Percentage delicate.			Percentage delicate.	
	Boys.	Girls.		Boys.	Girls.
All development cases (A) .	16·2	26·3	Development cases only .	5·8	10·0
All nerve cases (B) . .	12·3	16·6	Nerve cases only . .	4·1	5·4
All dull cases (D) . .	15·5	19·0	Cases dull only . . .	3·0	3·3
All development cases with nerve signs (A, B)	16·8	26·5	Development cases with nerve signs only	7·7	13·1
All development cases, also dull (A, D)	19·2	26·0	Development cases dull only	10·2	15·1
All nerve cases, also dull (B, D)	14·1	17·3	Nerve cases dull only . .	7·5	8·1
All development cases with nerve signs and dull (A, B, D)	19·8	26·0	Development cases with nerve signs and dull	19·8	26·0

TABLE V.—(50,000 Children seen 1892-94). Showing Percentage of Delicate Children with the Main Classes of Defect, and their Combinations.

	Percentage of delicate children presenting the defects.			Percentage of delicate children presenting the defects.	
	Boys.	Girls.		Boys.	Girls.
Defects in development (A)	49·9	55·5	Defects in development only	17·9	21·0
Abnormal nerve signs (B) .	47·1	43·5	Abnormal nerve signs only	15·4	14·2
Mental dulness (D) . .	43·1	40·5	Mental dulness only . .	8·4	6·9
Defects in development with nerve signs (A, B)	19·8	20·2	Defects in development with nerve signs only	9·2	10·0
Defects in development, also dull (A, D)	22·8	24·5	Defects in development, also dull only	12·1	14·3
Nerve signs, also dull (B, D)	22·5	19·3	Nerve signs, also dull only	11·9	9·1
Defects in development with nerve signs and dull (A, B, D)	10·7	10·2	Defects in development with nerve signs and dull	10·7	10·2

Percentage of delicate children who presented no other main class of defect:—Boys, 14·4; Girls, 14·3.

Table IV. shows the percentage of children with each main class of defect, who presented low nutrition, or were pale, thin, and delicate. The

percentages on the first line show the proportion of development cases, whether with or without classes B, D, who were delicate; on the second half of the same line is given the percentage of children, without classes of defect B, D, who were delicate.

Table V. shows the percentage of delicate children with each main class of defect (6).

In the management of these children appropriate clothing should be provided; a diet should be arranged as full as the child can well digest, properly distributed, and containing much animal food and fats. It must further be remembered that many of these children tend both to brain-disorderliness and mental dulness, so that education cannot wisely be neglected; these children fatten better in the country in absence of conditions of mental excitement, and fatigue should be avoided (10).

Nervous children.—Among the 26,287 boys and 23,713 girls seen in the schools, 2853 boys (10·1 per cent) and 2115 girls (8·5 per cent) showed some of the nerve signs, mostly indicating incoördination or nerve weakness. The conditions of these children are analysed in Tables VI., VII., which are arranged upon the same plan as preceding tables. A considerable proportion of these children presented no other class of defect; but 42 per cent were dull in school work, and in 30 per cent of the cases the nerve signs were associated with defects in development (see Table VII.) (6).

TABLE VI.—(50,000 Children seen 1892-94). Showing Percentage of Children with the Main Classes of Defect, and their Combinations, who also present abnormal Nerve Signs.

	Percentage with Nerve signs.			Percentage with Nerve signs.	
	Boys.	Girls.		Boys.	Girls.
All development cases (class A)	38·4	36·2	Development cases only .	18·0	12·8
All cases with low nutrition (class B)	47·1	43·5	Low nutrition only . .	15·4	14·2
All dull cases (class D)	57·6	52·6	Cases dull only . . .	33·9	29·8
All development cases with low nutrition (class A, C)	39·8	36·4	Development cases with low nutrition only	18·5	18·0
All development cases also dull (A, D)	45·3	41·6	Development cases dull only	36·4	30·8
All low nutrition cases also dull (C, D)	52·3	47·7	Low nutrition cases dull only	27·5	22·4
All development cases with low nutrition and dull (A, C, D)	46·7	41·8	Development cases with low nutrition and dull	46·7	41·8

TABLE VII.—(50,000 Children seen 1892-94). Showing the Percentage of Nerve Cases with the Main Classes of Defect, and their Combinations.

	Percentages of Nerve cases presenting the defects.			Percentages of Nerve cases presenting the defects.	
	Boys.	Girls.		Boys.	Girls.
Defects in development (A)	31·1	29·1	Defects in development only	14·6	10·3
Low nutrition (C) . .	12·3	16·6	Low nutrition only . .	4·1	5·4
Mental dulness (D) . .	41·8	42·6	Mental dulness only . .	24·3	24·2
Defect in development with low nutrition (A, C)	5·2	7·7	Defect in development with low nutrition only	2·5	3·8
Defect in development and dulness (A, D)	14·1	15·0	Defect in development and dulness only	11·4	11·1
Low nutrition and dulness (C, D)	5·9	7·4	Low nutrition and dulness only	3·1	3·5
Defect in development with low nutrition and dulness (A, C, D)	2·8	3·4	Defect in development with low nutrition and dulness only	2·8	3·4

Percentage of nerve cases that presented no other main class of defect:—Boys, 37·2; Girls, 37·8.

A number of conditions common in children are often taken collectively as indications of "Nervousness" or neurotic tendency. Two large and well-defined groups of cases, Headaches and Chorea, represent types—the one of sensory disorder, the other mainly of motor incoördination and weakness; the two types are often associated in the same child and in the history of a family; these cases, however, are dealt with in other articles (17). Some minor points among neurotic children may be described. The nervous child may be well made in body (of the boys with nerve signs 68·7 per cent, and of the girls 70·9 per cent, had no defect in development of body), but many are pale and thin. The associated nerve signs have been described, and are not repeated here. These children often grind their teeth at night; and the teeth may be found flat-pointed, especially the canines in both upper and lower jaw. Tooth-grinding is effected by the masticatory muscles which are supplied by the fifth cranial nerve, whose sensory fibres are distributed, among other parts, to the meninges. Hacking cough is often complained of; and, when accompanied by emaciation and weakness, raises a fear of consumption though the physical signs of the lungs be normal. The appetite is often capricious, failing completely; or it may be ravenous, though the child progressively drops in weight. The urine is often clear but scanty and dense; the specific gravity rising to 1030-35, laden with urea, as is common also in chorea. Complaints are often made of headaches and night terrors, or of restless sleep;

during the day the child is often irritable in temper, fretful and weak. The associations of such conditions with intestinal worms has often been referred to; the point is worthy of attention, but I do not find that intestinal treatment much improves these patients. The association of signs of rheumatism and mitral disease is very important; with such complications the child is likely to suffer from chorea. With care the prognosis is good, that is of course where no evidence of disease is found. In treatment these children require much the same care and diet as others pale and delicate; when body weight is normal, physical exercises in imitation of the teacher—in short lessons only—may do much to improve co-ordination, and to remove ill balances in body and in brain action. Cod-liver oil and iron are useful; stimulants are, I believe, best avoided, milk being preferable to tea or coffee (10).

The dull, delicate, and nervous children appear in a different aspect to the physician, to whom they are brought for advice, from that presented to the teacher in school to whom they are sent for educational training, among others who are strong and healthy. The teacher finds that certain children are dull and backward. Table II. shows that 84 per cent of these boys and 82 per cent of these girls have other classes of defect; more than half have motor signs of disorderly brain action; nearly half are not perfectly well made in body; and 15 per cent of the boys and 20 per cent of the girls are delicate children.

The teacher may observe slow action, wandering eyes, twitchings, awkward ways, or stooping; and be inclined to increase the amount of school drill. Table VII. shows that of these nervous children 63 per cent have other classes of defect; 30 per cent are not perfectly well developed children; 42 per cent are dull; 12 per cent of the boys and 16 per cent of the girls are delicate.

The physician sees the children mainly concerning some particular physical defect; in the schools 19 per cent of the boys and 16 per cent of the girls were noted as in some respect below normal standard. Conversely, teachers in a school gain their experience among children of whom 81 per cent of the boys and 84 per cent of the girls appear to be strong, healthy, and of average mental ability. Hence on questions of education there arise some differences of opinion between the teaching and the medical professions, which may best be met by a careful study of the mental and physical aspects of child life, by accurate descriptions of children which ought to be a part of the education of every trained teacher, and by a study of children in their mental aspects as well as in respect of their bodily ailments.

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F. W.

ON NIGHT TERRORS, SYMPTOMATIC AND IDIOPATHIC, WITH ASSOCIATED DISORDERS IN CHILDREN

THIS article may be read in association with that on "Insomnia," by Professor Bradbury (vol. vii. p. 746), in which an allusion to night terrors occurs. The full discussion of this subject was then referred to this place, where it succeeds a paper by Dr. Francis Warner, on "Dull, Delicate, and Nervous Children," and is written with special reference to patients of this class.

Many excellent monographs on night terrors have appeared, but allusions thereto in our text-books are for the most part brief and cursory. It is difficult to get trustworthy information on the subject from parents and guardians, and medical men seldom have opportunities of witnessing an attack of night terrors. Children, after a certain age, are usually left to take care of themselves at night. Stupid nurses and careless parents, unless, indeed, their own rest be disturbed thereby, seldom pay any heed to their children's behaviour during sleep.

Even when observed, night terrors are commonly regarded as trivial matters, and of humorous rather than pathological import.

So far as the connection between them and insanity is concerned, it may be remarked that we are all stark-mad in dreams, though it is only when dreams pursue us into waking hours that we are accounted insane.

Hence the study of the illusions, delusions, and hallucinations which come "through the ivory gate," may be of pathological no less than of psychological interest.

Symptoms of night terrors.—The attacks are usually described in children aged between three and eight years. Older children suffer from them, but we are comparatively seldom called to treat the disorder in these patients.

Typical night terrors occur, almost always, within half an hour to two or three hours of going to bed. Except in cases of febrile disturbance, recurrent attacks in a single night are rare; but they may be repeated for many nights on end, or at weekly, monthly, or longer intervals. Piercing screams are heard, and the child is found sitting up in bed, or crouching in a corner of the room, with hands outstretched as if to shield himself. Sometimes he is trying to get out of the window, or to open the door. He may get outside the room, and run screaming down the staircase with fear-winged feet. His face expresses wildest alarm, his eyes are widely opened, with pupils dilated, and he gazes intently at the ceiling, or towards some quarter of the room in which he locates the apparition which frightens him. He often gives a clue to its nature by shrieking, "Black faces!" "Black dogs!" "Horrid man!" or some such exclamation.

These hallucinations appear to be common in children up to the age of five or six; but in older children there is often a difficulty in discovering the content of the hallucination, owing, doubtless, to its being more complex in nature, though no less terrifying than simpler visions. The child may cling instinctively for protection to any one within reach, but he does not at first look at or recognise persons; his attention is fully taken up by the imaginary object of his fear. The period of terror lasts from a few moments to half an hour. The child usually then recognises his surroundings, but he sweats and trembles, turns pale, and seems shocked and exhausted. He will beg not to be left alone in the dark again, or that his hand may be held. He soon dozes, but sobs and starts for a time before sleep becomes sound. Sometimes at the end of an attack he passes a large quantity of pale urine, but more frequently he has wetted the bed or the floor during the stage of excitement.

Next day there is usually complete recollection of what has occurred; but in some cases, even when the child has got out of bed, and may have answered questions more or less rationally, he has never been really awake, and he remembers nothing subsequently.

The foregoing is a general account of the symptoms, but I must mention that subtle distinctions between the attacks, and between the patients have been drawn.

Night terrors have been divided by Silbermann into "Idiopathic and Symptomatic."

The characteristic of the idiopathic variety he holds to be a transitory hallucination of sight, due to an abnormally increased irritability of the brain; whilst the characteristic of the symptomatic form is a sensation of distress arising from digestive disturbance acting through the agency of the vagus nerve, and giving rise to dyspnœa.

This distinction is not altogether satisfactory, to my mind, because it is too narrow.

Other hallucinations, such as those of hearing, taste, and of common sensation, besides those of sight, may occur in night terrors of idiopathic origin, and also in those of reflex origin. Hallucinations may be due to

reflex irritation of the brain by local disorders, and hence may be included under the symptomatic variety; and this again should be widened to include night terrors occasioned by local disorders other than digestive, and not characterised by dyspnœa alone.

Dr. Coutts distinguishes between "night terrors" and "nightmares": the latter he regards as due to reflex disturbances; the former, he thinks, cannot be thus explained.

Like Silbermann, he regards it as essential to night terrors that the child should see visions, whilst in nightmare he only dreams dreams.

Other points of distinction which he makes are:—

(1) That night terrors seldom occur in children over eight years of age, whilst nightmare may happen at any age.

(2) That night terrors occur during the best of health, whilst nightmare attends chronic ill-health.

(3) That in the course of a night there is usually but a single attack of night terrors, although there may be several of nightmare.

(4) That in night terrors there is a family history of neuroses, such as epilepsy, chorea, hysteria, etc. In nightmare there is no such history.

(5) That infantile convulsions usually precede night terrors, but not nightmare.

(6) As regards the differentiation of symptoms, he mentions that in night terrors the child seems wide awake, but is not so. He still sees the vision that has terrified him, and is unconscious of his surroundings. In nightmare he is actually wide awake, but partially demented by recollection of a troubled dream. He is fully conscious of the presence of others in the room.

In night terrors there is no recollection of the event, whereas in nightmare there is a perfect recollection, and a dread of recurrence.

In night terrors the kind of the vision never varies; in nightmare the objects of apprehension have generally been met in waking hours, and are not invariably the same.

These distinctions are so clearly and well defined that it seems a pity to cast doubt on their practical value. Yet I must confess that they seem to me to be too hard and fast. Hallucinations of vision, as part of night terrors, are not confined to children under eight years of age; they may occur at any age. Quite recently I sat by the bedside of a boy, aged eleven, who was suffering from influenza, and had a temperature of 103°. He complained of hideous faces mocking him from the bedroom wall. He was quite aware of their unreality, and did not scream with fright at them, as a younger child would do; but he saw them nevertheless.

Only last year, during a mild attack of influenza, I awoke from an uneasy slumber, and distinctly saw the ghost of a gray old man sink gradually through the floor. Had I been a baby I should have yelled with terror at the sight; as it was, I watched the apparition with much interest, and was sorry when it disappeared.

Little children are frightened out of their wits at such hallucinations,

because they do not know what they are. Older children see them, and are terrified by them, but usually will not admit it for fear of being laughed at, or accused of having over-eaten themselves. Adults see them, and send an embroidered account of the vision to the Psychological Research Society.

Visionary hallucinations do not constitute a special type of night terrors.

I do not believe that night terrors (visionary hallucinations) occur in the best of health, but nightmare (troubled dreams) attends chronic ill-health. Both are indications of ill-health, chronic, acute, or temporary; and affecting brain or body, or both.

The recollection or oblivion of the event are to my mind immaterial.

We forget far more dreams than we remember.

Little children are even more likely than adults to forget their frightening dreams. Older children may partly remember them, but shame and shyness, also the probably complex nature of the dream, the description of which is beyond their powers of verbal expression, prevent them from telling us all they know. Hence they may be supposed to have completely forgotten the event. I see no reason for regarding oft-repetition of the same dream vision, or non-recollection of its occurrence, or peculiarity in the vision itself, as indications of a disorder more serious than an ordinary nightmare.

Indeed I can recognise no distinctions between night terrors and nightmare.

Night terrors may be symptoms of the most trivial, or of the gravest import to the patient, and it is therefore desirable to ascertain in every case the condition with which we have to deal. In order to do this we must have some definite plan of differentiation—and the simplest and best is, I think, Silbermann's division of night terrors into "Idiopathic and Symptomatic."

I would use the term "symptomatic" to describe all cases due to reflex disturbance of the brain by local disorders, and "idiopathic" to include all those of purely cerebral origin. The latter are by far the more important of the two. At the same time, it must be admitted that it is often very difficult to discover the cause of reflex disturbance in a given case, and also that reflex disturbances may be present in cases apparently idiopathic.

In the first place, we must try to find out whether the content or shape of the dream throws any light on its cause.

The content of dreams.—In young children, aged from about two to five or six, there is commonly a visionary hallucination, and it is usually a reproduction of something which they have seen, and which has frightened them during the day. It may be a dog or some other animal, a horrible negro or a sweep. It is usually black, but may be red. The vision is seldom, in young children, of an inanimate body, but it may be so. Thus a little boy, aged between five and six, used to

wake screaming, "It's the house with the blind eyes." No one knew what he meant till, some years later, he confessed that a house, the windows of which had been blocked up in order to evade the window tax, used to frighten him by day and appear in his dreams by night. Oliver Wendell Holmes speaks of a certain glover's sign in the shape of a huge hand which had a similar effect on him as a child. Hector's nodding crest probably figured largely in the dreams of the child Astyanax. In my own early childhood the visitations took the form of Fifth of November guys. I had lost my nurse, and found myself in a street peopled by monsters clad in black and fiery red fur. Their faces were hideous, and they had the power of looking into nursery windows, and spying out a small boy, even when he got home and hid under the bed or table.

The hallucinations are, however, not of sight only. Dr. Colman mentions a case of a child, aged two, who woke screaming that some one was hurting his finger. He pointed out where the person was, and insisted that the finger was bleeding. Assuming that there was nothing the matter with the finger, we should be justified in regarding such a case as of the idiopathic variety. Again, there is a curious and ominous condition in which the trivial events of the day became converted into distressing dreams by night—just as in adults who are mentally overworked.

Early school tasks, and especially initiation into the mysteries of simple arithmetic, are responsible for many instances of disturbed sleep in children. A common story is that the child is "doing sums in his head all night long." The children who suffer from this form of night terror are usually precocious and learn without difficulty, but the symptom is an obvious indication of cerebral activity which may soon end in exhaustion. The feeble-minded are naturally more readily exhausted than others. Thus the mother of a partially-imbecile child said to me, "It all came of his having to learn a hymn at school. It took him weeks, and he dreamed of it all night, and he has never been right in his head since." These cases are also of cerebral or idiopathic nature.

Below the age of five or six the dream content is usually simple, and there is seldom any difficulty in divining its nature from the child's exclamations. But later, as I have said, it becomes more complex, and therefore more difficult to describe. It is not until childhood is past that one learns what the child's sufferings in this respect have been.

In many instances the prominent feature is an elaborate visual hallucination. It is of some gigantic object dimly seen in constant intricate movement; a colossal wave, a seething maelstrom, a whirling mazy web, and so forth. The phenomena are purely subjective, they do not represent any objects which could have been actually seen in waking hours, they are therefore distinguished from the early, simple hallucinations which occur in young children. They frequently occur

in those who suffer from migraine, and I would suggest that the hallucination is induced by the visual aura which so commonly precedes an attack of megrim. The so-called Teichopsia, the appearance as of ebullition in objects, and other curious optical illusions, are familiar precursors of migraine. In the dream these illusions are converted into hallucinations.

Secondly, errors of refraction are now well recognised as commonly the cause of migraine, or enter into its causation; and they are met with in persons subject to the complex visual night terror. Thus the apparently long step between night terrors and errors of refraction may be bridged over by recognition of the type of night terror to which I have drawn attention.

In the common dream that one is on the point of being smothered or crushed, I believe that the sense of impending suffocation is real, and due often to a bad habit of sleeping with the head covered. I have frequently experienced the dream when suffering from nasal catarrh, and for this reason I believe that it is the type of night terror induced by adenoids and other naso-pharyngeal obstructions. The *mise en scène* may not be the same, but the tenor of the dream is always suggestive of partial asphyxia.

Aural vertigo as a cause of night terrors.—I can trace back to my eighth year a dream that, though wingless, I can fly. The dream is mostly pleasant. I am extremely proud of the grace and agility with which I exercise this unusual accomplishment. But the fate of Icarus soon overtakes me, and I realise the truth of Horace's line, "Mors et fugacem persequitur virum." For after soaring to some precipitous mountain peak or pinnacle, my powers desert me, and I am left clinging there in agonised fear of falling; and fall I do, down, down, through endless space, until I wake, shaken, shocked, and breathless. A medical friend tells me that in his dreams the course of events was the reverse of my own. He would be pursued, and on the point of being overtaken, when the power to fly would come to his relief. Sir William Gowers alludes to the feeling, common to most of us, of falling from a height when going to sleep, or just after going to sleep. "I believe," he says, "that it is really slight labyrinthine vertigo due to spasmodic contraction of a tympanic muscle, which suddenly changes the pressure within the labyrinth" (6).

He also says, "These attacks may be prevented by a dose of bromide."

Night sweats as a cause of night terrors.—Another and more grotesque dream haunted me, as a child, for many years: I was taken captive by Red Indians, pirates, devils, or masked burglars, it mattered not by whom, the treatment was the same. I was slowly tickled under the arms whilst quite unable to stir hand or foot, or even to cry out. The process always implied the utmost malignity on the part of my captors, and caused me most exquisite torment. I dreaded it above all others, and knew beforehand in my dream when it was imminent. It was useless to say to myself,

as I often did, "It is only a dream," the reality of the sensation persisted. I would wake with the horror full upon me, and pinch myself to avoid falling asleep again, but the instant I dozed my tortures began afresh.

As a child I sweated much at night, and I believe the dream was occasioned by the sensation caused by drops of perspiration trickling down my sides, for in very hot weather, or when the bed-clothes are heavy, I occasionally get it again, with all its horrors unabated.

I have never met another who complained of this form of dream, but not long ago I treated a patient, suffering from acute alcoholism, whose chief delusion was that he was being tickled to death at night by his enemies. "The process," he said, "was well known in the city," and was "carried out by means of electricity." But I thought it a delusion, due to his night sweats, which were profuse.

Heavy bed-clothes, and the common custom of tucking children up in bed so that they cannot freely move their limbs, may account for this and other forms of nightmare, especially the paraplegic variety. The dream that one is pursued, but cannot run away, is probably due to mechanical restriction of movements. But another explanation may be offered, namely, that deficiency of oxygen is the immediate cause. Mr. Glaisher, when at a height of 29,000 feet in Coxwell's balloon, found himself unable to execute any muscular actions, although his volition to perform them remained intact. Paul Bert, after exposing himself to low atmospheric pressures in a closed chamber (10), had a similar experience.

Professor Marcet concludes from these incidents that "the conception of volition does not require oxygen, but the manifestation or response of volition cannot be carried out without it." If this explanation be correct, the paraplegic nightmare may be traced to deficiency of oxygen occasioned by the atmospheric conditions of the bedroom, or by the physical condition of the patient. Hence the tenor of the dream may provide a clue to its cause.

Night terrors from febrile disturbance.—These are characterised by visual hallucinations which remain vivid although the child seems wide awake. He may be horribly frightened at them, and beg for their removal; sometimes he is fully conscious of his surroundings, sometimes not. Very young children do not recognise them as hallucinations, but older ones do, and, if encouraged, may speak of them afterwards. Young children seem to have forgotten all about them next day. I have met with a large number of instances of the kind during the recent epidemic of influenza, but they may be occasioned by any febrile disorder, and at once suggest a nightly rise of temperature. I draw special attention to this fact in order to show that the hallucinations of vision which have been regarded as of extremely ill omen are not of necessity so. Yet they indicate ill-health nevertheless.

Bodily pain as a cause of night terrors.—Here the tenor of the dream cannot, as a rule, be ascertained. Night screams may result from tooth-ache, ear-ache, stomach-ache, hip disease, calculus, and other painful dis-

orders. The scream of pain can usually be easily distinguished from that of terror. The pain generally wakens the child, and lasts long enough for him to indicate its site. But this is not always so. Miss Anderson, the matron of the Paddington Children's Hospital, a lady of great experience, tells me that children suffering from hip disease, who wake screaming at night, seldom complain of being in pain. Probably the pain in such cases is not severe. Very slight uneasiness is sufficient to set up the most weirdly terrible dream. I have often dreamed that all my teeth were falling out, and my face rotting to pieces, and have awaked to find slight uneasiness in the jaws, probably due to grating the teeth. Suspicions of hip disease or calculus always lead to inquiry as to night screams, but night screams do not usually arouse suspicion of hip disease or calculus; yet the possibility of this cause and effect should be borne in mind.

I have met with a few cases in which balanitis, phimosis, and vulvo-vaginitis seemed to cause night terrors, usually accompanied by wetting of the bed. But I have thought in such cases that masturbation, consequent on irritation of the genital organs, probably accounted for the disturbed sleep. Irritation of the urethra by abnormally acid urine will, I think, give rise to the same train of symptoms. Quite recently a child was brought to me on account of night screaming and the habit of masturbation. I found the urine was highly acid, and the vulva red and irritable. A few doses of alkalies and bromide put a stop to both symptoms.

Intestinal worms.—Parents are fond of attributing night terrors and symptoms of all kinds to the presence of lumbrici, or oxyurides. Often the parasites produce no symptoms whatever, and one does not know whether a worm has been harboured or not, until it is seen in a bottle. But I have certainly met with cases of obscure abdominal pain, irritability, and night screams which ceased after the expulsion of round or thread worms.

Dr. Still has drawn attention to catarrhal appendicitis in children, due to the presence of oxyurides in the vermiform appendix, and this condition might give rise to reflex cerebral irritation.

Difficult and delayed dentition in young children will often occasion febrile disturbance accompanied by nocturnal screaming.

Gastro-intestinal affections.—These necessarily arise in the minds of all as causes of night terrors. Yet, I fancy, too great prominence is usually given to them in this connection. I do not deny that an indigestible meal will often cause a nightmare, but inveterate and long-standing dyspepsia, although often coincident with night terrors, is not necessarily associated with them. Moreover, when so associated, it will be frequently found that night terrors do not subside under treatment for the dyspepsia. Hence I think that the dyspepsia may be due to the general perversion of the brain which gives rise to the night terrors. The dyspepsia may, indeed, be a neurosis. Thus night terrors in cases of this class must be of the idiopathic variety, to which I must now draw attention.

Idiopathic variety.—So far I have chiefly dealt with the reflex or symptomatic variety of night terrors, and have given examples of those which seem to be due to ocular, aural, nasal, faucial, gastro-intestinal troubles, and also of those dependent on close bedrooms, heavy bed-clothes, and position during sleep. Cases have been incidentally mentioned of others in which the affection seems purely cerebral or idiopathic. In these there may be harassing repetitions of sights seen, or of events which have happened during the day.

No local or general conditions of ill-health may be apparent. They may be actually absent. Yet it must be remembered that the sufferers from the idiopathic and from the symptomatic variety of night terrors are equally liable, at one time or another, to local or general morbid conditions, so there is no permanent distinction between the two. The real difference is that the effects are more severe and frequent, and are less relieved by local treatment in idiopathic than in symptomatic cases. In the idiopathic variety the patients are neurotic from the cradle, and they come of a stock of neurotic ancestors.

Unusual timidity is often an early sign. Little infants will start, tremble, and scream at a noise at which ordinary children would be unconcerned. The approach of a stranger, the sight of everything which is new to them, excite, not the normal curiosity of a child beginning to take notice, but wild screams of unreasonable alarm. Mothers of little children in arms have told me that they dreaded to take them out because they became so frightened at everything they saw. They are peculiarly liable to infantile convulsions. This unnatural timidity persists as the infant grows into a child. It often takes the form of shyness and morbid self-consciousness; he will not associate with other children, or take part in their games, and he looks bewildered and anxious at the noise they make. He prefers the society of adults, and soon acquires a precocity and old-fashionedness which make him unpopular in the nursery, and with his school-fellows. From sheer timidity he may become untruthful, and his character is thereby lost. He often gets shamefully teased and bullied, but bears it all with stolid patience until his wrongs have accumulated, then some trivial annoyance becomes the last straw, and he bursts into ungovernable and almost maniacal passion. He may become reserved, morose, jealous, and spiteful, he does not respond to kindness because he is always brooding over his fancied or real slights and grievances. Yet he is often a prey to agonies of remorse for all his misdoings, real or supposed. His dreams are of the judgment day and hell. His digestion and general health suffer, and he is apt to become melancholic, or, it may be, suicidal, hysterical, choreic, epileptic, or even maniacal. In others, timidity takes the form of most highly imaginative superstition. Their thoughts run on ghosts, witches, and death. All subjects which are terrible and uncanny fascinate them. They will pore all day over Fox's *Book of Martyrs*, or the dreadful pictures in some editions of the *Pilgrim's Progress*, and dream of them all night.

I cannot give a better illustration of the night terrors thus excited

than that contained in Charles Lamb's essay on "Witches and other Night Fears."

He says: "There was a picture, too, of the witch's raising up Samuel (in the history of the Bible by Stackhouse) which I wish I had never seen. . . . I was dreadfully alive to nervous terrors. The night-time and solitude and the dark were my hell. . . . I never laid my head on my pillow I suppose from the fourth to the seventh year of my life—so far as my memory serves in things so long ago—without an assurance, which realised its own prophecy, of seeing some frightful spectre. Be old Stackhouse then acquitted in part if I say, to this picture of the witch raising up Samuel (O! that old man covered with a mantle!) I owe, not my midnight terrors, the hell of my infancy, but the shape and manner of their visitation. . . . All day long, whilst the book was permitted me, I dreamed waking over his delineation, and at night (if I may use so bold an expression) awoke into sleep, and found the vision true. I durst not even in the daylight enter the chamber where I slept without my face turned to the window, aversely from the bed, where my witch-ridden pillow was."

In my own early days I shared Lamb's horror of this particular picture, and it contained a grisly skeleton horse, which, to my mind, rendered it peculiarly aggravating. I can remember being awakened by a younger brother screaming shrilly that "Satan's feet were dangling outside the window." Our nurse attributed the vision to what she called "gormandising"; but I knew a picture of Christian in the Valley of Death, standing prayerful, with a full-sized devil grinning over his left shoulder. The devil's feet were long and black, with disgustingly uncut nails, and they projected from behind Christian's back. Like my brother, I had seen them in my dreams, but, being older than he, I held my peace. It is interesting to note that Lamb ascribes the form, only, of his dreams to the picture which haunted him. Children such as he—and there are many—are not altogether dependent on what they see or hear for the scenes in their dreamland theatre.

Not long ago I heard of a lady who, in her desire that her children should learn nothing but what is true, banished fairy tales from her nursery. But her children evolved from their own imagination fictions which were so appalling that she was glad to divert them with *Jack the Giant-Killer*.

Doubtless nervous and highly imaginative children are more liable to aggravated and oft-repeated night terrors than those who are placid and commonplace. Little Ned, who, "when sent to bed, went without a noise," was probably as stolid as he was healthy, whilst "the young Augustus Edward, who reluctantly went bedward," had excellent though unexplained reasons for his reluctance.

The characteristics, then, of neurotic children who are specially prone to night terrors are timidity, shyness, and self-consciousness. These may lead, if the children are mismanaged and misunderstood, to highly imaginative superstition, or, worse still, to melancholy and

discontent, which sometimes culminate in acts of apparently flagrant immorality.

Soon or later general health becomes impaired. Chronic dyspepsia, the "habit forms" of chorea, hysteria, hystero-epilepsy, epilepsy, and even mania, are met with in such cases—and from this class are derived the neurasthenics and hypochondriacs who haunt our consulting-rooms and hospitals in after-life.

A few illustrations of these and other accompaniments of night terrors may now be given.

Day terrors.—In certain cases exactly the same symptoms occur by day as by night. Henoch mentions two such instances—one had hallucinations, the other would shut his eyes, stop his ears, cling to his mother, crying, "I'm afraid!" The duration of the attacks was only a few seconds. Naturally these attacks are most frequent in idiopathic cases, yet even in them a reflex cause may be at work. Henoch's description of the symptoms in the second case suggests the occurrence of vertigo.

The following is a case of "day terror," or delirium, produced by pediculosis capitis: I once saw with my colleague, Dr. Leslie Ogilvie, a girl, aged nine, who was said to have gone out of her mind during the night. She was sitting in bed at mid-day, flushed and wide-eyed, and was screaming madly of "black dogs" and "men under the bed." We had her removed to the hospital—she lived close by—and then found that her head was swarming with pediculi. These were attended to, and a few hours later she recovered her senses. Unfortunately her parents were so much incensed next day to find her hair had been cut, that they removed her, and I know nothing of her subsequent history.

Night and day terrors.—Another instance of a night terror becoming prolonged into a day terror is as follows: I was once asked to see a boy, aged eight, under treatment by Mr. Watson Cheyne for spinal caries at the Children's Hospital, Paddington Green. He had had an abscess, and his temperature had been hectic for a considerable time. On the night before I saw him he awoke at 9.30 screaming, "Robbers! Murderers!" He hid his head under the bed-clothes, and, when uncovered, bit and tore at every one who approached. He recognised no one, but listened intently to the slightest sound, fancying that robbers were coming to murder him. When I saw him next day he was still full of the same delusions. He insisted that the whole of the hospital staff had been murdered, and that his attendants were burglars dressed up in nurses' clothes. He refused food on the ground that it was poisoned, and spat in all directions for several hours at a time. (Dr. Hughlings Jackson refers to this symptom in cases of epilepsy, and attributes it to a crude sensation of taste) (3). He was alternately noisy and dull, muttering "thunder and lightning" to himself. (There had been a thunderstorm on the day that his attack began.) The condition of mania, with delusions, lasted for three days, and then gradually subsided. I attri-

buted it to fever mainly, but possibly the thunderstorm was the exciting cause of a prolonged night terror.

This boy was always odd and eccentric during his stay of many months in hospital, but had no further symptoms of insanity.

Maniacal screaming in children, in some cases, seems to be a form of day terror. It is not an uncommon symptom in young children of highly neurotic temperament and antecedents. Care should be taken not to regard it as a mere fit of passion in a naughty child. The attack occurs without any apparent cause; it is much more violent and prolonged than an ordinary fit of passion; it is quite uncontrollable, and no tears are shed by the child. I have met with several instances of the kind, and have been led to associate the symptom with chronic constipation, due to atony of the bowel. Yet such cases are strictly idiopathic.

Relation of night terrors to epilepsy.—There can be no doubt that epileptic subjects may suffer from night terrors also. But I cannot admit that there is any necessary connection between the two—or even that there is any marked resemblance between the symptoms. It is true that hallucinations of vision are at times the aura of an epileptic fit, and that sometimes the colour of the aura is red. But, in my experience, hallucinations of sight in epilepsy are decidedly rare, whilst in night terrors they are extremely common. The red colour of the vision, on which stress has been laid, is probably due only to sensation of light. It is curious that oblivion of the circumstances should be regarded as evidence of a parallel between night terrors and epilepsy, considering that we should never know what the subjective aura of an epileptic fit was like, unless the patient told us.

Yet the aura of epilepsy may take the form of a night terror. An epileptic girl, now under my care, dates her fits from a carriage accident occurring seven years ago. She tells me that she invariably seems to live through the accident again whenever she has a fit. But for this she would not know when she has one.

Narcolepsy and night terrors.—I have met with this association in one case. A boy, aged twelve, of highly neurotic family history, after an attack of influenza suffered from headaches and somnolency. He would fall asleep suddenly in the midst of a meal, or whilst dressing or undressing, or at any other inconvenient time. Once he slept from 3 P.M. until 11 A.M. the next day. After an ordinary night's rest he would sleep steadily through the forenoon or afternoon, if allowed to do so. At first sleep was natural, but later it was disturbed by screaming, muttering, and violent struggling, somnambulism, slowness and irregularity of the pulse. Once he split his nightdress from top to bottom, and overset the table by the bedside during the night, but had no recollection of what had occurred next day. The attacks of sleepiness, at first infrequent, became of common occurrence. In the intervals he seemed well at first, but gradually his moral nature changed, and he went through what his mother called "a phase of quite grave deceitfulness." He became timid and

afraid of the dark. He had no actual epileptic fit, but was subject to sudden attacks of convulsive, grasping movements of the right hand and twitchings of the right side of the face. All these alarming symptoms disappeared after removing him from school, and sending him to vegetate in the country for eight months. An elder brother of his, after gaining a scholarship at a public school, suffered from fits of daze or giddiness, with other symptoms of grave cerebral exhaustion, whenever he worked for more than a few minutes at a time. He always improved after a few weeks' holiday, but return to school work produced so many relapses that the parents wisely gave up all attempts at ordinary education. He was sent to do out-door work on a farm for two and a half years. This effected a complete cure, and he is now a lecturer on scientific agriculture and professional associate of the Institute of Surveyors.

These cases, given in the barest outline, illustrate the danger of routine school work in a certain class of neurotic children, and the advantage of finding out other occupations which cause them the least mental strain, and are likely to make them useful members of society.

I might mention other instances in which school work or school life produced disastrous effects on children neurotic by nature or inheritance. These are the cases in which the School Board authorities, who sagaciously ordain that if children are well enough to work they are well enough to attend school, should be defied.

Treatment in general.—So far as symptomatic night terrors are concerned, treatment is sufficiently indicated by discovery of their cause. When it is removed the night terrors cease. In idiopathic cases we cannot remove the primary cause, which is the neurotic temperament of the patient; but we can seek for, and alter, the conditions which aggravate it. These may be the same as those which produce the symptomatic variety. But in idiopathic cases their removal may not constitute a cure, although their non-removal hinders it. The removal of adenoids, for instance, or the correction of refraction errors, or the treatment of indigestion, will not avail in neurotic children if the patient's environment be ignored. So treatment in idiopathic cases must have reference to the child's studies, thoughts, occupation, and companions—as well as to local causes of ill-health.

No general principles or special rules can be laid down for the treatment of neurotic children; nor for that of the night terrors, visions, hallucinations; nor for the misconduct, falsehood, evil passions, acts of cruelty and immorality, which are but symptoms of the neurosis which besets them. But in individual cases, by using our wits, we may discover causes for such conditions, causes which parents and guardians have deliberately or unintentionally concealed.

In the powerful early chapters of *Jane Eyre* there is an account, which seems drawn from life, of a neurotic child, who, smarting under a long course of injustice and oppression, retaliates on her persecutor, and is punished by being shut up alone in a dark room. The result is a fit of

—apparently—hystero-epilepsy, in which the child has visions of "something all dressed in white, with a great black dog behind him." The doctor who is called in shrewdly divines that he is being misled as to the cause of the attack. By tactful cross-examination he soon gets to the truth of the matter, and Jane Eyre is indebted to him for removal from surroundings which, she says, "gave my nerves a shock of which I feel the reverberation to this day."

It has fallen to my lot, and probably to that of many others, to meet Jane Eyres, both male and female, in practice. In such cases tact and discretion are necessary, otherwise we shall only give offence to the parents, doing no good to the child. I knew an emotional child whose life was made miserable by the tyranny of an ignorant and vulgar nurse; yet the parents for a long time regarded the woman as a perfect treasure in the nursery, because she had been overheard teaching the child a prayer.

We must be on the watch for the irritating effects of home life as well as of school life on neurotic children, and must endeavour to counteract them.

With regard to over-pressure, a common cause of nervous breakdown in children, it should be remembered that the term is relative to the mental and physical capacity of the subject. A light task to one is heavy to another. A light task is rendered heavy by physical deficiency no less than by mental incapacity. For instance, I have already alluded to errors of refraction as producers of certain forms of night terrors and migraine. They may also lead to mental overstrain. In many schools the memory is trained by the visual method. This is excellent for those whose vision is normal, but in others, who cannot see clearly, it implies overuse of other faculties. A figure in Euclid chalked on a blackboard is no help to a boy who, at a distance of a few feet, cannot distinguish the letter A from B. He has to learn the proposition by heart beforehand, and usually breaks down in class, and is punished for idleness or obstinacy. He is usually too timid to offer the legitimate excuse; often he is quite unaware that his class-mates see better than he does. Eye strain often means mental strain in children.

As to the management of cases like his own, Charles Lamb says: "Parents do not know what they do when they leave tender babes alone to go to sleep in the dark . . . the keeping them up till midnight, through candle-light and the unwholesome hours, as they are called, would, I am satisfied, in a medical point of view, prove the better caution." If we cannot altogether approve of Charles Lamb's proposed method of treatment, we can agree with him as to the cruelty and senselessness of ignoring the mental torture which darkness inflicts on an imaginative child. The assurance that unseen powers are watching over it is but small comfort compared with that afforded by a simple night-light. I have heard of a child who, when told that she need not fear the dark because "God would be with her," said, with innocent profanity, "I wish you'd take God away, and leave the candle."

Had Charles Lamb's early fears been recognised and allayed, he might have become a healthier and happier man without any impairment of his genius. I am sure that the mental sufferings of childhood leave dark traces on character and health which in after-life are never effaced. In former days doctors were seldom consulted about neurotic children who evinced immoral propensities. Ill-behaviour in such children was regarded as deliberate wickedness, and punished accordingly. But we are frequently consulted nowadays in cases of supposed juvenile moral insanity. Parents are even apt to look for Lombroso's stigmata and Nordau's types of degeneracy in their offspring who have been guilty of some escapade, and they will come to us to have their suspicions confirmed. In a very few cases their suspicions may prove correct; but in the majority we find that ennui or boredom, parental negligence or coldness, or some unfavourable conditions of the home or school circle, have rendered the child discontented and unhappy, and have occasioned the outbreak. Under more favourable conditions a moral and physical degeneration takes place.

The use of drugs.—In all kinds of night terrors nerve sedatives are useful. Even in the most straightforward of symptomatic cases, it is as well to give a sleeping draught for a few nights after an attack has occurred; for oft-repeated attacks tend to make a child timid and nervous although by nature he may not be so.

In symptomatic cases I usually give paraldehyde in doses of 15 to 20 minims, for a child of five. In idiopathic cases the bromides are indicated. The bromide of ammonium may be combined with other drugs, such as ferri et ammon. cit., in anæmia; with bismuth, gentian, rhubarb, castor-oil emulsion, in gastro-intestinal troubles; with strophanthus, digitalis, citrate of caffein, when cardiac stimulants are needed; or with nux vomica and hypophosphites, and emulsion of cod-liver oil, in debility. Quinine is not usually good for highly neurotic children. When given it should be with hydrobromic acid.

When there are no special reasons for such combinations as the above, the mixed bromides of soda, potash, and ammonium may be given in suitable doses. I usually treat markedly neurotic children, as if they were epileptics, with a long-continued course of mixed bromides.

I have never seen any harm to result from the practice so long as the dose was not excessive, and care was taken to add stomachics, or tonics, or (in cases of acne) arsenic when required.

Summary of Argument.—(1) Night terrors are always to be regarded as evidence of ill-health.

(2) They may for convenience be divided into those of symptomatic and idiopathic origin. But *per se* the symptoms of the two cannot be distinguished.

(3) Hallucinations of vision are usually due to febrile disturbance.

(4) The content of the dream may, in some cases, throw light on its cause.

(5) The character of the dreamer is of more importance than that of the dream.

(6) In simple cases, simple treatment based on the causation suffices.

In idiopathic cases, not only local causes of irritation, but the environment and nature of the patient have also to be considered.

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IDIOCY AND IMBECILITY

Etiology.—Corresponding with the broad classification of the forms of mental imperfection into those dating from birth and those produced by causes acting on the child afterwards, the principal causes may be grouped as præ-natal or post-natal. The former include hereditary influences, mental and physical; whether traceable through several preceding generations, or personal to the parents themselves. The most notable of the præ-natal causes are a family history of phthisis, of insanity, imbecility, epilepsy, or other neurosis, and a parental history of intemperance, syphilis, ill-health, accident, or nervous shock affecting the mother during gestation. The chief causes coming into action at the time of birth (which might be designated *natal*) are the results of pressure during prolonged parturition, or in forceps delivery: premature birth is another cause referable to this group. The post-natal class comprises such causes as eclampsia (convulsions during teething), epilepsy, sun-stroke, cranial injury, severe mental shock, inflammation of the brain and its membranes, and exhausting febrile illnesses—such as whooping-cough, scarlatina, measles, and small-pox. Experience teaches that it is rarely scientific to assign one specific cause to a particular case; when it is possible thoroughly to investigate the history, many contributory factors

may usually be discovered. The medical man, therefore, must not too readily accept the proffered explanation of parents that the cause was purely accidental; or due exclusively to some illness during childhood: these may, indeed, be regarded in some instances as immediate causes, but the bias to mental breakdown is innate. Children of highly neurotic ancestry by nervous and mental instability are often incapable of tiding safely over the crises of development; and such cases have been described by Dr. Langdon-Down as *developmental*.

From a series of statistics, collected by ourselves at a large pauper and at a large charitable institution respectively, embodying in the aggregate the history of 2380 cases, a few figures bearing upon the causes of idiocy may be quoted. Of præ-natal causes the most prominent was a family history of phthisis, noted in no less than 28·31 per cent of our cases. In 21·38 per cent hereditary mental weakness (insanity or imbecility) was recorded; and in 20 per cent epilepsy and allied neuroses were noted. Parental intemperance gave a percentage of 19·57 at the pauper asylum, and of 13·25 at the charitable institution (16·38 being the aggregate of the two); the difference being probably due to the different social plane from which the patients were derived. Much stress has been laid by teetotal advocates on the paramount influence of parental intemperance on the procreation of a mentally deficient progeny; and although our figures (which have been collected with considerable care and discrimination) do not warrant the exaggerated views which are sometimes put forth, they are nevertheless sufficiently impressive to point this moral. Inherited syphilis was traced in no more than 1·17 per cent of our cases: and Mr. Jonathan Hutchinson states the result of an inspection of the patients at Earlswood to be that he found "only a very few who could be reasonably suspected of being syphilitic." It is probable, however, that the subtle influence of inherited syphilis, even when not denoted by its more obvious stigmata, may be responsible for certain cases of mental and physical breakdown at the period of second dentition or puberty which have recently been described under the name of "developmental general paralysis."

Abnormal maternal conditions during pregnancy were recorded in 29·87 per cent of our cases; and, although it may be doubted whether the mental causes assigned, such as shock, worry, and depression (amounting to 25 per cent), were in all cases adequate to interfere with due fœtal development, there can be no reasonable doubt that the ill-health of the mother during gestation, or a serious accident—such as a fall downstairs or out of a carriage—not infrequently produces disastrous effects. The question of the influence of consanguinity of parents may here be referred to, though statistics do not throw much light upon the subject. It would appear that the proportion of idiot children who are the offspring of cousins is not much in excess of the ratio of consanguineous marriages to marriages generally; and that the influence for evil of such marriages is solely brought about by the intensification in the offspring of some morbid proclivity common to both parents.

Passing now to causes operating at birth, there is no doubt that protracted pressure during parturition is a frequent cause of mental impairment. In no less than 27·25 per cent of Dr. Beach's cases there was a history of protracted parturition, forceps delivery having been effected in 3·98 per cent only. Dr. Langdon-Down puts down the frequency of *asphyxia neonatorum* at 20 per cent amongst idiots generally; and at 40 per cent amongst those who are first-born children. Our joint figures give a lower percentage; but considering the pernicious effect on the brain of the condition, which is the result of protracted pressure, the timely application of forceps in such cases is clearly indicated to the skilful obstetrician.

Infantile convulsions (eclampsia) give a percentage of 27·39 per cent in our combined cases; but it is open to question whether, in the majority, an innate morbid impressionability of the nervous system be not really the predominant factor. Epilepsy was assigned as the cause of the idiocy in about 12 per cent of Dr. Beach's cases; but the same observation applies to this as to the previous class. Dr. Shuttleworth's figures give 4·75 as the percentage in which mental enfeeblement was attributed to inflammation of the brain and its membranes in early life, including acute hydrocephalus.

Infantile paralysis was recorded in only 0·92 per cent of our cases; and sunstroke in 0·54 per cent only. The influence of febrile illnesses as factors in mental impairment is noted in 5·96 per cent; acute brain symptoms were intercurrent with the majority, whilst in the rest atrophy of brain tissue resulted from the exhausting character of the illness.

We repeat, then, that the causes contributing to a given case of idiocy are usually complex. The figures which have been quoted above give the percentages of frequency of the various factors most commonly recognised; more than one being for the most part noted in each particular case.

Types.—Idiocy has been well defined as "mental deficiency, depending upon imperfect development, or disease of the nervous system, dating from birth or from early infancy, previous to the evolution of the mental faculties." Imbecility is a milder form of mental incapacity. The cases which come before us may be represented by eleven principal types, each of which has characters of its own; and on inquiring into the family history we find that some cases date from birth, while others have evidently been produced by causes which have acted on the child afterwards.

The most important types of idiocy will now be described.

1. First, there is the *simple congenital* idiot, who has no marked defect of the head or limbs. Such a patient, though below the average height, usually has a head of normal shape; the expression of the face, however, is vacant, the features coarse and heavy, the palpebral fissures deficient, the lips thick and held more or less apart often with saliva flowing from them, the jaw heavy and sometimes underhung, the palate highly arched, the teeth irregular and decayed, and the ears large, implanted far back,

with a defective or adherent pinna or lobule. The sense of hearing is sometimes dull; an imperfection exaggerated by deficient attention. The child does not follow moving objects with his eyes, which remain fixed or wander restlessly; and the incoördination between the muscular efforts of the lips, tongue, throat, and chest explains the discordant or badly-modulated voice, and the more or less imperfect articulation. The patient walks with a clumsy, shuffling gait, and the hands perform even simple acts with difficulty. The body may be inert, or swing automatically backwards and forwards. The circulation is feeble, and the hands and feet are frequently cold. The ability to observe is often fairly developed, but the power of attention is defective and the memory weak.

2. The second type is the so-called *Mongolian*, from a resemblance in facial characteristics to the Chinese physiognomy. Sometimes these patients are the latest born of a long family, and have a phthisical family history. The chief features of this type are shortness of stature, broad features, obliquely-placed eyes, flattened bridge of the nose, rounded pinna of the ears, hypertrophied papillæ of the tongue which presents transverse fissures, rough skin, and short and broad hands and feet. The voice is guttural, and occasionally indistinct. These children are very imitative, are fond of music and dancing, and see the comic side of everything. Their circulation is feeble, they are liable to chilblains, and they usually die of pulmonary affections. Dr. A. E. Garrod mentions six cases of mongoloid idiots associated with congenital morbus cordis; but in our experience this association has not been observed, probably because the children die before the age of admission into a training institution. Many cases are due to maternal trouble, fright, or worry during the mother's pregnancy. They will improve under training, if advantage be taken of their power of imitation.

3. The *cretinoid* type. Children so affected bear a remarkable resemblance one to another as regards their bodily conformation, facial physiognomy, mental characteristics, and the symptoms generally. They are usually of a diminutive stature, and have a dolichocephalic head, flat at the top, spread out at the sides, and broad behind. The hair is sparse, coarse, and dry, like horsehair; and is usually of a brown or black colour. The forehead is low and depressed laterally. The eyelids, of a pale bluish hue, are swollen and infiltrated with a solid œdema which does not pit on pressure. The subcutaneous tissue of the hands and feet is similarly affected. The nose is broad, the cheeks full and flabby, the mouth large, the lips thick and slightly apart, and the ears large but not malformed. The neck is short and thick, and usually presents no sign of a thyroid gland. Well-developed fatty swellings are seen in most cases on each side of the neck, and occasionally in the armpits; they sometimes disappear before death. The abdomen is large, distended, and containing in its walls a quantity of subcutaneous fat; frequently there are umbilical and occasionally inguinal herniæ. The arms and legs are short, and the hands and feet broad, thick, and sometimes dry and scaly. The skin of the body, as well as of the upper and lower extremities, is thick, easily

separable from the muscles, whitish in colour, dry and rough, owing to the almost entire absence of perspiration; on the face it is of a yellow or waxy sallowness. The voice is rough, harsh, or squeaky, the gait clumsy and waddling, and the attitude inert. The reflexes generally are slow, reaction time being much retarded. Speech is limited to a few words, often monosyllabic. These children are placid and good-tempered, and fond of those who attend upon them. Death is due to bronchitis, convulsions, pneumonia, diarrhœa, or simple exhaustion. The treatment of cretinism is described elsewhere (*vide* art. vol. iv.), but I may say briefly that thyroid gland substance should be administered in the form of a tabloid or as a juice according to the age of the child, and this treatment kept up during the patient's lifetime, to prevent his lapsing into his former condition. It is necessary to watch the child carefully, for if he lose weight too rapidly, or the temperature and pulse rise much above normal, the treatment must be stopped for a time or the dose be reduced. In children who have undergone treatment by the thyroid gland, the fatty swellings disappear, the prominent abdomen subsides, and the herniæ are less noticeable. The skin of the body and extremities desquamates, so that it is no longer dry and scaly; and the temperature rises. The facial expression, as a rule, becomes more intelligent, and the children begin to grow while their weight is reduced. The treatment must be kept up as long as the patient lives; otherwise he will relapse into his former condition.

4. The *microcephalic* type represents cases in which the head is smaller than normal; usually 17 or 18 inches in circumference, and occasionally 15 or 16 inches only. The smallest we have ever seen was that of a girl, aged twelve years, whose head measured only 12 inches in circumference; and her brain, after death, was found to weigh only 7 ounces. This girl led a vegetative life, but learnt to recognise those around her, became cleanly in her habits, and made some attempt to articulate. The head in these cases is oxycephalic in shape, and the occiput is flattened. The forehead is narrow from side to side and often recedes, but the features are usually shapely, the eyes large, and the nose aquiline. In some cases they have a bird-like aspect; in others, the face is large in proportion to the cranium. While the lower class of these patients have scarcely any power of observation, and will sit still all day, the higher class are active and lively. They are restless, imitative, and fond of music, but have little power of attention; their capacity for improvement is limited by their cranial deficiency.

5. In strong contrast with the above class are the *hydrocephalic* cases, with large heads. According to Meynert, in the congenital form the lateral ventricles are extended in their long diameter; while in acquired hydrocephalus the ventricles are increased in their transverse and vertical diameter. The educational treatment is the same for both these classes, but it cannot be put into operation until the disease becomes chronic; then, as experience shows, some improvement can be made, unless a large amount of fluid cause wasting of the gray matter of the brain. The

head is rounded in shape, so that the antero-posterior and transverse diameters are nearly the same; the widest circumference is often at the temples, where there is sometimes a perceptible bulging above the usual place of greatest width around the superciliary ridges. The fontanelle is raised, thus differing from rickets in which it is depressed; and in the latter affection the head is elongated in the antero-posterior diameter. Patients of this kind do not improve much, but are usually good-tempered, of a contented disposition, affectionate, and fond of those who attend upon them. The most intelligent hydrocephalic patient under our care, after seven years' training, learnt to read, to write, and to keep simple accounts, and became a useful farm labourer; the remaining evidence of his imbecility being of a moral character.

6. A type with which the above is sometimes confounded is the *hypertrophic*, in which the brain is larger than normal. This and the types afterwards to be considered belong to the non-congenital class. The diagnosis between the two forms—the hydrocephalic and the hypertrophic—was described some years ago and rests on the following points. In hydrocephalus the increase in size of the head is most marked at the temples; in hypertrophy, above the superciliary ridges: in hypertrophy the head is square or perhaps elongated in shape; in hydrocephalus it is rounded: in hydrocephalus there is sometimes elasticity over the lately closed fontanelle; in hypertrophy there is none, and there is occasionally a depression in that situation: in hydrocephalus the distance between the eyes is increased; in hypertrophy this does not occur; moreover, the hypertrophic head does not attain so large a size as that of chronic hydrocephalus. One of the most marked cases under our care was in a boy fairly grown but with a vacant look. His head was large, and square in shape, with well-marked frontal prominences. He complained of headache at times, and when asked where it was, he pointed to the right temporo-parietal region. He walked slowly and unsteadily, hanging his head slightly forward; and, though he went to school regularly, he was dull, and made no progress. Questions were answered slowly, and there was always a distinct pause before he began to reply. A short time before his death his headaches were more frequent and severe, and he became weaker in his legs, so that he often fell down.

7. Another important type is the *traumatic;* in this form the defect is due to a fall or blow on the head; or results from injuries to the head during birth, caused by a narrow pelvis and prolonged labour. In these cases the degree of imbecility produced varies with the extent of destruction of the nervous tissue, and the presence or absence of hereditary predisposition; and the same remarks apply to the amount of improvement which will result from training. These patients have usually well-shaped heads and limbs, and good features. They can walk steadily and see and hear perfectly; but as there is often great difficulty in fixing their attention, they do not speak, nor take any notice of what is said to them. In other cases more improvement is made, and the children make good progress under training.

Closely allied to the above are the *eclampsic* cases, in which convulsions come on soon after birth, continue some years and then cease, but with so injurious an effect on the brain that the child becomes imbecile. An illustrative case of this kind is that of a girl who was mentally sound at birth and was a lively child up to the age of two years. She had convulsions, when cutting the teeth at the age of seven months; and they continued until she was five years old. She became very excitable and afterwards very quiet. When under observation she was so listless that, if allowed to do so, she would sit still for hours. She would not speak, but would amuse herself by singing or humming tunes at various times. Although kept for a considerable period under training, she learnt nothing, as her attention could not be gained. In other cases of this kind the excitability remains, and then there is constant movement, and the child is perpetually engaged in mischievous acts. These patients have a bright expression, but the eyes wander restlessly, and the attention cannot be fixed. They have full use of their limbs, but cannot bear restraint, and often fly into a passion; during this excitement, if they cannot inflict pain on others, they will bite their own arms or hands, or stamp with their feet on the floor.

8. Then there is the *epileptic* type, which represents some patients who recover under treatment, others who remain stationary, and others again who go from bad to worse, and pass at length into dementia. The first sub-class are bright, well-made children, who progress at school, and take an interest in their work, whether educational or industrial. The second are also well-formed children, who are very listless, but can talk and take an interest in what goes on around them. They usually make fair progress; but, when doing well, a succession of fits comes on and throws them back, so that for a time they become lost and dazed. The third sub-class have a more animal type of face, are dull, and, in consequence of the frequent fits, make no progress whatever. They are often addicted to masturbation, and gradually become quite lost and demented. These cases are very numerous, as at least 25 per cent of all idiots and imbeciles suffer more or less from epilepsy.

9. Another important type is the *inflammatory* or *post-febrile* type. Imbecility in these cases supervenes after some illness, such as measles, whooping-cough, typhoid or scarlet fever; these diseases cause inflammation of the brain and its membranes (or are complicated with it), not sufficiently grave to be fatal, but serious enough to cause mental impairment. As Dr. Ireland truly says: "The amount of damage to the intellectual powers must be mainly dependent upon the intensity of the morbid process." This we seldom have an opportunity of measuring, as the child does not come under our care until the disease has passed away. Of course, if one of the diseases we have mentioned should occur in a child previously disposed to imbecility, this affection is more likely to follow it. Many of these patients do remarkably well under training. In a girl, who was under our care, the imbecility came on after an attack of measles when she was four years old. For some time afterwards she

remained excitable, passionate and uncontrollable; but when she came under observation, she was well developed and nice-looking, with good use of her limbs, in full possession of her senses, and able to speak and talk. She made considerable progress, both educationally and industrially, and made herself useful in every way.

10. A type frequently met with is the *paralytic*. The paralysis may come on before or after birth, but the majority of cases belong to the latter category. Generally, these patients make fair progress mentally, if there be no fits, and the injury to the brain not great; but little can be done for the paralysed limbs. In cases of birth palsy, on the other hand (in which athetosis is often present), considerable improvement results from training. In a case belonging to the former class, which came under our notice, the boy was fairly intelligent when first seen; and as a result of training he not only made good progress in his education, but also gained considerable power over his paralysed arm and hand. Patients included in the latter class, however, in whom the imbecility and paralysis have come on after repeated fits, cerebral apoplexy, or atrophy of the brain, do not make much progress, either physically or mentally; for the fits interfere with improvement, or arrest it.

There are other types of less importance, such as the amaurotic, syphilitic, choreic, scaphocephalic, etc., which need not receive detailed description.

Pathology.—The pathology of idiocy will be considered in respect of certain differences and exceptions. The subject is an interesting one, and general practitioners should know something about it.

Hypertrophy of the brain is occasionally met with, and is of interest because it is often mistaken for chronic hydrocephalus. It is due to increase of the neuroglia of the white matter of the brain; there is not only mere growth, but the nutrition of the cerebrum is modified as well. The brain substance is usually white and hard, and cuts like cheese; generally it is anæmic on section, but there may be congestion of the membranes, and increase of the sub-arachnoid fluid, and of that in the lateral ventricles. On removing the calvâria, the brain often springs up as if after pressure; and on closer inspection the sulci will not be noticed, as the convolutions are flattened and pressed together. The parts affected are chiefly the white matter of the two hemispheres, the corpus striatum and optic thalamus. Death usually occurs from convulsions, or from an intercurrent disease, such as pneumonia, bronchitis, or diarrhœa. The weight of the brain is considerably increased; in one case under our care, a boy aged fifteen years, the organ weighed 62 ounces; a weight of from 49 to 53 ounces, which is much above the average, is fairly common. As a rule, the head in this disease is not so large as in chronic hydrocephalus; it is square, or somewhat elongated in shape, while in hydrocephalus it is rounded. In hypertrophy there is no increase in the distance between the eyes, a condition commonly noticed in hydrocephalus. There are other differences, but the above are those on which we lay most stress.

The opposite condition is *atrophy of the brain*, which is often seen; it

is present at birth, or comes on some time afterwards. The most common form of the congenital class is the microcephalic brain, in which there is incomplete development. The deficiency affects chiefly the anterior, upper, and occipital convolutions; the two former are often very simple in arrangement, while the latter, from insufficient development, cause the brain to be shortened, and the cerebellum to be to a great extent uncovered. The ganglia of the base are not affected in the same proportion, and the cerebellum retains its normal size. The cause of the disease is obscure; it was formerly attributed to premature synostosis of the cranial sutures, but this condition exists in exceptional cases only.

In the acquired form there is a loss of nerve-structure from inflammation of the brain, meninges, or skull, occurring either before birth or supervening in infancy. Cases of unilateral atrophy of one hemisphere, with coexistent atrophy of the limbs on the opposite side, are seen very frequently. On making an autopsy, we find a thickened cranium on the affected side, opacity and increased thickness of the membranes, effusion of fluid into the sub-arachnoid space or into the ventricles, and atrophy of one hemisphere of the brain, with atrophy of the cerebellum and spinal cord on the opposite side.

Sclerosis of the brain is either diffuse and affects large portions, or multiple and disseminated in patches. The former kind is the more common of the two. It involves a considerable part of one hemisphere, and is not distinctly circumscribed; the medullary substance is chiefly affected. The frontal, ascending frontal, ascending parietal, and occipital convolutions are those which are mostly implicated. The white matter is hard and looks on section like white of egg, though sometimes there is a honeycombed appearance. The increased hardness and density is due to an overgrowth of the neuroglia, which compresses the nerve-fibres, and finally causes their disappearance. The disease is due, no doubt, to a chronic inflammation of the membranes; and we find on examination increase and distension of the blood-vessels, infiltration of the perivascular sheaths with leucocytes which sometimes make their way into the surrounding tissue, and occasionally an increase of the fibrous tissue around the vessels. In disseminated sclerosis patches are found scattered through the cerebrum, cerebellum, basal ganglia, pons, medulla, and spinal cord. The convolutions of the brain are usually exempted. The patches are circumscribed and tough, and in the spinal cord, vary in size from a pin's head to a hazel-nut; they are usually larger in the brain matter itself. The meninges of the brain and spinal cord may be healthy, or there may be signs of congestion or chronic inflammation. The cerebro-spinal fluid, which is increased, is sometimes cloudy, and the lateral ventricles are dilated.

Porencephalus is a condition closely allied to chronic hydrocephalus, as fluid is found in the place of brain substance. The defect is either congenital and caused by arrest of development of the brain, or it may be an acquired condition. Usually, there is a cavity on the surface of the hemisphere, which may communicate with the arachnoid sac, or

more commonly with the ventricular portion of the brain. Sometimes, and especially in the acquired form, small cysts are found which contain clear straw-coloured or gelatinous fluid. The third ventricle, the lateral ventricles, the occipital lobes, and the convex surfaces of the right frontal regions are the parts chiefly affected. These cavities may be the result of antecedent hæmorrhage into the substance of the brain.

Softening of the brain is either general, or limited to certain portions of it; it is usually due to a feeble circulation or to a diminished supply of blood. The part involved is white in colour. The chief causes are an effusion of blood into the ventricles and sub-arachnoid space, chronic hydrocephalus, thrombosis of the middle cerebral arteries and superior longitudinal sinus, and tuberculous meningitis. The central white matter of the hemisphere, the corpus striatum and optic thalamus, fornix and septum lucidum are the parts chiefly implicated.

The tumours of the brain are generally tuberculous in origin, but occasionally are of a gliomatous nature. Sometimes tuberculous masses are found scattered through the substance of the brain, or gliomata of the size of a walnut or small apple may be met with, causing flattening of the convolutions over them. Occasionally psammomata are found attached to the choroid plexuses; and sometimes long masses growing from the dura mater make their appearance.

Simplicity of the convolutions is often noticed. Sometimes we find, on examination, convolutions of half an inch or even one inch in width. Of course, in these cases the arrangement is as simple as possible. As a rule all are more or less affected. Occasionally the convolutions of both sides are equally involved.

Asymmetry of the hemispheres and convolutions, an altered relation between the gray and white matter of the brain, thickening of the arteries, and thrombosis of arteries and veins are sometimes found.

Diseases of the membranes of the brain, affecting chiefly the convex surface, are often seen, especially in the chronic form. On examination, we find congestion and thickening of the dura mater; thickening and opacity of the arachnoid membrane; adhesion of the dura mater to the skull, of the membranes to each other, and of the pia mater to the brain; increase of the sub-arachnoid fluid, which may be clear, turbid, or purulent in character; and an excess of serum in the ventricles, which are dilated, with their lining membrane rough.

The acute disease takes chiefly the form of tuberculous meningitis, and in the cases we have seen it ran a lengthened course. The miliary tubercles are found in the meshes of the pia mater; especially over the longitudinal sinus and the Sylvian fissure, the middle cerebral artery, pons and medulla. At the base the membranes are thickened and opaque, and the meshes surrounding the optic commissure and Sylvian fissure are filled with yellow exudation. The lateral ventricles are dilated and filled with fluid, and the central parts of the brain are softened.

The most common *diseases of the cerebellum* are atrophy, tumours, and cysts. Atrophy has already been mentioned in connection with atrophy

of the brain, and requires no further description. Tumours are chiefly tuberculous in character, and cysts we have seen in one case.

The diseases of the spinal cord most usually seen are anterior poliomyelitis—giving rise to infantile paralysis, which, when it comes under our notice, has assumed the chronic form; congenital arrest of development of the pyramidal tracts, or descending sclerosis of the pyramidal tracts, both of which cause spastic paraplegia; unilateral descending sclerosis in connection with disease of the brain; and chronic myelitis. The last form may be transverse myelitis, extending so as to cause destruction of the ganglion cells of the anterior horns. Sometimes the transverse form ends in softening, or is associated with ascending sclerosis of the columns of Goll and descending sclerosis of the pyramidal tracts of the lateral columns. External spinal pachymeningitis, internal hypertrophic pachymeningitis, and tuberculous spinal lepto-meningitis are occasionally found.

Affections of the cranium.—After removing the calvaria and holding up the convex surface to the light, it is sometimes seen to be diaphanous in places; especially in the region of the anterior fontanelle, which occasionally persists. The sides and arch of the cranium are in a few cases thickened and sometimes asymmetrical; the former condition occurs when there is atrophy of the brain on one side and the skull is thickened to compensate the wasting; the latter, when one hemisphere of the brain is smaller than the other, or when the brain grows toward the side where there is least resistance. In a few cases the sutures of the skull become closed soon after birth, and then a microcephalic skull is formed; this form of skull is often characterised by a sloping away of the frontal part where the temples are situated, when an oval brain is formed. The scaphocephalic, conical, and other shaped skulls are caused by too early ossification of the sagittal, lambdoidal and coronal, or other sutures. The differences between the chronic hydrocephalic and hypertrophic skulls have already been mentioned. At the base there is often found in cretinism, as well as in other forms of idiocy, premature synostosis of the sphenoid with the basilar part of the occipital bone.

The cells of the brain in idiocy are generally rounded or pear-shaped, and deficient of processes. In hardened sections the nucleus has retracted protoplasm around it, and granular matter outside it; but with the fresh method, the processes stain well, and not only the primary but the secondary branches also can be seen. The third layer of cells is the one generally affected.

Treatment and training.—Indications for training vary with the different forms of mental deficiency: consequently a knowledge of the leading characteristics of the several types is essential in determining that which is most appropriate in a particular case. The inert, impassive idiot, for example, requires rousing, stimulating treatment; the child of restless, nervously excitable temperament is the better for soothing influences, with such exercises as will tend to bring its irregular out-flows of energy under control. For successful treatment co-operation between

patient, physician, teacher, and nurse is required; and in this article we propose to consider various ameliorative measures under the heads of:—

A. *General management.* B. *Medical and surgical treatment.* C. *Educational, industrial, and moral training.*

A. *General management.*—The home training of a mentally deficient child cannot begin too early. In the words of Séguin (*Idiocy*, p. 88): "As soon as any function is set down as deficient at its due time of development, the cause must be sought and combated; if external, removed; if seated in the nervous apparatus, counteracted by the earliest course of training and hygienic measures." Unhappily the mothers of weak-minded children are, as a rule, not themselves sufficiently strong-minded to carry out any system; but a judicious nurse may do much to check purposeless movements (apt to become automatic), and to promote habits of cleanliness. It is the duty of the medical attendant to point out the importance of persevering efforts, in spite of small and tardy results. Regularity of the bodily functions should by every means be encouraged; and gentle discipline will end in the formation of cleanly habits, of infinite importance in the after-life of the child. The "laissez-faire" system, which is content to treat the growing imbecile as a perpetual infant, to swathe him in napkins like a baby, and to inure him to the contact of wet and soiled clothing, is a mistake. The child should be encouraged to indicate his wants, and to avail himself of the opportunities of relief regularly afforded him. Cleanliness of body is to be promoted by frequent warm baths and frictions of the skin, the exhalations of which are apt to be offensive. Amongst other hygienic measures, sufficient exercise in the fresh air is of the first importance. This is apt to be neglected; sometimes from a shrinking from exposure on the part of parents, sometimes from difficulties arising from the physical infirmities of the patient. The superior facilities for outdoor life is one recommendation of a residence in the country rather than in town; and in view of the proclivity of idiots and imbeciles to tuberculous affections, a dry gravel soil and a bracing atmosphere are desirable. The dwelling must be bright, cheerful, well ventilated, and well warmed. A *diet* comparatively rich in carbonaceous elements is needed, as in these children thermogenic powers are deficient, and the extremities prone to chill. Clothing likewise must be warm and appropriate. The body should be encased in wool, the underwear being of varying thickness according to the season. The cut of the clothing should be such as to conceal and not to accentuate the bodily defects. Whilst some modification may be required to meet peculiar habits (such, for example, as the provision of slavering-bibs in some cases), it should assimilate as far as possible to that of ordinary children of the same age. As a rule, the wearing of indiarubber urinals, and other means of avoiding "accidents," militate against care in improvement of the habits.

B. *Medical and surgical treatment* consists, of course, in the application of general principles to the special necessities of the idiotic class. We

must content ourselves by referring to a few of the conditions most commonly met with. In the first place, feeble-minded children are, as a rule, feeble-bodied; and mental improvement depends to a considerable extent upon physical amelioration. The improvement of the general nutrition, of the quality of the blood, of the nervous powers, and of bodily infirmities is therefore essential. Cod-liver oil, malt extract, Parrish's chemical food, iron and quinine in their various combinations, are often serviceable; and in loss of nerve-power and wasting of muscles, electrical treatment and massage may be usefully tried. The mucous diarrhœa which is frequently met with, especially in the "Mongolian" class, is best combated by an emulsion of castor oil with small doses of opium; in the fermentative variety with fœtid stools, minute doses of carbolic acid, or of sulpho-carbolates, have proved useful. Enuresis may be dealt with by diminishing the amount of fluid imbibed at the evening meal, and by increasing doses of belladonna. Various discharges from eyes, nose, and ears may be treated by astringent lotions of sulphate (or, in more severe cases, of chloride of zinc). A spongy condition of gums is often met with in this class, and calls for strict attention to the hygiene of the mouth, and the administration of chlorate of potash. For chilblains, so common with idiots of feeble circulation, prevention is, of course, better than cure; and, as prophylactics, cod-liver oil and the painting of the toes with iodine are frequently of benefit. Frictions of the feet and legs are also called for, and in frosty weather the wearing of wash-leather socks both by night and day is an advantage. Where epilepsy complicates idiocy, bromide treatment may be tried, but not so far as to depress the patient. In some cases borax and sodium bromide in combination appear more efficacious than bromide alone; and the diet, although nutritious, should not be rich in nitrogenous elements. The treatment of cretinism has been described already (vol. iv. p. 484).

As regards surgical treatment it may be said that, as a rule, idiots are bad subjects for operations, which should only be undertaken when urgently necessary. Craniectomy, which of late years has been practised as a remedy for microcephaly, proceeds on an irrational basis, and the results have been eminently unsatisfactory. Bourneville, indeed, has recently adduced the evidence of autopsies to show that in the long-run such excisions tend to diminish (instead of increasing) the cranial capacity, as exuberant growth of bone is thrown out to replace that which was removed by the surgeon. Post-nasal growths (adenoids, etc.), frequently met with in abnormal children, should be removed, as they tend to intensify stupidity.

C. *Educational, industrial, and moral training.*—Under educational we include physical as well as mental training, inasmuch as the two are more or less interdependent. Starting with exercises calculated to improve and to co-ordinate the muscular powers, we endeavour by the simplest forms of drill —such as clapping the hands in time to music—to strengthen the child's powers of attention and of imitation. Breathing exercises are also useful, special care being taken to promote nasal breathing with closed mouth.

We note also any sensorial deficiencies, and endeavour to remedy these by appropriate exercises. Following the lead of nature in the spontaneous education of the normal infant, we proceed to place before our pupil contrasting substances, which he is encouraged not only to see, and if necessary to smell and to taste, but also to handle; the sense of touch serving to correct the impressions through the other senses. By the persevering application of such methods the intellectual activity is at length aroused, and exercises, at first purely imitative, are performed with discrimination. It is impossible, in the compass of an article like this, to give a detailed account of the various devices by which the above-described processes are effected: we can merely mention *bean-bags*, *peg-boards*, *size and form boards* as some of the apparatus found useful for the purpose. From these preliminary exercises the pupils readily pass to the occupations of the Kindergarten; and of these we may mention bead-threading, picture-pricking, and paper-weaving as specially serviceable not only for training the fingers but also for exercising the intelligence. Speech is, as a rule, more or less imperfect in mentally deficient children, and when the imperfection is not due to structural defect, much may be done to improve it by lip and tongue gymnastics, followed by systematic lessons in articulation. Music, which has special attractions for the mentally deficient class, is often a good incentive to speech; the words of nursery rhymes, repeatedly sung to attractive tunes, being gradually acquired. Some idiots have a remarkably correct sense of time and tune; and in consequence music is an excellent auxiliary to drill, which should be arranged so as to be not merely an imitative exercise, but to call forth the pupils' powers of attention and prompt action. Of what is regarded as ordinary school work we can only say here that all instruction must be illustrated as far as possible, and that every step in calculation must be objectively demonstrated. Mere learning by rote is of little avail; and in the education of mentally feeble children parrot-like repetition should be carefully avoided.

Industrial training is really of more importance to this class of pupils than literary acquirement, and Kindergarten occupations form an excellent introduction to manual work. Later, instruction in Sloyd, chip-carving, and carpentry may be given to those who show a taste for mechanical work; while others may prefer tailoring, shoe-making, or mat-making. For adolescent boys outdoor work in the garden, or at a farm, is of special value; for girls, sewing and work in the house, kitchen or laundry, are most likely to be useful, and patients so employed will lead much happier lives. Care must be taken to vary the monotony of training as much as possible; and the necessity of frequent recreation must not be lost sight of.

Moral training must proceed together with the intellectual; and good discipline must be maintained by kindly firmness. The aid of religion is valuable in promoting truthfulness, honesty, and straightforwardness of conduct; and the duty of doing to others as one would be done by must be steadily enforced.

In conclusion, we may point out that such training as that above

described can hardly be carried out satisfactorily at a patient's own home; to obtain the best results the varied resources of a specially equipped institution are desirable, and even mentally deficient children are the better for such emulation as judicious classification affords.

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VICE, CRIME, AND INSANITY

Introductory.—When a hungry dog finds himself alone in a room in which luncheon is laid and viands are on the table, he does not, if he has had the amount of training that is usually given to house-dogs, get upon the table and satisfy his hunger at once; he waits until his master sees fit to give him his allowance. Urgent as his hunger is, present as are the means of satisfying it, yet the dog waits. He exercises, as the phrase goes, self-control. He possesses the power of forgoing the immediate gratification of his desire. What the precise motive may be that overpowers the present desire, whether it be fear of a beating or merely of cold looks and scolding voice, or whether it be the anticipation of a more toothsome meal as a reward, we need not consider. All that is important to notice at the present moment is that the dog possesses this power of forgoing the immediate gratification of desire, even when the means of instant gratification are actually before him; and that he does forgo this immediate satisfaction for the sake of receiving a greater but more distant advantage.

If we seek to identify that quality or factor in conduct which is most distinctively human; in which man exceeds the lower animals as immeasurably as in the complexity of his brain; by which civilised man towers over uncivilised man; by which superiority in moral rank is recognised and measured; upon which the whole stupendous fabric of civilisation and morality is founded; we shall undoubtedly discover it in this capability to forgo the immediate gratification of a desire for the sake of obtaining a greater but more distant benefit.

In the lower animals this fundamental moral quality is but little developed; but in very many it exists in rudimentary degree, and in some it is readily perceptible. When the nisus of web-spinning dominates the spider, when the nisus of nest-building dominates the bird, the animal does not instantly gratify the desire, urgent as it is. It seeks first an appropriate and secure position; and not until some hours or days have been spent in the search, does it indulge itself in the gratification of its instinct. The immediate satisfaction of the desire is postponed in order that the ultimate satisfaction, though more distant, may be more complete. A still higher development of this moral quality is seen in the beaver. The food of the beaver is the bark of trees; its safety is secured by its insular habitation. While it is at home in its lodge, it is practically secure from its enemies; when it is seeking food on land, its slow gait and absence of weapons expose it to destruction. Thus it has developed a habit of cutting trees into logs of short length and storing them in its lodge for consumption in security. But, when a colony of beavers has lived long in one place, the trees in the

immediate neighbourhood of the settlement are consumed, and food has to be brought from a distance; the logs thus brought are floated down the stream, and, when the banks of the stream are cleared of trees, the beavers dig canals from the stream to the wood, in order to provide the advantage of water carriage for their logs. Now it is evident that, while the canal is being dug, the accumulation of food is postponed; the process of collecting food is postponed in order that its future collection may be the easier. The immediate gratification of the desire of collecting food is forgone for the sake of the greater but more distant benefit of greater ease and rate of transportation.

Every description of savage man, in whatever part of the world, in whatever age, whatever the mode of life, customs, and habits of the tribe depicted, invariably agrees with every other account in describing savage man as the creature of impulse, and as lacking in the capacity for steady, continuous labour. If he is impulsive, if he gives free rein to his impulses of ferocity or lust or greed, it is because he has not acquired the power of forgoing, for the sake of greater ulterior benefit, the instant gratification of his passions. If he is incapable of steady and continuous labour, it is that he is unable to forgo immediate indulgence in idleness for the sake of the future benefit that he would achieve by work.

Among civilised men moral rank is gauged by the degree in which this power is possessed. He who lives a life of self-indulgence is considered morally inferior to him who lives abstemiously; and the difference between self-indulgence and abstemiousness is the difference between the immediate indulgence of the appetites, and the forgoing of this immediate indulgence for the sake of greater future benefit. The spendthrift is regarded as less moral than the man who husbands his resources; and the spendthrift is the man who does not forgo the instant pleasure that is to be had for money, even at the expense of future want; while the thrifty man is he who prefers the greater future benefit to the instant gratification. So the men or women, who live in debauchery and wantonness, are regarded as immoral, while those of chaste and cleanly life are moral; and here again the same difference lies at the root of the distinction. It is not denied that there are other differences, differences which will be referred to presently; but the differences are less fundamental in character. The main difference between morality and immorality is postponement or forgoing of immediate gratification; the main standard by which degrees of morality are assessed is the extent of the possession of this power. If a man is a drunkard, it means that he gratifies the instant pleasure that he derives from the imbibition of alcohol, in spite of the future disadvantages of loss of money, of health, and of esteem. If he is a gambler, a loafer, an opium-eater, a votary of any other form of vice, the same rule holds good. The essence, the characteristic, the differentia, the identifying mark of vice, is the instant indulgence of desire at the cost of future disadvantage; the character of virtue is the forgoing of immediate gratification for the sake of greater future benefit.

If, by their self-indulgence, the glutton, the drunkard, the loafer, the spendthrift, the masturbator, the whoremonger forfeit a future benefit for themselves alone, without including others in their forfeiture, they are regarded as merely vicious; and, though their conduct is looked upon with reprobation, it is awarded no other punishment. It is the addition of this second element that converts vice into wrongdoing. When, by immediate self-indulgence, a man forfeits a future benefit, or entails a future evil, not only upon himself, but upon others also, his vice is simple vice no longer. It now becomes a wrong. The glutton who gorges himself so as to ruin his digestion and foster his gout, exhibits, so long as he alone suffers by his gluttony, simple vice. But if his circumstances are such that the excessive gratification of his appetite deprives his children of a proper quantity of food, his conduct is not merely vicious; he commits a wrong. So the drunkard who, by his vicious self-indulgence, brings his wife and children to poverty; the loafer who lives on his wife's earnings and leaves his children to want; the spendthrift who involves others in his ruin; the roué who seduces a girl; have, by this added element, converted that which, when it affected himself alone, was a simple vice, into something more and worse than a vice.

Wrongdoing is not necessarily vicious in the sense in which vice is here defined. A man may do wrong and yet may not entail upon himself any future disadvantage. The essential character of wrongdoing is the pursuit of gratification for oneself by means of injury to others. It matters not whether the others are injured in their persons either by direct violence, by the neglect of precaution which results in physical injury to them, by the wilful or neglectful failure to furnish them with necessaries, or in any other way; or whether they are injured in their property by forcible robbery, by fraudulent devices, by wilful damage, by damage arising from neglect or indifference; or in their feelings, either by acts or words which give pain, or by the omission of expected offices. In any case wrong is done when one individual seeks for himself gratification by means of injury to another.

It is evident that wrongs present a very wide range of variation in their gravity. They range from the pain inflicted by a snappish answer, or by such a disagreeable practice as hawking and spitting in the presence of others, to murderous attacks, and to the infliction of complete ruin by fraud and treachery.

Of vices pure and simple, as here defined, the law takes no cognisance. The community looks with indifference upon the vicious conduct by which a man sacrifices his own future to his present gratification. Short of taking it away altogether, a man may do what he will with his own life. It is true that to be drunk and incapable is an offence in law, but it is the incapability and its probable consequences to others that is punishable, not the drunkenness. Even when vice is pushed so far that it involves wrongdoing, the law remains indulgent towards it. Injury which is inflicted on others, not primarily for the gratification of the

injurer but secondarily as a result of his vicious self-indulgence, is regarded with leniency by the law. The drunkard who spends in drink the main part of his income, and leaves his wife and children with the barest necessaries, is not punishable so long as he does not leave them to actual starvation. The loafer, the spendthrift, the seducer, the gambler, however much distress they may bring upon others by the exercise of their vices, are seldom amenable to the law.

The law takes cognisance of that wrongdoing only which is direct; which is not an incidental result of vicious indulgence, but the direct result of acts done or omitted. It is true that in the complex entanglement of function of highly civilised communities the law punishes some things that are only constructively wrong. For instance, if my dog escapes into the street without his muzzle, during my absence from home, I am punished. If my kitchen chimney catches fire, I am punished. But broadly and generally the rule holds good that the law takes no cognisance of vices; that on wrongdoing, the incidental result of vicious indulgence, it looks with an indifferent eye. But when wrongdoing is direct,—when a man seeks his own advantage by means of injury to others,— the law will in many cases protect the injured party; and will often protect him not merely by the punishment of the wrongdoer for injury inflicted, but by punishment for injury that is impending, or probable, or, it may be, merely possible.

There are two ways in which the law takes cognisance of wrongdoing. It may allow the injured party to sue the wrongdoer, and award to the former compensation for the injury that he has suffered; or it may, itself, inflict punishment upon the wrongdoer. The theory of legislation is that when the injury affects the injured party alone, he is left to obtain compensation by his own efforts; but that when the injury is of such a nature as to affect injuriously not only the person primarily wronged, but the entire community as well, then the community avenges its own wrong by punishing the malefactor. It steps in between the injurer and the injured; it regards the injury as bearing most grievously upon itself, and looks upon the injured party as having a secondary and mitigated interest only in the matter. It may, indeed, permit the victim to obtain compensation from his injurer; but, whether such compensation be given or not, the wrongdoer must still be punished. So completely does the community take to itself the wrong that has been done, that if the injured party, content with his compensation, declines or neglects to pursue the measures necessary to secure the punishment of the offender, he may himself be punished for his neglect. Thus the part taken by the community is very widely different in the two classes of wrongs. In the one class it does nothing except to provide machinery by which the injured party may obtain compensation from his injurer; in the other, it takes the matter completely out of the hands of the sufferer, and treats it as an injury done to itself. So profound a difference in the attitude of the community towards them will prepare us to find a very broad and deep difference between the two classes of wrongs. It is

with no small surprise, therefore, that we find, upon examining the two classes, that in principle there is no such difference between them. Differences there are, it is true; differences that are often clear, often wide, and often neither clear nor wide; but in no case do we find a difference of so fundamental a character, or of such far-reaching importance, as to warrant such a profound difference in the attitude of the community towards them. If it is an injury to the whole community for one man to appropriate the property of another by theft or by fraud, it is difficult to see how the appropriation of the same property, by wrongful detention, or by breach of contract, can be a matter which does not injure the community. If it be an injury to the whole community for one man to interfere with the activity of another by wounding or maiming him, it is difficult to see why the interference with his freedom of action by wrongful imprisonment is a matter with which the community has no concern. However they may be separated in English law, it appears that in real nature, and in their effect upon the community, there is no such difference between crimes, torts, and breaches of contract as would justify any great ethical distinction between them. There is one fundamental quality which is common to them all, and which distinguishes them from vices on the one hand, and on the other from the class of acts that we shall next have to consider: this quality has already been indicated; it is the seeking of gratification for the actor by means of injury to others.

The immediate effects of vice we have seen to be limited to the vicious individual. Vice is the sacrifice of the future to the present, but of the future of the vicious man only. It is dependent on an incapacity—the incapacity to forgo a present gratification for the sake of a future benefit.

The immediate effects of wrongdoing are upon others. Wrongdoing is the sacrifice of others to self. It implies the existence of others. A solitary man can do no wrong. Wrongdoing connotes association with others; the existence of a community; of a social state. Now, the existence of a community—of an aggregate of any kind—implies and involves the surrender, on the part of the individuals who compose the aggregate, of a part of their freedom of action. If we desire to diminish the cohesion with which the individual atoms of a mass of iron cling together in a common aggregate, we heat it; that is to say, we impart to each individual atom a larger amount of independent movement. We can, by increasing this independent movement of the atoms, melt, and even volatilise, the iron; that is to say, we can dissipate the aggregate altogether. Conversely, a good housekeeper who does not like to set her butter on the table in a smeary state, keeps it in summer upon ice. By cooling the mass—by diminishing the independent movements of the several component particles—she binds those particles more firmly together. In every case in which individuals are combined together into an aggregate, the aggregation implies, involves, and requires a surrender of a part of the freedom of action of the individuals; and this is true no less of organic than of inorganic aggregates. If one or more animals of a

herd start off at a gallop, while the others remain stationary or continue to walk, the herd will be disintegrated. A certain surrender of individual freedom of action is essential to the existence of the gregarious state. Every member of a community must exercise forbearance towards the other members; must limit his freedom of action in those directions in which it interferes with the freedom of action of others. On no other condition can a community exist. The solitary bee makes its cell in cylindrical form. The gregarious bee, crowded on every side by its fellows, makes a cell the cylindrical form of which is modified by the proximity of those fellows. Where the activity of its neighbours meets, and tends to encroach upon, its own activity; where its own activity meets, and tends to encroach upon that of the other; where the cylinders would, if completed, encroach upon each other; the activity of both is checked. Since both cylinders cannot encroach at the same point on each other, and since the encroachment of either would unduly limit the activity of the constructor of the other, a compromise is arrived at. A bargain is, as it were, struck; a via media is found. Each bee so limits the extent of its own construction as to allow to its neighbour a range precisely equal to its own. The resulting structure is far better adapted to serve the purposes of the community than if each bee had worked independently: strength is gained; time, labour, and material are economised. This typical instance well illustrates the essential condition of social life; first, the necessary surrender of some part of the sphere, in this case the cylinder, of individual freedom of action; and, secondly, the advantage which the community gains by the limitation of the action of the individual.

When an individual member of a community does wrong; when he seeks his own gratification by means of injury to others, he is exercising an undue freedom of individual action. He is allowing his own sphere of activity to interfere with the sphere of activity of his fellows. If one man inflicts violence upon another, if he wounds or maims him, if he prevents him by force or by threat from doing that which he wishes to do, he is manifestly extending his own field of activity so as to interfere with the activity of his fellow. If he take the money, or goods, or land of another, either by force or fraud; or if he keep the money or goods or land of another out of that other's possession; or if he encroach upon another's enjoyment of money or goods or land, either by trespass or by breach of contract, similarly he is extending his own field of activity so as to interfere with the activity of his fellow. And if he diminish the enjoyment of another by hurting his feelings, the same is true; he is extending his own independent freedom of action to an extent at which it interferes with the freedom of action of others. But it has been shown that the restriction of individual action within such bounds that the freedom of action of neighbours is not prejudiced, is a condition essential to the maintenance of the social state; and that freedom of individual action beyond these bounds is incompatible with the integrity of the community. Thus the community, as a whole, is directly interested in restraining

such undue freedom of individual activity, and we see the true reason why wrongs done to individuals are regarded as offences against the community and are punished as such :—it is because of the perception that such wrongs tend to the disintegration of the community ; and that, if they were allowed to become general, the community would be dissipated into detached units ; a perception which is, indeed, dim and confused, as is shown by the arbitrary exclusion of large classes of wrongs from the category of crimes, but which, so far as it exists, is powerfully operative.

This perception was very slow in becoming established. In an early stage of society it has no existence. Crimes, by which is here meant acts punishable by law, are, in early stages of society, those acts only that directly menace the integrity of the community. Those acts which are here called treasons are the only crimes then recognised. Wrongs are looked upon as injuries done to the injured individual only, and to be purged by a compensation paid to that individual or his representatives. The only part taken by the primitive community as a whole in redressing private wrongs, is to settle the amount of the compensation, and to assist in its recovery. It is only in advanced and developed communities that the disintegrative effect of wrongdoing is recognised, and that it is transferred from the class of private wrongs to the class of public crimes. And, as we have seen, even in the most highly-developed communities that have ever yet existed,—even in the height and pride of western civilisation,—the process is not completed. There are still large classes of wrongs which are excluded from the category of crimes, which are looked upon as injurious to the individual alone upon whom they are inflicted, and which are left to his unaided efforts for their redress.

Wrongdoing therefore, like vice, is dependent upon an incapacity in the wrongdoer. What is wanting in the vicious is the capacity of foregoing an immediate satisfaction for the sake of a future good. What is wanting in the wrongdoer is the capacity of limiting his own freedom of action for the benefit of the community to which he belongs. He is imperfectly socialised. His adaptation to the social state is faulty. In both vice and wrongdoing the incapacity is an incapacity of control ; it is a lack of inhibition ; a want of self-restraint ; an inability to restrict undue freedom of action. Correspondingly, we find that all fundamental moral enactments are prohibitions ; they enjoin, not the doing of acts, but the leaving of acts undone. Their common form is, "Thou shalt not ——."

In addition to vices and wrongs, there is a third class of acts which are regarded with reprobation by the community. These acts are not always vices, and are seldom wrongs, in the sense in which that term is used here, but some of them are regarded as crimes, and so dealt with. These are acts which tend directly to disintegrate the community ; they tend to disorganise the body politic, to relax the bonds which unite individuals into a social aggregate, and to bring about the dissolution of society. Acts which have this disintegrative effect upon the community

are those which tend to weaken or discredit the influences that bind the component individuals together in a common aggregate. Of these influences, three stand out conspicuously as the most important:—

The first of these is the central government — that power which governs and regulates the internal relations of the community, and which wields and directs it in its external relations—in its relations, that is, with other communities and with all circumstances outside itself. It scarcely needs demonstration that the total destruction of the governing power usually implies and involves the disintegration of the community. In primitive communities, in which the governing power is centred in an individual, the death of the individual often involves the actual disintegration of the community; as, for instance, when at the death of Charlemagne his empire fell to pieces; as again in the numerous cases in which, when the governing power of a community has been destroyed by an invader, the community has been scattered or absorbed by the conqueror. In more stably constituted communities the destruction of the governing power does not necessarily involve the actual and complete disintegration of the community, but it involves a partial disintegration and fearfully injurious consequences, as is instanced by the destruction of the French Empire in 1870. Hence any attack upon the governing power, any act that tends to weaken it or to render it less efficient, is an incipient disintegration of the community, and as such is resented and punished by the community. Such acts, when done by members of the community itself, constitute the crime of treason; and the perception by the community of their dangerous character is shown by the much greater severity of the punishment which the community awards to such acts than of that which it awards to acts of private wrong-doing.

The protection which the community confers upon its government is extended, in a more or less mitigated degree, to all the agents of the government; so that it is a more serious offence to assault a policeman, for instance, than to assault a private citizen.

Acts by which the Government is attacked are often of the nature of wrong-doing. Such an act, for instance, is the assassination of, or assault upon, the head of the Government, or of a member or representative of the Government; such, for instance, as the murder of Mr. Spencer Perceval, of Mr. Drummond, of President Lincoln, and of President Carnot. But, primarily, these acts are not private wrongs. The person attacked is attacked, not that the assailant may gain advantage by the injury of his victim, but as a representative of the governing system of the community. Often, indeed, the assailant, so far from anticipating any personal advantage by his act, deliberately incurs a certain and usually a terrible penalty. He is actuated often by motives just the opposite of those of the doer of private wrong. So far from attempting to obtain personal gratification by his injury of his victim, he deliberately sacrifices himself for what he believes to be the public welfare. Still, rectitude or even philanthropy of motive makes no difference to his fate. The community, if it is to remain a community, is bound to protect itself

against such acts, and does protect itself by inflicting upon the actors punishments of extreme severity.

The second great safeguard of the integrity of the community is the inculcation and maintenance of religion. Amid the well-nigh infinite variety of tenet, of dogma, of exhortation, of prohibition, of observance, and of practice that different religions present, certain features remain that are common to every religion, and characteristic of it. For instance, every religion offers a theory of the cosmos, but with this aspect of it we have in the present connection nothing to do. What concerns us is this, that every religion requires a belief in the supernatural, and every religion inculcates a rule of conduct which in the first place is founded on the belief in a supernatural power, and in the second demands the self-sacrifice of its votaries. But self-sacrifice, as we have seen, is a necessary condition of social state. Every individual component of an aggregate must surrender some part of his individual independent motion, for without this surrender there can be no aggregation. Any reassumption of independent motion involves a step towards the disintegration of the community. Hence any influence that tends to maintain the spirit of self-sacrifice tends to maintain the integrity of the community. The influence of religion is therefore a very powerful social influence; it is one of the strongest of the controlling powers that maintain in social aggregation individuals whose turbulent, restive, self-seeking activities are continually urging them to independent action which, if unrestrained, must break up the community into its separate components. Hence we see one reason of the sedulous care with which every community has always safeguarded its religion; of the terrible punishments with which it has visited those who would question the validity of the established religion; and of the rigour with which religious observances have been enforced.

The third great binding social force is the force of custom. The mode by which custom operates as a cohesive is very similar to that which gives its social efficacy to religion, to which it is allied, and the function of which it supplements and completes. It promotes uniformity of action; it discountenances and checks individual initiative; it provides against individual aberrations from common action, and thus it keeps the community together. If religion is the shepherd who directs the flock in the way it should go, custom is the shepherd's dog that keeps the flock together and prevents any straggling from the main body. Correspondingly, we find that this utility of custom in maintaining the solidarity of the community has developed in the latter an instinctive abhorrence of departure from custom. Innovators, in whatever department of life, are denounced, persecuted, and very often have been killed. The subject matter of the innovation makes but little difference to the abhorrence in which the innovation is held. The abhorrence is indeed greater in the case of an innovation in religion than in anything else, and the reason is clear: such an innovation is a double attack upon the bonds which hold society together; it attacks both religion and custom. But outside of religion it matters but little what the custom is that is threatened by

innovation. The opposition to the change is equally stubborn whether the matter be important or unimportant; whether it be the abolition of rotten boroughs or the substitution of knickerbockers for skirts, the feeling of the community is equally outraged by the proposal to change, and the innovator is equally an object of scorn and detestation.

The third great division of acts that are reprobated and punished by the community includes, therefore, attacks upon the Government, attacks upon religion, and attacks upon custom. If all these acts are not now treated formally as crimes, and punished by the law, the time was when they were so treated and so punished; they are still so treated and so punished in some communities, and even with us the great majority of them are still punished informally by disfavour, and even by ostracism more or less complete.

With the progress of enlightenment and the increase of intelligence, and especially with the growth and development of the social instinct, which substitutes an internal and spontaneous cohesion for that external coercion which has hitherto been the main bond of social union, a shifting and rearrangement of the objects of social reprobation is taking place, and will, no doubt, progress much further. When a government is so stable that it has little to fear from assault, the punishments for such assaults are milder, and are often contemptuously lenient. Ravaillac, the lunatic who slew Henri IV., was killed by horrible tortures. Hadfield, the lunatic who attempted to slay George III., was taken care of for the rest of his life. Now that the individual freedom of action, which is incompatible with the social state, is in great part voluntarily surrendered, and does not so much need to be repressed by external coercion, assaults upon custom are no longer looked upon as crimes, are tolerated, and often, by part of the community, applauded. In the distant future we may expect to see not only that innovations upon custom are judged upon their merits instead of being met by instinctive opposition, but that all classes of private wrong will be recognised in their true light as injuries done to the community, and will be punished as crimes.

It is evident that the whole of the acts that are included in the last of our classes—attacks upon the Government, violations of religion, and innovations upon custom—stand, in one very important respect, upon a totally different footing from vices and wrongs. In both vices and wrongs the prime factor, the most important constituent in the act, is self-indulgence. Each is characterised by a defect in the power of forgoing gratification. In each a present satisfaction is chosen at the cost of a greater advantage in the future. But into the third class of offences no such element need enter, and in very many cases no such element does enter. The very opposite motive is often at the root of these acts. It seldom requires any self-sacrifice to refrain from attacking the Government; the sacrifice of self is usually required of the person who does assail it. Similarly, the violator of accepted religion and the innovator upon established custom are seldom prompted to these acts by any self-indulgent motive; on the contrary, the benefit that they seek is

expected only in the distant future; is pursued for the advantage, not so much of themselves, as of others, and is sought at the cost of much present suffering.

Vices, while they resemble wrongs in having their origin in defect of the ability to forgo self-indulgence, differ from the other two classes of offences in that they do not presuppose the social state. In both the second and the third classes of offences injury is done to the community, and, in the absence of social relations, the offences would not be possible; but if a man lived alone in a desert he would still be able to indulge himself in vice.

Vice and Insanity.—Insanity is a dissolution; it is a retrogression; it is a traversing of the path of development in the reverse direction; it is a peeling off of those superimposed layers of development which have been laboriously deposited by the process of evolution. Agreeably to the nature and law of dissolution, those qualities which are the latest additions to the fabric of development are the first to be lost in the process of general decay, and those which were earliest acquired are the longest preserved. And we have seen that the quality of self-control or self-restraint, by which we mean the power of forgoing immediate gratification or enduring present discomfort for the sake of future good, is one of gradual development. It is more developed in man than in the lower animals; it is more developed in civilised than in savage man; in the more civilised than in the less civilised. Hence we expect to find, in the dissolution of insanity, that this quality is diminished; that its highest and most lately-acquired manifestations are abolished; that its earlier and more deeply-engrained capabilities are weakened and diminished, and that insane persons will be addicted to vice. And this is undoubtedly the case. Every form of vice is seen among the insane. Every insane person exhibits some form of vice. The most flagrant and shocking vices are not exhibited except by insane persons; and even the most moral and refined among the insane exhibit defect in the little benevolences of life. They are wanting in obligingness; they do not hand a chair to a lady, they do not pass the salt and the mustard at table. If they play billiards, they let their adversary spot the red and take the balls out of the pockets, and when their turn comes they do not reciprocate these little offices. They lack courtesy and politeness; and this lack, while on the one hand it is due to self-indulgence and unwillingness to take trouble, on the other hand involves the disadvantage of forfeiting some of the respect and esteem of their fellows, and so satisfies the definition of a vice.

While all insane persons are vicious, in the sense in which that term is here used, and while, therefore, much vice is due to insanity, and is a manifestation of it, yet undoubtedly many persons, who for all practical purposes are sane, exhibit a large amount of vice in their conduct; and it is often a matter of the greatest importance, as well as of the greatest difficulty, to determine in any given case whether vicious conduct be or be not insane.

The man who refuses to work to-day with the knowledge that his refusal will put him on short commons next week, is viciously idle. The man who wets his bed, rather than take the trouble to get out and make water, is insanely idle. The man who gets drunk every Saturday night, at the known cost of hot coppers on Sunday morning, and of diminished comforts in his home, is viciously drunk. The medical man who, with the clear knowledge that he is on the brink of delirium tremens, that he is drinking himself to death, and ruining himself, his wife, and family, still continues to drink, is insanely drunk. The woman who goes upon the streets is viciously immoral. The woman who makes an indecent assault upon every man she sees, whatever the time, scene, or occasion, or however many the witnesses, is insanely immoral. The man who, in a few years, muddles away his fortune in horse-racing, gambling, loose women and dress, is viciously extravagant. The man who in one day orders plate and jewellery to the amount of his yearly income, carriages and horses to an equal cost, furniture, again, to the same extent, and at the same time gives orders for the enlargement of his house or the purchase of a new estate, is insanely extravagant. What we have to ascertain is the distinction between vice which is vice only, and vice which is the manifestation of insanity.

Upon consideration we shall find that it is possible to construct a continuous series of graduated cases from highly moral, virtuous and praiseworthy conduct at one end, through conduct which exhibits simple vice of various degrees, to the outrageous forms of vice that are palpably the expression of insanity.

Of several men who are equally dependent upon their daily labour for their daily bread, one will work for twelve hours a day before his determination to postpone indulgence in rest and recreation gives way before fatigue and monotony. For another, the yielding point is reached after six or eight hours' work. Another gives way at three or four hours; and yet another can maintain uncongenial labour for only an hour or two at a time, and that not every day. The man who cannot postpone his desire for the immediate ease of rest and recreation, even at the cost of certain want of food, is exceeded in laziness by him who will suffer cold rather than take the trouble to keep up the fire; and he again by him who will rather wet the bed than face the exertion of getting out to empty his bladder. Here is a continuous series between industry and idleness; between idleness that is vicious only, and idleness that is insane.

So with indulgence in drink. There is the ordinary man, the detestation of the teetotaller, the man who takes his glass of beer or wine with his meals, and never is within sight of being drunk. Then there is the man who is usually temperate, but who gets a little elevated two or three times a year when he goes to a city feast, or some such banquet. Another man gets drunk regularly once a week, but does not allow his inebriety to interfere with his work. Another loses a day or two now and then, but keeps his situation. Yet another is sober for six months together, and then has a terrific debauch ending in an attack of delirium tremens. Here

again is a continuous series between sobriety and drunkenness ; between the drunkenness that is vicious only and the drunkenness that is insane.

It is the same with extravagance. One man lives well within his income, insures his life, saves money, and leaves his family well provided for when he dies. Another, without exceeding his income, lives completely up to it, and puts by nothing for the support of his wife and family after his death. A greater degree of vice is shown by him who habitually exceeds his income ; a still greater degree by him who dissipates his capital ; and so we may go on instancing cases of greater and greater extravagance till we come to the general paralytic who offers to squander the millions which he never possessed. Again the series begins with moral conduct, and passes through simple vice to vice which is insane.

Or take the case of sexual conduct. At one end is the modest and continent married woman. A step less moral is the married woman who commits excess, but confines her embraces to her husband. Then there is the gay widow who admits one or perhaps two of her gentleman friends to intimacy. Between her and the open street-walker are many grades ; and beyond the ordinary prostitute is the woman who, having taken to the life of vice by reason of excess of libidinous desire, is urgent and importunate in her advances. Then there are women who assail with lascivious glances and gestures every man with whom they may find themselves alone. There are others who do not stop at glances or gestures, but add alluring words and embraces ; and, finally, there are women whom neither the disgust of their victims nor the presence of bystanders can restrain from actual indecent assault. At the one end of the scale is the virtuous woman ; in the middle is the woman who is simply vicious ; and at no position in the chain is there an interruption. The series is continuous.

The series is continuous in each form of vice. At what point in any of the series can we make a division and say, all on this side of the line are virtuous, all on that are vicious ? At what point can we draw a line and say all above this are simply vicious, all below are insane ? Upon what principle can such a division be made ? What is the differentia ? What quality is there in virtue that is absent in vice ? what quality in simple vice that is absent in insane vice ?

It is clear that there can be no absolute difference of kind or quality. The difference is a difference of degree only. The difference between virtue and vice is a difference between plus and minus ; the difference between simple vice and insane vice is a difference between less and much less ; and the definition of vice that has already been given, supplies us with the factor, the excess or defect, or great defect, of which constitutes the difference between virtue, vice, and insane vice. The criterion by which we distinguish between these three qualities of action is the *gravity of the difference* between the benefit of the immediate indulgence and the benefit in the future which immediate indulgence will forfeit. If immediate indulgence of desire involves the forfeiture of no future benefit—incurs no future disadvantage—then there is no vice in the indulgence. There

is no vice, for instance, under ordinary circumstances, in satisfying hunger or thirst. If the benefit of the immediate indulgence is approximately equal to the benefit that is forfeited; if it incurs no future disadvantage greater than the present advantage, still there is no vice. I cannot eat my cake and have it too; but if I eat it now, the worst consequence is that I shall not have it to eat presently. The benefit of eating it presently, that I forfeit, is no greater than the benefit of eating it now, that I indulge in; and still there is no vice. Vice begins when the benefit forfeited is greater than the benefit gained by immediate indulgence, and when it is not only greater, but is known to be greater. If the disadvantage that is incurred is unforeseen, if the actor is unconscious of the effect of his action, he escapes the stigma of vice. Vice implies choice. It is wilful indulgence at the known and understood cost of future benefit. If the cost is quite unknown, the action is not vicious; if the cost is not wholly known, is not fully understood, is not quite realised, by as much as its appreciation is defective, by so much is its character as vice mitigated.

The savage when he first tastes rum, and, liking the taste, goes on drinking it until he is comatose, is not displaying vice, for he is ignorant of the disadvantages that he is incurring. The extravagance of the general paralytic is not vice, since he does not in the least realise that the money that he is spending is beyond his means.

But if the consequences of the indulgence constitute a graver disadvantage than abstinence from the indulgence; and if the gravity of the difference between the benefit derived and the benefit forgone (or, what is the same thing, between the disadvantage avoided and the disadvantage incurred) is known and appreciated, then the choice of immediate indulgence rather than of greater future benefit is vice; and if the difference between the advantage derived and the disadvantage incurred is a very grave difference, then the choice of immediate indulgence is insanity.

It remains to explain what is meant by the *gravity* of the difference. By this term is not meant merely the *magnitude* of the difference. The future benefit forgone may be very much greater than the benefit to be derived from immediate indulgence, and yet the choice of the latter may not be insane, may be not even vicious. For instance, a man receives an offer of £100 down for a reversion of £300, which will not fall in for sixteen years. He chooses the immediate gratification of receiving the smaller sum, considering that the remoteness of the advantage which is forfeited counterbalances its magnitude, and in so choosing his conduct is not vicious. But if he agreed to sell for £100 a reversion of £200, which is due to him in six months, his conduct is improvident to the point of vice, unless the £100 will purchase for him an advantage equivalent to £200 six months hence. Clearly the *proximity or remoteness of the advantage* which is forfeited by immediate indulgence is an element which has to be considered in determining whether the action is or is not vicious. The proximity of the future advantage is a factor in the gravity of the difference between it and the immediate advantage.

A man sees his way to stealing a valuable jewel with very small risk

of detection, and he steals it. We are not now concerned with the wrong-doing but solely with the vice of the act. He gains an immediate and great benefit at the possible cost of great future disadvantage, but the risk is so slight that he considers himself justified in incurring it: the act, however wrong in other respects, is not vicious. But if he were to seize the same jewel under the eye of the owner, with the certainty that he would be instantly given in charge, and punished with a heavy sentence of imprisonment, the act would be vicious to the point of insanity. So that the *certainty of the future disadvantage* is another element which must be taken into account in estimating the gravity of the difference between the advantage gained and the advantage forfeited, before we can decide whether an act is vicious or not.

A man has to present himself before a Board, at a certain hour, as a candidate for a valuable appointment; yet he lies in bed so late that he fails to present himself before the Board, and the appointment is given to another candidate. Let us suppose, first, that he is already in possession of a good income, and that the addition that he will secure by the appointment is counterbalanced, or perhaps rather more than counterbalanced, by the time and labour that he must devote to his new duties. Upon further consideration, he has come to the conclusion that he will derive no particular advantage, and may even lose by his acceptance of the post, and he deliberately forfeits it. There is no vice in his act; and the reason that there is no vice is that he forfeits no future advantage by his immediate self-indulgence. But if the additional income that he would derive from the appointment is a matter of importance to him, it is clear that the act is vicious; and it is vicious because he does forfeit, by immediate indulgence, a future advantage. And if he be without means of subsistence, and the gain of the appointment would make the difference between penury and affluence, and if he still forfeits it by being too lazy to get out of bed in time, his self-indulgence is vicious to the point of insanity. The neutrality, viciousness, or insanity of the act depends in this case upon the *magnitude* of the difference between the benefit enjoyed and the benefit forfeited, and upon no other quality in the act.

Let us now suppose that his circumstances are such that he would derive a distinct benefit in balance from the appointment if he could get it; and let us suppose, moreover, that he has discovered from the result of a prolonged canvass that his chances of obtaining it are very remote. There are several other candidates in the field who are not only better qualified than he, but are better known to the Board, and in greater favour with its members. In fact, his chance of obtaining the appointment is dependent upon a chapter of accidents—upon this candidate failing to appear, upon that candidate being considered too delicate for the place, and this other declining the appointment. If in such circumstances he wakes up with a headache and a raised temperature, and guesses that he may have an attack of influenza, it will argue no vice in him to lie in bed rather than to attend before the Board. But if he has been given to understand that the appointment is practically already made, and that he

has only to appear before the Board to have it ratified, then the laziness which should prevent his getting up and going to receive it would certainly be vicious. In this case the factor which determines the innocence or vice of the course pursued, is the degree of *uncertainty or certainty of the disadvantage* incurred by immediate indulgence.

Lastly, let us suppose that the appointment for which he has applied is one which is at the moment actually less advantageous than that which he at present holds; but that it offers him a better position at the end of twenty years than he can hope to attain to if he remains in his present situation. He will have, if he accepts the new position, to get up an hour earlier every morning than he is accustomed to do. On the first morning on which the demand is made upon him he determines that the price paid for so remote an advantage is too great; he lies in bed and lets the appointment go by default. If his conduct is vicious, it is so in but trifling degree, and the vice is but trifling because of the *remoteness of the future benefit* which he forfeits. But if the improved position were to become his immediately upon his acceptance of the appointment, then his self-indulgence would undoubtedly be vicious; and, furthermore, if the improvement were to be very great, the self-indulgence would be vicious to the point of insanity.

Hence it appears that the difference between simple vice and insane vice is a difference in degree only, and depends upon the gravity of the difference between the benefit secured and the benefit forgone by the act; the gravity including the three factors of magnitude, certainty, and proximity.

Regarded from this point of view, the reason of the difference of opinion that is so often shown as to individual cases is immediately apparent. While all would be agreed with respect to the extreme cases at the ends of the scale, there will always be differences of opinion as to those intermediate cases in which the gravity of the difference, upon which the judgment depends, is variously estimated by the various idiosyncrasies of the observers.

Such a criterion is unsatisfactory. It is desirable to have a test in which the personal variation is eliminated, or at least minimised; and for such a test it is necessary to have recourse to more fundamental principles. Insanity has been defined by the writer (*Sanity and Insanity*) as defect or disorder of the process of adjustment of self to circumstances, and as comprising four factors of disorder—disorder of conduct, of mind, and of metabolism, all of which are dependent on disorder of the highest regions of the nervous system. In any case in which there is a doubt as to the existence of insanity, the test to be applied is whether this disorder of the process of adjustment be or be not present. If it be, the subject of the inquiry is insane; if it be not, he is sane.

It appears, from what has gone before, that insanity is related to vicious conduct in two distinct ways. When a general paralytic, with an income of say £500 a year, orders enlargement of his house and grounds that would cost £1000, the extravagance is due to no wilful disregard of

the difference between the benefit gained and the benefit forfeited, but to the obscuration of the difference. He is unable to perceive that the amount that he proposes to spend is utterly disproportionate to his means, and that its expenditure must land him in bankruptcy. His notion of his own wealth is such that to him the expenditure of that sum does not appear to entail any future disadvantage, and consequently the definition of vice does not apply. So with the imbecile who spends the major portion of his time in the practice of masturbation. He does not in the least recognise that the instant indulgence of his desire entails upon him any future disadvantage. He does not deliberately choose immediate indulgence at the known cost of future detriment; he is ignorant of the future detriment, and is unable to make the comparison. Such cases of insane imprudence are outside the category of vice.

The second way (strictly speaking, the only way) in which insanity is related to vice, is in the weakening, not of the perception of the difference between the benefit and the disadvantage of immediate indulgence, but of the power of giving effect to the perception when made; of the power of postponing the immediate gratification for the sake of future good. How much of this moral weakness is due in any individual case to original congenital defect; how much to the influence of vicious training, and the fostering of habits of self-indulgence; and how much to the deteriorating effect of insanity, it is never possible to determine. This, however, must be recognised, that this power of forgoing immediate indulgence, for the sake of greater future good, is one which bears no fixed relation to the qualities that are more strictly intellectual: it is often present in high degree in persons who in other respects are stupid; it is often lacking in those who possess brilliant abilities in other directions. Finally, it must be recognised formally, as it is in practice recognised, that a great defect of this quality alone, unaccompanied by any other conspicuous or discoverable defect in mind or conduct, of itself constitutes insanity.

We may now take in turn the commoner forms of vice, and apply to them the principles that we have endeavoured to establish; examining, as we proceed, the relation to insanity of the various manifestations of each form. The great majority of insane persons are lacking in industry. Many are too deficient in energy to be capable of continuous exertion. Many are too deficient in intelligence to be capable of useful occupation. But of those who have both sufficient energy and sufficient intelligence to do useful work, many are incurably idle. Young, vigorous, and of good intelligence, they pass their whole existence without ever doing a useful act. They have plenty of energy for the playing of games, and pass the greater part of their time in recreations; but so utterly idle are they, so incapable of any exertion that is not itself pleasurable, that they will even forgo their favourite recreation rather than take the trouble to fetch the necessary appliances. This chess player will not play if he has to get out the men and set them up for himself. That billiard player will neither take the cover off the table nor the balls out of the pockets. This other, who plays quoits or croquet, must have his

appliances brought to him, for he will rather sit idle than go to fetch them. I am now treating of lunatics with positive delusions, certifiable and certified; the subjects of intellectual disorder, as well as of the moral defect here dwelt with. But the same defect is common in persons who exhibit no evidence of intellectual disorder; here is a large class of persons who are often of acute and quick intelligence, who have no evident delusion; who in general ability are equal to the average; who have often abundant energy, and are of an active, bustling disposition; who are always busy, and yet utterly devoid of industry. For by industry we mean steady persistence in a continuous employment, in spite of monotony and distastefulness; an employment that is followed, at the cost of present gratification, for the sake of the future benefit to be derived from it. Of such self-sacrifice the persons under consideration are incapable. They are always busy, but their activity is a recreative activity, in the sense that it is always one which is congenial to them, and from which they derive immediate gratification. Upon no other terms will they exert themselves. As soon as they tire of what they are doing; as soon as their occupation ceases to be in itself grateful and attractive, it is relinquished for something else, which in its turn is abandoned as soon as it becomes tedious. Such people form a well-characterised class of human beings, and their characteristics are as follows:—they are clever; they readily acquire accomplishments which need no great application for their mastery; and, agreeably to the recreative character of their occupations, their natures are particularly well developed on the artistic side. They paint, they draw, they play and sing, they write verses, they make various pretty things with easy dexterity. Their lack of industry prevents them from ever attaining mastery of the technique of any art. They exhibit considerable artistic taste and feeling, but they are always amateurs. Their productions, relatively good though they may be for amateurs, are never really good. Before they can be commended, allowance must always be made for this and that. So with games and sports, to which they devote a disproportionate amount of time, they are often proficient, but they are never excellent. With the vice of busy idleness they exhibit other vices; the same inability to forgo the enjoyment of the moment at the cost of future advantage exhibits itself in other acts. They are nearly always spendthrifts; they are usually drunkards; they are often sexually dissolute. But, next to their lack of industry, their most conspicuous quality is their incurable mendacity; if in other arts they never rise above the status of amateurs, as liars they take professional rank. Their readiness, their resource, their promptitude, the elaborate circumstantiality of their lies are astonishing. The copiousness and unimpeachable efficacy of their excuses for failing to do what they have undertaken to do, would convince any one who had had no previous experience of their capability in this direction. Withal they are excellent company, pleasant companions, good-natured, easy-going, and urbane. They have but one peculiarity which appears to indicate actual disorder of mind; their self-conceit is not only inordinate, but remains un-

diminished in spite of their repeated failures in the most important affairs of life. The normal effect of failure, especially in important affairs, and more especially in the most important matter of gaining a livelihood and administering the means gained, is to depress; it produces dejection, diffidence, lack of self-confidence, and of self-reliance: but the people here described are continually failing; their lives are one long record of failure; they are turned out of employment after employment; they see themselves fall immeasurably behind those who are admittedly inferior to themselves in cleverness; they are always in debt, and always sinking deeper into debt. The means that they possess, they cannot administer with ordinary judgment and prudence; they take no thought for the morrow; they will starve upon an income on which most men could live in comfort. And yet they are not only cheery and content, but their confidence in their own powers, in their business aptitude and general superiority to other people, remains undiminished. Such unwarrantable elation is clearly abnormal, and the grounds upon which it rests are abnormal. They account to others for their failures by a series of elaborate lies. They find the cause of their repeated dismissal from employments, of the failures of all their undertakings, not in their own shortcomings, but in the bad faith, the jealousy, the dishonesty, the caprice of others; or in the occurrence of a series of extraordinary and unforeseeable accidents; or in some mysterious and incapacitating malady of which no other evidence is forthcoming. These are the ways in which they account to others for their ill-success in life, and by such explanations they not only attempt to deceive others, but they appear really to deceive themselves, and to offer these explanations in good faith and sincerity.

Such characters are common enough, both in real life and in fiction. Their great prototype is Falstaff; but there are few families without one representative of the class, and scarcely an individual who does not number one of them among his acquaintances. The proportion of the several ingredients varies in different cases, but, in various mixture, the combination of idleness and other vice with cleverness, especially in art, with mendacity, conceit, and incapability in the serious affairs of life, is very common. Are such persons to be regarded as merely vicious, or does their vice depend upon insanity? Are they merely bad, or are they bad because they are mad?

It would be easy, and it would not be altogether inaccurate, to evade the question by saying that they are upon the border line; and, if we look merely to the degree in which conduct is vicious, this is the best answer that can be given. If the difference between simple vice and insane vice is a difference of degree only, then the decision of this question must depend upon the degree in which the power of forgoing immediate indulgence is wanting. This degree varies very much in cases of this class. In all it is defective; in some it is so extremely defective that a verdict of insanity would be given without hesitation. Others again would be looked upon as cases of simple vice. No definite line can be drawn. We must have recourse to more fundamental principles for a

solution of the problem. Insanity has been already defined as defect or disorder of the process of adjustment of self to circumstances, and when the self is unadjusted to the circumstances, the test of insanity is the determination whether the fault be in the self, or in the circumstances, or in the process of adjustment of the one to the other.

If we pass in review the qualities that have been described as characteristic of the persons in question, we cannot help being struck by their similarity to the qualities of uncivilised man. The fundamental defect in their nature, the incapacity for steady, continuous, persistent industry, is eminently and emphatically the defect in which the savage is most conspicuously inferior to civilised man. The other qualities which are defective in them are defective in the savage: those which they possess, they possess in common with him. In their shallow cleverness; in their manual dexterity; in their addiction to crude artistic performances; in their fondness for sport; in their sedulous care of their personal appearance; in that colossal mendacity which indicates, not so much a disregard of truth as a want of perception of it; in their personal conceit and vanity, they proclaim aloud their kinship to the savage. Two other qualities only are needed to complete the parallel; and neither is wanting. The lack of intelligent foresight, which renders the life of the savage an alternation of orgies of gluttony with intervals of starvation, is paralleled by the equal lack of the same quality which his modern representative exhibits when he squanders upon luxuries in a fortnight the means which, if properly husbanded, would have kept him from penury during the remainder of the half-year. And the complement and obverse of this lack of foresight, that forgetfulness of past distress which deprives the savage of his incentive to provide for the future, not only performs the same office for the class of men here dealt with, but prevents them from experiencing that normal and proper depression and loss of self-esteem which these repeated failures ought to produce. Even the impulsive ferocity of the one is represented by the short-lived outbreaks of anger in the other. In all essential respects, the person whose character has been sketched is a reproduction, at a later date, of the qualities of his remoter ancestors. He "throws back" to his forefathers. He is an example of atavism, of reversion. As a civilised man he is a failure; but he is a very fair savage.

If this be so—if this is the true explanation of the peculiarities of character of this class of vicious person—does it help us towards a solution of the problem that we are investigating? Does the recognition of the tadpole among frogs, of the jackal in the pack of hounds, of the savage in broadcloth, help us in determining whether this primitive being among his more advanced congeners is to be regarded as sane or as insane? If the criterion of insanity here adopted be accepted as a valid criterion, then this view of his nature not only helps us to a conclusion, but also solves the problem. He is unadjusted to his surroundings, it is true; but this unadjustment is due to no disorder in the process making the adjustment; it is due to the fact that he finds himself in

surroundings for which he is unfitted, and for adjustment to which he does not possess the means. So the tadpole which is lying on the bank is unadjusted to its surroundings. It is incapable of locomotion. It breathes with difficulty. But this unadjustment is due to no disorder of the process of adjustment on the part of the tadpole; it is due to the fact that it finds itself in circumstances for which it is unfitted, and for adjustment to which it does not possess the means. So long as it remains in this unnatural position it remains unadjusted; but put it back into the water—provide it with suitable surroundings—and, by swimming away, it instantly proves that to these surroundings it can duly adjust itself. The civilised savage cannot be so dealt with; there is no pond of savagery to which he can be restored. Or, if the attempt be made, as, with some half recognition of his true nature, it often has been made, to find such a pond in the backwoods, the prairies or the hinterland of some colony, it is commonly found that his possession of the nature of the savage fails to compensate his lack of the training and arts of the savage. Not only has the tadpole failed to develop his legs, but his tail has shrunk to uselessness. This then is his position: he is out of adjustment to his circumstances, moreover there are no circumstances to which, if left to himself, he can adjust himself. The unadjustment is due, not to disorder of the process of adjustment, but to defect of the process. He is as wanting in the ability to conserve his own life by his own efforts as is the imbecile who cannot be taught the difference between a shilling and a farthing. His defect is not of the same nature, it is true; it is not an inability to perceive the true relations among simple phenomena; it is an inability to forgo immediate indulgence for the sake of greater future benefit: and if we regard this ability as the foundation of morality, he may be classed with scientific precision as a moral imbecile. As the imbecile, with patience and with labour, may be educated to understand some of the simpler relations among phenomena, so the moral imbecile may be educated to exercise some degree of self-restraint; but as no amount of education can give to the former a normal amount of intelligence, so no amount of pains can make the latter normally industrious or thrifty. He remains with his congenital defect, and his life provides its own punishment.

Other vices besides that of idleness are commonly indulged in by insane persons. Other vices besides that of idleness, when they are pushed to excess, raise the question whether they should be considered as degradation of conduct only, or as degradation the result of disorder; whether those who practise them should be regarded merely as vicious, or whether they should be considered insane.

Gluttony is a very common vice among insane people. The greedy eyes with which they follow the food as it is brought to them; the wolfish ravenousness with which they throw themselves upon it; the startling rapidity with which they bolt it; and the enormous quantities that they gorge at a sitting, are often revolting to a sane onlooker. But, although gluttony is the commonest accompaniment of insanity, its

existence in an otherwise sane person does not raise a suspicion of insanity, perhaps because it is never seen in sane persons in such great excess.

The same incapability of restraint that is a part of insanity, and that permits the manifestation of other vices, very commonly allows of drunkenness also. A large proportion of the chronic insane are preserved from habitual drunkenness by being deprived of the opportunity of getting drink; if they do gain access to drink, they forthwith take advantage of the opportunity to get drunk. On the other hand, there is a very large number of drunkards—more or less habitual drunkards—with regard to whom the question of insanity, apart from the effect of drink, never arises: it is recognised on all hands that their drunken habits are vicious, and vicious only. Again, there is a third class whose sanity is called in question because of their drunkenness, because of the persistency with which they get drunk in spite of the strongest inducements to remain sober; and between the last two classes there is a continuous series of cases, from unquestionably sane vice at one end to unquestionably insane vice at the other.

Drunkards may be divided into three fairly well characterised groups. Those of the first group may be termed ordinary drunkards, and are persons whose drunkenness is so little abnormal that it is scarcely even a vice. In this group would be included our three-bottle ancestors of the last century, who considered it unseemly and unmanly to go sober to bed. They scarcely recognised any disadvantage from their indulgence, and hence their indulgence was scarcely a vice. It would include also the labourer or artisan who gets drunk regularly every Saturday evening and Sunday, and yet goes sober to work on Monday or Tuesday morning. These men recognise no disadvantage from their action; nay, it is doubtful whether they suffer any appreciable disadvantage. They gain the indulgence in what is to them the maximum of luxury, and they lose nothing; or, if they do now and then lose a day's work, or incur a fine at the police court, they look upon such incidents as legitimate expenditure for the sake of equivalent gain.

The second class includes the periodical or paroxysmal drunkards, whose conduct is of very different character. The characteristics of such persons are as follows:—They come of a stock that is of unsound nervous constitution. Often they are of insane parentage. Often one of the parents has exhibited the same vice in the same form. Often their near relations suffer from other nervous disorders. Quite early in life—at, or soon after, adolescence—they exhibit the tendency to drink to excess, and the tendency shows a definite periodicity. For a month or six weeks, for three or six months, or even for a year or more, they live perfectly sober lives. Then, more or less suddenly, there comes upon them a craving for drink, a craving so intense and overmastering that it demands gratification at any and every cost. Not only is it unrestrained by any consideration of bodily deterioration, of future poverty, of immediate disgrace and loss of social standing; but it is wholly unre-

strained and unaffected even by the certainty of immediate ruin or the assured prospect of speedy death. "It is of no use advising me," said one of the subjects of this craving, himself a medical man, "I know as well as you do that I am drinking myself to death. My father drank himself to death, and so did my grandfather, and I am doing the same. I cannot help myself." He spoke the truth. In two months he was dead.

Another medical man, whose outbreaks occurred pretty regularly about every four months, would seek, when he felt them coming on, the shelter and restraint of a private asylum, in which he could have no access to drink; and, when the craving had passed away, he would return to his practice: this he did many years in succession. As life advances, the tendency is for the outbreaks to recur at shorter intervals, until they become well-nigh, or quite, continuous; and then the end is near. In other cases no such aggravation of the habit takes place. After one of the outbreaks, the subject of them loses the craving more or less completely until the next is due; commonly, at any rate in the early stage of his career, he is a perfectly sober man in the intervals between his outbreaks. If he have yielded to the craving, and drunk to excess, it has usually been to very great excess, and the outbreak may, and often does, culminate in an attack of delirium tremens. In any case, when the craving dies away and he ceases to drink, he suffers for some time from the effects of his debauch. But the remarkable thing about these attacks is this: that even if he have taken precautions against himself; even if he have placed himself under control and provided that his craving shall not be indulged, but that he shall be compulsorily abstinent during the whole duration of the craving, even then, the suffering during the attack, and the prostration as it passes away, are little, if any, less severe than if he had yielded to it. In many cases the periodicity is not regular, in some it is not well marked; but there are no cases of this class in which a more or less pronounced periodicity cannot be traced.

Is such conduct simple vice or insane vice? What is the gravity of the difference between the disadvantage incurred, and the advantage gained? In this case the difference is extremely grave. The disadvantages incurred—social degradation, pecuniary loss, injury of health even fatal in degree—are as great as can well be imagined. Not only are they great, but they are certain. The repeated indulgence in such debauches must inevitably result in them. Not only are they great and certain, but they are in some degree imminent. Every successive debauch entails at once some further loss of respect, some further pecuniary damage, some further appreciable injury to health. So far as the disadvantages are concerned, they could scarcely be increased. But what of the advantage that the paroxysmal drunkard gains by his indulgence? This is a matter that we cannot accurately estimate. He gains the alleviation of a degree of misery that we cannot gauge, and that we have no means of knowing. We can only guess at its intensity by its results. So that in this case we cannot well apply our test, and we must, as in a previous case, depend

upon more general considerations for the solution of the problem. Fortunately such considerations are not wanting, and are not difficult to apply. Insanity is a fourfold disorder. It is known to us by disorder of conduct, which is the outward manifestation of disorder of mind. Both of these disorders are dependent on disorder of the highest nerve regions; and a further consequence of this last disorder is some derangement of the process of metabolism throughout the body. In the paroxysmal drunkard, none of the factors which together constitute insanity is wanting. The disorder of conduct is patent. Disorder of mind is clearly evidenced by the intense morbid craving for drink; and disorder of metabolism is proved by the suffering, misery, and prostration that accompany and result from the attack. The picture is complete, the insanity unquestionable. Or let us take a cognate test. Insanity is failure of adjustment of self to surroundings, due to defect or disorder neither of self nor of surroundings, but of the process of adjustment of the one to the other. In this case the defect is clearly not in the surroundings. There is nothing in the circumstances of the individual to lead him to destroy himself with drink. Neither is it in the self. What he does, he does with his eyes open, with full knowledge of the speedy and complete destruction which he is incurring; yet, in clear view of the consequences, he deliberately chooses that course which is worst for him. This is disorder of the process of adjustment, and is insanity. The man who places himself in an asylum when he feels the craving coming on, procures, while he is yet sane, admission into an environment which is artificially adjusted to him, so that the disorder of the process of adjustment, when it occurs, leads to no ill consequences.

Besides the mere self-indulgent toper and the paroxysmal drunkard, there is a third variety of drunkard. This is the man who is drunk in season and out of season; who loses no opportunity of getting drunk; who, by reason of his drunkenness, loses his employment and means of livelihood, forfeits the respect of his fellows, and lands himself at last in the workhouse or the lunatic asylum. In what position does he stand with regard to sanity? Such cases are divisible into two distinct groups, and the descriptions that follow apply not only to drunkards but to the slaves of opium, morphia, and other drugs.

The first group includes men who take drink for the pleasure which it affords them. They begin either at the invitation of others or from curiosity, and finding a definite pleasure from the effect of the alcohol, they continue to take it, regardless of its ill effects, for the sake of the pleasure that it affords. They are not ignorant of its evil consequences, but they are for the most part men of fine physique. For a long time they feel no ill effects, and the remoteness of the ill consequence nullifies its deterrent effect. Deficient in self-control, they fail to forgo the immediate indulgence for the sake of avoiding the future disadvantages that result from it. They are, in the beginning at any rate, simply vicious. After long-continued indulgence a new motive is introduced, and they enter the ranks of the following class.

Habitual drunkards of the second class stand upon a different footing. Often they begin as drunkards of the preceding class. Sometimes they were originally paroxysmal drunkards, whose paroxysms have become more frequent, less excessive, and of longer duration, until they have become practically continuous, with or without remissions. Whatever the origin of the habit, its characteristics when fully developed are as follows:—The unfortunate subjects of these habits suffer very severely from depression and incapacity, both mental and physical. The tide of nervous energy in them is always at the ebb. They are not only wretched and incapable in mind, but they are feeble and incapable in body. They cannot exert themselves, they cannot study, they cannot attend to business, they cannot find interest in any occupation; nor, if they could summon up interest, have they enough energy to engage in its pursuit. Games, recreations, and amusements are almost as impossible to them as work. They have neither the mental nor the bodily energy to take part in them. They lie late in bed from sheer want of the physical energy to get out and dress. They cannot even walk more than a few hundred yards, and that only at a snail's pace. With this feebleness and incapacity they often exhibit a weak restlessness, which adds at once to their fatigue and to their misery, and renders them unfit to go into society. Their condition is almost as pitiable as the condition of a man can be. It is so wretched that they are ready to grasp at any means that will afford them relief; and such a means is ready to their hand. A dose of their habitual stimulant transforms them altogether. They take a draught of alcohol or of morphia, or whatever it may be, and in a quarter of an hour they are wholly different beings. Their misery passes away like a morning mist before the sun. Their energy returns. Their interest revives. Their muscles are steadied and braced. They become at once lively, bright, animated, energetic and capable. They can transact business without effort and with success. They can study with profit. They can hold their own in business, in society, in conversation, in work and in play. The man who, but a quarter of an hour ago, sat writhing and trembling in his easy-chair, wringing his hands and weeping at his own incapacity, can now get up and take a ten-mile walk, laughing and bantering with his companions; can go about his business with energy; can write his letters with a clear head and a firm hand; is once more capable to transact all the affairs of life. When such are its effects, with such a motive for his action, is it any wonder that he has recourse to his drug? Granted that he knows the gradual demoralisation and destruction that the drug will ultimately produce, granted that he feels that each successive indulgence rivets still tighter the chain which binds him, that he finds a larger and a still larger dose is necessary to give him relief, that he sees the imperious necessity, and has the fixed intention to tear himself out of the habit, yet is it not certain that each occasion on which the relinquishment is attempted will seem an inappropriate occasion, and that it will be found necessary to take just one more dose now, and to postpone the effort to a more convenient season? He

has his daily business to attend to. Upon his attention to it depends his livelihood. Without his daily quantum he cannot attend to his business, and therefore the daily quantum is taken. If he has been obliged to give up his business, still, every day brings him some task that he cannot accomplish, some burden that he cannot bear without recourse to his crutch; and it seems essential that this task at any rate must be accomplished, this burden cannot be shirked. At length, perhaps, a time comes when no excuse for further indulgence presents itself, or when the horror of the slavery to which he has reduced himself compels an effort at abstention, and the effort is made. Now, not till now, he realises the full power of the thraldom in which he lives. Deep as was his depression, wretched as was his state, when the time for his customary dose arrived, the lapse of every subsequent hour increases his misery with such frightful rapidity and to such an appalling degree that the utmost limit of human endurance is soon reached. No human being has ever been endowed with the degree of resolution and strength of character that are needed to escape unaided from the tyranny of such a habit, and the wretched sufferer is bereft of his last hope of ever voluntarily relinquishing the use of the drug.

Are such persons sane or insane? Before the drug has structurally damaged the nervous tissue, their minds are quite free from any trace of intellectual defect or disorder. They suffer from depression, it is true, but the depression is no more than is justified by the circumstances of their unhappy bodily condition. Whatever disorder they exhibit is exhibited in connection with the indulgence in their customary drug, and in that only. In all other respects their conduct, apart from the effects of the drug, is normal. The problem before us is, — does indulgence, of the kind and degree above described, of itself constitute insanity; and, if so, upon what ground is it so characterised? These questions are not infrequently argued by the victims of the habit themselves, and argued very acutely. "It is preposterous," such a man will say, "to tell me that I am insane. My mind is as clear as a man's mind can be. I have no trace of delusion. I do not even deceive myself as to the consequences of my own conduct. I see as clearly as you do what it will bring me to. My intellect is absolutely unclouded." And because his intellect is unclouded he considers that the charge of insanity is baseless. It is then necessary to point out to him that a man may be insane with disorder of feeling, without any more intellectual disorder than he admits in himself, but again his answer is ready. "My feelings are not normal, it is true," he will say, "but neither are my circumstances normal. I am depressed, but are not my circumstances such as to warrant my depression? Insane disorder of feeling is, you admit, such disorder as is not justified by the circumstances, but what are my circumstances? Here I am in bondage to this horrible habit. If I do not yield to it, I am in misery. If I do yield to it, I know that I am digging my own grave. Is not that enough to justify my depression?" Again we must admit the justice of his argument, but we must point out to him

that his admission is a damaging one. He admits that he sees clearly the consequences of his conduct. He knows that he is digging the grave alike of his fortune, his reputation, and his health; and yet in this course of conduct he persists. Is it not insanity for a man to persist in conduct which leads to such a termination? Once more his answer is ready. "I admit," he argues, "that it is as you say. I do see clearly the result of the course that I am pursuing. I know, as well as you can tell me, the ruin and destruction that await me if I continue in this habit; and yet I cannot abandon it. I have not the resolution. My way to safety lies through a period of agony too intense for human endurance. Anything, even immediate death, would be preferable. You yourself admit that the degree of resolution and strength of character that is required for the relinquishment of the drug is beyond the capacity of human nature to attain; and am I to be considered insane because I lack a superhuman quality?"

The argument is cogent, but it contains a fallacy. In spite of the clearness of his intellect and the cogency of his reasoning, the indulgence in the drug is insane conduct; and so far as that department of conduct is concerned, the man is insane. It is evident that the difficulty of resisting a desire is not a matter that a bystander can measure. It is a factor which cannot be estimated. Whether a man could or could not have resisted a desire we can never tell; all that we can observe is whether, as a fact, he does or does not act in accordance with it. The test of insanity is not the relative strength of one motive or another in the mind of the actor, but whether his conduct is or is not adjusted to his circumstances; and, if it be not, whether the maladjustment is corrigible. If it be corrigible, the process of adjustment is normal, and he is sane; if it be incorrigible, the process of adjustment is disordered, and disorder of the process of adjusting self to circumstances is insanity. What are the facts in the case of the so-called dipsomaniac, or morphiomaniac? That his conduct is unadjusted to his circumstances is manifest. He deliberately and intentionally pursues a course that leads directly certainly and speedily to his own destruction. More complete failure of adjustment there could scarcely be. And the maladjustment is incorrigible. With a full knowledge and a clear view of the inevitable results of his conduct he still pursues it, and pursues it with increasing vigour. With such evidence before us we need not turn aside to investigate the condition of the man's mind, and the relative potency of the motives which prompt him. His conduct is insane; and by conduct, by conduct alone, can insanity be estimated.

The next form of vice that calls for notice is sexual vice, and the forms of sexual vice and their relations to insanity are very various. Its manifestation by the man and by the woman will require separate consideration.

Sexual vice in the man may be divided into that which is normal in form but excessive in amount, and that which is abnormal in form.

What is sexual excess? The expression is common enough, and

there is scarcely a disease or disorder of the nervous system which has not been attributed to it; but no definite meaning has ever been attached to the term, neither is it possible to give to it any exact definition. It is manifest that a repetition of the sexual act which would be moderate at one time of life would be greatly excessive at another; and that what would in one person be excess would in another be moderation. Sexual excess means, in fact, sexual excess; it means indulgence in the sexual act with such frequency as involves subsequent damage to health. Not only cannot this degree of frequency be numerically expressed in any statement that shall be applicable to all men at all periods of life, but it cannot be postulated for any one period, nor for any one man. It is scarcely possible for any individual to know whether at a particular time he is indulging in excess. Doubtless that indulgence which is not due to overmastering desire, but requires whip and spur and artificial stimulus to make it possible, is excessive; but it cannot be said that the converse is always true, and that the indulgence which is prompted by internal craving only is never excessive. That amount of indulgence which involves future deterioration of health, strength and energy, is of course excessive; but to render such a degree of indulgence not only excessive but vicious, it is necessary that the actor should know at the time of the indulgence of the ill consequences of his act; and such knowledge is rarely attainable, except in the cases, already referred to, in which artificial stimulus has to be used to make the act possible.

Of sexual practices that are abnormal in form many varieties have been detailed, with unnecessary minuteness, by certain writers. Of these we need only mention the most frequent. By very far the commonest of abnormal sexual practices is that of masturbation. It is, no doubt, extremely common, and probably the great majority of the male population indulge in it to some extent at some time or other of their lives. It is debited with a causal influence in very many cases of insanity; but the evidence upon which this opinion is founded is far from convincing. That it is an antecedent in the majority of cases of insanity is undeniable; but if it is a fact that it is practised by the majority of the whole male population, its practice by the majority of insane males is absolutely devoid of causal significance. That it is practised by those who subsequently become insane in greater excess than by those who do not, there is no evidence to show. But, allowing that it is so practised by the former class, it does not follow that it has any causal influence. Insanity does not occur in those who are congenitally of sound mental constitution. It does not, like small-pox or malaria, attack indifferently the weak and the strong; it occurs in those only whose mental constitution is originally defective. But when the mental constitution is defective, the defect will, agreeably to the law of evolution, be most pronounced in those qualities which have been latest acquired by the race; and of those qualities the power of self-control and of forgoing immediate indulgence is one. Hence, persons who are prone to become insane are naturally more deficient in self-control than those who are not so prone, and consequently

they are more prone to indulge in masturbation. It is for this reason that masturbation is so commonly an antecedent of insanity. That the masturbation has a contributory influence in bringing about the subsequent breakdown is likely, but the amount of this influence has probably been greatly exaggerated.

When once insanity is established, and a further diminution of self-control has taken place, indulgence in masturbation, as in other vices, becomes more free. Among insane males the practice is very common indeed—is, in fact, the rule,—and is often indulged in to very great excess. To such an extent is it carried in some cases that its very excess constitutes of itself evidence of insanity. The wretched youths who cannot keep their hands away from their genitals, who, undeterred by remonstrance, publicity, and restraint, practise this vice during almost the whole of their waking hours, exhibit a degree of vice that is of itself insane.

In young lads, about the time of puberty and adolescence, the occasional indulgence in this vice is very common, and is scarcely to be considered abnormal. The same may be said of those cases in which it is occasionally indulged in by those who are at a time of life when the sexual passion is naturally strong, and who have no opportunity for its normal gratification. But the case is otherwise when it is practised by married men who have free access to their wives, or by old men whose sexual powers have died away and been in abeyance for years. In such cases the departure from the normal is so wide as of itself to raise the question of insanity, even if it be not enough to establish the existence of it.

Beyond the practice that we have been considering, there is a still graver departure from the normal. There is a certain small number of men who are abnormally constituted in such wise that their sexual desires are directed towards individuals of the same sex, with members of which they obtain gratification by some contact or some pseudo-sexual proceeding. Such a disorder is clearly of the nature of insanity. It is a disorder of the process of adjustment of self to surroundings. It exists, however, in various degrees. Some there are who experience this unnatural perversion of desire from the time when sexual desire first makes itself felt. They never at any time experience a normal passion for the opposite sex. It has been said that they have the desire of a woman in the body of a man, but this is not quite an accurate statement. They have a desire towards the male sex, it is true, but this is of the nature of male and not of female desire. It has the aggressiveness of the male. They do not wait to be sought, to be courted; nor do they practise the passive allurements of the female. Their desire is the male desire for sexual proceedings, and with sexual proceedings of some sort they obtain gratification. Their yearning does not, as that of the female does, extend beyond the sexual act to the possession of offspring. They are males in every respect except in the object of their desire.

Abnormal as such persons are, they are exceeded in abnormality by

others who exhibit a second variety of the disorder. These are men who have lived a long life without exhibiting, even to themselves, any sign of perverted feeling. They have married, have lived normal sexual lives, have brought up families of children, have grown old, and have experienced the natural diminution, and at length the extinction, of sexual desire that comes with advancing years. Their conduct throughout a long life has been normal; but in old age, when they have long been grandfathers, they are troubled by a recrudescence of the sexual passion which has been obsolete for years; and their trouble is increased to dismay when they discover that, in this recrudescence, the desire is not, as in their younger days, normal in its object, but is directed towards their own sex. Whatever doubt may exist as to the sanity of persons of the previous class, there can be none as to the insanity of these. The double abnormality places it beyond doubt. The recrudescence of very strong and urgent sexual desire in old age is abnormal. The direction of sexual desire towards the wrong sex is abnormal. The simultaneous appearance of these two disorders in an individual who, during a long lifetime, had never before exhibited either of them is not explicable by any hypothesis of mere vice. It indicates insanity beyond doubt. Cases of this description not infrequently come before courts of justice, and, when they do, we witness the gruesome spectacle of an old, and, until now, an honoured citizen, being lectured from the bench for conduct which was at least as much the outcome of insanity, and was not more damaging to society, than that of the girl who has caused the death of her new-born bastard, whom the jury will not convict, and who leaves the court amid the sympathy of the spectators. Little does the judge know, when he inflicts some draconic sentence upon the trembling wretch before him, with what truth he might say to himself, "There, but for some mysterious difference in bodily organisation, stands Mr. Justice Shallow."

In women, sexual vice has to be judged by a standard different from that which applies to men. The mere indulgence in normal sexual intercourse by unmarried men is scarcely vicious in the sense in which the term vice is used in this article. It does not entail future disadvantage, or if it do, the disadvantage is, as a rule, so trifling as not to be incommensurate with the advantage derived from the immediate indulgence. With women it is far otherwise. The social penalty attaching to such an indiscretion on her part is extremely severe. The chance of evading it is small, and it follows speedily upon the offence. Hence, in her, sexual indulgence before marriage is notably vicious.

Considering how slight is the impulse in the great majority of women towards sexual indulgence as such, and having regard to the severity of the penalty which it incurs, some explanation is required of the fact that it is ever incurred at all, save in those exceptional cases in which the impulse towards it is of very exceptional intensity, or in those in which it is submitted to under the stress of want. The

explanation is doubtless that which has been recently suggested by a thoughtful writer of fiction. Though the impulse towards sexual intercourse is in the majority of women but slight, the craving of every woman for the individual affection of a man is intense; and there is no doubt that in the majority of cases in which a previously modest woman yields to the importunities of her lover, she does so in the assured hope that by so yielding she will secure the perpetuity of his affections. The result is, as a rule, the opposite of that for which she hopes; but in this, as in other departments of conduct, the continual disappointment of others fails to diminish hope.

The majority of habitually immoral women—those who rank as professional prostitutes—are the counterpart in the female sex of those reversional savages who have been described in a previous section. In them the instinct of chastity is undeveloped. They are the representatives in modern life of the women of those tribes who possess their women in common; and, conformably, they have other qualities characteristic of the savage. Chief of these is the incapacity, which I have already dwelt upon, for industrious labour. Prostitutes are invariably idle. Even in workhouses and in prisons, whither so many of them find their way, the difficulty of getting them to work industriously is very great. Like savages, they are capable of very strenuous effort; but their efforts are short-lived. They are incapable of steady, continuous exertion. And they exhibit other forms of vice, showing that, generally, their capacity of self-constraint is undeveloped. They are usually drunkards; they are almost always spendthrifts. However splendid their income, and it is often very large, they make no provision for the future. They are thoroughly immoral. Their sexual immorality arises usually from no excessive development of sexual desire. It is not that the impulse towards lust is greater in them than in modest women, but the restraint of modesty is less. Incapable of continuous industry, they are yet under the necessity of making a livelihood, and, in the absence of the restraint of modesty, they turn to that occupation in which a livelihood can be made without industry.

Of such women the great majority of the class of prostitutes is composed. But there is a small minority of unchaste women who are unchaste, not so much from lack of the ordinary instinct of modesty, as from the overmastering intensity of their sexual desire, which breaks down the restraint of modesty, however powerful that may be. Of such excessive desire there are many degrees. There is the woman who deliberately sets herself to seduce every man with whom she is brought into frequent association, but who still pays homage to public opinion by the secrecy that she observes in her amours, and by the outward decency of her life. There is the woman for whom the attentions of her husband are not enough, who invites men into her husband's house, and carries on her amours with reckless indiscretion. There is the woman who goes upon the streets from no need of earning her livelihood, but solely to gratify her passion; and so on in continuous series to the furious

nymphomaniac who embraces every man she can get at, with shameless disregard of time, place, circumstance, and spectators.

There is a considerable minority of prostitutes which consists of women who have been brought up in the slums; who have never from earliest infancy known what it is to occupy a bedroom except in common with men; who began sexual intercourse at an age at which they were scarcely aware of its meaning, and whose prostitution is more a matter of circumstance, training, and what may be called accident, than of deliberate choice. To such women the term "unfortunate" may be applied with a more accurate significance than commonly attaches to it. They grow up so inevitably into their course of life that in them it can scarcely be termed vicious, in the limited sense in which that word is used here.

To the ordinary prostitute, who has taken to the streets from lack of morality in all its forms—lack of industry, lack of chastity, lack of self-control generally—much the same reasoning will apply that has already been applied to the case of the male idler. She is a reversion; a representative in modern life of a type that has for the most part been superseded by a better. She "throws back" to her savage ancestors. By common consent such women are regarded as vicious, and as vicious only. They are the very embodiment and example of vice as ordinarily understood. But if the term is accepted in the somewhat limited and special sense in which I have used it, it becomes a question whether the course of conduct that they exhibit is not something more than vicious. They are in truth congenitally deficient in that power of forgoing immediate indulgence which is the foundation of morality. They are moral imbeciles. That their conduct depends upon mental defect, and partakes of the character of insanity, is evidenced by the application of the test by which insanity is unfailingly identified. They are incorrigible. However great, however speedy, however certain the advantage that they might obtain by forgoing immediate indulgence, the power of self-control is denied to them. They must have their indulgence at whatever cost.

The third class of unchaste women—those whose unchastity is due to excess of the craving for sexual intercourse—are still more clearly of abnormal mind. Reluctant as we may be to regard as insane that lecherous disposition which, while maintaining an outward show of propriety, seeks to allure to sexual intercourse any and every man with whom opportunity offers, yet we cannot fail to recognise in this disposition a lesser degree of that maniacal fury of desire which can be restrained only by force, and which is universally admitted to be insane. While we may not regard the slightly pronounced cases as technically insane, we must admit that they differ from insanity only as the bud differs from the flower; or, let us say, as the maggot from the blow-fly.

Agreeably with the greatly inferior intensity in women than in men of the craving for sexual intercourse, abnormal modes of gratifying this craving are in the former very much less common than in the latter. While it is probable that the great majority of young males practise

masturbation at some time or other of their career, the number of girls who do this is probably a very small minority. Indeed, it is beyond doubt that many women live a long married life without ever experiencing the sexual orgasm. While the occasional practice of masturbation by a lad is of little practical significance, the mere fact of a girl being addicted to it stamps her at once as abnormal—as differing to a marked extent from other girls; and although it would be an exaggeration to say that a girl who indulged in the practice should on that account be looked upon as insane, it would be no exaggeration to say that she belonged to the class of persons who are liable to become insane.

Among insane women masturbation is naturally much more common than among the sane; it is, however, very much less common than among insane males. Among the latter the practice is of no special significance with regard to the form of insanity to which they are subject; on the other hand, an insane woman who is addicted to the practice almost always gives evidence in other ways of undue potency of sexual craving. She is either subject to delirium of a sexual character, or in conversation or in conduct she exhibits leanings to sexual activity.

Wrong-doing and insanity.—Wrong-doing has been defined as the seeking of gratification for oneself by means of injuring others. It may be put as the intentional injury of others for the gratification of oneself. Injurious acts which do not satisfy this definition are not wrong; and although all acts which do answer to the definition are *prima facie* wrong, yet not only are there many different degrees of wrongness in such acts, but there are cases also in which their wrongness may be mitigated, minimised, or altogether removed by certain factors in their constitution.

To satisfy the definition the actor must intentionally injure another, and must do so for his own gratification. If either of these conditions fail, the act is not wrong-doing.

An act which injures others is not wrong if the actor does not know that he is causing injury. The child who, while convalescing from scarlet fever and still infectiferous, joins other children at play, and communicates the disease to them, is causing injury to others for its own gratification; but the act is taken out of the category of wrong-doing by the child's ignorance of its ill consequences. If the child's parents are aware that it is an infectifer, and still send it to school, they are guilty of wrong-doing; but if they have no suspicion of the injury that will result, they are innocent, however many children may die in consequence of their act. The man who takes a watch off a tradesman's counter and walks off without paying or intending to pay for it, is in most cases a thief; but if he has taken it in the firm and assured conviction that the watch is his own property, the act is not wrong. Knowledge that an act is injurious is essential to its wrongness.

Neither is an injurious act wrong if it is not done for the gratification of the actor. If I toss a man's coat upon the fire to gratify my dislike of the man by injuring him, the act is wrong; but if I do the same act

with the intention of destroying a garment that I know to be infected with the plague, the act is no longer wrong; and it is deprived of its wrongness by the fact that it is not done for my own gratification. Assault upon a child is *prima facie* wrong; but if the assault is inflicted as a punishment for wrong-doing on the part of the child, and to improve its moral disposition, it is no longer wrong. If I stick a knife into a man, the act is *prima facie* wrong, and if it is done to gratify my anger against the man, the wrong-doing is patent. If the act is the beginning of a surgical operation done for the man's benefit, the wrongness of the act is removed; but if the surgical operation is done not so much for the benefit of the patient as to afford me needed practice, and to enable me to exhibit my skill, the importation of this element of self-gratification into the motive for the act again makes it wrong.

In the cases just cited the injurious act ceases to be wrong because the definition of wrongness is not satisfied. But there are acts in which the definition is completely satisfied, and in which the act is yet not wrong.

If one is endeavouring to injure me, I may inflict upon him such injury as will prevent him from effecting his purpose; and in thus obtaining gratification for myself by the injury of another I shall not be doing wrong. My retaliation must be limited, however, to the extent stated, or my action will be wrong. If he assaults me, I may retaliate by such violence as will prevent him from continuing his action; but when I have stunned him by my counter assault, and so rendered him incapable of carrying out his intention, I shall not be justified in kicking his brains out into the bargain. Nor, if he attempts to rob me, am I justified in robbing him in retaliation. So long only as the injury that I inflict is done for the purpose of preventing a threatened injury to myself, is my action justifiable; and, when the injury is so limited, it may be inflicted for the purpose of gaining gratification to myself without wrong-doing. The attempt to inflict injury is *provocation;* the magnitude of the provocation depends upon the magnitude of the injury that is sought to be inflicted. The attempt to inflict a severe injury justifies a graver retaliation than the attempt to inflict a slight injury. I may kill without blame the man who is endeavouring to kill me; but I may not intentionally kill the man who is trying to pick my pocket. Every excess in the amount of retaliation over that which has been defined as justifiable is wrong, and the greater the excess the greater the wrong.

Provocation is not the only justification for inflicting injury upon others. A woman's dress catches fire, and she seizes a cloak, that does not belong to her, to wrap round her burning clothes and put the fire out; and the cloak is spoilt in the process. She seeks her own advantage by means of injuring the property of another; yet we do not call the act wrong; and upon consideration the reason is apparent: it is because the advantage that she gains is very great in comparison with the injury that she inflicts. In all cases in which the advantage gained is very great in proportion to the injury inflicted, the wrong is minimised or

altogether removed. A man who is perishing of want and in imminent danger of death from starvation, steals a turnip from the field of some wealthy farmer: he gains gratification by means of injuring another; but he does no wrong. Or, if it be formally admitted that he does any wrong at all, his fault is venial, it is regarded without reprobation; and the reason that it is so regarded is because of the immense disproportion between the injury inflicted and the advantage gained; the one is infinitesimal, the other very great, and the disproportion minimises the wrong.

If the disproportion is in the other direction—if the injury inflicted is very great and the advantage gained is but trifling—the wrongness of the act is exaggerated. Says Bacon: "It is the nature of extreme self-lovers, as they will set a house on fire an it were but to roast their eggs." Here the magnitude of the injury, in comparison with the trifling advantage gained by it, makes the act one of great turpitude. Still more infamous was the act of Napoleon Buonaparte in ordering a certain attack to be made upon an enemy: an attack in which several men were killed and more wounded; an attack from which his own troops could reap no possible advantage, but which he ordered for the purpose of showing his mistress what fighting was like. It is more infamous because of the greater disproportion between the advantage gained and the injury inflicted.

So the measure of the magnitude of wrong is the proportion which the injury inflicted bears to the advantage gained. Where the advantage gained is very much the greater, the wrong disappears; where the injury inflicted is very much the greater, the turpitude is maximised.

It is true that the proportion cannot be estimated with exactitude, neither can we indicate any fixed disproportion which we can posit as relieving the actor from the stigma of wrong-doing. Advantage and injury do not admit of being weighed and measured. The man who loses a new pair of boots suffers, other things being equal, a greater injury than does he who loses a worn pair. But if the good pair is one of twenty in the possession of the loser, and the worn pair is the only pair that its owner had, then the loser of the worn pair suffers a greater injury than the loser of the sound pair. The gain of £50 is a huge advantage to one who is struggling with penury; to a millionaire it is nothing: in such cases we can easily apportion the incidence of the advantage, because the difference is great. But where the difference is small, and especially where the factors are many, the estimate cannot be made. We cannot say whether the loss of £5 would be a greater injury to a man of, say, £500 a year, who has a thrifty wife, three children, and is simple in his tastes, than it would be to the man who, with a similar income, has a less thrifty wife, but one child and more expensive habits. Still, the inability to make an exact estimate does not vitiate the doctrine that, when a comparison can be made, the measure of the turpitude of an act is the magnitude of the injury inflicted in comparison with the advantage gained.

There are, therefore, four conditions under which injury to others is not wrong-doing, viz. :—1. When the actor is not aware that his act is injurious. 2. When the act is not done for his own gratification. 3. When the injury inflicted is no more than is enough to prevent a threatened injury to himself. 4. When the advantage that he gains is very great in comparison with the injury that he inflicts. Moreover, the presence of any of these conditions, in any degree, is sufficient to diminish the wrongness of the act, even if the condition be not present in degree sufficient wholly to exonerate the actor.

For the purpose of lessening or removing the wrongness of the act, it makes not the slightest difference whether any one of the foregoing conditions is actually present, or whether the actor mistakenly believes it to be present, or whether his belief in its presence is the result of insane delusion. In either case the act ceases to be wrong.

1. The man who takes another person's watch, believing it to be his own, does no wrong so long as the belief is honest; and the act is equally innocent whether the belief be sane or insane—whether he take the watch off the counter in mistake for his own, which he had left to be repaired, or whether he take it under the delusion that everything in the town, including the watch, is his own property. So if he procures that another person become infected with scarlet fever, the act is innocent if he did not know that the result of it would be to communicate the fever; and it is equally innocent whether this is mere ignorance of the infectiousness of the disease, or whether he is under the delusion that he is the Deity, and can, by a miracle, prevent the infection from being communicated.

2. Or if the actor knows that he is inflicting injury, but does so with no desire to benefit himself, the act is deprived of the quality of wrong-doing, whether the motive be sane or insane. Torquemada, acting under the genuine belief that he was benefiting his victims, was not doing wrong in burning heretics—any more than the lunatic does wrong who kills a man under the delusion that he is assisting him to a new and beatific reincarnation.

3. Provocation also may exonerate a person who inflicts injury from thereby doing wrong. A man may rightly kill another to prevent himself being killed by that other; and the act is still right whether the other was indeed endeavouring to kill him; or whether he mistakenly, but honestly and sanely, believed that the other was so endeavouring; or whether his mistaken and honest belief was the result of a delusion. A burglar or footpad threatens his life, and gets killed; the killing is not wrong. A friend, by way of practical joke, makes up as a burglar or footpad, threatens his life in joke, and gets killed; the killing is not wrong. A man approaches him in the dusk, and he, under the delusion that the wayfarer is a persecutor who has long sought and still seeks to take his life, and who intends to kill him there and then, attacks and kills his supposed persecutor; the killing is still not wrong.

4. The fourth consideration that may remove the nefariousness of an injurious act is the magnitude of the benefit gained by the actor in pro-

portion to the injury that is inflicted. If, in order to enjoy a beautiful view, I trespass on my neighbour's preserves, and disturb his sitting pheasants, I do wrong. But if my chance of preventing a railway accident depends upon my despatching a telegram before a certain hour, and I can only get the telegram off in time by taking a short cut through my neighbour's preserves, I do no wrong, even though I disturb his pheasants. If I am mistaken as to my chance of preventing the accident, but still act upon a *bona fide* conviction, I do no wrong, whether my mistake arose from a sane error or from an insane delusion.

5. In all these cases insanity may exonerate from wrong-doing a person who inflicts injury upon another; but he is exonerated not because he is insane, but because his beliefs, insane though they are, are exonerating in character. We have spoken as if the mind of a person who suffers from insane delusion were in other respects precisely like the mind of a sane person, but it is very important to remember that this is not the case. Not only does he suffer from the particular delusion, but in all matters connected with the delusion he is incapable of estimating facts in their true relations. For instance, he believes, deludedly, that a certain person is torturing him by means of electricity. This belief supplies him with a provocation for injuring his persecutor. According to the principle laid down, the justification extends to such injury only as will prevent the further persecution; but the deluded man is deprived by his insanity of the power of estimating rightly the gravity of the provocation. Such an injury as the persecution, the infliction of horrible tortures upon an unoffending person, by means of fiendish devices, appears to him a justification for the most extreme measures of retaliation, even to the killing of the persecutor. Or a man murders his children in order to save them from dying of starvation; even to his deluded imagination the benefit to be obtained from the act can scarcely appear so overwhelmingly greater than the injury inflicted as to justify the act; but the man's insanity prevents him from recognising the absence of the disproportion.

It is in this way chiefly that insanity exerts its influence in causing injurious and criminal acts; that is, by the obscuration of the true value and relations of facts rather than by the influence of definite delusion. A man sees another asleep by the wayside, and cuts off his head in order to enjoy the astonishment of the victim when he shall awake. There is no such definite delusion here as will justify the act. The justification for the act is in the confusion of mind which prevents the actor from clearly recognising the facts with which he has to deal, and the consequences of his act.

It is to this incomplete appreciation of the character of their acts by insane persons that Mr. Justice Stephen referred when he said that "knowing the act is wrong means nothing more or less than the power of thinking about it the same as a sane man would think about it." It is by the application of this principle that insane persons are often held exempt from punishment for acts which they knew to be wrong. It may very well happen that a man knows that an act is wrong without

knowing how wrong it is. Besides the existence of an exonerating but deluded belief, and the inability to appreciate the true relations of facts, there are other ways in which insanity is connected with wrong-doing.

6. We have seen that many wrong acts are also vicious, and we have seen that vicious acts may be insane in a way that is different from any of those just enumerated. An act which is vicious is open to the same possibility of insanity whether it be merely vicious or whether it be a wrong as well as a vice. Nearly every wrong carries with it the possibility of a penalty: for many a penalty is provided by law; for many a penalty is provided by the retaliation of the injured person; for many the reprobation with which they are viewed by onlookers provides a very efficient penalty. There is scarcely a wrong which does not carry with it the possibility of incurring one or more of these penalties. Hence, when wrong is done, the wrong-doer indulges in present gratification at the cost, not only of the detriment of others, but of possible future detriment to himself. He does, in short, a vicious act; and a vicious act is insane when the disproportion between the advantage gained and the disadvantage incurred is grave, gravity being understood as the sum of the relative magnitude, the certainty, and the imminence of the ill consequences of the act. As with other vicious acts, there is in vicious wrong-doing a continuous series between those that are simply vicious and those that are insanely vicious.

It was pointed out by Bentham that no sane man would steal, even though all punishment for stealing were abolished, if the thief knew for certain that, as soon as the article was stolen, it would be taken out of his hands and returned to the owner. Here the certainty and the imminence of the disadvantage incurred reduces the advantage of the act to nothing. The man who would steal under such circumstances would be insane. Dr. Gray, lately physician to the Ameer of Afghanistan, relates the case of a man who, after having first his right hand, and subsequently his left hand, struck off as punishment for theft, seized with his stumps, and made off with, an earthenware pot of trifling value and of no use whatever to him. The crime was witnessed, and the criminal at once arrested and taken before the Ameer, who sentenced him, as he must have expected, to be hanged; and hanged he accordingly was. The gravity of the difference between the advantage gained and the disadvantage incurred by the crime was here at a maximum. The utmost benefit that the man could hope to achieve was the possession of an earthenware pot of trifling value. To attain this advantage he ran the risk, a risk so great that it was almost a certainty, of being hanged next morning. The magnitude of the difference between the advantage of owning an earthenware pot and the disadvantage of being hanged, the great probability, amounting almost to certainty, that the penalty would be inflicted, and the imminence of its infliction, taken together, leave no explanation of the act except that it was insane—that it was insane by reason of the extremity of its vice.

A bank-clerk who should embezzle a sum of money on the day before that fixed for the audit, with the certainty that on the very next day his defalcation would be discovered, would commit an act of insanity. A trustee who should appropriate the trust-fund with the certainty that his defalcation would remain undiscovered for twenty years, if he should live so long, would not necessarily be insane. He gets a good run for his money. The remoteness of the disadvantage, in comparison with the instant benefit gained, so much diminishes the gravity of the difference between them as to leave the act one of merely vicious wrong. So the man who murders another, in order to rob him of some article of trifling value, may be sane or insane according to the circumstances. If there is no possibility that the murder will be discovered, the act is not only not insanely vicious, but is not vicious at all in the sense in which vice is here understood. If, on the other hand, the murderer knows that detection is certain and will be speedy, then the act is vicious to the point of insanity, the difference being so extremely grave between the penalty incurred and the advantage gained.

It is different if the murderer is inspired by a frenzy of hatred against his victim, and deliberately determines that the satisfaction of gratifying his passion is worth the risk, or even the certainty, of being hanged. In this case the ill consequence incurred is, in the opinion of the actor, who alone is in such a case competent to judge, not out of proportion to the advantage gained, and the act is not insane.

7. Lastly, there is yet one other ground upon which the perpetrator of an act of wrong-doing may rightly claim exemption from the penalty attaching to his act. He is not wholly responsible for his act unless it is the act of his whole self. Let me make my meaning clear. A child suffers from St. Vitus' Dance; he cannot keep his limbs still; he is continually writhing, jerking, and tossing his limbs about; or rather, his limbs are continually writhing, jerking, and tossing about in spite of his utmost efforts to keep them still; his face is distorted into a hundred grotesque grimaces; the food that he tries to convey to his mouth jerks out of his hands, or is plastered upon his face by the movements, the uncontrollable movements, of his arms. The affection is common in children, and many children have been, and are, punished for the grimaces of their features and for the clumsiness of the movements of their limbs —for the things they throw about and the things they break—before the existence of the malady is recognised. But it is clear that the child ought not to be punished for such movements. Although the movements are movements of his limbs and face, they are not *his* movements. His will, his "self," is not concerned in them; they are made in spite of his utmost efforts to prevent them. Supposing that a sufferer from this affection were told to move a lamp, and supposing that, in his effort to do so, he were to throw it over a bystander and set him on fire. Clearly the act would not be wrong. It would be exempt from wrongness on two grounds: first, the actor derived no gratification from the act; and, secondly, it was not his act at all. It was not done by him;

it was done by a rebellious part of him in spite of his utmost efforts to prevent it.

This division between the moving body and the actuating "self" may exist upon a higher plane—in a more elevated region of organisation. When a man is asleep, for instance, his "self" is in abeyance, and for what his body does in the absence of his "self" he is not responsible. A woman takes her infant to bed with her in cold weather; she has no means to procure a fire, and she has not enough clothing to keep the child warm unless and except she can impart to it some of the warmth of her own body: so she takes the child to bed. While she is asleep she hugs the child so closely to her bosom that she suffocates it. The act is not wrong. "She" did not do it. It was done without her knowledge. Her body acted apart from her "self." She is not responsible.

The act done during sleep may be much more elaborate. A man may get out of bed while still asleep, may light his candle and go downstairs with it. As he goes he brushes past some curtains, which catch fire, and the house is burnt. "He" did not set the house on fire. The negligence was not "his" negligence. The act was done by his body without his concurrence, and without his knowledge. There are certain conditions that arise in disease which closely resemble somnambulism. In *petit mal* consciousness is suddenly and, as far as we can judge, entirely, removed; and during this state of unconsciousness the patient still stands, walks, speaks, and acts, although the conscious "self" has nothing whatever to do with the action. Usually the acts done in this unconscious state are what are called "automatic"; that is to say, they are acts which, from very frequent repetition, have become habitual, and have become easy to perform without much or any engagement of the attention upon them. At the moment at which consciousness is abolished there is a short interval of quiescence, and then there is a strong tendency to act, and to act in some habitual way. If the individual finds in his hand any instrument which he is in the habit of using, the tendency is to use that instrument; but the use is not the normal use: it is some caricature of the normal use. If it is a pen, for instance, he does not actually write, but he makes marks upon paper; or if there be no paper there, he makes movements as if writing on the table. If he has no instrument in his hand, he does some act which is thoroughly habitual. He takes out his watch and winds it; or he makes water; or he undresses himself. It is clear that acts of this kind may easily be injurious to others, and may easily become criminal; for instance, he may make water or undress himself in a public place. But his acts are most likely to be injurious when he has some instrument in his hand and uses it without the guidance of his conscious intelligence. A woman was cutting bread and butter for her children's tea when she had an attack of *petit mal*. The knife being in her hand, she went on using it during her unconsciousness, but instead of cutting the bread, she cut her own arm so severely that she was in hospital for many weeks. It was pointed out at the time that it was a mere accident that the knife

was used upon her own arm; if she had happened to touch one of her own children, she might just as probably have used the knife upon the child's arm as upon her own. A year afterwards this actually happened. Another woman had just such an attack under precisely the same circumstances, that is, while she was cutting bread and butter for her children's tea; and this woman did actually cut her child's arm, in consequence of which the child died. She was tried for murder, and with great difficulty the plea of insanity was established. It is quite manifest that all acts done automatically in the unconscious stage of *petit mal* are not wrong. They are done entirely without the will, without the knowledge, of the actor. They are done by the body and limbs of the actor, but without the concurrence, or even the knowledge, of the conscious "self."

In these cases the insanity of the actor is clear. If the facts be granted, there can be no question about the conclusion. So long as the "self" is not implicated in what is done by the body, the self is not responsible, and cannot justly be punished.

There is, however, a class of cases in which the division between the actuating self and the acting body is upon a still higher plane—takes place at so high a level of the organisation that the real self is perhaps in part implicated, but in which the whole self does not concur in the act. Every one is familiar with the annoyance of having a tune, a line of poetry, or a phrase "running in the head." The form of words, or whatever it may be, presents itself and compels its repetition. No sooner is it finished than the mind takes it up again and repeats it once more. We get weary of it. It is a bore and a nuisance. We try to banish it. But still it recurs again and again in spite of our efforts. At length we find ourselves repeating it aloud. We can, it is true, repress the actual vocal articulation of the words, but we cannot repress the repeated presentation of them in consciousness. In such cases the mind works without the concurrence, and in opposition to the will, of the "self," and it would be manifestly unjust to hold the individual, the "self," responsible for entertaining the thoughts, supposing that they are objectionable; and sometimes they are objectionable. Sometimes the words and phrases that thus present themselves, and persist in claiming recognition and repetition, are blasphemous or obscene. Such blasphemous or obscene words occur to pure-minded men and women, to whom their occurrence is a matter of suffering and horror, and still they cannot be suppressed. The conception of such words in the silent language of thought is of itself a stage on the way to their actual utterance in speech; and the more frequent the repetition of the word in the mind, the stronger becomes the tendency for it to break out in actual utterance (vol. vii. p. 877). We all know that the line of poetry or the remembered phrase does very often come at last to be uttered aloud; and similarly, the blasphemous or obscene expression will at last find utterance, at a time, perhaps, when the more vividly conscious part of the mind is occupied with something else; and the shock and horror of hearing the spoken word is the first intimation that the "self" has of the increased intensity that the process has assumed.

The impulsion towards verbal utterance is not the only form that this process of "obsession," as it is termed, may take. The mind may be occupied, in spite of the unwillingness and of the active exertions of the "self" to eject them, by imagination of other modes of activity; and in these cases also the tendency of these modes of activity to exceed the stage of mental representation, and to become actual, is sometimes powerful to the point of irresistibility. A man takes every morning the same walk—a walk along which there are posts at frequent intervals. The movement of touching the posts suggests itself to him, and in spite of "himself" this movement finds vent; he touches every post as he goes along, and if by chance or design he misses one, the impulsion to this particular act is so strong that he has to go back and touch it.

Such an act is harmless; but acts of this class, which suggest themselves, and are executed, without the concurrence and in defiance of the superior "self," are not always harmless: on the contrary, they are sometimes of the most lethal description. A man comes to a lunatic asylum, and begs with the most urgent solicitation to be admitted and placed under restraint, because he has been seized by a horrifying impulse to murder his wife or his child. He is horror-stricken at the thought of committing such a deed, but, in spite of his horror, he feels the impulse so strongly that he knows that nothing short of actual physical restraint will prevent him from executing the act; and he demonstrates the *bona fides* of his statement by the action that he takes: he places himself under physical restraint. Upon the same motive a man has been known to give himself up to the police in order that he may be forcibly prevented from committing a murder, the impulsion to which is present in his mind, but from which his "self" recoils.

It is quite clear that if this man were by any untoward accident prevented from placing himself under restraint—if the law prevented the asylum from receiving him, or if the police inspector pooh-poohed his appeal and turned him out of the police station—it is evident that if, under such circumstances, his impulse were to find expression and he were to commit murder, he would not be fully responsible for his act. Of course it is evident that such a plea as "obsession," or the execution of an act by a man's body and limbs in defiance of the exertion of his own will, should be received with the utmost caution, and should require the clearest evidence for its establishment. But this is true of all pleas for the exoneration from punishment of those who commit acts of wrong-doing. The amount and kind and cogency of the evidence that will suffice to establish the existence of the exonerating circumstance are matters with which we are not here concerned. Our task is to lay down principles, not to apply these principles to individual cases. All that is claimed is that the existence, in rare cases, of obsession, in the sense in which the word is here used, is established beyond the possibility of reasonable doubt; and that such a condition, if proved to exist in any case of wrong-doing, exonerates the wrong-doer from punishment.

Two observations have, however, to be made. In the first place, the

conflict between the impulse to do the act and the will or desire to refrain from doing it is confined entirely to the consciousness of the individual in whom it takes place. We cannot witness it, and the only evidence we can have of it, beyond his statements, is the observation of conduct of his which agrees with his description, and cannot be otherwise accounted for. Such conduct as the voluntary placing of himself under physical restraint for the avowed purpose of preventing the act would satisfy this condition.

Secondly, granted that there is this conflict in the mind of the wrong-doer before the wrong is done, we have no means of knowing how far the impulse to do the act was an irresistible rebellion of the man's lower nature against his higher, or how far it might have been prevented, post-poned, or minimised by an exertion of that higher nature, that "self," which may have been possible, and may not have been made. Some exertion may have been made, and the wrong-doing may have been mitigated; but we can never tell whether the exertion made was the utmost of which the man was capable, and whether there-fore, while he ought not to receive the same punishment that would be inflicted upon a normal person for the same offence, he ought to receive a mitigated punishment. The whole of the facts, confined as they are to the consciousness of the person implicated, must necessarily remain to a large extent in obscurity; but so are all facts of motive, intention, and the like, with which criminal courts are constantly con-cerned. And if, in these latter cases, practical certainty can be reached by the observation of acts and words, and by reasoning back from acts and words to states of consciousness, the same observations and the same pro-cess of reasoning will lead us to trustworthy conclusions in these difficult cases also. Cases of obsession are for practical purposes on all fours with the cases of dipsomania and morphinomania that have already been dealt with. The individual has a morbid craving to do a certain act which he knows to be very greatly injurious to himself or to others; against it he struggles, but struggles unsuccessfully, and the act is done. It is evident that the question of insanity, whatever test we apply, will depend very largely upon the advantage that he derives from his act. If voluntarily, and with his eyes fully open to the consequences, he does that which brings upon himself serious disaster without compensating advantage, the man is mad, whether the disaster be his own ruin and death from the abuse of a drug, or whether it be the death of those against whom he has no animosity, and who are perhaps very dear to him.

It is recognised in the jurisprudence of all nations that injury done to others is the more atrocious the more deliberately it is planned, and the longer the interval between the inception and the execution. So palpable is the difference thus constituted, that crimes the result of sudden impulse are invariably placed upon a different footing, and visited with a lighter punishment than those which follow prolonged premeditation. The reason for this mitigation of the wrongness of the act, when it is very suddenly conceived, is allied to that which has just been dealt with. It is felt that the whole self of the actor is scarcely concerned in the act.

When a man acts upon impulse, he acts without the guidance and concurrence of the highest part of his nature. There is no time for "self-control" to be brought into play, and the leniency with which the act is regarded is due to this assumption that it is not the act of the whole "self." It is indeed a common saying that the man would not have acted so if his "better self" had had time to assert itself.

From what has already been said it would appear that the insane are more prone to impulsive action than the sane. By the very fact of their insanity, whatever form it may assume, their self-control is weakened, their higher nature is to some extent removed, and they are less able than are sane persons to forgo the immediate indulgence of desire. While, therefore, the mere existence of insanity in a wrong-doer does not necessarily relieve him of all responsibility for his act, it does in every case to some extent diminish his responsibility; and, although it may be proper to punish him for his wrong-doing, it will not be proper to inflict upon him the same severity of punishment as might rightly be inflicted upon a sane person for the same offence. Whatever the form of the insanity, and whatever the offence, the mere existence of insanity is a valid plea for the mitigation of the punishment of the offender. The mere existence of insanity has been held in some cases sufficient to exonerate a criminal from the punishment incurred by the act; but such cases are exceptional. What is much more common—what is, indeed, the rule—is that when the circumstances of the crime are such as to satisfy one or more of the conditions herein laid down, and so to afford a partial exoneration, then the additional fact of the existence of insanity, and of the weakening of self-control that insanity involves, is taken into consideration, and completes the exemption.

To take an actual case of a very common kind. A man who has been insane, and in a lunatic asylum, conceives the delusions that his wife is unfaithful, and is trying to poison him. Under the influences of these delusions he attacks and kills her. The jury, upon the direction of the judge, finds that he is "guilty but insane"—that is to say, he is exempt from punishment. On what ground is this decision arrived at? Granting that he entertained the honest belief that his wife was unfaithful and was trying to poison him, it cannot be maintained that the murderer could claim total exemption under either of the headings 1, 2, 3, 4, or 6. It cannot be maintained—1, that he did not appreciate that he was injuring his victim; nor 2, that the act was done with no intention of obtaining gratification; nor 3, that it was the least injury that would prevent injury being done to him; nor 4, that the benefit sought by the act was out of all proportion greater than the injury inflicted; nor 6, that the ill consequences of the act so instantly and immensely outweighed its advantages as to constitute the act *ipso facto* an insane one. On what ground, then, was the exemption given? Clearly on the grounds numbered 5 and 7. It is very doubtful whether a man whose mind is so affected as to entertain the delusions which this man undoubtedly did, really appreciates the full heinousness of the act of killing another. Although

what he did was not the least injury that would prevent the injury that he believed to be impending over him, yet it was a very effectual means of preventing that injury. There was, to his mind, provocation; and although the retaliation was unquestionably in excess of the provocation, yet here again the mere fact of insanity helps to exonerate the criminal. It prevents him from duly weighing the gravity of the retaliation against that of the provocation, and estimating their due proportion to each other. The same affection of mind would prevent the accurate estimation of the proportion of the benefit gained to the injury inflicted. Upon all these grounds a certain degree of exemption, a certain mitigation of punishment, is felt to be proper; and in addition the mere fact of the insanity shows that the man, although capable, in the ordinary sense, of controlling his actions, yet suffers from such a weakening of that ability of "self-control," by which is here designated the ability to forgo the immediate gratification of an impulse, as may well be allowed to, and as does in practice, complete the exemption.

A woman of good social position and ample means steals an article from a shop. What are the tests that ought to be applied to determine whether the act is sane and punishable, or whether and to what extent the thief is immune on account of insanity? We have to ascertain:—

(1) Whether, when she took the article, she did not know that she was inflicting injury; (2) whether she took it without any intention of gratifying herself; (3) whether she had any, or if any, sufficient, provocation; (4) whether the benefit gained by her theft was out of all proportion to the injury inflicted; (5) whether she was unable to appreciate the facts of the taking, as set forth under these headings, in their true relations; (6) whether the difference was grave between the benefit gained and the disadvantage incurred; and (7) whether the act was indeed the act of the woman herself, or whether her body acted in any degree without the knowledge or without the control of her innermost self.

If any one of these propositions can be established in full, the thief is immune from punishment; and if any of them can be established in part, or if she is insane, she is entitled to a mitigation of punishment. But if none of them can be established even in part, she is not entitled to complete exemption from punishment even though she be insane.

It would be easy to give instances of the fulfilment of each of these conditions, but it is needless to do so. In practice the difficulty is to prove the fulfilment of the conditions; but when this is proved, it will scarcely be gainsaid that immunity from punishment should follow. It is submitted that it is a distinct advantage to have stated the whole of the alternative conditions under which wrong acts are exempt from punishment.

Treason and insanity.—Treason as understood in this paper includes not only attacks upon the government of the community, but all those acts which, whether vices or wrongs, or neither, tend directly to the disintegration and disorganisation of the body politic. If such acts are vicious or wrong, they are taken out of the category of mere vice or

wrong-doing by the additional quality that they possess of being directly or immediately injurious to the constitution of the community. Such acts are, as we have seen, of three classes—attacks upon the governing power, attacks upon religion, and attacks upon custom.

Attacks upon the governing power are of two kinds—concerted attacks made by several people in common, and attacks by individuals. In the first class lunatics very rarely take part. The insane, as is well known, are rarely capable of concerted action; and when a lunatic is drawn into rebellion it is usually because he is a person of weak mind, easily led, does not fully comprehend the nature of his act, and is the tool of others: as, for instance, in the case of Barnaby Rudge.

Individual attacks upon the governing power, on the other hand, are as often made by lunatics as by sane persons. The immense disproportion of power between the representative of the community wielding the power of the whole community and any single individual in the community, is, in fact, so great that an individual who shall engage in the contest must be either inspired by a degree of enthusiasm that is almost supernatural, or must be insane. That this degree of enthusiasm has been occasionally reached by sane revolutionaries, history demonstrates; but in the majority of cases in which a single individual has made an attack upon a representative of the governing power, the act has been that of a lunatic, and of a lunatic of a particular class—of that class, namely, whose members are affected by what are known as delusions of persecution. These unfortunate persons are possessed by the belief that they are tormented in some mysterious way by persons whom they are as a rule unable to identify. That they do suffer from very unpleasant sensations in different parts of their bodies is highly probable; and these sensations they believe to be produced by the agency of others. From such persecution it is, they conceive, the duty of the State to deliver them; and the persistent neglect or refusal of this deliverance they regard as a grievance which justifies them in retaliatory measures. The retaliation is directed against some individual who represents the power of the State—commonly the chief or some subordinate magistrate; and it is upon this motive that most of the unconcerted attacks upon prominent individuals have been made.

So long as the social instinct was imperfectly developed, and the binding force of religion was a very important factor in maintaining the social state, so long any attack upon religion was very highly resented by the community, and was punished with great severity. Any influence that tends to loosen the bonds that hold the community together is felt as partaking of the nature of treason, and is punished as such. In modern times the high development of the social instinct has superseded the function of religion in maintaining the cohesion of the community; and with this decay of the social utility of religion has proceeded a similar decay in the resentment which is felt by the community at attacks upon religious belief and observance. They are no longer regarded as crimes or treasons, and the relation of insanity to them is no longer a matter that need be investigated in such an article as this.

The same is true to a large extent of attacks upon customary observances. The relation of intelligence, and of disorder of intelligence, to customary observance are very definite and very interesting, but in two respects only do they demand notice here—namely, in respect of attacks upon ceremonial and attacks upon sexual morality.

The cohesive influence of ceremonial upon society need not be demonstrated; it is sufficiently clear to thoughtful minds without demonstration, and formal demonstration would extend the limits of this article to an unwarrantable degree. It must be postulated that the abhorrence and resentment that are felt towards those who violate customary ceremonial usages, have their origin in the instinctive aversion that is felt against all influences that tend to loosen the cohesion with which the members of a community cling together. Violation of custom is, in short, a species of treason, and is on that account resented. At the present day, when the development of social instinct diminishes the importance of the maintenance of ceremonial, the chief importance of violations of ceremonial in connection with insanity is in the indications that they afford of its existence. Ceremonial observance is perhaps the most recently acquired of all the fundamental forms of social conduct, and therefore, agreeably to the law of dissolution, is the first of those forms of conduct to be impaired in a general deterioration of conduct. Hence we find that it is in ceremonial observances that failure of conduct is first and most exhibited in many forms of insanity. As has been already mentioned, the insane are almost invariably deficient in politeness. They fail to perform those little customary observances by which deference is shown to age, to sex, and to various other qualities. They are especially wanting in appreciation of the significance of costume. Persons who are deeply insane often display their insanity in eccentricities of dress; and, when the costume is not eccentric, it is usually slovenly, dirty and disorderly. Often the first indication of insanity is the assumption of some costume that is wholly inappropriate to the occasion in which it is worn. A man will go to a dinner-party or to a funeral in cricketing or shooting costume, or to a race-course in evening dress.

The importance to the community of chastity in its female members is so very great and so very obvious, that no explanation is needed of the abhorrence with which its violation is regarded. The connection of unchastity with insanity has been so fully dealt with in the section on vice that there is no need to dwell upon it here, farther than to point out the reason of the detestation in which it is held.

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The ordinary bibliography of Criminal Responsibility is much too voluminous to be referred to, but all that is essential is contained in the admirable summary by Dr. Orange in Hack Tuke's Dictionary; in Fitz-James Stephen's *History of the Criminal Law of England;* in the *Report of the Select Committee on the Homicidal Law Amendment Bill*, 1874, and that of the Capital Punishment Commission, 1875.

C. M.

THE EPOCHAL INSANITIES

ATTACKS of mental disease are often determined by the great physiological epochs and "crises" of life. Certain remoter or more immediate causes act with especial force at such epochs. When an attack of insanity is so determined, its mental and bodily symptoms and accompaniments are influenced in such a way at each epoch that the cases have certain common characters, and may properly be classified accordingly. It is of the greatest interest and importance for the practising physician to look at his cases from this point of view; for it often leads him to found his treatment on physiological lines, to be more precise in his prognosis than he could otherwise be, and in many cases to take valuable measures for future mental safety after recovery. For the ordinary man or woman to pass with impunity of body and mind through the various epochs of life is perhaps rare; for the neurotic and the psychopathic to do so is still more uncommon. An attack of insanity forms the acme of the dangers incurred, and is the worst of all the risks, unless it be death itself; indeed by many men death would be faced more calmly. One of the chief points of interest in studying the epochal insanities is the opportunity it gives us of comparing the symptoms present with the normal physiological and psychological characteristics of the various periods of life; and of observing the degradation of physiological into pathological characters. That each epoch of life has its proper psychology is attested throughout our literature. Poetry, the drama, and fiction have all found their themes in the various thoughts, feelings, and actions characteristic of youth, of maturity, and of old age. Psychiatry, too, finds some of its most subtile and interesting studies in the mental and bodily symptoms, and in the prognosis and treatment of the insanities of puberty and adolescence, of pregnancy, of the puerperium, of lactation, and of the climacteric period and old age; for these are the chief epochal mental disturbances. It must be clearly understood that not all these are forms of insanity in a definite sense, as is general paralysis, for example; it is often impossible from the symptoms present in any one case for us to say definitely which form we have before us; and in mental and bodily symptoms, intensity, duration and curability, individual cases of the same epochal form may also vary greatly. Yet in all these respects, as we shall see if we take 100 cases of each variety, there will be found so many characters in common as abundantly to justify this mode of classifying insanity, for which we are chiefly indebted to Skae of Edinburgh. For the physician to derive the full benefit from a study of the epochal psychoses he must correlate them with the epochal neuroses, and the other bodily diseases that are commonly called "critical."

THE INSANITY OF PUBERTY AND ADOLESCENCE.—The normal process of the development of the human brain cortex in all its inconceivably delicate, subtile and complicated functions, and the gradual establishment of the normal relationship of those functions to each other, are as "unthinkable" as the connection of thought and organisation. Though our present knowledge in regard to these processes is very elementary, and very indefinite, certain facts are patent enough: the most definite of these is that the entering of sex and reproductive energy from the potential into the actual state at puberty accentuates and transforms the higher activities of body and mind. It also brings in a liability to diseases unknown before. A very little study of this all-pervading function and its effects shows us that this great process of vital transformation does not complete its work suddenly; it occupies, on the average, all the twelve years from puberty till full development at twenty-five. All this time steady progress is being made in acquiring new capacities, and new responses to feelings from within and to impressions from without. These impressions may come from the opposite sex, objectively or subjectively; from ambition; from morality; from religion; from art; from literature, indeed from the whole circumstances and conditions of life. An orderly progression of developmental changes in the emotions, the imagination and the volition is seen, as time goes on, from the first onset of reproductive energy up to its completion and decay. In such an article as this, the normal physiology and psychology of puberty and of its continuation in adolescence—this term being used to indicate the period from puberty till the fulness of bodily and mental development—cannot be entered into. The fact about adolescence that most concerns the physician is that it is a period full of the possibilities and probabilities of arrested, perverted, and postponed mental and moral developments, and of the risks of diseases of many kinds, especially of nervous diseases. These are soon perceived to be to a larger extent the result of hereditary tendencies than the same class of diseases at later ages. Indeed evil heredity in certain respects then first comes into its fullest play, and decreases in its effects thereafter.

The insanity of adolescence and that of puberty are essentially the same. It is the most hereditary of all forms of mental disease; bad mental and nervous conditions being in fact traceable in ancestry and collaterals in twice the proportion of ordinary forms of insanity. In my personal experience I have rarely found any case, in which the family history was well known or accessible to me, where there was not a record of mental disease, or one of the graver neuroses, in one or other of the patient's four grandparents, their collaterals or descendants. In 25 per cent of the whole, in which I could not find any such case of definite disease, I usually found the stock on both sides to be a highly "nervous" one; and sometimes I ascertained that for two or three preceding generations such neurotic stocks had intermarried, and so accentuated the neuroses present. As to the special symptoms and character of this form of insanity, I found, from a careful analysis of 320 cases, that in about 80 per cent of

them the mental symptoms were those of mania; mostly of an active, lively, aggressive, motor character, tinged often with erotic, hysterical, or pugnacious ideas. The other 20 per cent of the cases were mostly melancholic in character, seldom being deeply suicidal, but often tending to be stuporose. In fact stupor, both in its melancholic and anergic varieties, is found much more frequently during the age of adolescence than at any other period of life. Whether maniacal, melancholic or stuporose, one very marked character in the mental condition is the tendency of the symptoms to periodicity, remission and relapse. This is common at all ages more or less; but in adolescent insanity it is especially frequent, few cases being free from it altogether. In different cases there would be a week, or a month, or two months of excitement, and then a remission, with a relapse in a few weeks. I explain this tendency as being the representative and pathological equivalent of the sexual and reproductive periodicity. As to the exact year or years of the twelve which cover the adolescent epoch, I find that the early years from fourteen to sixteen were very free from insanity; though they yield abundance of other developmental neuroses in the shape of chorea, somnambulism, and epilepsy. The next four years, from sixteen to twenty, produced a larger proportion of insanity than the earlier years, but still few compared with rather later years. It was in the next five years, from the twentieth to the twenty-fifth, that the great majority—68 per cent—of my adolescent cases occurred. These facts correspond with the physiological facts of brain growth and development. During its period of rapid growth in the womb, the great teratological defects and malformations and congenital idiocy arise. During the second period, from birth up to puberty, we have a long series of defects and diseases, from rickets and convulsions to certain forms of idiocy and epilepsy. During the adolescent period, we have in the earlier years, from fourteen to twenty while the motor centres are reaching perfection, epilepsy, hysteria, ugliness, and, as we have seen, little insanity; while in its later years, when the mental cortex and its functions, the crown of the whole organism, is reaching perfection, the great breakdown of insanity is most frequent. This coincides with the age when, in a normal organism free from neurotic heredity, perfect fecundity, the form and characters of man and woman, the moral qualities of self-control and altruism, and the intellectual and imaginative faculties are all approaching their full development. In persons who become insane, nature, unable to complete her work, attempts after her fashion thus to kill off a bad stock. A careful study of this period shows that in other hereditarily neurotic cases, adolescent psychoses of a more partial kind are apt to occur; such as stupidity, lethargy, indolence, unsocial practices, affective aversions, "incompatibilities" of temper, frothy religionism, sudden immoralities, perverted sexual acts, outrageous unconventionalities, dipsomania, and crime.

In the *treatment* of adolescent insanity we must take physiological considerations into account. To get healthy young men and women, sound

minded, self-controlled, moral, non-hysterical, muscular, and fairly fat, we provide during the whole period of development plenty of fresh air, muscular exercise, good non-stimulating food, suitable employments, reasonable amusements, and usually also some outside control. Now these are the principles of treating adolescent insanity. We give milk, eggs, farinaceous diet, fruits, vegetables, and the lighter kinds of animal diet rather than too much stimulating animal foods. We want sound general organic development and not over-stimulation, for the neurotic and those hereditarily disposed to insanity have often a great difficulty in controlling and regulating their sexual and reproductive instincts during adolescence. Masturbation is common among them, and in them especially becomes dominant and hurtful. It is one of the worst complications of adolescent insanity. I give cod-liver oil also and the hypophosphites; and I try to keep up or increase the body weight during the attack. The patient should live in the fresh air, should do gardening, walking, and outdoor games. Under such suitable treatment about 60 per cent of the patients recover; but, unfortunately, in after-life half of these patients have relapses. Before perfect mental recovery takes place the signs of full organic development are usually seen; the form expands, the voice changes, the beard and sexual hair grow, the weight increases, and in women the mammæ enlarge. Few cases end in death during the attacks; but unfortunately about 30 per cent sink into "terminal dementia," which constitutes the great mass of the incurable perennial insanity of our asylums. In these cases nature determines that the unfit shall not live, but the death is mental instead of bodily.

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The insanity of pregnancy.—Mental changes are common in pregnant women; insanity is very rare. The psychological changes that might almost be called "normal" in the pregnant woman commonly affect the emotions, appetites and instincts. Sometimes very serious morbid cravings arise—for alcohol and opium, for example, or for unusual or indigestible and hurtful foods; but nature commonly shields the pregnant woman from actual insanity. Yet there are a few women who cannot become pregnant without becoming insane; these represent the acme of the tendency towards mental change. Then there are a few who are subject to the disease under special circumstances. The typical group of symptoms in the insanity of a pregnant woman are stupor, apathy, depression, conscious loss of affection for husband or children, and suicidal feelings; these may become very strong and dangerous, and should always be kept in mind as a possible risk. In a very few cases I

have met with acute mania; but this only occurs in those that have become very thin and weak, or who have been reduced by some severe bodily disease. The *treatment* must be largely expectant, with as few drugs as possible. Some patients recover before delivery, but this is rare; we have to wait till the confinement is over before the majority of these insane pregnant women throw off their morbid mental symptoms. Some of the patients who do not recover, sink rapidly into complete dementia. There is usually a strong heredity in this form of mental disturbance, and the disease occurs most frequently in first pregnancies. I think that if the disease occurs before the fourth month of pregnancy the bringing on of abortion, after due medical consultation and with the sanction of the responsible relations, would be the proper remedy. This can now be done with little risk; and I think the woman is entitled to the extra chance this course would give her of regaining mental soundness, and of avoiding the greater risk of the mental death of dementia.

PUERPERAL INSANITY.—No proximate causes of mental disease are, in certain cases, more definite than the physiological conditions of pregnancy, childbirth and lactation. Childbirth especially stands out as bringing on mental disturbance of a severe character in 1 case out of every 400 labours; and as constituting 5 per cent of all the insanity in women sent to mental hospitals. Taken together, these three forms of insanity amount to 10 per cent of all the asylum insanity in women. There is a certain uniformity in the symptoms of all three, especially in those of puerperal insanity; they are all very curable, and, as a medical man is usually in attendance on the patient at these times, it is most important that the early symptoms of the insanity then prone to occur should be recognised and treated; for many of the slighter cases, especially among the well-to-do classes of society, can be treated at home, and the attacks arrested at the outset. It adds much to the family distress when, at these times, when grief drives away joy, the stricken patient has to be removed from home for treatment. The name "Puerperal Insanity" is technically limited to the mental disturbances that occur within the first six weeks after confinement. But as by far the majority of the cases—four-fifths of them—occur within the first fortnight after confinement, and one-half of them within a week, we commonly have to do with the bodily effects of the recent puerperium, mixed up with and complicating the treatment of the mental disease. We are not yet in a position to say decidedly what is the immediate cause of the very intense cortical disturbance that we commonly find. In some cases this is unquestionably direct sepsis from the uterus and passages; in others there is no direct evidence of this. The reflex disturbances of the brain from the womb, the sudden change in the requirements of blood-supply after delivery, the numerous new organic and functional accommodations that have to be suddenly made between the blood-forming glands, the womb, and the mammæ, and the new and intense emotions aroused in the woman by pregnancy, childbirth and nursing, may all upset the cortical working in those

predisposed to mental disturbance. When compared with other forms of insanity, heredity is found to exist to about the usual extent. This is on the whole the most acute of all the forms of insanity, and the mean temperature I found to be higher than in that of any other form. The risk of death, too, is greater than in any of the curable forms of insanity, for over 8 per cent of the patients die during the attack. Every patient in whom the temperature rises above 103° runs grave risk.

The *symptoms*, in a well-marked case, are commonly as follows. They come on very suddenly and run up to a high point of intensity within a very few days, sometimes within a few hours. The new mother, and the disease is most frequent in primiparæ, changes in facial expression, looking self-absorbed and dull. At the most altruistic of all times of life she becomes egoistic; the time when the life of another human being absolutely depends on the mother, and the time of the intensest emotion seen in nature, that of a mother towards her sucking child, becomes a time of neglect, and even, in some cases, of homicidal impulse towards her helpless offspring. The mother does not notice the child, or ask for it. She does not readily answer questions; she does not eat; she does not sleep. She becomes restless, incoherent in speech, full of fancies, and expresses foolish dislikes to those about her; she soon begins to chatter or to scream, and in no long time her mental condition is that of an acute delirium. She needs to be held in bed, and exhibits great strength and great tendency to violence. The suicidal impulse is present in 40 per cent of the cases, and must be thought of and guarded against most carefully; the nurses being warned of their responsibility. The bodily signs by this time are well marked; the temperature has risen to 100°, or, in the septic cases, even to 105°; the eyes are brilliant and feverish-looking; the lochia has stopped, sometimes becoming septic before disappearing; the pulse is small and thready; the face is haggard, though perhaps flushed; the skin is moist and clammy; the lips and tongue soon get dry. There are in fact combined together an intense mental disturbance, a great motor perturbation, and an organic state of dangerous exhaustion. Such a combination means much danger to life, and requires all the suitable nursing and treatment that can be instantly applied. The ways and means of keeping up the patient's strength have first to be faced; for usually she will not herself willingly eat or drink anything, urgently as she needs support. Liquid but strong nourishment, in any suitable form, we give every hour; such as liquid custards, strong soups and alcoholic stimulants, which I order freely; and I unhesitatingly feed the patient by the nose-tube if she cannot be got to take enough nourishment and stimulants otherwise. A custard containing two eggs, some sugar and two glasses of wine, sometimes proves the best hypnotic and sedative. If the temperature be above 99° I always give quinine in from 5 to 15 grain doses, frequently repeated. The effect of this in reducing the temperature is in some cases instant. It is a good thing to keep washing out the vagina by antiseptic douches. If no sleep is got after the first night it is well to try two drachms of paraldehyde; but I am not in favour of the continuous or repeated

exhibition of hypnotics or sedatives. Opium in any shape or form I avoid, because it tends to dry up still further the mucous membranes already too parched, and to accentuate the existing dislike to food. If called in at the stage when there is mere sleeplessness without excitement, I should give 20 grains of sulphonal. A never-ceasing supervision, plenty of nurses and constant warmth are absolutely necessary to give the patient the best chance. We expect some improvement to begin in a week or two, and recovery to take place within three months. A few patients recover at once, and completely, as soon as the initial period of fever and intense excitement has passed off; but in others, on the contrary, the disease runs on as subacute mania for six or even twelve months. When recovery has taken place it is usually complete and abiding; but the patient should have a change of scene before resuming her family duties, and she should not be exposed to the risk of another pregnancy for a considerable time. I always feel more sure of the recovery being complete when menstruation has returned. All the cases are not of the acute form I have described; a few are only mildly maniacal, a few delusional, a few melancholic, and a few confused and stuporose. These forms occur most frequently among the few patients in whom the disease comes on from the third to the sixth week after confinement. They need *treatment* on the same general principles as the acuter cases. My experience is that from 75 to 80 per cent of the patients recover. As might be expected, moral and mental causes may assist the direct effects of the puerperium in causing the disease. The disproportionate amount of the disease that occurs among primiparæ whose offspring is illegitimate shows this fact very well.

LACTATIONAL INSANITY.—The poor and hard-working are subject to mental upset during nursing in much larger numbers than the well-off. Four per cent of my pauper patients are cases of lactational insanity; very little over 1 per cent of my richer patients are due to this cause. This fact throws much light on the causation of the disease; it means an exhausted anæmic brain without the means of treatment, without rest, and without the possibility of giving up suckling. It is much more frequently seen in mothers who have had many children in quick succession than in primiparæ. The symptoms are far less acute in their character than in puerperal insanity. They are usually ushered in by the bodily symptoms of headaches, lassitude, neuralgia, giddiness or faintness; every one of which points to an anæmic, exhausted brain. Then comes sleeplessness and loss of interest in things; then depression of mind, which may soon pass into a subacute irritable maniacal condition. The mental control is lost, delusions come on, or suicide is attempted. The symptoms are rarely intense. The *treatment* of lactational insanity is that of brain anæmia. Immediately its preliminary or first symptoms appear, suckling should be stopped; the patient should have much fresh air, and a change. She should take iron, quinine, malt liquors, cod-liver oil, and good food. Recovery may be expected in 80 per cent of the cases in about three months. Recovery

is always accompanied by a great increase in body weight, a better colour of skin, and a restoration of the number of red blood corpuscles. Menstruation should not be stimulated or encouraged until the strength and fatness return. Very few of the patients die from the immediate effects of the disease; but tuberculosis must be looked on as a possible risk, for it occurs in a few of the cases. The nearer to the puerperium the first symptoms come on, the more acute and maniacal they are apt to be; the further away they are, the more subacute and melancholic in character will they prove.

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Climacteric insanity.—At the climacteric in both sexes there is in certain persons a special liability to nervous and mental breakdown. This is probably a partial representation of the physiological fact in nature that when the power to reproduce ceases, the whole vital energy is lessened, and begins to show signs of decay. Reproductive death is, in fact, the first presage of actual death. In many forms of lower life the act of reproduction marks the end of the life of the individual. In the human being there is a normal psychology of the climacteric, and there is an accentuated and abnormal psychology which is called climacteric insanity. The normal mental changes consist chiefly of a lessening of the sexual desire and all that is implied therein; the affections largely change from the mate to the progeny, the imagination loses its former force and fire, poetry and action alike are less craved for. The instinctive feeling of sexual difference is lessened. There is less energy and less spontaneity and originality. Along with all these mental changes, the bodily changes, especially in women, of form, of the constitution of the blood, of gland and of trophic action, are coincident. These climacteric changes, mental and bodily, are seldom sudden; like adolescence, they cover several years. The moment of the menopause in woman is something of an accident, and is a signal announcing great physiological changes. The course of a case of climacteric insanity in a woman is usually this:—After experiencing many of the usual sensory neuroses that accompany the climacteric, such as giddiness, flushings, flashes of light before the eyes, or unusual feelings in the head, the woman, after, coincident with, or before the menopause, begins to feel less active in mind and body. Her courage, her spontaneity, her power of resisting and rising above the small worries of life, lessens. She often feels irritable. Then come groundless fears, conscious depression of spirits, want of interest in life and in her affairs, and lessened social instincts; meeting with her fellow-creatures is a strain rather than a

pleasure to her; to live is no longer in itself an enjoyment. With these early mental symptoms there are also usually well-marked bodily symptoms. The most common of these are loss of freshness of complexion, of weight, of appetite, and of digestive power. The skin looks muddy and pigmented, the bowels get costive, and the sleep is shortened or disturbed. In a few cases there is a sort of accentuated but irregular sexual excitation, of which the woman is usually much ashamed; or there are delusions as to the other sex, as, for instance, that some one is in love with her; or there are delusions of pregnancy: but all these cases are exceptional. The next stage is one of more pronounced mental disease. The morbid fears become formulated delusions of self-blame, suspicion, and fear. She affirms that something dreadful is certainly going to happen to herself, or to her husband or children. She has suicidal feelings, but they are not always intense. She becomes restless, cannot settle to work, moans and weeps. She rapidly loses weight, the alimentary secretion dries up, and there is troublesome constipation; the appetite is not only lost, but food is repugnant and refused; and there are often trophic affections and skin irritations. This state may pass into the most excited melancholia, leading to exhaustion of strength, and death in spite of treatment; or the symptoms may all pass off gradually, the woman becoming for a time more healthy and strong than she had been for years before. I found that, out of 228 cases, 57 per cent of the female cases ended in recovery, while only 31 per cent of the males did so. There was a high proportion, but a low intensity of suicidal impulse. As to the age at which the disease occurred, about an equal number of cases in women occurred from forty to forty-five as from forty-five to fifty; while the male climacteric cases occurred chiefly from fifty-five to sixty-five. The chief difference between the female and the male climacteric case is that in the man the symptoms are more complicated with the lesser mental and bodily signs of senility. His "grand climacteric" is a less definite vital epoch. He feels the *tædium vitæ*, he cannot work, he cannot enjoy life, he cannot settle to anything, and he tends to be hypochondriacal. Climacteric insanity is apt to last longer than most other forms, the average duration of treatment in the asylum cases of recovery being in 50 per cent, three months; in 65 per cent, six months; and in 91 per cent, twelve months. At all the more advanced ages, both in women and men, the number of recoveries diminished. There were some cases of mania among the many of melancholia.

The *treatment* of climacteric insanity is that of melancholia in general, but with special reference to an organism that has "turned the corner" of life. In the early stages I have found change of scene, with freedom from worry, and life in the fresh air especially effective. Careful dieting, frequent meals of stimulating as well as nourishing food, wines and malt liquors used dietetically, the natural mineral waters, quinine, iron, strychnine, the hypophosphites, arsenic, and other tonics are serviceable. A few cases in both sexes end in recovery after many years of melancholy and even of delusion.

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Senile insanity.—In old age the gradual decay and dissolution of energy and faculty extend especially to the functions of the brain cortex. Motor energy, speech, co-ordination, sensibility common and special, trophic power, and mind are all affected. The gray and white matter then shrink in bulk; cells and fibres gradually undergo demonstrable dissolution. Then vessels change in their coats and in their capacity to carry the normal blood current, and to adapt themselves to the varying conditions of the intracranial pressure. Commonly the memory for names is the first mental faculty to fail, and then every faculty slowly diminishes in power. It commonly happens that we observe mind failure to take different courses in different individuals; in one memory, in another volition, in another emotion, and in another moral sense being the first to give way. The exceptions to the rule of physiological failure in old age are only apparent, and in degree; merely showing that some men have vital energy enough to put off the evil day. If they live long enough, they too fail in mind and body. The mental extinction of senile dotage must be considered a normal stage in the life of man, as much as his birth and his manhood. Looking to the immeasurable capacities of the brain cortex, to the strains it has frequently to bear, and to the manner in which bad heredity specially affects it, there is little wonder that in some cases the recession of mental function is not on physiological lines, but diverges into pathological states. It is not surprising that an organ, the normal action of which is so largely paroxysmal and spasmodic, and is so intensely sensitive to its proper stimuli from without and from within, should exhibit mental explosions in its decadence if it contains the seeds of hereditary weakness, or undergoes local irritations from gross lesions such as softenings or atrophies. Or, looking to the fact that the higher mental part of the cortex is by far the most complex product of evolution, it is scarcely surprising that in certain cases this product should fail earlier in life than the coarser elements of the brain and body; and that in consequence we should have mindlessness before complete organic decay and death take place. The organ that thus fails in its work contains within it representations of every other organ; its chief duty being to harmonise the action of them all for the welfare of the general organism. Every time any organ was active, some part of the brain cortex was active too. Every time an organ suffered it suffered also. These are the conditions which commonly end in senile dementia, but not always, as we shall see. This is not a simple and uniform type of insanity; far from this, there are

few of the clinical forms of insanity that present such an immense variety of feature. Some of the cases are melancholic, some of them are maniacal, some are enfeebled, some are delusional, and some few are even immoral and impulsive in general mental character. The two most common types are, first, the occurrence of maniacal excitement with certain senile features, tending in a longer or shorter time to pass into dementia; usually indeed having in it from the beginning some of the elements of dementia: secondly, a type in which melancholic symptoms are the first mental disturbances, and in which there is more hope of recovery, partial or complete, and less chance of passage into dementia. This last results often enough from some disturbance from without or within, of a brain whose power of resistance is becoming impaired in early senility.

I will shortly sketch the chief features of these two senile types of mental disturbance. A man over seventy, commonly over seventy-five, who has been looking old for some years and whose articulation has been losing its crispness and finer co-ordinations, begins to fail in his sleep. He soon gets restless both at night and by day. He becomes morbidly suspicious about small matters. He cannot carry out a fixed purpose. He is very forgetful, and perversely obstinate. Sometimes his moral sense fails him and he speaks and acts in immoral ways, entirely contrary to the tenor of his past life. I have known such persons take to cheating, to lying, to deception of all sorts and to sexual immorality of a scandalous kind. His regard for convention becomes less, and he often thus shocks his family and friends. In these respects, as pointed out by Dr. Savage, the brain in its process of senile dissolution loses first the qualities that in the process of evolution had come last into existence. The next stage of the case is one in which the most troublesome symptoms are sleeplessness and restlessness and sometimes noise at night, oftentimes with dirty and degraded habits, and even great violence and destructiveness. This nightly mania is, of all the symptoms, the most troublesome to manage; and often compels asylum treatment in spite of the greatest natural reluctance to adopt it in such aged persons. The brain exhibits in fact its normal nightly lowering of action in an extreme and pathological degree. It is interesting to compare this senile nocturnal mania of the brain, thus undergoing dissolution, with the common night delirium of the undeveloped brain in the fevered child of neurotic constitution. During the day, especially in the early stages of his attack, the restless, noisy, and entirely unreasonable man of the night before is often enough quiet, and, in a sort of automatic way, coherent and reasonable. He is sometimes provokingly so, for it is difficult to make relatives who have not seen his condition believe he has been so ill during the night. In a few cases we see grandiose delusions of wealth and power simulating typical general paralysis. Gradually the symptoms of general mental enfeeblement come to prevail over those of brain excitement, and if the patient do not become exhausted, or die, he lives on a senile dotard, who is often restless and troublesome at night, till a paralytic shock, or heart failure, or an attack of bronchitis brings life to an end. And in

connection with paralytic shocks I have often seen a slight attack of this sort stop the maniacal symptoms, and produce a quiet, manageable paralytic dotage. This form of senile mania is the most frequent one, but it is by no means so general as might be imagined. I was myself surprised to find that only about 60 per cent of my asylum cases of "senile insanity" were of this kind. The others largely consisted of cases of melancholia; some of them of great intensity, and many of these suicidal. Of this class 30 per cent ended in recovery. Certain persons in old age, with "senile hearts," atheromatous vessels and poor nutrition of body, are apt to become unduly depressed when any febrile illness comes on, or anything goes wrong with them. The curable cases of senile melancholia usually occur at the earlier ages, from sixty-five to seventy-five. Some of them present a very curious series of symptoms of what might be called "automatic motor misery." The facial expression of persons of this class is one of deep depression; they weep, they groan, they wring their hands, and any ordinary onlooker would regard them as profoundly miserable; but all this will pass off in a moment from no outward cause, and the patients will recollect nothing of it. They would seem not really to have felt the depression in any proper sense. The motor machinery of grief had been in operation, but the sensory and perceptive apparatus was not in action, or had disappeared by senile dissolution. Many of the "recoveries" are of course not such in an absolute sense, but only represent a recovery from the symptoms of excitement or depression, and transition into a quiet, normal dotage. In a few cases vivid hallucinations of sight and hearing, and in others convulsions and epilepsy complicate senile insanity. No doubt the pathological explanation of this is that destructive lesions of an irritative character, whether gross or microscopic, are occurring in the sensory or motor centres of the cortex.

The *treatment* of senile insanity is often a difficult problem, because it implies not merely the giving of drugs, but careful dieting, unceasing watchfulness, and a most difficult combination of rest and exercise in the fresh air. A good nurse, skilled and patient, is the first requisite. Change of scene or travel is of course out of the question; the old do best with old scenes and ways. Home or an asylum is commonly our only choice; warm and airy apartments, sunshine if it can be got, warm clothing by day and night, easily masticated and easily digested, non-stimulating foods, of which warm milk and eggs should form a considerable part, are to be provided. Cod-liver oil works wonders in some of the thin anæmic patients. Night feeding is commonly advisable. To combat the dirty habits of the senile insane is often most trying work to the nurses. As to sedatives and hypnotics, my own experience is strongly in favour of sulphonal and paraldehyde judiciously given and carefully watched. I have undoubtedly tided more mild senile cases of the restless type through their attacks by the use of sulphonal in doses of 15 grains and upwards than by any other drug. Tonics and the hypophosphites are often very useful. A general watchfulness over the bowels and other organic functions by the nurse is always very necessary. Sometimes cardiac tonics

are useful. Let the senile patient rest and sleep when he is inclined to, no matter what time of the day it is.

We are gradually building up a rational pathology of senile insanity, and we may say the same of normal senility. In about one-half of the cases, gross lesions, such as "softenings" of the brain and arterial disease, are found. Endarteritis and periarteritis are both now found to be very common, though in many cases microscopic section of the part is necessary for their demonstration. By these means Dr. W. F. Robertson, pathologist to the Royal Edinburgh Asylum, has demonstrated such disease in the majority of senile cases he examined. In nearly all these cases, and in the others where no such gross lesions are found, there are microscopic atrophies and pigmentary and granular degeneration of the large motor cells, the protoplasm of which has wasted and changed in character, having undergone chromatolysis, and the processes of which have largely disappeared. In some of the acutely maniacal cases the membranes are thickened, and the vessels altered in their coats, in somewhat the same way as we find in cases of typical general paralysis, or alcoholic insanity; while, like these diseases, spider cells may abound in the outer layers of the cortex. It is my belief that patients in whom such lesions as these last are found have usually taken too much alcohol throughout their previous lives. In nearly all of them there is found more or less general atrophy of the convolutions and shrinkage in bulk of the whole brain. The whole subject of the mental and motor symptoms of senility is a most interesting one and well worth scientific study in the light of recent brain physiology and histology. Shakespeare in *King Lear* has given us an incomparable representation of mental senility. We may now well supplement and further illustrate the subject by the means which modern science gives us of correlating the physical brain facts with the mental facts he has described. Thus will brain study on scientific lines further elucidate human action.

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Insanity of Phthisis

The question of the attribution of such mental disturbances as can properly be included under the term insanity to diathetic and toxic causes is one of great interest. It may be admitted that to be definitely insane a patient must have had an original tendency in this direction. A family history of neurosis, in some degree or other, is so common a thing that for every case of mental disease there must be ten in which the weak spot, if one there be, never gives way. If some defect of structure be

inherited at all, it may resist destructive influences of low intensity; or such influences may be altogether avoided. To show how the working of the higher cortex of the brain is affected reflexly and directly by disease we need go no further than the manifest facts, now more and more recognised, of the physiognomy and psychology of many ordinary diseases; such, for example, as cardiac and visceral complaints. The mental symptom of the *spes phthisica* in consumption is a very old and certainly a true psychological observation; and this is not the only mental symptom of phthisis. Many authors of repute had long ago noticed the frequency of deaths from tuberculosis among the insane, and it is found that two-thirds of the deaths among idiots result from tuberculosis. As a matter of fact, pulmonary consumption is found three times as frequently as a cause of death among the insane as among the sane of the same ages; and the graver, the more prolonged, and more incurable the form of insanity the higher is the death-rate from this cause. About one-third of the chronic cases of complete dementia end in this form of death. This may mean that, from some cause or other, the condition which makes the lungs a fit nidus for the propagation of the tubercle bacillus exists in thrice the strength in the insane as in the sane; though it is not to be forgotten that the propagation of tuberculosis is favoured by the congregation of the insane often in overcrowded rooms, and by their greater carelessness in expectoration. Now, the chief of the constitutional conditions is probably a general debasement of the nutrition of the tissues and organs of the body, especially perhaps of the lungs. This may mean that certain nervous centres, governing nutrition, have been weakened in action. But beyond these suppositions, certain clinical observations, made by me in 1863, induced me in that year to go into a careful clinical and statistical investigation into the whole relationship of tuberculosis to insanity, when I came to the conclusion that a closer and more interesting affinity exists between these two diseases than the high rate of phthisical mortality among the insane. My chief conclusions were that in certain families there is a close hereditary kinship between phthisis and insanity; and especially that there is a form of insanity so distinct in mental symptoms, and, clinically, so characteristic of pulmonary tuberculosis, that it may be called "phthisical insanity." The chief facts that led me to this conclusion were—1st, That in a certain number of the insane the two diseases appear simultaneously, or, at all events, within a year or two of each other; 2nd, that in a large number of these there is a family history both of insanity and consumption; and, 3rd, that in these cases a certain distinctive group of mental and bodily symptoms is almost always present. The knowledge of these facts has often enabled me to diagnose phthisical insanity by the mental symptoms alone, before the appearance of any symptoms in the lungs. This form of insanity cannot be said to arise from long-continued mental disease, or from the hygienic defects of asylums. The deficient cortical working that is the immediate cause of insanity, and an enfeebled nutrition of the lungs, which may be

one of the important causes of consumption, exist together; and these morbid conditions mutually influence each other.

The general mental *symptoms* of phthisical insanity are a peculiar suspiciousness of mind, mild delusions, an alteration of disposition and conduct in the direction of unsociableness, irritability and moroseness, a lassitude and incapacity for exertion—at any rate at first—a want of interest in the usual avocations of life, and a morbid waywardness and perversion of feeling. The patients can pull themselves together for a time, and may have occasional gleams of high spirits, approaching subacute mania. Food is often refused; it is frequently supposed to be poisoned. The chief bodily symptoms are want of appetite, loss of flesh and incapacity to digest fatty foods, weak circulation, a low temperature, especially of the extremities, and various perverted sensations. Some decided signs of lung tubercle are discovered early in the disease, though they seldom advance very rapidly. Such patients have not the well-marked initial attack of acute mania or melancholia, running on into dementia, as in ordinary insanity. The disease comes on in the earlier ages of life, and is always a subacute psychosis. Often the mental and brain disorder so masks the phthisis that no subjective symptoms are felt by the patient at all, not even when the lung disease is far advanced. The *prognosis* is bad, but not so bad as I used to believe it to be. Under suitable early treatment, which, I may say, is that of ordinary early phthisis, about one-third recover from the mental disease; and many also from the phthisis. This result can only be attained by an early recognition of the fact that we have here to treat a mental disease, as it were on a phthisical basis. Phthisical insanity forms about 3 per cent of the admissions to asylums.

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TOXIC INSANITIES

Toxic insanity depends on poisons either derived from without or generated within the body. All these poisons, in interfering with the healthy nutrition of the highest nervous structures, act alike; and their effect depends on the concentration of the poison, the frequency of its use, and the power of the patient to withstand its effects. We shall see that in some instances the poison, by its volume and by its concentration, annihilates all mental functions at once; this is familiarly known in poisoning by alcohol, and by various gases. In other cases the poison is retained in the body, and produces what are called "cumulative effects." The collection and concentrations of poisons in this way are well seen in the effects produced by lead and arsenic; and it is generally true that the persistence of the nervous symptoms is closely related to the stability of the poison, or to the directness of effect on nervous tissue. Thus lead is a more stable poison than alcohol, and produces much more persistent effects; and the poison of influenza appears to have a directly noxious action on the higher nervous tissues.

Some other poisons are specially injurious to the nervous tissues, such poisons being selective in their specific action; on the other hand, some persons are especially sensitive to one or more of the poisons: certain conditions, again, tending to nervous degeneration, render some persons peculiarly susceptible to particular poisons. In my opinion neurotic persons are, as a class, more open to infectious influences; and the degenerating, such as those suffering from senile, general paralytic and similar brain changes, are readily affected by such poisons as alcohol and narcotics. It may be, too, that in the neurotic the poison of syphilis selects the nervous system for its manifestations. Poisons, whether introduced from without or generated within the body, may affect different parts of the nervous system, and these in different degrees; and consequently the resulting symptoms will differ enormously. Almost any form of mental (and nervous) disorder may arise from poisons; disorder extending from slight social incapacity to absolute and permanent dementia.

I shall now endeavour to group the results of poisons in such a way that they may be readily compared; but it will be impossible to give more than an outline of the subject.

There are several points of special interest which must be noticed before proceeding to other details. As a rule the poison is absorbed in small doses, and produces its first effects on the highest and most specialised parts of the nervous system. Loss of power of accommodation to special social conditions are seen earlier than loss of common mental faculty; at a later stage affection of the peripheral nervous system gives rise to various

illusions and hallucinations of the senses, which may set up insanity with organised delusions; next, if its influence continue, the poison leads to permanent structural changes which weaken the will, the control of the emotions, and especially the recent memory. Another characteristic peculiarity is the establishment of an organic need for the poisonous stimulant; a "habit" or craving which, in the case of the stronger poisons, can only be compared with lusts or irresistible passions. These desires lead to dishonesty and untruthfulness, which mark the strength of the poison and the weakness of the nervous system.

The poisons may act directly on the nervous tissues, affecting either the central or the peripheral parts first and chiefly; or the poisons may interfere with the general nutrition, and affect the nervous system mainly by altering the nature or amount of the blood-supply.

External poisons are chiefly absorbed through the respiratory or the digestive tract; though the skin or other surfaces may in some cases be the sources of infection.

Malaria, giving rise to ague and various intermittent and remittent fevers, may cause impairment of the nutrition of the nervous system; and though serious effects are not common in England, yet sleeplessness, neuralgia, mental depression, loss of power of application, doubt, suspicion, dread, fear of impending evil, are met with in such cases, and are relieved by such remedies as quinine and arsenic. I have met with acute mania and acute melancholia following ague; and permanent mental weakness, with some definite changes in the brain tissues, has been described as a result of prolonged exposure to malaria.

Special reference has been made to pigmentation in the higher brain cells in these cases, but on this subject further evidence is required.

Influenza is a disorder which resembles malaria, and there is no doubt that its effect on the nervous system is definite and severe. During the recent epidemics I have seen certain forms of mental disorder following influenza, especially in predisposed subjects. Sleeplessness, neuralgia, neurasthenia, delirium, and peripheral neuritis are some of its consequences; and though in the great majority of the cases these symptoms pass off, yet in a very large number actual insanity arises.

Influenza may give rise to insanity in highly neurotic subjects; it affects persons who have previously been insane; those who are at critical periods of life, such as that of childbirth or the menopause; and, still more commonly, those who from age, arterial degeneration, or alcoholism are already showing signs of wear in their nervous systems. In comparatively few instances does the insanity follow the first attack of influenza; but the neurotic seem specially liable to frequent recurrences of the disease, recurrences which sooner or later produce serious injuries in the brain. Like alcohol, then, the influenzal poison disposes to fresh attacks, and tends to nervous degeneration.

Influenza may cause not only genuine insanity, but also diabetes, megrim, nervous deafness, epilepsy, various paralyses, and so forth. Though as a rule the mental symptoms following influenza are of the melancholic

character, yet in some instances the febrile stage passes from delirium to acute delirious mania of a very grave kind. In most cases there is well-marked and distressing sleeplessness, accompanied or not by paroxysms of neuralgia; this sleeplessness is followed by waves of profound mental depression. In many instances the melancholia is simple, that is, without delusions; although the depth of despair and the paroxysmal nature of the symptoms frequently lead to suicide.

In many cases there are sensory disorders, and hallucinations are common; sensory defects, such as deafness, are frequently met with also in patients who have already been insane, but who have been free from mental illness for many years. Influenza brings a return of their malady; and in chronic insanity recrudescences of mania or melancholia are common. Delusional insanity is frequently made worse, or started afresh.

Sometimes stupor succeeds the delirium, the epileptic fits, or the acute mental disorder which follows influenza. In some cases puerperal insanity begins after an influenzal attack. In a very few cases the febrile stage of influenza appears for a time to relieve the mental symptoms. Senile insanity of various forms may be precipitated by influenza.

In doubtful cases of general paralysis, influenza commonly clears up the diagnosis. Many patients who have been losing some of their mental power, but who are not supposed to be suffering from this disease, after an attack of influenza become manifestly paralytic. In some cases of alcoholism influenza gives rise to marked symptoms of degeneration. Though a considerable number of patients do not recover, yet, if suitably placed and properly treated, the young, and middle-aged and temperate patients do get well; though not completely perhaps for one or two years. Many patients are left changed, weakened, or aged by the attack. Rest, sea travel, tonic treatment, and the free administration of quinine and alcohol are the most efficient means of cure.

Dr. Leledy of Bourges summed the matter up as follows:—Influenza may set up psychopathy. Insanity may come on at any stage of influenza; and this disease may set up any form of insanity. No specific symptoms result from influenza. The part played by influenza in the production of the insanity varies; it may take a nearer or a remoter place in the causation. In all cases there is acquired or inherited nervous instability. The insanity follows altered brain nutrition, possibly toxic. The onset of insanity is often sudden, and bears no relation to the severity of the influenza. The instability depends on general rather than on the special conditions. The insane are less liable to take influenza than the sane (this is probably not true). Rarely, it has cured psychoses. There may be remission of symptoms during influenza. Influenza may lead to crimes and medico-legal issues.

Insanity of various kinds has followed the **inhalation of poisonous gases**. The most common cases arise from exposure to *coal gas*. In these there is not infrequently complete insensibility, followed by a more or less pronounced state of stupor or acute dementia. In some cases the stupor

is followed by a period of mental excitement of the hysterical or maniacal type; in my experience, it is more rare for mental depression or delusional insanity to arise.

In patients already degenerating, poisoning by coal gas may accelerate these changes, hastening the symptoms of general paralysis or those of senile dementia. Complete loss of memory of the accident, and of some interval after it, is common. Similar symptoms may follow poisoning by sewer air, if this be concentrated.

Carbonic acid gas poisoning leads to states of mental stupor, which may be very long, or even permanent.

Chloroform, ether, laughing gas, and other anæsthetics occasionally produce mental disorder, mania of hysterical character or stupor being the more common result. I have known one lady after chloroform, and another after "gas," behave as if they were drunk, a state which continued for some days (*vide* art. "Surgery and Insanity," p. 318). In some neurotic patients the use of anæsthetics during labour seems to have contributed to subsequent insanity.

The poisons which give rise to *fevers* may be considered under this head of air-borne poisons.

Typhoid fever is water-borne as a rule, but the symptoms produced by it are like those following similar poisons borne in the air.

In any febrile state delirium may occur, and this is more likely to occur among the neurotic. Delirium may be the starting-point of acute mania; after the delirium, or after fevers apart from delirium, there may be marked evidence of mental weakness, as shown by loss of recent memory, weakness of will, emotional weakness, and social incapacity. Moral insanity also may follow febrile disorders.

In some cases there is a direct connection between the height of the fever, the degree of delirium, and the mental weakness; but in other cases no such relation exists. It may be mentioned that the joint pains disappear with the delirium of hyper-pyrexial rheumatic fever.

Next we have to consider the **poisons which arise in the body** itself. Mental disorder may be the expression of disease of any of the excretory glands.

With *jaundice* depression is very common, and at times there are sensory hallucinations. I have myself met with only one (doubtful) case in which a jaundiced patient complained of seeing all things yellow. With hepatic trouble profound melancholia is not uncommon, and the interpretation of the miserable feeling will depend to some extent on the age, sex, and condition of the patient; the old man fears ruin, the middle-aged woman dreads dishonour. Gall-stones and their consequences are very common among the chronic insane in asylums, a proclivity dependent on their inactive life, good feeding, and torpid bowels.

With *albuminuria* there is a tendency in some patients to great irritability and to depression; and I have known many suicides depend on this state. Worry and anxiety lead to kidney disease, and kidney disease often accentuates worry and depression.

In some puerperal cases albumin may be present in the urine, but this is not a common occurrence.

Eclampsic attacks, associated with albuminuria, occasionally give rise to mental disorder of various kinds.

The convulsions of uræmia, if recovered from, may leave permanent mental weakness.

The relation of *excess of uric acid in the blood* to various neurotic states has been very fully studied by Dr. Haig; some persons seem to owe their mental depression to some such perversion. The old notions of suppressed gout and of gouty metastasis to the brain represent the fact that in some persons who are gouty, the cessation or arrest of a gouty attack may be associated with mental disorder, which is frequently melancholic. I have never met with greater mental misery than in such cases, and in them the tendency to suicide is very great. A return of the gout clears off all the melancholia. In some cases the suppressed gout is represented by hypochondriacal melancholia of a very harassing kind. Instead of suppressed gout maniacal symptoms may come on before, during, or after an attack of gout; and the mania, as a rule, is violent and dangerous. Such patients chatter without ceasing and rapidly exhaust themselves.

Furthermore, in such subjects epileptic seizures may occur, and mental weakness and premature senility are not uncommon.

Sugar may be found in the urine of insane patients, and the present opinion is that this may occur as a passing symptom in some puerperal cases, and that it may be transient and in no way connected with the insanity. In certain other cases it may be present only during the insanity, and be related to the insane state, or may occur only while the patient is sane and disappear while he is insane.

True diabetes occurs in members of neurotic families, and it may alternate with other neuroses.

Towards the close of diabetes, marked mental weakness may be evident; and some of the most extreme examples of insane hypochondriasis are met with in such patients. After the convulsions or coma of late diabetes marked dementia may come on. Sugar may be present in the urine of neurotic patients without producing any mental disorder.

Blood poisoning produces a certain proportion of the cases of puerperal insanity, which generally arise within a few days of delivery; the thermometer must be the chief test of this, for acute delirious mania, which may also arise at the same time, is hardly to be distinguished from septic puerperal mania; but the temperature of the septic disease rises higher and is more variable than that of acute delirious mania. Septic puerperal insanity is generally maniacal in form, but it may be active melancholia or stupor. Though most of these cases are very grave, a certain number pass through the ordinary stages of the mental disease, and exhibit their septic nature only by some lung complication, or by some secondary abscesses. After severe injuries, such as railway smashes, I have met with a few instances of mental disorder which were in part

attributable to septic troubles. Septic troubles may arise from large suppurating surfaces; and it is necessary to record the fact that iodoform applied as dressing to wounds may give rise to maniacal excitement, which rapidly passes off with removal of this dressing. There is nothing specific in iodoform mania: it may occur with the first dressing, or it may result from its prolonged use; it gives rise to restlessness, to sleeplessness, to irritability passing into mania; and the mania may rapidly give place to stupor or mental weakness. In some cases a degree of mental stupor follows the recovery from the acute disorder.

In a certain number of cases erysipelas precedes the outbreak of general paralysis, and the connection between these diseases appears to be more than accidental.

Among the organic poisons, syphilis has been already referred to (p. 310, and special articles).

It is almost certain that acute delirious mania, or grave delirium (see p. 320), depends on some auto-toxin; and I am confident that sooner or later it will be found that some rapid degenerative change in the highest nervous tissues produces the poison which so rapidly and profoundly affects the whole nervous system.

Defective action of glands may so seriously affect the general nutrition as to cause insanity. Cretinism and myxœdema are examples of this; and I believe that in certain adolescents the imperfect action of ovaries and testicles give rise to defective general development. Such are certain conscientious, passionless youths with feeble circulation who seem unable to grow into vigorous social units.

Lastly, we have to consider the group of cases depending on poisons taken from without, usually through the mouth or skin.

Alcohol is the most important of these, and in England the increase of insanity is generally considered to vary directly as the increase of the consumption of alcohol. This subject is considered separately (p. 322), but I may sum up its effects thus: alcohol acts directly on the nervous tissues; it produces excitement, followed by exhaustion and decay; it affects neurotic more than non-neurotic persons; it affects more seriously the higher nervous systems of those who are already degenerating along their nervous lines; it acts most injuriously after injuries to the head and sunstroke, in cases of general paralysis, and in senile degeneration. Immediately or remotely it may cause insanity. It may produce delirium tremens, delirium e potu, or acute delirious mania; and the delirium tremens may be prolonged, and even persist as chronic mania. It may produce sudden stupor, or more or less complete dementia. It may give rise to peripheral neuritis of various forms, which may start illusions, hallucinations, and delusions. The result of these sensory disorders may be one or other of the forms of systematised delusional insanity, persecution mania, insane jealousy, suspicions, paranoia, monomania of grandeur, and the like. It may give rise to epilepsy, and to its mental consequences. It may lead to defect of memory, or to insanity of doubt, due to loss of will-power. It may establish a habit of intemperance, chronic or recurring

(dipsomania). It may assist in the production of general paralysis, and it gives rise to criminal tendencies and to crime; from the parent it may be transmitted to the child, showing itself in degeneration of mind, morals, or body.

Idiocy, imbecility, epilepsy, neurosis, and crime are among the results of parental excess in alcohol.

I have met with a few instances of acute insanity following poisoning from *belladonna*. In these cases the delirium of belladonna poisoning passed directly into delirious mania. In all the cases there was strong neurotic inheritance. Atropine has in rare cases, even when dropped into the eye, set up temporary mental disorder.

To the effects of anæsthetics in producing insanity I have referred already.

Duboisin may set up mental disorder resembling that due to atropine.

In England we have little experience of the poisoning produced by *Indian hemp* (Cannabis indica), but Drs. Sandwith and Warnock have described the effects of the poison (vol. ii. p. 900).

Morphine is next to alcohol the poison most frequently regarded as a cause of insanity (see vol. ii. p. 892). In referring shortly to the subject here I would premise that as the neurotic are more sensitive to pain, and less tolerant of discomfort, they fly the more readily to sedatives, and suffer more from their use. Unfortunately, medical men are, of all persons, the most given to the abuse of morphine. It gives rise to insane habit (morphinomania), loss of moral sense, of truth, honesty, and all altruistic feelings. It gives rise to sensory illusions and hallucinations, which may originate various forms of delusional insanity, resembling those produced by alcohol. Suspicion, jealousy, fear of detectives are common in such patients. Visions of a terrific kind may occur by night or day. Distaste for food, with ideas of poisoning, may follow. Affections of common sensibility may set up ideas of unseen or electrical influence, hypnotism, spiritualism. Various defects of knowledge of time and space, somewhat similar in those occurring with alcohol, may appear. During the period of indulgence, or more often on the attempt to break off its use, mania or active melancholia of a very violent or suicidal type may arise. Vomiting may cause further exhaustion, and the free use of stimulants may be required. I believe in the sudden and complete withdrawal of the drug, and I do not believe in the gradual reduction. If the whole of the drug is withdrawn, and a full dose of sulphonal (or paraldehyde) is given, the patient being kept under chloroform for an hour till the mild sedative is at work, the worst will be got over, if the vomiting be not very severe. Rectal feeding and the administration of chloral hydrate by the bowel may be necessary.

Cocaine may produce acute delusional insanity in persons strongly disposed to its influence; but as a rule the hallucinations and ideas of persecution rapidly pass off. In my experience it produces hallucinations and delusions chiefly in those who take it in the hope of reducing the suffering while they are breaking off the morphine habit: in these cases

the nervous system has already been seriously affected by the morphine, and the cocaine acts only as the exciting cause of the insanity. General systematised delusional insanity follows, which rapidly diminishes on the removal of the drug. In a few cases the nervous system has no power of recovery, and chronic delusions or chronic mental weakness results.

Sulphate of spartein is used by some morphine takers, and atropine by others, to conceal their habit; and these alkaloids may assist in the nervous breakdown and may colour the mental symptoms which arise.

Chloral hydrate, if taken in very large doses, may cause stuporose dementia or profound melancholia. In continual doses it leads to some moral perversion, and may give rise to delusions of persecution. It may start sensory illusions and hallucinations, but these are not very common. Stupidity, slowness of reaction, doubt, and suspicion are the most common symptoms produced by its prolonged use. In some instances the symptoms resemble those of general paralysis.

The use of *antipyrine* may become a habit, and even a craving, but I have not met with any cases of insanity following its use.

Lead, arsenic, and phosphorus may each give rise to forms of mental disorder. *Lead* appears to have a special power over the nervous system, and it may cause general or local nervous disorder. When taken by the mouth or through the skin, it may give rise to symptoms directly, or the result may follow an accumulation of the drug in the system. Acute mania may follow the taking of such a poison as plumbic acetate, or the absorption of lead from lotions. The mania may be of short duration, or having been set up by lead, may follow an ordinary course. Melancholia or stupor may result from the more slow absorption of the poison, but mental weakness is more common. The dementia of lead poisoning may be transient, or it may be part of a steady progress of degeneration leading to true general paralysis of the insane. General paralysis is started in a few cases by lead alone, or by lead and alcohol or lead and syphilis. Lead may give rise to peripheral neuritis and to palsies, which may be associated with delusions, illusions, or hallucinations chiefly connected with ideas of poisoning, persecution, and the like. Lead may cause epilepsy, and with the epilepsy there may be simple mental weakness; or any of the mental disorders associated with epilepsy may be met with.

Arsenic taking leads in some cases to a craving for it, and this may be associated with a loss of higher morality; but I have no experience of insanity due to habitual use of arsenic. *Phosphorus*, however, as we all know, may cause various forms of mental weakness.

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INSANITY AND SURGICAL OPERATIONS

A SEARCH through the reports of cases will reveal the occasional occurrence of mental disturbance after surgical operations. Only of late years has attention been drawn to this form of insanity, as a direct sequel of the operation; and, as the connection is still uncertain, little more can be done, at present, than summarise the main features and varieties of the complication. Without speculating on the precise causation, it may be noted that certain factors which may readily conduce to mental disturbance are present in any surgical operation of magnitude; and from the prophylactic as well as from the prognostic point of view, it is important to take these into account. Such are—the mental strain of anticipation; the actual operation, which may cause pain, bring about relief, or entail shock; the mental reaction, even after an entirely successful operation. Among the possible after-effects sepsis, too, must be reckoned. All these influences seem at first sight so likely to induce some degree of mental disturbance that it is strange indeed to find the sequel so rare. That insanity is a direct sequel of surgical operation is shown by the remarkable fact that it occurs frequently in persons in whom there is no inherited liability to mental disorder. Making every allowance for the difficulty of obtaining a trustworthy history, the absence of any heredity in the majority of cases seems well established. In this respect the disorder has some affinity with instances of "Transitory Mania." It is true that instances have been recorded in patients the victims of marked heredity, but these do not constitute the largest proportion of published cases. The exact contrary has been asserted by French surgeons; but I have seen and collected so many cases which support my statement that I cannot but believe that the heredity has been at times assumed to exist. As cases in which undeniable heredity is present exhibit no very special features, little reference will be made to them in this article.

In all the cases there is a distinct period of quiescence after the operation, from the immediate effects of which the patient apparently recovers in a perfectly normal manner. The mania is thus to be distinguished from that produced by anæsthetics. In the latter instance the insanity is directly consequent on the operation, and the consciousness is affected or lost, possibly for weeks or months, from the time of the anæsthesia. The distinctive characters of the two varieties of insanity are settled by the fact that mania has followed operations where no anæsthetic was given.

The period of quiescence may vary from a few days to some weeks; the shortest period known to myself is two or three days, the longest eight weeks; the usual time being about one week. The complication may occur at any age, but it seems more prone to affect the young than

other forms of insanity. I have seen well-marked instances in children of six, eight, and eleven years of age. My experience, therefore, differs from that of MM. Hartmann, Broca, and others, who state that while they have frequently seen transitory delirium (*délires passagers*) they have never observed real psychoses in the young. But profound mental disturbance, associated with delusions and hallucinations lasting for many weeks, cannot be dismissed as a *délire passager*, and such a condition I have seen in several instances.

The onset is insidious and gradual. Usually in the case of children, and frequently in the case of adults, the first symptoms noted are fretfulness and a change of manner. The child conceives a dislike for the nurse or the mother. In young patients the disorder may not progress beyond this point, and in a few days or weeks the symptom passes off. The young often exhibit a repugnance to those nearly related to them which may amount to a horror; and older patients may exhibit entire indifference to those for whom they previously had much affection, or even hatred of them. This distressing feature disappears on recovery. The patients often become garrulous; they are usually dirty, in the young this is nearly invariably the case. Sometimes they are restless, disturbing their dressings; but as a rule they pay little attention to the wound. The temperature is usually raised, with a mean from 100° to 101° F. If the mania becomes chronic, the temperature may become sub-normal. The increased temperature seems independent of the wound. Any surgical procedure necessary during the progress is, as a rule, well borne. If the wound is doing badly, and the diseased part can be wholly removed, the further operation will be more likely to benefit than harm the mental condition. If an anæsthetic be desirable, it is well to substitute one different from that originally employed. Generally speaking, when the patient is in a state of mania, chloroform answers best. If the wound progress satisfactorily, the patient's appetite continuing good, and the weight keeping up, recovery, both of mind and body, may be looked for with some certainty.

Acute mania is not very common, though it may occur. The chronic and the milder forms are most frequently seen. Delusions and hallucinations are frequent; in my experience the patients frequently become suspicious. The hair occasionally becomes coarse and stiff; and a return of the hair to its normal condition is often an early indication of recovery from the mania. The skin appears to show little change. Anæsthesia or hyperæsthesia is not commonly seen; but occasionally, as in delirium, there is insensitiveness to pain in the wound. Though the mental condition of itself appears to exercise no injurious influence on the progress of the wound, if the operation has been a grave one, and the mania is acute, death may occur; but even in cases which end fatally the wound may progress in a perfectly normal manner.

Causation.—The occurrence of a complication, such as insanity, after a particular case of operation, naturally leads to a search for instances of a similar character; and the conclusion is, on this account, apt to be too

hastily drawn that the operation in question is one especially likely to be complicated with mania. More extended search tends, however, to confirm the conclusion that the nature of the operation has little to do with the matter. At one time it was supposed that operations involving the peritoneal cavity are more apt than others to be followed by insanity. Many cases of insanity following operations on the female pelvic organs have been recorded; and it might be thought that the disturbance would be especially apt to follow operations of this class. But the occurrence is certainly rare; and some surgeons who have had very extended experience in this particular branch of practice have never met with an instance of it. Mania has been known to follow operations of magnitude; such as amputations, excisions of joints, perineal section, ovariotomy, or hysterectomy: but it is recorded also after such slight surgical procedures as tenotomy, ordinary operations for necrosis, and the like. The variety shows that no class of case is exempt. As regards the nature of the operation, no one factor or combination of factors can be accountable. Instances of insanity have been noted after all the operations quoted, in none of which could the slightest tendency to heredity be traced. Recently several cases have been published where insanity followed the operation of castration performed for the relief of enlargement of the prostate gland. The point is one of some surgical interest, especially when we consider that in old days this treatment was recommended for epilepsy.

Seeing that one form of puerperal insanity is held to be due to sepsis, and that surgical insanity has obvious points of affinity to that disorder, it is not surprising that some authors hold that insanity after an operation is due to failure to maintain an aseptic condition of the wound. It may seem bold in these days to assert that any sort of complication is unconnected with sepsis; but in my own opinion the insanity under consideration is commonly, if not always, quite independent of septic absorption. Insanity may occur where the wound heals absolutely by first intention throughout.

It is well known that certain drugs may produce insanity, as for example, iodoform, morphia, belladonna, or eserine. Such drugs might be used either as surgical dressings, or in the after-treatment of a case: but in many of the instances none of the agents commonly held accountable has been used at all; and the fact that mania has been known to occur with every variety of after-treatment shows that it may originate independently of toxic causes. Indeed, as already pointed out, the mania may occur while the wound heals absolutely by first intention, and when there can be little or no absorption of any drug, unless given by the mouth.

As regards the *prognosis*, good hopes may be entertained of ultimate and perfect recovery if the mania be chronic and the patient otherwise healthy. On the other hand, if the patient be the subject of grave disorder, and his constitution broken down by alcoholism, renal disease, syphilis or the like, the mania is likely to persist and to run on into

chronic dementia. Recovery, when once the mental convalescence begins, is tolerably rapid. In the young, recovery is almost invariable.

Throughout, the mental and the surgical aspects of the case can be considered rather apart, for the former affects the latter but little. The possibility, however, of some causes of irritation being present as the result of operation, leading to what is known as reflex insanity, must be borne in mind. A buried drainage-tube, or the irritation of an unabsorbed ligature, might be the persistent cause of mental disturbance, and recovery might depend on the removal of the foreign body.

On several occasions I have operated a second time on patients who have had attacks of this surgical insanity, without any repetition of the complication.

The stages of recovery are as with other forms of mania. The leading symptoms abate, delusions and hallucinations subside, and the patients have no recollection of events that happened during their period of insanity; as they improve further they become to some extent conscious of their own condition, and aware that something is wrong with them, and finally they recover their faculties sufficiently to realise fully that they have been out of their minds. But there is complete amnesia as to events and as to the lapse of time; and there will be no more memory of occurrences during the period of mania than in cases of concussion during the period of unconsciousness that follows the head injury. The amnesia, however, is not, so to speak, retrospective; as happens occasionally in concussion, where the patient may have complete and permanent loss of memory of all that occurred some time previous to the actual injury.

The *treatment* is simple, and may be briefly dismissed. The great point is to feed the patient well. So long as the appetite continues good the case is hopeful. Drugs, such as iodoform, had better be discontinued if insanity occurs; and it is often wise to substitute other dressings for those in use, or, when the wound has to be washed out or irrigated, to change the antiseptic solution. Hyoscyamus or hyoscyamine answers well in procuring sleep in many cases. Bromides are not to be recommended as they tend to depress the patient. The dirty habits of the patients, while the insanity lasts, render them liable to bedsores, and especial care must be taken to prevent them.

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ALCOHOLIC INSANITY

In discussing alcohol as a factor in the causation of mental disease, there are several points of importance to be borne in mind. Some persons cannot maintain health and nourishment without the aid of alcohol, while others cannot tolerate its use even in small quantities. It may therefore be either beneficial or injurious. "One man's drink another man's poison" is not altogether a question of quality or quantity; much depends upon the peculiarities of the drinker. We have to consider—(*a*) the cause of alcoholism; (*b*) alcohol as a cause of insanity; and (*c*) the characteristics of insanity associated with alcoholism.

The **causes of alcoholism** are not infrequently overlooked in our estimation of cases of insanity. There may be a physical or a mental craving for alcohol, or a diminished power of resistance to its effects, the proclivity being the expression of an unstable inheritance; or, on the other hand, the nervous instability may manifest itself by a tendency to epilepsy, insanity, idiocy, imbecility, or other neurosis. This neuropathic diathesis, when due to alcohol, shows itself by an increase in mortality, diminution of the number of births, decrease of moral energy, and slowness in the rate of development of the intelligence. The majority of drinkers are disposed to drink by heredity. In 100 recent cases of alcoholic insanity admitted into Bethlem, no less than 67 had a neurotic inheritance; 32 had a family history of alcoholism: in 8 cases only was there a history of alcoholism without insanity in the parents. Alcoholism without insanity or other neuroses in the parents is more rarely followed by alcoholism in the offspring than when other neuroses in the parents are contingent factors. Alcoholism in the parents is, however, a very common factor in determining the occurrence of other neuroses in the offspring.

Analysis of another series of 100 cases, in which intemperance in the parents was the sole ascertained cause, confirms the experience of Dr. Bevan Lewis that the alcoholism was almost exclusively limited to the father; in one case only was the mother addicted to drink.

The proclivity to drink may show itself in several ways: (i.) it shows itself precociously, and the brain is more readily affected by alcohol; (ii.) alcohol may engender or determine a psychosis which is inherited, or reveal ideas or tendencies which normally were kept in subjection; (iii.) delirium tremens, mania transitoria, impulsiveness, tendencies to rash acts, and even epileptiform seizures manifest themselves under alcohol; (iv.) mental disorders may appear suddenly, due to causes other than alcohol; or sometimes even the sudden suppression of alcohol will determine an attack of insanity (*delirium e potu suspenso*); (v.) sensory perversions are more common, especially illusions and hallucinations of sight; (vi.) according to Legrain, suicidal attempts in these patients are

planned and not impulsively carried out. This, however, is not invariable. In one remarkable case, now in Bethlem, marked amnesia, analgesia, and suicidal intentions carefully planned, are the main symptoms; the chief factor of causation being a hereditary disposition to drink. Further, in regard to heredity, there appears to be a greater tendency for the female children to be affected by insanity; they break down more readily, and from slighter causes, than the males. In a certain number of predisposed persons a craving exists which may be quite independent of use of alcohol; thus the heredity may be alcoholic and transmitted as a craving, or purely nervous, with alcohol as an accidental factor in the child as in the parent. I have seen three brothers who manifested the existence of hereditary cravings by the abuse of morphia, cocaine, and alcohol respectively.

The causes of drink-craving are therefore important, and the same causes may induce insanity or alcoholism, or both. Some conditions of exhaustion require alcoholic stimulation in order that the failing energies may be restored. Out of 100 cases in which alcohol was an assigned factor of causation, in 11 only could it be said that alcohol was the sole cause. In all the other cases other factors were at work; such as syphilis, sexual excesses, bodily diseases, money losses, domestic griefs and worries, injuries to the head, intracranial diseases, or other conditions, which were either the causes of the habit, or at least as important factors as the alcohol itself in the causation of the insanity. Syphilis, cranial injuries, sunstroke, malaria, and many other diseases render individuals very prone to suffer from the effects of alcohol; and in hot climates alcohol is more particularly dangerous to such persons.

Dr. Bevan Lewis finds that mental affections due to alcohol are far more prone to occur between the ages of twenty-five and thirty, and, again, from thirty-five to forty-five, than at other periods of life. The reason why the ages of from thirty to thirty-five are marked by special immunity is not explained. Children can directly inherit the tendency to drink; therefore it happens not infrequently that cases of genuine dipsomania occur at the early age of four or five years. Cohn, Maden, Moreau, and others have recorded cases of alcoholic delirium in children between the ages of five and eight years. Possibly alcoholism is more frequent in children than we at present imagine. When insanity supervenes the symptoms are nearly the same as in adults; but the prognosis is naturally more grave. In old age alcoholism may be symptomatic of brain decay; and the alcohol may tend to increase the failure of the mental faculties, and to hasten the cerebral degeneration.

Pathology.—The effects of alcohol upon the tissues and functions of the body generally have been described already (vol. ii. p. 859): its effects upon the vascular and nervous tissues of the cerebrum are far-reaching and frequently disastrous. The vascularity is almost invariably increased. Bevan Lewis has drawn attention to enlargement of the cortical vessels with advanced atheromatous, fatty, and degenerative changes in their coats. The nuclei in the adventitia proliferate freely, and the protoplasm of the cell structure becomes fatty. Aneurysmal dilatations are frequent;

and here and there are to be found collections of extravasated blood, hæmatoidin crystals, and sometimes fat embolisms. Associated with the vascular dilatation there is frequently an increased effusion of the plasma of the blood. In the degenerative processes due to chronic alcoholism the nuclear proliferation and overgrowth of the connective tissue cells appear to be closely related to the continued dilatation of the vessels and the consequent increase of exudation of lymph into the tissues.

The mechanism of the dilatation would appear to be of primary importance, but we have rather to do with the part played by the vascular endothelium and the inflammatory exudate. When dilated the walls of the vessels are weaker, and the exudation of plasma is more readily induced. In ordinary inflammation the exudate contains a relatively smaller quantity of proteids than does the blood plasma—owing possibly to the selective activity of the endothelial cells. In this case the extravasated leucocytes tend to undergo rapid destruction and dissolution. When alcohol is conveyed to the plasma the metabolism of the leucocytes is retarded—owing to deprivation of the tissues of some of its oxygen; and there is retention and proliferation of the exuded material. We have in this way a tendency to the development of more stable but less highly developed tissues.

Dr. Bevan Lewis contends that certain cases of chronic alcoholism are very similar to cases of general paralysis; and that in alcoholism the morbid change is centred in the atheroma of the inner coat; whilst in general paralysis the adventitial sheath is mainly affected. Periarteritis, however, occurs in many conditions other than chronic alcoholism, so that this question need not detain us. In every instance of alcoholic cerebral degeneration we have to deal with the part played by the inflammatory exudate, that of the alcohol in the exudate, and the combined effects upon the nutrition and metabolism of the nervous structures.

Before attempting to sum up the evidence in favour of this or that causative condition, we must mention the more important changes described in the nerve-cells and their processes. Bevan Lewis describes the motor cells of the cortex as being swollen and rounded, staining deeply, granularly pigmented, and with degenerated apical processes. The cell wall is thickened, and a considerable quantity of pigment is deposited between the shrinking protoplasm and the cell wall. The processes of the cells are described as stunted, and covered with nuclei; and the protoplasm as being granular or vacuolated. In the lowest layer "scavenger" cells and nuclei cover the spindle cells, which are very much altered and degenerated, and are devoured by these proliferating cells. The medullary sheath of the nerve processes gradually disappears; or is so altered by the invading connective tissue that the axis-cylinder, which is frequently fusiform as in other cases of inflammation of the nerve fibres, can be easily demonstrated by means of aniline stains. Binz has shown that there is evidence of parenchymatous, cloudy, or granular swelling of the protoplasm of the larger cells of the cortex; appearances which have been regarded as evidences of increased

activity of the protoplasm. At first there is little or no change in the appearance of the nucleus; but subsequently, if the process be continued for a long time, the nucleus also becomes affected and slightly granular. The exact nature and disposition of the granules in the nerve-cell is now receiving considerable attention: in some instances they are arranged in linear series; in others they are scattered indiscriminately throughout the cell structure. What determines the relative coarseness or fineness of these so-called granules is as yet a matter of investigation; and it is at present doubtful how far some of the varied appearances met with may be artificial.

Certain changes in the anatomico-physiological connections between the neurons in alcoholic insanity have been described by Dr. Andriezen and others. These changes are described as occurring in the ultimate protoplasmic expansions and contact granules; and also in the ultimate naked fibrils (collaterals and terminals). Beginning with softening and swelling of these contact granules, and also of the protoplasmic twigs on which they are situated, the earliest noticeable changes are due to coalescence of these into small irregular composites, recognisable here and there as a local coarseness. As the changes progress in coarseness and extent, moniliform swellings appear along the course of the terminal protoplasmic twigs. These changes affect the cells of the ambiguous, long pyramidal, and polymorphic layers; but the chief stress of the lesions appears to fall in the regions of the molecular and sub-molecular plexuses, and in that of the sub-pyramidal plexus. These early changes in the fine protoplasmic contact granules of the apical expansions are regarded by Andriezen as associated with the amnesia so characteristic of some forms of alcoholic insanity. The fine collaterals and terminals of the molecular, sub-molecular, and sub-pyramidal regions also become granulated and wrinkled in outline, with irregular swellings here and there.

Dr. Berkeley has studied the lesions produced by the action of alcohol on the cortical nerve-cells of the brains of rabbits, and found that a large number of the cells were abnormal. The principal lesions were:—distinct diminution in size, shrinkage of a vast majority of all the cortical cells, disappearance of the gemmulæ, and certain swellings in the dendritic processes, to some extent of the cell body also. The basal dendrons became involved only after the cell body had undergone degeneration. Possibly Berkeley is correct in his belief that the moniliform swellings of the dendrites and the loss of the lateral gemmulæ form the first step in a pathological process which ends eventually in the partial or complete disintegration of the cell structure; but we do not as yet know enough about the nature of these structures to satisfy ourselves of the correctness of his view. Dr. Alexander Hill believes the so-called "thorns" to be organic structures which are not shown in their entirety by the chrome-silver method; and that a thorn is really the cell-end of an unstainable nerve filament surrounded by a film of staining cell plasm. The pathological data are undoubtedly of great interest; but the uncertainty prevailing as to the trustworthiness of silver preparations renders it unsafe to build too much upon them. This

conclusion is also supported by the fact that precisely similar appearances have been found in preparations from a case of paralysis agitans in which there were no mental perversions; and also in several cases of insanity in which alcohol was not a factor of causation. The varicose appearance has also been recognised in many other affections of the nervous system, including general paralysis, secondary dementia, and rabies. In the near future we shall probably learn what constitutes disease (cytolysis) and death (cytoclasis) of the nerve-cell; and it will then be a comparatively easy step to determine how far regeneration (cytothesis) is possible.

Symptoms.—The ordinary symptoms of alcoholism are too well known to need description (vol. ii. p. 839). The features of alcoholic insanity are varied and important both in a bodily and mental sense.

Motor disturbances are manifested chiefly by enfeeblement, incoordination, or paresis. Tremors, twitchings, spasms, or cramps may affect any of the muscular structures. The tongue, lips, eyelids, and fingers are usually tremulous; the limbs and even the intestinal viscera may be affected by muscular spasms; and the corrugators, orbiculares, scaleni, and sternomastoids are frequently affected by twitchings. Speech is often blurred, hesitating, and thick. The tongue may be not only tremulous, or ataxic in its movements, but also protruded to one side. In acute cases, where there is rise of temperature, refusal of food, sickness and loss of weight and strength, the tongue may be furred, dry and cracked. The speech resembles that of general paralysis, but in general paralysis improvement does not take place as in alcoholism. Similarly, the tongue tremors pass off more readily in alcoholic affections. Most drunkards display incessant movements and general restlessness; with also a characteristic tendency to impulsive violence, which may result in suicide or homicide. Epileptiform seizures may occur in varying degrees of severity, from mere dizziness, syncope, or *petit mal* to actual paralytic strokes. Hemiplegia and aphasia sometimes occur. Functional affections of the spinal cord are common, with abolition of the spinal reflexes. The knee-jerks may be absent, exaggerated, or unequal; and ankle clonus may be present. The gait is sometimes ataxic, or spastic. Impaired movement is often shown by stolidity or loss of expression, or by asymmetry of the face. Inability to walk, with evidence of alcoholic neuritis, is much more frequent in women than in men (3 : 1), and occasionally there is loss of control over the sphincters.

The eye symptoms are of importance. Nystagmus has been observed rarely, and is apparently of doubtful significance. The pupils may be dilated or contracted, with or without failure of reaction to light and accommodation. Inequality is present in about 40 per cent of the cases; and irregularity of the margin is also comparatively frequent. Sometimes the cornea is duller in transparency, and the visual acuity may be diminished. Mere inequality of the pupils is not so significant as the absence of reaction to light. When there is failure of reaction to light, the pupils being either dilated or contracted, there is almost invariably a history of syphilis in addition to that of alcohol.

When bodily symptoms are present they require careful consideration. Alcohol alone seldom produces general paralysis; but not infrequently it so damages the brain tissues as to lead to a chronic delusional state, or to dementia. In cases with few or no physical signs the prognosis of the case will be based upon the progress of the mental state; and much will depend upon the restitution of memory, and upon the nature and persistence of hallucinations or delusions. The history of syphilis, sexual excess, stress and strain, both physical and mental, in addition to that of alcohol, renders the outlook more grave; and the case may end in stupor, dementia, or coma; or there may be persistence of hallucinations, aggravation of insane suspicions, moral perversions, suicide or homicide, or even the progressive paralysis of the insane. It must be noted that inequality of the pupils is not necessarily an unfavourable symptom, provided there be no history of syphilis or sexual excess. Inactivity of the dilated pupils to light, or dulness of cornea and inactivity of the contracted pupils, on the other hand, will probably prove unfavourable and portend the existence of a progressive lesion.

Much difficulty will be experienced in the diagnosis of the *pseudo-paralytic type;* and it is to be noted that in true progressive paralyses with remissions the pupillary changes may clear up much more readily than in the false forms. This, however, applies more to pupillary inequalities and irregularities than to conditions of reflex irido-plegia. In the false forms of paralysis the physical symptoms may follow epileptiform or apoplectiform seizures, or be consecutive to subacute alcoholism; but although the symptoms may be severe for the time they tend to improve rather than progress unfavourably.

The sensory perversions associated with alcoholism are numerous, and in many particulars characteristic. Sensations derived from the visceral system are frequent. Some patients complain of unusual feelings in the heart, as of fluttering or of "wind round the heart"; others derive their sensations from the lungs, stomach, or bowels. It is not, however, with the mere sensations that we have to do; the phenomena are almost invariably misinterpreted; and hence arises a grotesque and incomprehensible series of illusions and delusions. The illusions and delusions may take the form of poisoning, of magnetic or unseen agencies, or of torture of the viscera by internal agents, such as animals or devils. Most drunkards give a melancholic and suspicious interpretation of their feelings. Perversions of taste may arise in many ways, and are commonly associated with alcoholism. The perversion may take the form of a morbid exaggeration of all gustatory sensations, but much more frequently the sense of taste is diminished or absent. Parageusia is seen in nearly every form of insanity; and in alcoholism it usually takes the form of complaints that poison or filth is put in the food. Perversions of smell, especially when there is an olfactory stimulation proceeding from a disordered stomach, may take the form of offensive and foul odours, to which false objective significance is given. Perversions of sight are relatively more common than in other forms of insanity. The illusions

or hallucinations are usually fleeting and terrifying. They are especially frequent in acute delirium tremens, and occur chiefly during the night time. Amblyopia and dyschromatopsia are also frequent. Galezowski found the chromatic anæsthesia chiefly pertaining to composite colours, especially yellowish and bluish-greens. Auditory illusions and hallucinations are not so frequent in acute cases, but when there is a tendency to chronicity they become relatively more frequent. Perversions of tactile perception are very common, and the illusions and hallucinations arising in connection with disordered cutaneous sensations are almost characteristic of alcoholics. In some cases hyperæsthesia is general, or confined to patches distributed indiscriminately over the cutaneous surface. The exalted sensibility may depend upon a too great sensitiveness to impressions of the sensory nerves, or a too acute perception by the nerve-centres of these impressions. This, however, does not tell us why patients suffering from tingling, numbness, burning, stinging, shocks, and the like, attribute their sensations to electricity, witchcraft or mesmerism. Similarly conditions of diminished sensibility, either as local or general anæsthesia, or as hemi-anæsthesia, and the variations in the excitability of the nerves to pain and temperature can be partly explained from a physiological point of view; but we are quite in the dark as to the neural processes underlying normal perception; and there is as yet nothing to demonstrate the physiological or pathological reasons why the perceptive processes may be normal, and yet the interpretation of them so wide of the mark.

The outcome of persistent misinterpretation of sensory data is often disastrous, and patients of this sensory bent, from their common, visceral, or special sensory perversions usually pass into a chronic state of delusion. It must be remembered, however, that hallucinations of hearing and delusions of conspiracy and persecution occurring in alcoholic cases sometimes pass away, even when the patient has suffered from many previous attacks. Relapses are common, and the return of hallucinations may possibly be due to return of the disease of the same cells; in this case alcohol may not be the immediate cause of the relapse.

Delusions of grandeur and wealth occur in about 20 per cent of alcoholic cases. The conceit and optimism differ somewhat from the expansive benevolence of some forms of progressive paralytic dementia in that the delusions are characterised by fixedness and distrust in the drunkard, and are without the benevolence of the paralytic. No matter to what extent the drunkard carries his imagination, there is almost invariably a distrust and suspicion of those around him; and he is tenacious of his imaginary position and wealth.

Some cases are characterised from the first by dementia, and gradually the mental faculties are lost. Cases of this type are often deceptive, and extreme difficulty will be found in forming a prognosis. It is important to remember that alcoholics do recover from extreme depths of degradation; and slowly, step by step, regain the use of their faculties. According to some authors considerable amnesia is an unfavourable symptom; but even in these cases the memory is sometimes regained to

an extraordinary extent, and the patient may be able to dispense with asylum care. It must be confessed, nevertheless, that many cases of continued amnesia do not end in recovery, but the patient remains in a condition of partial or complete dementia.

Not only do drunkards suffer from various degrees of amnesia, but they are also prone to be affected by various illusions of memory, termed "paramnesic" states. In these conditions the patient believes that his present circumstances, which are, in reality, new to him, have previously formed a part of his experience. Paramnesia occurs more commonly in alcoholic insanity than in any other form of mental disorder. A simple image may appear as a recollection. Thus, such patients will give marvellous accounts of what they have seen and what they have done, although the accounts have no real foundation in fact. They state that they have just been out for a walk in the garden; whereas they have been kept constantly in bed. In some cases an illusion or hallucination may have been the initial factor in the production of the paramnesia; and the confusion has resulted from inability to distinguish between what was actually a false sensory perception and a perception founded upon an objective reality. When an illusion is revived, the fact that the primary vision was imaginary may be lost sight of, and the present revival appears to be based upon fact. In alcoholic cases the false memory usually refers to a visual image of persons or places seen, or to a motor or kinæsthetic image of actions performed. It would appear reasonable to assume that the starting-points of the initial illusions or hallucinations were in the cells most immediately concerned with vision and kinæsthetic impressions respectively; but this would give no solution of the delusion as to the actual reality of the object seen or action performed.

Forms of alcoholic insanity.—It now only remains to mention briefly the chief forms assumed by alcoholic insanity.

(*a*) *Ordinary drunkenness* comprises periods of excitation, confusion, coma, and malaise. It is of temporary duration and passes off when the cause is removed.

(*b*) *Subacute insanity* is characterised by mild melancholia or mania, with sleeplessness, dreams, nightmares, general restlessness, and hallucinations. It is generally of short duration, and with the return of sleep the patient recovers, usually within five or six days.

(*c*) *Acute alcoholic insanity*, which comprises (i.) acute alcoholic delirium (*delirium ebriosum: mania e potu*), which is of short duration—chiefly in cases where there is hereditary instability and sometimes a craving dipsomania as well; and (ii.) febrile delirium tremens, in which there may be a rise of temperature, delirium, terrifying illusions or hallucinations of a fleeting character, more pronounced physical disturbances, complete insomnia, accelerated pulse, epileptiform attacks, suicide or homicide; or recovery in a few weeks.

(*d*) *Chronic alcoholic insanity*, which comprises the sensorial, motorial, amnesic, delusional, and demented forms already described.

Treatment.—For those who crave for alcohol preventive measures

should be taken. The offspring of habitual drunkards should be removed from their vicious surroundings, and encouraged in some healthy occupation. The individual peculiarities of patients should always be well considered before prescribing alcohol, and it is also of great importance to ensure its discontinuance as soon as possible.

In acute cases of alcoholic insanity the diet should be nutritious and easily assimilated. Food should be given frequently, in small quantities. Some patients do well with food given at intervals of two or three hours.

Sleeplessness is a troublesome symptom, and it is often advisable to induce prolonged sleep by the use of hypnotics. The danger of hypnotics is that a craving for the hypnotic itself may take the place of that for alcohol. The bromides, chloral hydrate, sulphonal, paraldehyde, trional, chloralamide, or hyoscine may be given. Morphine should be avoided. Plenty of open-air exercise will sometimes induce sleep. Massage, the use of the dry pack, and also of the wet pack, have in some instances proved beneficial. Many inebriates resort to so-called "specific" remedies, which unfortunately may be dangerous frauds. Institutions, therefore, which rely upon the efficacy of their proprietary "specifics" ought to be regarded with suspicion.

Suggestion during hypnosis is regarded as of considerable value in ridding a patient of the craving for alcohol. By the direct method the patient is during hypnosis induced to believe that the desire for alcohol has left him, and that he even dislikes it. Sleep can also be induced by suggestion. In cases where alcohol has been withheld, but in which its after-effects are still present, it is asserted by several eminent foreign observers that suggestion during hypnosis is capable of exercising a beneficial influence on various physiological processes, and that in this way it may prove a valuable ally.

For particulars as to "Licensed Retreats" (vol. ii. p. 857), hypnosis in dipsomania (vol. ii. p. 859, vol. viii. p. 421), and other details of treatment, see articles by Rolleston and Milne Bramwell in this work.

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INSANITY AND EPILEPSY

EPILEPSY—to resume the features described in a foregoing article (vol. vii. p. 758)—is a paroxysmal neurosis affecting consciousness. It is characterised by intermittent attacks, generally accompanied by convulsions, consisting of tonic and clonic spasms. In this association there is no definite constancy; convulsions may be absent (*petit mal*), and the affection of consciousness may vary from a defect only—a more or less fleeting impairment, such as vertigo, loss of memory, a dreamy condition, or special delirium (*épilepsie larvée* of Morel, the *masked epilepsy* of Esquirol, *psychical epilepsy* or the *convulsive idea* of Maudsley)—to an almost complete suspension, eclipse, or abolition of consciousness, as in the coma of the *status epilepticus*.

The three well-marked clinical stages of epilepsy—the aura, the loss of consciousness with motor disturbances, and the subsequent dreamy or torpid state—may each or all of them be interchangeable with some form of mental disorder; so that epilepsy in its functional range is closely allied to insanity, which is itself a symptom of many morbid conditions; the term being applied to certain results of brain disease and brain defect which invalidate mental integrity. In this alliance there are points of similarity as well as of difference or contrast, and they may be considered under the following heads:—

Morbid anatomy.—Idiopathic epilepsy and insanity have this in common, that both are due to an affection of the organ of mind, and particularly to a disorder of the cortex cerebri. In both the disorder is of the highest centres, and is of so fine a nature that it may elude the minutest research; so fine is it that it is called a disorder of nutrition only. The general opinion concerning epilepsy has been that the nutritive disturbances need not necessarily express themselves in recognisable morbid change; for, as in some cases of insanity, it has been definitely asserted that no discoverable lesion can be traced, although in other cases gross lesions may be present in both. Thanks, however, to the improved methods of staining introduced by Golgi, Cajal, Bizzozero, Nissl, and Marchi; Marinesco and Sérieux have described after paroxysmal discharge in uncomplicated epilepsy three specific lesions—(*a*) a partial disappearance of the tangential fibres of the cortex, the "neurons of association" so-called, similar to those lesions described in cases of general paralysis; (*b*) an infiltration of nerve-cells by leucocytes; and, which is most important, (*c*) a disappearance (chromatolysis) of the fine granules in the protoplasm of the cell substance of the cortical nerve-cells. This cell alteration is of much consequence, in so far as it suggests an instability of equilibrium in the cortical centres, and appears to bear a close relationship to the paroxysmal discharges. It is difficult to describe

these nutritive changes otherwise than as of a bio-chemical nature, to be revealed only by the most perfect histological methods. They have their homologues in the cells of the salivary glands, which after activity lose their zymogen cell granules. Hodge has also proved the disappearance of stainable granules in the ganglion cells of bees after fatigue. In epilepsy associated with insanity, Bevan Lewis has described highly significant changes in the cortical cells of the second layer. These changes begin in the nuclei, which have a bright, refractile, usually spherical body of a fatty nature in their centre, spreading until it may occupy the whole cell; the cell protoplasm itself eventually betraying signs of degeneration, and ultimately breaking down. Physiologically it is known that the cell nucleus plays an important part in the functional activity of the cell; and that its absence or variation by disease is a constant accompaniment of cerebral disturbances, which are indicated by loss of control. The small pyramidal cells of the second layer have been assumed to be preponderatingly sensory in feature and function, and to be organically connected with the larger deeper cells, which are said to be less preponderatingly sensory. Possibly the upper layer may exercise an inhibitory control over the deeper, and lacking this their discharge will be liable to the periodicity of a nutritive rhythm. Sir W. Gowers somewhat differs from this doctrine, as he considers epilepsy to be a disease of the inhibitory fibres—that there is a diminished resistance on the part of the fibrillar "spongy" gray matter, rather than an increased production of energy caused by an active discharging cell lesion. He looks upon the tangential fibres of the gray matter—the "neurons of association"—to be more at fault than the cells themselves. Dr. Hughlings Jackson, on the other hand, looks upon epilepsy as an increased nutrition, causing an exaltation of function and issuing in strong discharges. He maintains that hitherto we have not known the pathological process productive of this functional abnormality; but states that to consider epilepsy—occurring in neurotic families interchangeably by inheritance—as a neurosis of purely nervous origin, beginning in nervous elements which are primarily at fault, is less valid than to assert it to be primarily arterial or venous, and only secondarily nervous and due to damage by vascular changes. It is implied that the true pathological cause is to be sought in the nutritive disturbances, caused probably by a change in the circulation due to the occlusion of a vessel in the "arterio-cortical area," which can give rise to a "discharging lesion." This opinion receives support from the hypothesis, advanced by Cajal, that certain glia cells related to the arteries of the cortex may exercise a contractility over them, which so alters their capacity by dilatation, or otherwise, that the blood-supply can vary the nutrition of these cortical centres. The protoplasmic neuroglia cells referred to exist in the gray matter; they are surrounded by a lymph space continuous with the perivascular lymph spaces, and they are characterised by some prolongations of foot-like cell processes, which expand upon the perivascular sheath of the arteries and other processes which join collaterals from nerve-cells (see Figs. 6 and 7,

vol. i. p. 183, article on "Nutrition"). Their function hitherto can only be a matter of surmise, but their contractility has its analogue in the contractile pigment cells in the frog's skin.

Relation of mental and nervous states.—We believe in the psycho-physical parallel of mental and nervous states; and we find in the excitement of insanity, which constitutes mania, that the mental exaltation is accompanied by violent, purposeless, and inharmonious sensori-motor disturbances—and as sensori-motor we describe the nervous centres which represent impressions and movements; whereas in the opposite condition of melancholia, characterised by a depressed emotional tone, there is a sensori-motor suppression. In epilepsy the sudden disturbance of consciousness is accompanied by sudden and often violent sensori-motor discharges. These discharges of the nervous arrangements are followed by exhaustion, indicated by paralysis on the motor aspect, and by loss of consciousness, which may amount to coma, on the mental side. The loss of consciousness is probably due to a negative functional lesion of the highest centres, as the paralysis is due to a negative functional state of the sensori-motor area. Both these are conditions of exhaustion. This is well illustrated in cases of conjugate deviation due to unilateral convulsions; the nerve tracts after a time become exhausted, and deviation takes place in the opposite direction through the unbalanced action of the healthy muscles on the unparalysed side. That tracts, through which these excessive currents have travelled, become exhausted, is evidenced by the increased knee-jerk and foot-clonus observed in post-epileptiform paralysis. This condition, known as *epilepticism* or the "*epileptic hemiplegia of Todd*," is exemplified in the following case:—

M. A. O., an insane epileptic, had a succession of severe convulsive fits at the fifth month of pregnancy. They succeeded each other rapidly, and culminated in the *status epilepticus*, with all its attendant phenomena in their severest form. On regaining consciousness she was aphasic, and paralysed in the right side. In time she recovered fully, and was delivered of a healthy child at full term.

States of consciousness, we can say, are concomitants of nervous states; the actual relation between these two concomitants remains unknown, but cerebral activity is not thought—the processes are parallel, but not dependent.

Personal conditions relating to epilepsy and insanity may be considered under—

(*a*) *Sex.*—Sir W. Gowers states that women suffer from epilepsy rather more frequently than men, and that the ratio is 60 to 50. In insanity the reverse is the case, there is more occurring insanity among males, although women preponderate, the proportion at the present time being 50 women to 42 men living. Men suffer from more acute and rapidly fatal forms of insanity than women, who thus "accumulate" and vitiate statistics by showing an apparent increase of insanity in this sex.

(β) *Age.*—Three-fourths of all epileptics occur under 20 years of age; of these one-eighth are in the first three years of life. One-half of all cases occur between 10 and 20. Inherited cases are more frequent under 20 years than at subsequent ages. In the insane the majority of cases occur between the ages of 25 and 35, the age most vulnerable to the combined effects of inheritance and stress. At all ages insane women preponderate, except between 35 and 45, when men are most numerous. In epilepsy women exceed men up to the age of 30; afterwards it is the reverse.

(γ) *Civil state.*—Since epilepsy manifests itself before marriageable age most epileptics are necessarily single. This, for other reasons, is also the case in the insane. At the marriageable ages, and in proportion to the population, insanity is more frequent among the single than among the married or widowed. Of married persons insane women preponderate, probably owing to puerperal and epochal disturbances.

(δ) *Numerical ratio of epileptics to insane in asylums.*—The proportion of epileptic insane admissions to non-epileptic insane admissions is 8·6 per cent; but the proportion of epileptics to the ordinary insane in asylums, owing to "accumulation," is usually about 16 per cent; because death from epilepsy is by no means so common as from the various kinds of insanity: general paralysis, for instance, being almost invariably fatal within a period of two years. Indeed it is rare for the epileptic insane to die during the fits; death occurring more commonly from the exhaustion of the *status epilepticus.* The yearly average admissions of epileptics into asylums in England and Wales for the five years ending 1895 have been 801 men and 611 women, or a proportion of 9·4 male epileptics and 6·8 female epileptics per cent to the total yearly average of all admissions into asylums for the same period; and as epileptic women preponderate, more male epileptics must become insane.

(ε) *Inheritance.*—This is a principle of universal acceptance and a truism. The attributes of the parent have a tendency to be repeated in the offspring, as there is a continuity in the germinal plasm. There is a tendency on the part of nature towards the normal; an apparent disposition of the molecules under favourable conditions of selection and marriage to sustain and reproduce the healthy, showing a predominance of the conservative and progressive over the degenerative tendencies. Functional and formative plasm must progress, and the tendency of diseased structures of themselves is active, and therefore towards extinction—witness the tendency to die out in certain royal families which, under compulsion, intermarry. As one would expect from the influence of cross marriages, there is a tendency to dilution or concentration of peculiarities in the offspring depending upon contrast or similarity in the parents, so that in this way we may have a metamorphosis of neuroses, and an interchangeability of the different forms—epilepsy and insanity, insanity and hysteria, migraine, asthma or neuralgia. At Claybury an insane father has one epileptic daughter and two insane; a general paralytic father an epileptic daughter; again an epileptic father has an insane daughter. An insane

father has two sons and two daughters insane. A mother had puerperal insanity with her first child; she afterwards becomes the mother of seven children, five of them inmates of asylums—one for the eighth time. Of several children of an eccentric father, two daughters are insane, one being an epileptic; several of the others are eccentric. A mother is epileptic, and has an insane son. All who know the large asylums meet with these and similar cases, and indeed every one must be struck by the facts of heredity when interviewing the friends of the inmates. We recognise in certain families a proclivity which we call "neurotic," a tendency towards nervous instability and degeneration, seen in loss of control affecting either the motor, sensory, or mental aspect. Insanity produced by coarse brain injury, alcohol, local degeneration or disease in the parent, may yield epilepsy in the offspring; whereas the children of the truly "neurotic" or unstable parent are liable to idiocy, moral insanity, or the slighter aberrations known as moral obliquity, also probably to the more chronic and permanent forms of insanity with hallucinations. Eccheverria states that an epileptic parent entails his disease upon 49 per cent of his offspring. Sir W. Gowers asserts that in pure epilepsy an inherited tendency is stated to occur in about a third (35 per cent) of all cases; and less frequently in males (33 per cent) than in females (37 per cent). In epilepsy associated with insanity an inheritance is traceable in 52 per cent, and more frequently in males (58 per cent) than in females (47 per cent). In the ordinary non-epileptic insane, of 1024 males admitted into Claybury a history was obtained in 683, showing a neurotic taint in 386 cases, either of insanity, epilepsy, or paralysis (37 per cent of the total males, and 58 per cent where the history was ascertained); and of 1261 females, with an ascertained history in 771 cases, there was an inheritance in 515 cases—a proportion of 66 per cent, or a proportion of 40 per cent of the total females, giving a proportion of 62 per cent in both sexes combined, and indicating that heredity occurs almost twice as often in the insane as in the epileptic, namely, 62 per cent and 35 per cent. Gowers states that there is a family history of epilepsy itself in 66 per cent of his cases of pure epilepsy, and of insanity in 33 per cent. In 211 of the epileptic insane, whose histories were ascertained, there was an inheritance of epilepsy in only 16 per cent, and of insanity in 33 per cent; showing that in this class insanity is the more powerful factor, and is inherited twice as frequently as epilepsy. In the ordinary insane, out of 1400 cases where the history was ascertained, a family history of epilepsy in the parents occurred only in 8 per cent, and it appears to be rarely the direct cause of insanity in the offspring, although it is known to be powerful as a remote cause. Epilepsy appears to be more often the cause of epilepsy in the offspring than of insanity. When in epilepsy there is such an inheritance, it is the women that are more likely to suffer; that is, there are more women with such a family history than there are men. In insanity it is the same, and this leaves room for the more frequent occurrence of accidental causes in men, who, as is known, are more exposed to stress and direct hurt than the opposite sex. In epileptics the

transmission is more often direct from father to son, and from mother to daughter. In the epileptic insane, men receive their inheritance somewhat more often through the mother, and women through the father. In the ordinary insane, transmission varies. In some forms, however, such as suicidal insanity, it is more often direct than the reverse; the same is the case in melancholia; whereas mania appears to be more often crossed in transmission.

Form of insanity.—Taking the interval between fits in the epileptic as more likely to represent the general mental tone, there is more depression than exaltation. The former is not quite representative of melancholia, but there are many epileptic inmates of asylums who are weak-minded from progressive dementia. In the ordinary insane, mania or exaltation is twice as common as melancholia or depression; and half as common as all other forms combined. Speaking generally, the insanity of the epileptic is different from that of the ordinary insane. Whilst the one is solitary and egotistical, the other is sympathetic and associative. The epileptic is industrious, and benefits to a marked degree by occupation and congenial industrial pursuits. Roughly speaking, the epileptic insane are of two classes, namely, the simple or weak-minded, who are generally advanced in years and infirm; and the non-confirmed but mostly chronic, among whom are some of the most impulsive, dangerous, and homicidal inmates of asylums. The former number about 20 per cent, the latter about 80 per cent of the epileptic insane, and of these 20 per cent are of the "very" dangerous.

Basis of the aura.—The cerebral cortex is the anatomical or physical basis of the aura, and the medium for the transmission of sensations. It is at present described as consisting of four layers—(i.) the molecular, consisting chiefly of neuroglia cells with caudate "foot-processes" on the surface, a few nerve-cells with dendrons and two or three axis-cylinders, together with a few medullated white fibres (Exner's). On section of the gray matter, it may appear to the naked eye as a white line. (ii.) The layer of small pyramidal cells with dendrites upwards and an axis-cylinder downwards. (iii.) The large pyramidal layer whose axis-cylinder process gives seven or eight collaterals, and then continues to anterior horn arborisations. The collaterals of this layer form two white plexuses on each side of it, visible to the naked eye as white streaks (inner and outer line of Krause, inner and outer line of Baillarger—the outer being also the line of Vicq d'Azyr). (iv.) Polymorphic layer of cells of various forms, with single axis-cylinders and numerous dendrites. Below this is a layer of arcuate fibres which connects one convolution with another. The axis-cylinders are now stated to be only one for each cell, and to form projection fibres ending in a network, which may terminate round anterior horn cells, as instanced in the pyramidal cells of the third layer of the central convolutions. Their collaterals have one of two destinations: (*a*) they form commissural fibres to the opposite hemisphere ending in terminal cortical arborisations, thus co-ordinating functions in the two hemispheres; (*b*) associated fibres to other parts of the cortex

of the same hemisphere. To a nerve-cell with its prolongations and ramifications Waldeyer applied the name neuron, and he divided the whole central and peripheral nerve structures into three systems of neurons, namely, first, centripetal or sensory neurons transmitting excitations from the periphery to the brain; secondly, neurons of association connecting the various sensations in the brain, and augmenting, retarding, or changing them according to the fineness, multiplicity, and almost infinite development of the collaterals, ultimately transmitting them to, thirdly, the centrifugal or motor neurons which convey nerve waves to the muscles. As regards the aura it has been asked, where is the actual seat of the sensation or warning? Forel replied that it is in the brain at the point of arrival of the peripherally-excited wave; and that it begins centrally, namely, at the terminal arborisation of sensory fibres. Bevan Lewis believes the aura to be the indirect effect of an actual spasm at the periphery, but this, in my opinion, occurs only in forms of epilepsy other than idiopathic. The scheme in the diagram (p. 338), taken from a preparation after Ramon y Cajal, represents a reflex cerebral circuit—what has also been called the diastaltic arc. To the right, A, are axis-cylinders ascending to sensory terminal centres; they carry peripheral sensations through the optic thalamus to the neurons of reception in the gray cortex. At B are seen neurons disposed horizontally; their (cellulipetal) protoplasmic prolongations are connected with the neurons of reception, whilst their other (cellulifugal) prolongations join the neurons of discharge C. An aura originates, owing perhaps to vascular changes, in the neurons of association—the "tangential" fibres; and is peripherally projected by the neurons of reception to various sense organs in distal relation to them: it then spreads through the neurons of discharge to pyramidal horn cells causing motor-convulsions. The wave of discharge may modify associated sensations in force and character, owing to variations in the associated neurocymes; and upon these will depend the character of the mental or somatic reactions. According to the limitation of these disturbances to the same group of neurons, so will the impressions or sensations be also limited; the same order brings about the same delusions, the same acts and the same sequence of events; a repetition of the symptom group being characteristic of epilepsy. The experiments of Dana and Ransom on the human subject are interesting in relation to this scheme of the aura, and the sequence of events. Excitation of the cortex was made over the arm area, which immediately caused a motor discharge of which there was no recollection; consciousness having vanished before the discharging lesion had been transformed into motor energy in the anterior horns. It is not improbable that sensory disturbances may precede the motor. The central convolutions of the cortex have been looked upon by Ferrier as purely motor; and by Munk, Bastian, and others as primarily sensory; the motor area being relegated to the bulb and cord. These experiments, however, tend to support the opinion of the latter observer.

Nature and variations of the aura.—The aura records the last act

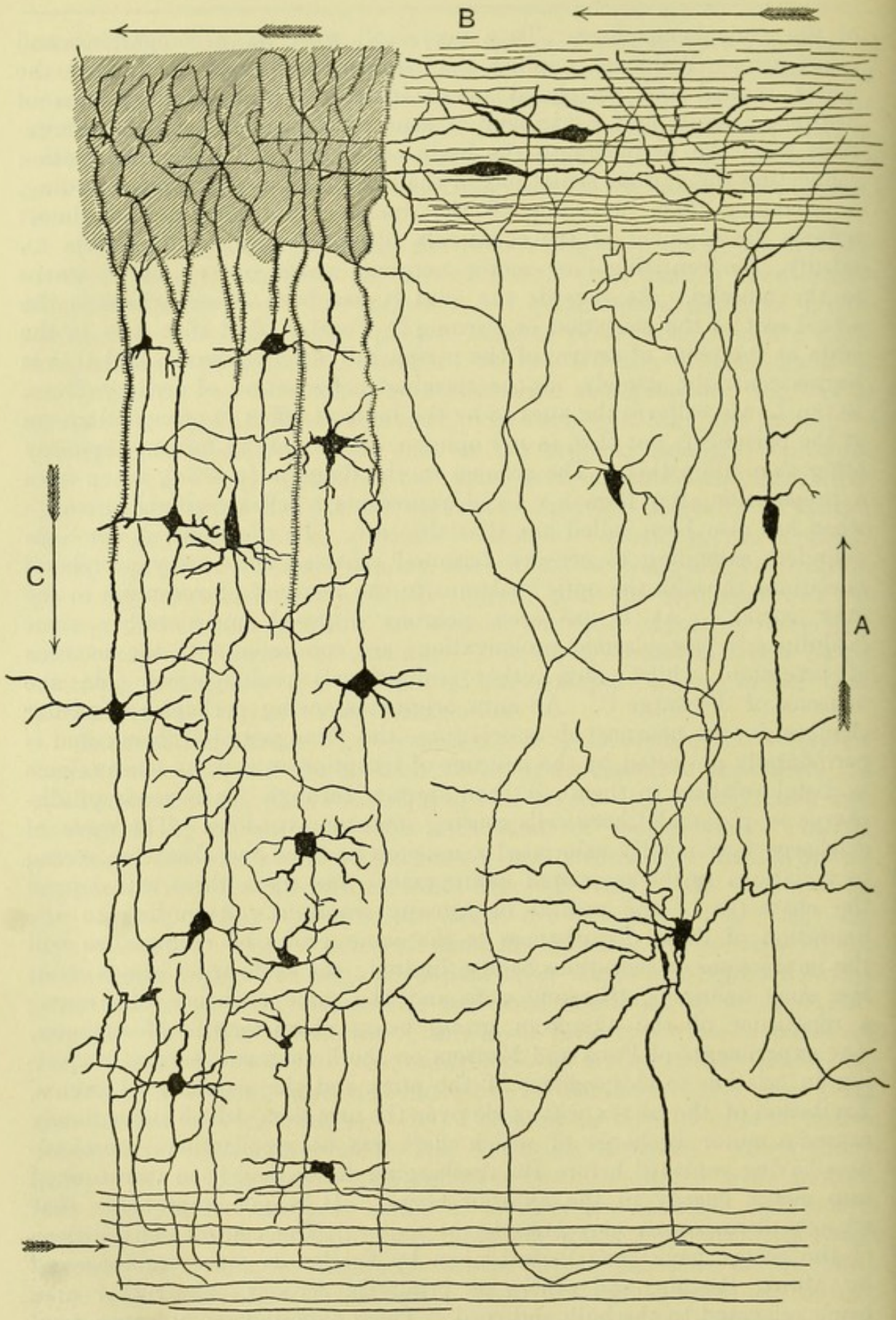


FIG. 1.—A reflex cerebral circuit. From a preparation after Ramon y Cajal.

in consciousness, and immediately precedes unconsciousness. It may indeed precede the fit by hours or days, though usually only by moments, when it is sudden, acute, and immediate. If the aura be absent, there is generally no recollection of the fit, unless some pain be present from injury inflicted upon the tongue, or some soreness of the muscles after the struggle. At night, wetting the bed may be the only significant discomfort. In the absence of these signs, epileptics not infrequently deny fits altogether, and often have to be reminded of them by their nurses or fellow-patients. As to the frequency of the aura, Russell Reynolds gave statistics of 81 cases of uncomplicated epilepsy; in 33 there was no warning, and only a doubtful one in 13 others. He states that in the majority of cases an aura does not exist. Gowers and Sieveking state that an aura is present in 50 per cent of cases. In epilepsy associated with insanity Guinon and Raichline found the aura present in 64 per cent, Marinesco and Sérieux in 66 per cent, and, from an analysis of 116 cases in Claybury, we have found it in 66 per cent. The probability is that it would be present in more cases were it not for inability in some patients, in whom the mind is permanently weakened, to describe sensations accurately. Or indeed the aura may never rise into consciousness. The aura preceding the fit is generally constant for the same person. If a definite interval occur between the aura and the fit it is often of great advantage to the victim. A man, whose occupation as a bricklayer necessitated his working upon a high scaffolding, was subject to violent seizures, but he always had sufficient time after the aura to descend into a place of safety before the loss of consciousness occurred. Another had the sensation of being parched, and had time to enter a house or call for help before the fit. As to the character of the aura it may be—(i.) that of *ordinary sensation*, which may occur in the hand, arm, leg, or one side of the trunk. Gowers states that arm sensations never occur above the wrist, but they may be felt as they pass upwards, giving rise to sensations in the arm. E. C. complains of a feeling that her hands are held fixed, after which they are twisted and tied; then comes the fit. Skin sensations are not uncommon—numbness of the fingers, creeping sensations in the head and neck, tingling, heat or cold, and various pricking sensations. The name *epileptogenous zone* was applied by Brown Séquard to the part of the skin in certain animals experimented upon which on being irritated produced epileptic convulsions. It is said to be almost unknown in the human subject. In a case of Jacksonian epilepsy of the right arm and hand, by shaking the limb severe convulsions in it could be produced at will, followed by general convulsions of the whole body, which became involved in one violent epileptic seizure with loss of consciousness. Heat in the eyes, fire between the teeth, or a feeling as if they were coming out (the person holding her right hand over her mouth to prevent them falling out), are all known as auræ preceding the fit. (ii.) *Motorial*—a stiffness or limpness, a general trembling of the whole body, and certain peculiar circular movements. A running gait, "*E. cursiva*," also may precede the fit. Megazzini has described the

formation of circles (*E. circumcursiva*), and a rotation in the long axis of the body (*E. rotatoria*) as an aura, or as replacing the fit and followed by stupor. He attributed them to unilateral cerebellar ischæmia. Motor auræ are instanced in A. C. and A. W., who get up suddenly and turn round and round on the same pivot in the direction of the hands of a watch, and then suddenly fall; but have no convulsions. E. W. repeats the same rotatory movements three times and falls in a petit mal. S. N. rotates before a petit mal, but not before a grand mal; C. W. also before a petit mal. E. B. walks round and round the room before a fall. P. R. walks at starting, then suddenly runs in a straight line and falls in severe convulsions. She will knock any one down in her track, and if it be a nurse she is clutched violently and both fall, when it is impossible for the nurse to extricate herself until the fit occurs. She never evades objects. Bilateral motor auræ are not frequent, except in the trunk as general tremors. (iii.) *Vocal*—the aura may consist of certain phrases which are mechanically repeated: S. T. repeats "I don't care," and E. W. "Black Jack" several times before falling. (iv.) *Visceral*—probably influenced through the vagus—are not uncommon, and may be in the throat, thorax (cardiac and respiratory), or abdomen. If abdominal, they are usually referred to the epigastrium, and are most frequently on the left side. The fits that follow epigastric auræ are very often severe. Cardiac sensations are often very painful; some complain of strings being wound round the heart, others of a palpitation with a choking sensation; and, when recovering from a fit, they have a mechanical way of moving their hands as if winding imaginary skeins of thread or taking foreign bodies off the tongue. J. G. is very bad after her fits with these auræ. She is resistive, noisy, restless, and full of purposeless energy. Those who have feelings referred to the throat and chest are not infrequently extremely restless and troublesome. (v.) *Vaso-motor auræ* are not common. E. S. has a scarlet rash which is associated with aural hallucinations; she then has a seizure, the rash becomes purple and after a time fades. (vi.) *Cephalic* auræ, such as vertigo, a swimming in the head, somnolence, or these in combination with other auræ, such as giddiness with vision disturbances, are frequent. L. P. states that her eyesight suddenly disappears and she becomes giddy; then she feels perfectly blind. J. B. has giddiness, after which she remembers nothing. C. W. has giddiness beginning with a pain in the right temple; her fit comes then, which is followed by melancholia and irritability in the post-paroxysmal state, and she does not want any one to approach her, or to talk to her. A. J. says she has a peculiar feeling in the brain which goes down to her leg, and then comes the seizure. A. K. says her head feels like a ball of fire, after which she immediately loses herself and goes into a fit. (vii.) *Special sense auræ.*—(*a*) Olfactory is rarest. A. J. complains before the fits of bad smells and a taste of bad food. Hallucinations of this sense are not more rare in the insane than in other epileptics, although the opposite statement has been made upon eminent authority. (*b*) Gustatory is next in frequency; and then (*c*) auditory, mostly sudden explosive noises, whizzing

and hissing, less often distinct voices ; when these occur they may influence the conduct after the fit. (*d*) Visual auræ are the most common, and occur twice as often as all the others together. All colours pass before F. M.'s eyes before a fit ; red and blue are the most frequently seen. E. M. sees different colours, but when blue appears it is always associated with a balloon rising into heaven. Sometimes they approach, but oftener recede. Lights may be seen after the sight is lost, showing that discharges may occur in a disused or an inhibited centre. Illusions of sight are frequent ; perhaps these are more nearly related to psychical auræ, in so far as they rule conduct when present. All the auræ, being presumably central in origin, are for the same reason psychical ; but they are also sensory in so far as they are projected peripherally, and more specially to the various senses. M. W. has visions of Jesus Christ appearing to her, after which she has a fit. When recovering she continues to see the same figure in the sky, and imagines she is an angel called to heaven ; she answers the voice and makes repeated attempts at flight. She is with difficulty restrained from undressing herself, and she is absolutely impervious to all appeals to her reason. It has been seen that the last impression in consciousness before a fit may be revived after the paroxysm, and sustained on regaining consciousness. This has been called the *epileptic echo*, and may take the form of a directing voice, an *imperative idea*, or a *fixed delusion*. Thoughts occurring as an aura, or directing voices heard before a fit, whether persecutory (which is most frequent) or the reverse, may thus be the incitement to impulsive actions performed subsequently without consciousness. (viii.) *Psychical auræ.*—The basis of the intellectual and moral life is in the sensations and emotions, and as the aura is of central origin with peripheral projections and manifestations, it would appear that all auræ are in their nature psychical, although it is convenient to describe them as they appear to occur in somatic sense organs. Mental associations referring to abstract qualities, such as the good, the evil, or exaltation or depression, not referable to special sense organs, may perhaps be more appropriately considered as psychical ; and, using the term as synonymous with mental, there are undoubtedly auræ of this description. The term, however, has been indifferently used and loosely applied ; it has been considered as synonymous with the *masked epilepsy* of Esquirol, the *épilepsie larvée* of Falret and Morel, also with the state generally described as *automatic*, which is that of imperfect consciousness with actions apparently conscious. This state is neither a warning, nor a premonitory sign of an impending seizure, constant in its character and periodic in its occurrence, but a pre- or a post-paroxysmal condition, which may even replace the fit altogether. To this subsequent reference is made. As a few instances of the psychical aura I may refer to E. M., who is overawed with fear, she has a fixed idea that some calamity is about to occur to her and she has a fit. Another patient gets acutely depressed without apparent reason and immediately falls in a fit. C. P. always thinks of her future prospects, becomes confused, begins a conversation, and has a fit. L. G. believes

she has messages from the Almighty. G. S. has pleasurable thoughts which he cannot describe, and whenever these occur he is sure to have a fit. M. L. has a notion that people mimic her, and that they afterwards compel her to do things against her will, to which she replies, "Oh no, I won't," and thereupon she has the fit. M. W. before a fit believes her life is to be taken, and calls out "Murder, murder." Sometimes a patient can stop the fit by retarding or controlling the aura, as with a piece of string round the arm. A patient states that if by an effort of will he can fix his attention upon one particular train of reasoning, he can stop the fit. It is possible that a new sensation is imparted to nerve-fibres, which raises their inhibitive power, and thus prevents the spread of the discharging lesion. (ix.) *The epileptic cry* is not an aura, although it occurs immediately before the distressing features of the fit. It is due to spasm of the respiratory muscles forcing air through a closed glottis. There is usually one long cry; but there may be several interrupted ones, according as the spasm is tonic or clonic. Patients rarely recollect the cry, as it generally comes on after the loss of consciousness. The cry is of far greater import to those attending upon the epileptic insane than the aura, as nurses and attendants, who are always about, get to know the cry and recognise the person from whom it comes. Thus they can render assistance before the fall, and often prevent it. Nurses say they can recognise the fit from the cry, and at night when sleeping in bedrooms adjoining patients' dormitories, they can distinguish from a large number who is in a fit. The aura is a subjective phenomenon, the cry very distinctly objective.

Pre-paroxysmal stage.—Certain conditions of mind occur both in the ordinary and the insane epileptic, which are best described under this heading. A change in the moral conduct of the individual may take place, to which the term *moral mania* has been applied. He may become sullen and moody, and fall into delusions of suspicion; or he may give way to exceptionally violent and sudden fury, which only those who have seen it can appreciate. Dr. Maudsley, calling it the *furor transitorius*, describes it as having no bounds. The patient is absolutely regardless of consequences, he observes no obligation to others, and is defiant of reason. His actions during this stage are impulsive, blind, wild, and furious; and he is quite unconscious of his destructive energy. He is subject to gusts of passion and calls out with maniacal and vociferous force, insisting on trivial demands as if his life depended on them. He shouts night and day, and is sleepless for many nights; he takes no food, and his eyes stare with a desperate glare. J. S. raves threateningly and piteously in turn for "a bit of soap to save his life," and he is absolutely regardless of dissuasion. However much in ordinary mania the gentle answer may turn away wrath, upon the irritable, spiteful, and quarrelsome mood of the epileptic it is wasted; nay, it may even aggravate the ruthless progress of his uncontrollable, impulsive, paroxysmal violence, which in its fierceness and vehemence is terrific and fiendish. If a fit occurs at this stage, a calm succeeds, excitement ceases, and reason

returns. But a fit may not occur, and the mania becomes a true *epileptic mania* taking the place of the fit. This condition may happen in both sexes, women sometimes manifesting hysteroid symptoms associated with violence. Another condition which may occur before the fit—which is in this case of a vertiginous and momentary character—is a dazed and stupid dulness, lasting for a few minutes only, rarely longer. The patient does not fall, and there are no convulsions. He continues in a dreamy state, and performs actions of which there is no subsequent recollection. For example, a student at college entered a class other than his own, and without his gown; he then insulted the professor, and immediately fell into a fit. On recovery he had no recollection of his delinquency. A youth at table suddenly gets up in the middle of conversation, quaffs the various drinks belonging to other guests, and then falls in a fit. Dr. Savage says this automatism occurs more often after than before the fit, and calls it the *automatism of the post-epileptic state*. The fits that usually accompany this condition are not of the convulsive variety, and, being often of momentary duration, may not be noticed.

Paroxysm.—This has been described elsewhere (vol. vii. p. 768). I will only state that the destructive effect upon the mind depends rather on the frequency than the gravity of the seizure; the convulsions in themselves being less harmful than the slighter attacks.

Post-paroxysmal phase.—Epileptics are more dangerous in this stage than in any other. They frequently have hallucinations which are systematised into delusions. They fancy that their friends or their enemies are about them, they can see and hear them; and they do most unaccountable things. They are more continuously noisy, violent, and perverse in this stage than in the pre-paroxysmal; but they are less impulsive and explosive, being guided more by hallucinations than by blind fury. Actions in this state are also less conscious. This is the *period of automatism*, the *dreamy state*, the state of "*dual consciousness*." Dr. Maudsley asserts that this condition may precede or replace an ordinary convulsive seizure, but, as I have said, automatism is almost always a post-epileptic phenomenon. This state much resembles somnambulism, for there is a partial suspension of consciousness in both; and some writers regard them as having a common origin in the neurotic temperament. There is but little doubt that automatism depends upon a heredity in the species of certain habits noted in the individual. There is no recollection of events that may have occurred during this period of imperfect consciousness, even when actions end in the direst results. Anger, violence, retaliation for imaginary wrong, purposeless acts, assaults, murder, and indecent exposure have all been recorded during this phase. When the mental symptoms replace the convulsive seizure, the condition has been described by Echeverria as *intermittent mental epilepsy*. It is the *masked epilepsy*, or the *épilepsie larvée* already referred to; but it is now generally understood that a slight fit precedes this automatism. The fact that it occurs most frequently in the slighter forms of epilepsy, where the symptoms are in the main subjective,

momentary, and fleeting, and that it is a known sequel of some attacks of the graver form, support the view that automatism is in its nature post-epileptic. Often the very cases in which the most serious consequences follow are those in which it is most difficult to prove medico-legally that disease sufficiently accounts for the acts. The slighter forms of automatism are not uncommon—for example, L. M. goes round the ward arranging everything in a neat and orderly way. After a petit mal she will refold and rearrange all clothing and bedding in the store-room. E. C. takes off all her clothing, wrapping and folding everything she takes off into a neat bundle, and if prevented is always ready to fight the nurses. Conduct is often the only clue to a fit in these cases. Generally speaking, the actions repeated during the automatism are those performed daily by the person, as the centres in most frequent use discharge most readily when the inhibition of the higher centres is withdrawn. To this repetition of habit the French apply the name *professional automatism*, as examples of which a tailor mimicked work for ten minutes after the attack, and a laundry-man repeated his usual technical movements for twenty minutes after a vertiginous attack. Dr. Orange quotes the case of a woman who, while cutting bread with an infant in her arms, was suddenly seized with a slight fit, after which she automatically cut up her child. C. O. "waltzes perfectly" after a fit, and often hums or whistles an appropriate tune. She will often seize any one near her and compel him to career round; but on regaining consciousness she has no recollection whatever of her conduct. Persons starting off to their usual daily callings will find themselves at the end of a day or two (and to their profound astonishment) far from home without knowing how they got there (*comitial ambulatory automatism*). Undressing is a frequent and often very inconvenient form of automatism. Dr. Hughlings Jackson attributes these acts to an affection of the highest cerebral centres, the exhaustion of which by the discharge removes the inhibition from the next highest centres of which those most frequently in ordinary use respond most readily. As an instance of the extreme perversity of persons in the post-paroxysmal stage may be quoted the case of I. J., who after a fit refuses to sit at table, preferring to lie under it. She refuses to eat from the proper side of the plate and will only eat off the back of it. She will not sit with others unless with her back to them; she refuses to lie in bed, preferring to squat at the foot instead of the head; and elects to cover herself entirely with the bed-clothes rather than to sleep in the ordinary way. "*Double consciousness*" resembles the automatic state, but is usually more prolonged. All the organic functions are normally performed, but there is no consciousness of ordinary life, all its actions being unreasonably performed in a mechanical manner. A case is recorded of dual consciousness for one year following a fit; after another fit the patient emerged into her previous conscious life, but the past year was to her a total void. Violent hysteroid conditions may follow fits in young women, when they become deceitful, vain, mischievous and troublesome, often falling into delusions about the

sexes. *Verbigeration* has been noticed in some during the post-paroxysmal automatism, but the condition hardly corresponds to that of katatonia described by Kahlbaum (p. 384). There are a few instances of all these varieties in every large asylum.

Effect upon the mind.—(*a*) *When unassociated with insanity.* A high degree of intelligence, amounting even to genius, has in some cases been associated with epilepsy; and it is well known that men of mark and note, who have created epochs, have been leaders of men, or have originated schools of thought and systems of religion, have been subject to fits of epilepsy. Julius Cæsar, Augustus, Caligula, Mahomed, Joan of Arc, Savonarola, Swedenborg, and Napoleon Buonaparte are all alleged have to suffered from epilepsy. This greatness of mind may occur also in persons disposed to insanity, of which alliance many painful examples are on record. A certain instability is essential to nervous action. In the normal state, which allows of a ready rearrangement of the nervous molecules with a free and easy liberation of energy, this instability necessarily exists in varying degrees; and mental development amounting to genius may coexist with morbid instability of some parts of the nervous mechanism. Epilepsy may coexist with a healthy growth and development of the intellectual faculties, and it is not until the fits become frequent that the malady exercises a destructive influence; the petit mal is believed to signify a more retrogressive condition. Even when no definite mental weakness is present, a certain peculiarity is common to the class, and dominates their character,—a peculiar *irritability*, with which may often be noticed a fervour and a zeal which makes these patients particularly susceptible to religious impressions. The epileptic is apt to be influenced greatly by the mystical or the awe-inspiring, and he is disposed to morbid piety. He has an outer religiousness without corresponding strictness of morals; indeed the sentiment of religious exaltation may be in great contrast to his habitual conduct—the key-note to which is hypocrisy—which is a mixture of irritability, vice, and perverted instincts. (*b*) *When associated with mental weakness in the young*, epilepsy is often the cause of imbecility, varying from the lighter forms to the most profound idiocy; 25 per cent of all the cases admitted in one year into Earlswood were there through epilepsy. Infantile epilepsy begins in the majority of cases during teething, and in the first year of life; hereditary epilepsy, as we have already seen, manifests itself earlier than the non-hereditary form. In respect of prognosis, the most improving cases are those in which fits begin after puberty, in which the neurosis, that is, is not inherited. In adults the mental changes are of two kinds—one patient is sombre, distrustful, irritable, and quick to take umbrage, to quarrel, or to wound and strike; the other is obliging, obsequious, cajoling, full of effusiveness and of a shallow and untrustworthy goodness.

After a longer or shorter time, depending upon the frequency of the fits, the probability is that mental enfeeblement will set in; hallucinations may arise in some cases, setting up delusions which become systematised,

and, as the fits continue, dementia will ensue. The chronic dementia of epileptics is characteristic. The aspect of these dements is dull, listless, and heedless, with a dreamy, heavy, and unintelligent expression. The face is not infrequently distorted and ill-shapen from scars or injuries due to falls. Saliva may dribble from the mouth, and when the patient walks his carriage is drooping, the head and neck being downcast and bowed. His mental reaction is slow, although there are still irritability and impulsiveness; his habits are faulty and solitary, and he prefers to be left alone. He is neglectful of his personal appearance and oblivious of his surroundings. His muscular movements are sluggishly performed; he dresses or feeds himself (when able to do so at all) in a clumsy and ill-directed fashion; his common and other sensations are blunted; he feels and handles things as if his hands were numb from cold; his gait is dragging, and when he sits, or lies in bed, he prefers to do so huddled together in a heap, or crouching more like an animal than a human being. His impaired circulation gives him the appearance of an inanimate heap with venously congested extremities. A characteristic aspect is also known and recognised in some of the varieties of insanity. In the intervals of fits, that is, between any two seizures, insanity in the ordinary epileptic is very rare; in asylums the epileptics are fairly sane between the attacks, the insanity in them being generally intermittent or remittent. The tone of mind is melancholy or depressed, although ordinarily there is no permanent mental derangement. The melancholia may either be accompanied by ideas of persecution, and a tendency to fits of passion,—such as irresistible impulses to homicide and suicide, or by hallucinations of a depressing, fearful, or terrifying nature. The general sanity of the interval is noted by the sociability and altruism of epileptics—often the first sign of convalescence in the ordinary insane. They may often be seen in little côteries, or friendly groups, in the grounds or the wards of asylums. Rarely is the ordinary lunatic inclined to associate with his fellows, or to show consideration to those around him. Egotism and independence are his doctrine and mode of life, and he is slow to recognise any obligation to others. In some cases of congenital weakness this perversion is an interesting peculiarity, for, like colour-blindness or tone-deafness, it is an inborn constitutional feature; whereas in the insane and the epileptic advanced in dementia it follows the rule that the latest-obtained and last-developed acquirement, being a faculty of the highest centres, is the first to suffer. The moral sense and the conduct being dependent upon the higher emotions are the first to be affected, and this change is often noticed by the friends of the patient long before it becomes necessary to place him under treatment.

Relation of epilepsy to general paralysis.—It is not easy to discriminate between these diseases when, as is frequently the case, the latter is modified. General paralysis is of necessity a protean malady, recognisable by the association of certain cerebral or cerebro-spinal symptoms, varying as the brain or the brain and spinal cord are re-

spectively affected. Whilst tabetic or motor disturbances are present alone, there may be no exaltation or special mental symptoms. The character of the seizures in general paralysis also varies; for there may be all varieties, from petit mal, or syncopal, hemiplegic, monoplegic, and unilateral twitching, to epileptiform or apoplectiform seizures, not one of which alone is pathognomonic of the disease. The pupils are most often fixed in general paralysis, which is not the case in epilepsy, although when it is associated with hemiplegia the pupils are often unequal. A history of syphilis is usually obtained in general paralysis, but this is not specifically the case in epilepsy proper. The different effect of treatment upon the two diseases, and the prognosis involved, makes it necessary that a correct diagnosis should be made; and, speaking generally, the symptoms upon which most reliance can be placed are the character of the seizures—which ordinarily are convulsive or congestive—and the pupillary reaction. Patients in the fits of general paralysis rarely bite the tongue, and there is no aura. The general paralytic seizure is of longer duration, and is usually continuous; whereas in the status epilepticus intermissions may be noticed. The cry has been considered peculiar to the epileptic fit, but this is not the case. The history of the patient may aid us; for epileptic fits, if occurring in middle life, and associated with mental symptoms, and with the rapid onset of a paralysis, must always suggest the diagnosis of general paralysis. The general relation of epilepsy to insanity is best summarised by Dr. Savage, than whom there is no higher authority. "Epilepsy may be a true neurosis by origin and relationship. It tends to a marked degeneration of mind, and affects the moral side of man specially. It tends to idiocy if present in infancy. It leads to rapid degeneration if occurring in youth. It may be associated with genius. It is often associated with hallucinations of a special type. It may be associated with delusions. It may be related in various ways with regular attacks of mental disorder; thus insanity may precede, replace, or follow the fits of epilepsy. There may be an attack of mental disorder of the ordinary type, or there may be a period of automatism. Chronic epilepsy with chronic insanity produces a very hopeless and dangerous class of insane patients, in whom some special ideas and specially dangerous impulsive attacks are present."

Treatment.—The medicinal and operative treatment of epilepsy are discussed in the article on this disease (vol. vii. p. 789), and references are also made in that article to the influence of diet.

The subject of a suitable dietary for the *epileptic insane* has received very careful attention from time to time. Experiments have been made with exclusively vegetable diets, but experience has proved a mixed one to be the most appropriate. The albumin of vegetable substances is found in association with relatively large quantities of starch which, being enclosed in a network of cellulose, is excessively resistant to the action of the digestive juices; whereas albumin obtained from an animal source is more readily assimilable and more sustaining. The reasons, however, for

suggesting a vegetable dietary were that in the metabolism of a nitrogenous animal diet lactic and phosphatic acids accumulated in the urine; and, as Araki, working in Hoppe-Seyler's laboratory, has proved, lactic acid appears also in the urine after severe epileptic convulsions. Therefore to diminish acidity from this cause by a simple dietary might act as a valuable therapeutic agent. What control a purely vegetable diet may exercise over lactic acid, or what relation lactic acid bears to fatigue products, are matters of which at present we know but little.

Flechsig's treatment, consisting in the daily administration of less than a grain of opium increased gradually to four or five grains for a period of five or six weeks, and then followed by bromides in daily doses of one to two drachms for two months, has proved disappointing. Opium is unsuited to cases with hallucinations; or with a tendency to renal disease, bronchial catarrh, or plethora.

Bechterew's fluid, in so far as it consists of the bromide salts, has been found beneficial. The same may be said of the Dragées Anti-Nerveuses du Gelineau, which probably derive their medicinal value from the same salts, although arsenic and picrotoxine are said to enter into their composition.

As to the recent growth of opinion in favour of the segregation of this class in what has been called the "Epileptic Colony," it must be pointed out that this method is not a new one. About thirty years ago a Lutheran clergyman in Westphalia, Pastor von Bodelschwingh, actuated in the first instance by philanthropic motives, believed it possible to found a hospital where those suffering from epilepsy might perhaps be cured, or, if recovery were impossible, might have a home in which their mental faculties could be developed, or at any rate preserved from deterioration.

The treatment aimed at securing freedom from anxiety, while encouraging contentment and industry by occupations suitably selected according to individual tastes; thus, by assisting patients to lead even and well-regulated lives, they might be led to forget their affliction, and helped to think that they were taking some part in the work of the world. A small farm with four patients has now developed into a colony of nearly 2000.

Considering that the natural termination of epilepsy is a hopeless dementia, the results have been extremely favourable; 6½ per cent are stated to be discharged recovered, and 20 per cent returned to their homes improved after varying periods of residence. These encouraging results have brought into existence many similar establishments, both on the Continent of Europe and in America—the States of New York and Pennsylvania, California, New Jersey, Massachusetts, and Ohio (the oldest) having large institutions for the care of their epileptics. A new one, Craig Colony in New York State, has had much thought bestowed upon it and is well equipped for research. The need for them in this country was strongly urged in a paper by Dr. C. T. Ewart, who divided epileptic patients into three classes, namely, (i.) epileptic children;

(ii.) epileptics not insane; and (iii.) the epileptic insane. Only in the London district (Northampton excepted) has provision been made for poor children; but a National Institution was founded in 1893, at Chalfont in Buckinghamshire, for the adult epileptic *not* insane, and is now being extended. The first home of this kind in England was at Maghull, near Liverpool, established in 1888. The routine medical treatment at Chalfont places every patient upon half a drachm of bromide of potassium at bedtime; occupations, mostly in the open air (agriculture, horticulture, and dairy work), are provided, and a carefully arranged dietary is prescribed—avoiding "strings and stones, skins and bones." The epileptic seizures are said to be less frequent, and the general mental and physical condition to be ameliorated. Some cases, however, prove unsuitable and have to be transferred to asylums.

To the friends of the "colonists" the relief must be immeasurable, and it is impossible to over-estimate the advantages of these "Homes" to the community, which is thus no longer hampered by an unproductive burden.

Recently the London County Council has considered the subject in respect of their epileptic insane, and a colony for 400 more is to be established. There are 12,122 insane persons in the asylums of the Council, and of these 1256—a proportion of about 10 per cent—are epileptics. It is computed that 1 in every 1000 of the population is an epileptic, and there are therefore over 4000 epileptics, sane and insane, in the metropolitan area. Altogether in the various asylums and licensed houses there are 20,000 insane persons in London; and it may be computed that among these are about 2000 insane epileptics, the greater number being males. The proportion of epileptic admissions, as compared with all other admissions into asylums in England and Wales during the five years ending 1895, was 8 per cent, being in the proportion for the two sexes of nine male to seven female. Thus there are probably about 1120 insane male epileptics in London under the supervision of the Lunacy Commissioners; not more than about 30 per cent of these would benefit by special occupation; in the intervals of their paroxysms they are quiet, able-bodied inmates who already do much of the work in asylums, and with more suitable occupation their lives will be much happier.

The scheme of the London County Council in regard to the epileptic insane aims at (*a*) a hospital for the cure of epilepsy; (*b*) an industrial institute with a variety of callings for the adults; and (*c*) a home for the demented. The same plan is also under consideration by the Chorlton and Manchester Joint Asylums Committee, with an extension for sane epileptics should this latter course be sanctioned by law.

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R. J.

ACUTE DELIRIUM

Syn.—*Acute delirious mania; Bell's disease; Délire aigu; Delirium acutum; Delirium grave; Mania gravis; Typhomania; Phrenitis; Collapsdelirium.*

Definition.—An acute mental disorder of rapid onset, with severe affection of mind of the delirious type, associated with febrile disturbance, profound bodily exhaustion and prostration, and tendency to the typhoid state; ending not uncommonly in coma and death.

Causes.—The rapid onset and frequently brief course of cases of this nature, together with the presence of febrile disturbance, have given rise to the opinion that acute delirium may, in some cases at least, depend upon a self-intoxication arising from the production within the organism of chemical bodies which have a toxic effect on the higher nervous mechanism; or in other cases may depend upon the introduction of micro-organisms into the body. Further chemical analysis and bacteriological investigation are needed to ascertain the truth or falsity of these opinions. Attempts to obtain culture of micro-organisms from the blood, or fluids of the brain, after death in cases of acute delirium have so far yielded little result. Wood has recently arrived at an entirely negative result in such investigation. Rasori found in the subdural fluid of a fatal case a small bacillus which, injected into rabbits, caused death by septicæmia; but further confirmation is needed before it can be considered certain that acute delirium depends upon the introduction of a specific bacillus.

Neurotic or insane inheritance is usually found. The disease more commonly affects women than men, and occurs most frequently between the ages of twenty-five and forty. Frequently, before the onset of the disease, there has been debility for a long time, arising from such causes as pro-

longed intellectual strain or anxiety, accompanied by insufficient rest and sleep, and want of care in maintaining the bodily strength. Debility from exhausting disease may have the same result, especially if severe emotional shock be superadded. It occasionally follows the specific febrile diseases, or other diseases such as cystitis, diarrhœa, or diabetes. Further, it may be caused by alcoholic excess, head injuries, heat-stroke or sun-stroke. Its occasional occurrence after confinement renders it probable that, in some cases at least, the disease is septic. General paralysis sometimes begins with an acute delirious onset. Blandford mentions its occasional association with epilepsy. Levinstein-Schlegel places acute delirium under the head of "Infectionspsychosen," although the evidence of infection is at present small.

Symptoms.—Acute delirium may begin suddenly, but more commonly there is a short period of depression with irritability, sense of impending illness, sleeplessness, exhaustion, inability to concentrate the attention or to collect the thoughts, associated with discomfort, heat, or pain or confusion in the head. Hallucinations rapidly appear, and are commonly terrifying and associated with an anxious expression of countenance. Consciousness becomes profoundly affected, and the patient loses mental grasp of his environment, and passes into a condition of complete mental confusion with constant delirious chattering. Sleep is absent or very deficient. There is extreme restlessness and excitement, with a tendency to resist and struggle against feeding, or any necessary attention; the effect of this being to produce profound exhaustion. If the disease be not checked by treatment, and the nutrition maintained by abundant feeding, the muscles waste, the fluids of the body become diminished in quantity, the tongue becomes dry and brown, the bowels confined, and the pulse feeble and irregular. Finally, the motor restlessness ends in twitchings and purposeless movements; complete mental apathy, attended by low muttering delirium, supervenes, and coma with eventual failure of pulse and respiration may close the scene. In cases which do not end fatally there is loss of memory of the attack.

The temperature is usually raised, but without definite course; in most cases varying between normal and 103° F., but in others rising as high as 106° F. In another group of cases (delirium asthenicum) the temperature may not be elevated, or only for a short time at the outset of the disease. Albumin is occasionally present in the urine. Bedsores are apt to form rapidly. In cases of alcoholic origin peripheral neuritis may appear. Short remissions may occur. As in some cases well-marked painful emotion may be associated with delirious chatter and extreme opposition to all necessary attentions, the name Acute delirious melancholia has come into use. Probably, however, there is no essential difference between the pathology of such cases and those of the more maniacal type.

Prognosis.—Always grave, and generally unfavourable to life. Patients who come under treatment early, and are not profoundly exhausted, may recover quickly; but, if early treatment be neglected, death may ensue by

the rapid onset of coma, or as the result of some local complication. The prognosis is better in women than in men. Recovery takes place in some cases after a prolonged period of secondary stupor, when excitement has disappeared; but in others, though life may be preserved, there may be mental death, the patient remaining incurably demented.

Pathology.—The brain and meninges are usually found after death to be congested. The cortex of the brain appears somewhat swollen, and the gray matter darker than normal. The perivascular spaces are dilated, and contain abundant extravasated leucocytes, which sometimes cause a naked-eye appearance of white lines along the vessels. There is usually excess of sub-arachnoid fluid; but, in patients who have become comatose as the result of prolonged intense excitement, and who at the same time have not received sufficient fluid nourishment, there may be an almost complete absence of fluid from the brain.

Microscopically, the changes noticed are principally in the blood-vessels and perivascular spaces. In addition to extravasated leucocytes there may be red corpuscles. The small arteries are full of blood. Leucocytes may be in excess in the ground substance of the cortex, and may be found in contact with Deiters' cells, and occasionally in the pericellular spaces of the ganglion cells. Deiters' cells are more numerous than normal. The ganglion cells do not necessarily show any marked change, the process appearing to be more of the nature of a periencephalitis than of a primary affection of the nerve elements. There is usually hypostatic congestion of the lungs; the heart substance is pale and friable; and the skeletal muscles may show evidence of degenerative changes analogous to those met with in typhoid fever.

Diagnosis.—From ordinary acute mania by the more rapid onset, the greater severity of the symptoms, the presence of fever, and the tendency to end fatally in a short time. Most writers consider it distinct from acute mania, but some observers describe it as a third stage of that condition. From meningitis and other cerebral diseases the disease is distinguished by the absence of cranial nerve paralyses, vomiting, optic neuritis, and convulsions. There is less tremor, more febrile disturbance, more intense excitement, greater prostration, and more profound affection of consciousness than in delirium tremens. Acute febrile diseases, with delirium in the early stages, are of course finally distinguished by the occurrence of a specific eruption.

Treatment.—Rest in bed in a quiet and somewhat darkened room, under the care of skilled nurses, and the removal of all sources of irritation, are necessary. In the milder cases of this affection, and where the means are ample, the patient may perhaps be treated at home or in a general hospital; but in the majority of cases removal to an asylum is absolutely necessary, and the earlier the better. Many patients are not removed till too late, and when irreparable damage has been done. In an ordinary house it is almost impossible to avoid the constant holding of the patient, which so rapidly exhausts his strength; and feeding is apt to be very imperfectly carried out. The patient should be liberally fed;

principally with fluid nourishment in the form of milk, eggs, beef-tea, or peptonised meat. Should food be refused, as is often the case, nasal or œsophageal feeding must be resorted to, without hesitation and without delay; and should be done three or four times in the twenty-four hours. Stimulants are almost always indicated by feebleness of the pulse, and at times they induce sleep. Stimulants are often avoided on the notion that the case being one of "brain fever," harm will be caused by their administration; but many patients will die if stimulants be not given to them.

Sleep always needs attention, and if it does not follow feeding, or tepid sponging, must be produced by drugs. Chloral, bromide of potassium, opium or hyoscine are better avoided. Paraldehyde is perhaps the best drug for this condition, and may be given by the nasal tube when the patient is fed. Chloralamide or sulphonal is, however, useful. The hypodermic injection of ergotine has been recommended. During convalescence tonics and liberal diet are necessary, and prolonged rest from work in country surroundings and without excitement are essential.

Confusional Insanity.—This condition is closely related to acute delirious insanity. The name is applied to a variety of acute mental disorder characterised intellectually by confusion of ideas, slow and incomplete thought processes, slow reaction to questions, want of grasp of circumstances, failure to recognise persons or mistakes in their identity, failure to record new impressions, so that memory for the attack is usually defective, and hallucinations of various senses. Definite formulated delusion may be absent, though in some cases present and arising out of hallucinations. The speech generally gives evidence of the confusion of mind, in that it is slow and fragmentary, and sentences are incomplete and incoherent. The patient, when roused, appears momentarily to wake up from a dazed condition, but relapses into it before any train of thought is completed. The condition differs from delusional stupor, as in the latter the patient is less responsive to questions and appears to be more profoundly stuporous; yet on recovery he is frequently found to have been fully conscious of his surroundings, and to have been previously enthralled, as it were, by some dominating delusion or hallucination associated with a painful emotional state. In confusional insanity there appears to be neither pleasurable nor painful emotion, but a neutral state; though there is often resistance to feeding, dressing, and other attentions, partly due to delusion and partly to want of comprehension of their meaning.

The milder cases most nearly resemble the condition known as "acute primary dementia," or "anergic stupor"; the more severe ones approach the delirious type. The disease is, however, a very curable one, unless there be permanent organic disease.

It may result from acute exhausting diseases, the puerperal state, alcoholism, sexual excesses, severe emotional shock, and surgical operation or injury.

The physical condition generally depends upon the cause, the patient always being weak and poorly nourished; and there is frequently a tendency to dryness of mucous membranes, and to the accumulation of sordes on the teeth, tongue and lips. The temperature, however, is not raised.

Wood comments on the absence of evident brain lesions in fatal cases, and concludes that confusional insanity may in its most acute form become an acute delirium, "probably the result of changes in the ganglion cells."

The treatment consists in the exhibition of abundant nourishing diet, with stimulants in some cases, and the administration of iron and other tonics. Rest in bed is necessary in the more severe cases; but in the milder ones the patient is able to be up, and indeed derives benefit from gentle exercise in the open air.

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P. S.

MANIA

VARIOUS names have been given to the several forms of maniacal excitement which need no special mention here.

Some forms have been named from their causes, as for instamce alcoholic mania, which, however, resembles ordinary mania; though the alcoholic factor may give it a delirious aspect.

Ephemeral mania may follow epilepsy, childbirth, or any toxic influence.

Senile mania is often erotic in tendency, and leads rapidly to exhaustion; in these cases early and careful feeding is essential.

Chronic mania is in some cases chronic from the outset; in others it is secondary to previous attacks of insanity.

Recurrent mania occurs as a rule in neurotic persons who, having had several attacks of acute mania, pass into a state of permanent instability, so that they are never long without recurring attacks of excitement, which, as a rule, resemble one another almost in every detail; such attacks may extend over thirty or forty years, leaving the patient, between the attacks, sane and with little mental defect. In such cases asylum treatment is almost essential; though some, when the periods of excitement are short and the patients are feeble, can be managed in private care.

ACUTE MANIA.—**Definition.**—A form of mental disorder depending on altered nutrition of the highest nerve-centres, marked by loss of control of the higher psychical processes, which gives rise to disorder in the conduct of the individual. This defect of control varies in degree as well as in aspect, the variations depending on the heredity, education, and general surroundings of the patient, as well as on the remote and proximate causes of the disorder.

Forms of mania.—Acute mania is seen in two very distinct forms; the one approaching delirium, the other resembling hysteria. We shall consider these two different groups of symptoms apart, as they are in most respects utterly unlike each other; though the chief characteristics in both consist in defect of the higher nervous control.

The following general remarks hold good of both forms. Mania may arise from disease of the brain itself: thus it is common as the earliest symptom of general paralysis of the insane; it may depend on general bodily disease affecting the nutrition of the brain, and may thus be met with in various blood disorders; it may arise in conditions of defective blood-supply to the brain, or be due to blood poisoning, as in alcoholism, uræmia, plumbism; or to general sepsis, as in puerperal states.

Mania may be part of a morbid mental process, or it may be the whole. Thus there may be maniacal stages in *folie circulaire* and in some chronic forms of mental disorder; or there may be a maniacal outburst during general paralysis, or with epileptic insanity.

Mania may alternate with periods of mental depression. Mania rarely arises without some prodromal symptoms.

Simple mania without delusions. (Simple hysterical mania.)—This form of disorder is most frequently met with in persons who come of neurotic families. Such persons have more than ordinary mental ability, but with lack of persistence. They are often attacked for the first time at or about puberty; and the attacks are generally associated with some slight exciting cause, such as emotional upset, physical illness, disappointment or the like. A young man or woman, after some emotional or physical disturbance, becomes sleepless, and then complains of vague uneasy pains in the head; various neuralgic discomforts are felt; change of scene is recommended, possibly with temporary relief; then more complaints are made, of a very hypochondriacal nature, the patient being restless, discontented, and almost always stirring up family troubles: this stage may last for a few days, or for weeks together, then a spirit of opposition arises so that everything seems to be done out of perversity. These patients have a marvellous power of upsetting homes and friends. They make frivolous complaints, exaggerate events, and often tell untruths without any design. They say and do what comes first into their minds. They rapidly become less and less conventional. Thus a lady will smoke, talk slang, or be extravagant in dress; and will declare her intention of doing as she likes. At this stage love affairs and like complications are common. In men sexual and alcoholic indulgences generally follow; in women masturbation or unseemly

language and gesture. The sleep is broken, the appetite large or capricious, the pulse often rather rapid and weak, the general condition feeble, irritable, and anæmic.

There is, moreover, general perversion of sentiment and of feeling. In the early stages it is common to meet with patients who change their religion. As a rule with each recurrence a similar religious version takes place; the Protestant seeks advice from a Romanist, and the Dissenter turns to the Church.

The general aspect of the case is very hysterical; a girl will receive the doctor in bed, dressed in the most fanciful of bedgowns with her hair, her flowers, her books and nick-nacks all arranged for effect. The pupils are generally dilated and mobile; the tongue tremulous and moist, with perhaps some white fur; bowels generally regular; no local gastric symptoms; urine often abundant and of low specific gravity; menstruation often profuse or irregular. The mental disturbance is worse at the menstrual periods. A patient in this stage may never get beyond home control; though she is often very hard to bear with in a private house. The milder cases are rarely certifiable, unless some foolish act betray the disease, or the patient refuse food, or threaten suicide; yet removal from home at an early date is the essential means of cure. In some cases, however, the loss of self-control becomes more obvious, and no doubt remains about the necessity for legal control. This simple hysterical mania may be but an early stage of ordinary acute mania with delusions, or it may be the early stage of acute delirious mania. If the attack follow its ordinary course, after some weeks or months the patient becomes dull, complaining frequently of symptoms like those with which the attack came on, such as neuralgia, or weakness; this period is one of anxiety, for suicidal attempts are then not uncommon; the sensitive neurotic has discovered his tendency to insanity, and dreads the future. With complete rest, followed by quiet travel (in men a sea voyage is often useful), the normal level is once more reached. Such an attack may be completely recovered from, and there may never be a recurrence; on the other hand, if a fresh and similar attack occur within a year or eighteen months, I think the prognosis is very bad; the prospect being that the patient will be liable to recurrences which will tend to mental weakness or to more permanent mental instability, recurrent mania, recurrent melancholia, or partial mental weakness with periodical outbursts of excitement. Another not uncommon termination is for the patient, after several attacks of mental excitement, to die of nervous exhaustion, or of some secondary lung trouble with which there is not nerve power to contend.

The treatment of this form of disorder is removal from home and relations (in many cases there is no necessity for certification), simple diet, abundant exercise in the open air, abstinence from alcohol; in the cases of girls it is well, if possible, that a nurse should occupy the same bed to check masturbation. Saline purgatives will probably be required. It is certain that sexual excitement must be avoided. I have

known marriage suggested, and even tried, as a cure, with the most disastrous results.

As far as drugs are concerned I do not approve of the continual use of bromides or chloral, singly or combined; at times they may be useful, but conditions of life are more efficient than drugs. Hydrotherapy is useful.

Just as at puberty these cases of hysterical or emotional insanity without delusions may occur, so in the decline of life similar disorders may arise; men who, till they were fifty-five or sixty, had led exemplary lives, lose self-control and do foolish things; such attacks frequently pass off in the same way as in adolescents, leaving a depression of spirits which is regarded by friends as proper contrition. However, similar attacks recur, and not infrequently lead to moral and financial ruin before their true nature is recognised. In nearly all these senile cases there is a recrudescence of lust which leads to foolish or immoral connections, senile marriages, and, occasionally, to sexual crimes or misdemeanours. The general termination of these cases is in mental enfeeblement, though the outbreaks of excitement may still recur.

Though these cases are common towards the end of life, they may also occur as the first stage of general paralysis; or at any age they may be met with in states of nervous exhaustion following bodily disease.

Impulsive mania.—These are cases of sudden maniacal excitement without either a stage of depression or of exhaustion. They may be epileptic in origin, either preceding, replacing, or following an epileptic attack, whether of the major or minor form (*vide* art. "Insanity and Epilepsy"). These attacks, regarded as simple explosive discharges of nervous force, may be very sudden, violent, and destructive; fully formed and apparently purposive acts may be performed, and yet the patient may have no memory of any part of the attack; in this respect he differs from those suffering from ordinary mania, in whom there is almost always a memory of the illness, though in the hysterical this is often denied. I have met with sudden ephemeral attacks of mania associated with chronic mental weakness, and with nervous exhaustion; especially if the exhaustion were due to sexual excess or masturbation: it is also worthy of notice that some chronic cases of delusional insanity seem to present sudden impulsive outbreaks of mania; the truth being that such patients have suffered for weeks or months from mental troubles which they have concealed.

Simple acute mania may depend on brain disease, bodily disease affecting brain nutrition, or defect of higher self-control. Though most common in early and middle life, it may occur at any age; it occurs nearly equally in both sexes. It is favoured by neurotic heredity and previous attacks; the immediate causes may be physical or moral. Any cause of delirium, such as alcohol or toxæmia, may set up mania.

The symptoms depend on defective control of the thoughts and

feelings which leads to incoherence in language, and impulsiveness in act.

The earlier stages are marked by general malaise with dread of some impending evil; there is a restless, emotional state with disturbed sleep and painful dreams, capricious appetite, rapid circulation, disordered digestion, sallow skin, and lithatic urine. In women menstruation is often excessive or too frequent; and there is general ill-health of a vague nature with little or probably no increase in bodily temperature. The mind is equally disturbed; for, though power of perception and even memory are retained, there is want of power of application and attention, and the thoughts appear without control; there is a tendency to react to the first impression without consideration of any but immediate consequences. This is a kind of uncontrolled or exaggerated mental reflex. A sensory impression starts a train of thought which is at once diverted by the next sensory impression. In the same way a visual or auditory suggestion may give rise to a direct and unbalanced action.

In the above ways incoherence of language and impulsive action follow. A patient seeing a "ring" on your finger at once says, "fling," "sing," "bring"; then as rapidly passes from verbal association to ideational, and says "gold," "bank," "robber." On seeing the ring he begins as before; but as he is playing on the word "ring," a sound strikes his ear and he goes on from ring to "music," "ringing changes," "church bells," and so on.

It is interesting to note that some maniacal patients react more readily to impressions on one sense than they do to those on another; and in the same way the impulsive reaction will be greater on some lines than on others.

The period of malaise above described may be more profound, and may amount to a true melancholic stage in which all the ordinary symptoms of melancholia are present; this stage varies very greatly in duration, in some instances lasting only a few days, or even hours, while in some it may continue for many weeks or months.

Some cases of ordinary melancholia which have lasted for years may suddenly take on the characters of ordinary mania.

The passage from the melancholic stage to the maniacal may be sudden or slow, simple or variable; that is, it may appear and disappear, again to reappear. In many cases the patient appears to wake up to the folly of his depression, and thinks that now he is quite well and that he must make up for lost time. This leads to restlessness and over-action.

The period of transition may be very short, or may itself need consideration; for it is at this time when we hope—too often in vain—to check an attack. In patients who have had previous attacks, similar if not identical symptoms recur in the same order, and we are inclined to hope that the process may be modified by early treatment. I am very doubtful whether such attacks can thus be cut short.

The first sign of acute mania is generally some outrageous or violent act. The nature of the attack will vary greatly, according to the

sex, age, and social position of the patient. As a rule there is degradation along all the social lines; the patient says things without regard to the feelings of others, and, later, without regard to social customs. There is a strongly marked exaggeration of self-feeling, a feeling of independence and a consequent intolerance of interference; next to the increase of self-feeling, there is almost invariably increase or perversion of sexual desire, leading to immoral or indecent acts; increased appetite often with well-marked degradation, so that blood, raw meat, or filth may be eaten; the tongue is coated, the breath foul, the bowels generally confined and the stools offensive. In some cases marked gastric disorder is present, the face may be flushed or sallow; as a rule the bodily weight decreases; there is no increase of muscular power, and there may be marked tremor of the finer muscles, and lack of staying power; there is constant restlessness, the urine may be of high specific gravity with an excess of lithates, but it rarely contains either sugar or albumin. Sleep is very defective, there being often constant restless chatter day and night, till the mouth and tongue become dry, and speech difficult to understand. Dreams and nightmares, however, often pervade the restless sleep. The senses are often unduly acute and memory may be good, so that a maniacal patient will recall words which have been spoken to him when he was maniacal. In some cases, though the special senses seem to be acute, common sensibility may be reduced; at any rate patients will suffer injuries or inflict them on themselves without apparent feeling.

The destructiveness of maniacal patients may be aimless; their acts may be simply impulsive, depending on uncontrolled reflexes; but often the destructiveness has a constructive idea at its origin, the patient, wishing to have new clothes or clothes of a new pattern, unpicks his old hat, but, lacking the power of sustained effort, he fails in reconstruction.

Hallucinations and delusions may occur at any period of the disorder, but as a rule they seem to occur first during the restless nights, when the bewildering thoughts seem to take shape, appear as foes or friends, and are addressed in suitable terms. Hallucinations of sight are very common, especially in cases depending on any form of toxæmia. Gastro-intestinal trouble gives rise to notions of poisoning.

Illusions are very common at night, when they are the cursory and mistaken interpretations of the sensory impressions. Delusions, more particularly having reference to the patient and to his friends, are common; at first the feeling of buoyancy leads to self-appreciation, and later to the notion of undue interference.

The symptoms depending on loss of control become more and more marked, till the patient is restless, sleepless, ungoverned, and incoherent; an organism which is swayed by every influence and impulse and beyond all self-control. Such a state in which thought follows and obscures thought, and in which no "ego" persists, may run on to exhaustion and to death; or it may slowly pass by, leaving the patient in a state of exhaustion more or less profound. He may then have passed from a stage of melancholia through one of mania to one of dementia, with a

sudden, or slow, or progressive transition. As a rule, the amendment follows natural sleep, and may seem to result from some bodily crisis or disorder. The recovery may be rapid or slow, and it is important to recognise that in many cases there is great danger of relapse during the post-maniacal stage; premature return to home and work are therefore especially dangerous in these cases. An attack of mania rarely passes off under three or four months. In a woman two normal menstrual periods should be passed before return home; and no man who has had a severe attack of mania ought to resume business responsibilities till he has been well for six months. There may be perfect and enduring recovery, or the recovery may be partial; the patient being no longer able to fulfil his business or social duties. Among the latter results we meet with cases of moral as well as others of mental defect.

An acute attack of mania may leave a man incapable of directing his conduct, in one way or in many. Recovery may seem to be perfect, but instability remains so that the patient becomes liable to recurring attacks. In some cases one attack of mania leaves a patient demented, and incapable of ever again taking his place in the world. Death may occur from exhaustion; in which case restless, sleepless excitement leads to a delirious state in which it is impossible for the patient to rest or to take food; and the result is rapid emaciation and death. In some cases of mania the end is quite sudden, the patient in the midst of restless excitement dies suddenly; such cases occur in the anæmic, and in persons with diseased vessels, or with an alcoholic history.

Death may occur from suicide, or more often as the result of accident. Maniacal patients not infrequently sustain accidents and injure themselves, and yet are unaware of the injury, and cannot give a history of its cause.

Treatment.—In the treatment of acute mania, the need of an asylum is almost inevitable; for though it is possible, where money is no object, to treat a patient in some private houses, yet in my experience the patients do not recover so rapidly as if sent to an asylum.

In the early or threatening stage, we must be guided by general principles; and experience shows that home and the most devoted friends are not to be looked upon as suitable ministers. I do not think foreign travel is to be advised in the earliest stage. I believe that change to some quiet, healthy, sleep-inducing spot is better, the man being removed from business, and the wife from husband and family. General tonic and hygienic treatment and hypnotics will have to be tried, and little or no harm follows the brief or occasional use of bromide and chloral.

I prefer giving great freedom in the open air, abundant milk food, and no stimulants; while the bowels are opened freely with calomel or saline purges. Hot baths are also useful. There is no good in shaving the head and applying blisters. I prefer to give little in the way of sedatives, but if there be restless sleeplessness I give sulphonal or trional in moderate doses; if there be violence and mere weakness I prefer paraldehyde in drachm doses, every two hours for three doses. In young, active, and very violent patients hydrobromate of hyoscine (subcutaneously), beginning

with $\frac{1}{200}$ of a grain each hour for three doses, is useful. Great freedom, abundant food, and no more sedatives than necessary, produce the best results, and these are best carried out in an asylum.

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MELANCHOLIA AND HYPOCHONDRIASIS

SYN.—In the older English writers *Lypemania* and *Phrenalgia*: they also used Melancholia as a collective term for insanity, without regard to emotional exaltation or depression. Fr.: *Monomanie triste; Aliénation partielle ou depressive.* Germ.: *Trübsinn, Tiefsinn, Schwermuth.*

THE mental disorders in which emotional depression is predominant may be grouped for convenience under this heading. Hypochondriasis is but a sub-variety of melancholia, and, although often dealt with separately, it will be treated here in what appears to be its proper pathological subordination.

Introductory.—The interpretation of melancholia as a morbid mental state is based on the following considerations:—States of consciousness are divided into feeling, ideation, and volition; but no one state of consciousness can be regarded as pure feeling, ideation, or volition, some element of each of the other two aspects being always present also in greater or less degrees.

The greater the predominance of one aspect of consciousness, the less is the share of the others, the more are they inhibited: thus in intense ideational activity volition is often automatic, and small sensations are unnoticed; so in excessive volitional activity, as in violent strife, pain is frequently unfelt, while thought is a mere reflex; in intense emotion ideation and volition are greatly affected, so that in great joy thought is often incoherent and action purposeless; in great fear thought is arrested and volition paralysed. Intense morbid emotion has similar results.

Emotional states invariably affect the processes of bodily nutrition: thus by fear the circulation may be depressed even to fainting; respira-

tion is diminished, as shown in the sighing of grief; secretion may be lessened, as seen in the dryness of the fauces, and arrest of the secretion of milk; excretion is affected, as evidenced by the limpid urine; probably metabolism also is affected, mental shock often being followed by forms of auto-intoxication (by jaundice, for example), and assimilation is interfered with by the arrest of the secretions.

In depressed emotional states the power of resistance to external influences is diminished, as manifested in the diseases arising in beaten armies; and the power of nutritional repair is lowered, as is commonly seen in surgical cases.

The general peripheral sensations again, especially the visceral, are greatly influenced, as Sollier and others have shown, by emotional impressions; and lowered cœnæsthesia is asserted by Dumas to be the invariable antecedent of depressed emotional states, whether arising from somatic causes or of mental origin. A local peripheral irritation also may produce marked emotional changes, and these may disappear immediately on the removal of the irritation.

In diseased conditions, especially in the depressed emotional states, this interaction of the mind on the body and of the bodily state on the brain establishes a vicious cycle of nutritional disorder, which tends to increase and prolong the disease.

Definition.—Melancholia, from the foregoing considerations, may be defined as a painful state of consciousness, unrelated or disproportioned to any painful mental impression or bodily condition, of abnormal persistence, and accompanied by excessive restriction or disorder of ideation and volition, and by diminution of the nutritional activities.

Prevalence.—Melancholia is a form of disorder found in a very large proportion of the admissions to asylums in England and Wales; thus in 1894 the Commissioners in Lunacy report a yearly mean of 1731 men and 2558 women admitted with this form of disorder; being 25·8 per cent of all admissions, namely, 21·5 for men and 29·9 for women. In the private asylums these proportions are 25·7 and 34·0 per cent. These figures do not represent the full extent of its occurrence, since a very large number of cases are treated without admission to asylums, and a large proportion of suicides probably occur in early stages of the disease.

Incidence.—The figures in the preceding paragraph show that the disease occurs more frequently in women than in men; and more often among the well-to-do than amongst the poorer classes. The reports of colonial asylums lead to the inference that it is more frequent amongst civilised peoples.

Causation.—*Age.*—Melancholia occurs with increasing frequency as age advances.

Race probably has little influence, as compared with the complex conditions of civilisation.

Religion might be expected to exercise considerable influence, and, although obscured by other conditions, probably does do so. Moham-

medanism, for example, with its fatalistic doctrines, ought to have little effect; more emotional creeds should produce melancholia more abundantly; but no statistics are available on this subject.

Occupations have an undeniable influence; those which involve the use of the mind rather than of the muscles, which are sedentary rather than active, monotonous rather than varied, or are concerned with poisons, such as alcohol or lead, furnish more than their quota of melancholia.

Predisposition.—Individual predisposition to this form of disease is found in the children of parents who have suffered from melancholy, or in whom other forms of insanity, or of defects of control, such as intemperance (in alcohol, morphia, opium, etc.), or of neuroses (epilepsy, etc.) are recorded. Phthisis, too, is often found in the family history: a combination of this disease with psychoses or neuroses is especially unfavourable. The physiological conditions of the puerperal state, of lactation, of the climacteric, and of senility favour the occurrence of melancholia; any condition, indeed, which results in prolonged imperfect nutrition or toxic states tends in this direction.

The proximate causes of melancholia are usually of slight intensity but protracted duration. In the predisposed, however, intenser causes of briefer duration may engender it. The history of the case commonly reveals protracted malnutrition, due to malassimilation, toxic conditions, or defective rest; these factors being commonly associated, or deriving from one another.

The defective assimilation may result from insufficient or inadequate food, chronic indigestion—especially from bad teeth or defective mastication, organic conditions of the stomach (dilatation, displacement, etc.), protracted ill-health (from exhausting discharges, loss of blood, semen, pus, etc.), or other conditions of disease.

The toxic conditions which produce it are usually of slight intensity, such as tippling, insidious poisoning by lead, influenza, or malaria, gout, constipation, defective action of kidney or liver, and so forth.

Imperfect repair may result from a long-continued output of energy disproportioned to the strength or assimilative power of the individual; or from protracted mental causes, such as worry, anxiety, disappointment, grief, shame, or general unhappiness; from continued pain, or peripheral nerve irritation, as by a disease of the skin. These last causes are specially operative when they interfere with sleep.

In nearly every case, however, the causation is complex, and hence the disorder is often curable in the earliest stages.

Predisposed persons are characterised by defect of assimilative power, either absolutely or in relation to their nervous activity. Periods of great energy often alternate in them with periods of exhaustion and depression, as is strikingly illustrated in the lives of some eminent men. Functionally, while often possessed of considerable mental power and ability, such persons are irritable and easily exhausted, are often variable and uncertain in their social relations, and are often celibate. Physically,

they are often slight in build and bone, and with chylopoietic viscera under par. They have commonly dark complexion, eyes, and hair. The teeth often decay early, thus exaggerating their weakness of digestion. The stigmata of degeneration are not usually well marked in them, but they are thin even at periods of life when, as Dr. Clouston remarks, "it is physiological to be fat." We often hear in them of night terrors or sleep-walking in childhood, and of emotional disturbances at puberty.

Prodroma.—Melancholia may gradually arise in predisposed persons, in whom it may seem to be but an exaggeration of the natural character. Burton, in his *Anatomy of Melancholy*, quaintly describes such a case. Commonly, however, after exposure to one or more of the conditions already mentioned, for more or less protracted periods, depressed spirits and sleeplessness gradually culminate in veritable melancholia.

Rapid or sudden evolution of the disorder usually occurs only in strongly predisposed persons; and from such intense causes as mental shock, debauch, severe toxic conditions, or acute insomnia.

Melancholia may also be a secondary condition after mania or stupor. It may follow obsessions, hypochondriasis, hysteria, or neurasthenia; and may be associated with chorea, epilepsy, general paralysis, or other organic diseases of the brain.

Degrees.—The emotional disorder may range in degree from slight failure of pleasure and interest in life to the most ecstatic dread or horror.

The intellectual abeyance may vary from a mere difficulty and sense of effort in thought to the involuntary concentration of the attention on a single idea. The disorder, commonly associated with incomplete attention to all but the predominant idea, leads to defective conception; the judgment is perverted, and errors thus accepted become delusions.

The volitional arrest varies from slight apathy to the absence of all volitional effort, and its disorder from mere restlessness to incessant gestures of misery; or phases of quietude may alternate with impulsive activity.

Disorder in conduct necessarily follows, and is especially manifested in neglect of self and circumstances, culminating in impulse to self-destruction.

Variations.—These variations in degree give rise to characters which may be more or less persistent, and may even form distinguishing features of the disorder throughout its whole course. To these and other variations particular names have been applied, and a very profuse and confusing nomenclature is the result.

Melancholia has been divided into the simply affective, without delusion, and the intellectual or delusional. It is more convenient and systematic to consider these varieties, together with the symptoms of the special area of consciousness predominantly affected, in the orders of emotion, volition, and ideation.

Emotional characters and varieties.—Every emotion may be affected in

every degree of intensity, giving an infinite variety of suffering to what has been aptly described as a "psychologic Inferno."

Thus the attitude to past events may range from regret to bitter remorse; the present state may be one of discomfort or of ecstatic horror, and the future may be regarded with apprehension, dread, terror, or despair.

The dissolution of disease may often be recognised in the disorders of emotion; the highest, most complex, most recently developed, and consequently least-organised feeling being the first to be diminished, perverted, or lost. In mental action, moreover, the higher functions control the lower; and the loss of this higher control may lead to the unrestrained activity of the lower. Thus the representative abstract feelings are usually the first affected in melancholia; and, by the loss of their control, fuller play is allowed to the lower, more presentative feelings. From this it results that the individual lives more and more in the subjective feelings of the present.

The abstract sentiments are often the first to be affected. If the higher æsthetic tastes have been developed, these no longer yield their wonted pleasure; intellectual effort of any kind is painful, and there is no longer satisfaction in acquiring knowledge. Delight in the new and strange is lost early, and even the feelings of surprise and wonder on which these are founded are diminished, so that startling impressions, unless they happen to be in harmony with the predominant morbid feeling, are ignored or excite little attention. In this general defect it is remarkable that the feeling of the ludicrous often persists, and in its lower forms may even be exaggerated. The case of Carlini is often quoted in this connection.

The moral sentiments, too, are often affected early. There is no pleasure in duty, in honour, or in the contemplation of abstract moral sentiments or of personal ethics. Complaint is commonly made of a sense of moral deficiency and unworthiness, which in extreme cases culminates in a causeless conviction of sin or of crime; the memories of former moral lapses are revived and exaggerated, or evil temptations take possession of the mind. The name *Melancholia moralis* has been given to such cases of delusion; or in which, as sometimes happens, there is moral perversion. The religious sentiments indeed usually cease to yield pleasure, comfort, or exaltation; they bring only misery and depression, regret or remorse, culminating in hopeless despair of this world and of the next (*M. religiosa*). Or again, the sufferer is tormented by blasphemous ideas, or voluntarily gives vent to outrageous language. Sometimes such perversions are intended to shock other persons, or to inflict self-pain. Sympathy, in its higher form, is usually reduced; the suffering or complaints of those around them leave them cold. The contagion of sympathy, the quasi-reflex form, is however sometimes increased in this sense that the patient may adopt and imitate the melancholic expressions or acts of others if these harmonise with his own feelings. Thus are epidemics of suicide originated. This form of sympathy occurs

in children and undeveloped persons; indeed, this reduction is most commonly found in young, uneducated, or ill-developed persons.

The specialised instinctive feelings are usually affected early, especially in persons in whom they were prominent and active. Thus melancholics continually complain of their loss of regard for their family and friends, and tax themselves with this evidence of their own wickedness. The perversion of these feelings is indeed often remarkable; so that an especial aversion from those nearest and dearest, amounting even to hatred, may be manifested, a perversion which may find vent in bitter accusations, or even in homicide.

The *social feeling* is almost invariably lessened, as evidenced by the avoidance of the company of others, and loss of pleasure in it. The solitariness of the melancholiac is well known, and may be noted wherever a number of the insane are congregated. This is sometimes perverted into active dislike, or even hatred, of their fellow-men (*M. misanthropica*), and may even lead to malevolent acts (*M. malevolens*).

The *self-feeling*, expressed in that love of approbation which is perhaps the lowest grade of social feeling, is commonly diminished; in extreme cases all care for the opinion of others is lost, and at times such patients act in a manner which would even suggest that they desire to lower themselves in the opinion of others. The loss of self-feeling is shown even more forcibly in the neglect of lifelong habits, and in the abandonment of cherished ideals, aims, and ambitions. In the slighter forms of mental depression the physician has often to guard the patient from giving up occupations, pursuits, or positions which on recovery would be bitterly regretted. The *egoistic self-feeling* is invariably depressed early. The melancholic usually complains of his sense of unfitness for his work or duties, even while still performing them satisfactorily to others; of his loss of all feeling of satisfaction in his actions or belongings, and of care for personal appearance or health. Perversion of self-feeling may culminate in self-loathing or hatred; and very commonly in loss of the instinctive desire to preserve life (the fundamental self-feeling), resulting in neglect of health, or even in self-mutilation and self-destruction (*Suicidal melancholia*).

The feelings which have *anger* as their fundamental emotion are markedly affected. The melancholic is no longer indignant at moral wrong; combativeness is lost, and submission is often made with meekness and humility to events that in health would have been strenuously resented. In the earlier stages this is often recognised and complained of by the sufferer. Perversion commonly manifests itself in grumbling, discontent, and dissatisfaction; but occasionally it grows into vindictiveness, usually in persons who believe themselves acted upon by external influences, especially if associated with illusions and hallucinations.

Fear, which is perhaps the most fundamental of animal emotions, is always present; and, as a rule, the greater the defect in the higher areas of emotional feeling, the more prominent does fear become. Fear may vary from a mere loss of moral courage or timidity, from vague feelings

of apprehension of impending calamity, even to panic terror. Fears in ordinary states of melancholia are not usually persistent; but in some cases (commonly of slowly advancing depression of no great intensity) they become fixed, may persist for months and years, and may dominate the conduct of the patient more or less; although he may recognise that they are unfounded. The variety of these fears is very great, and the records of the subject have been greatly encumbered by the invention of innumerable names to describe them; the tendency being to make each name into a disease. Nothing could be more absurd, for in the early stages these fears often coexist, and they vary from time to time. Moreover, if the basis of the fear be inquired into, very various explanations are given. Thus in claustrophobia, while one patient fears that the room will close in upon him, another fears that other dangers may befall, and others again fear that they themselves may become mischievous. It is sufficient to say that fears may be associated with every sensation, thought, or action; and that such names as claustrophobia, agoraphobia, and the like, are superfluous.

Volitional activity is inhibited in degrees varying from a mere distaste for doing or deciding to an absolute inertia. When the motor volitional arrest is extreme the sufferer may sit or stand in one position for hours, shunning all efforts of will; the attitude and facial expression usually being that of hopeless dejection: even speech may be in abeyance. When such patients do move, by their own volition or by the impulse of others, their motions are slow, heavy, listless, and spiritless; the speech is often monosyllabic, a whispered monotone. These quiescent cases usually yield without resistance to the impulse of others, and for such cases the name *M. passiva* has been used.

The name *M. cataleptica* has been applied to cases in which this passivity is accompanied by a certain amount of "flexibilitas cerea"; but where this is the case there is usually some degree of stupor, a condition which may shade off into *Melancholie avec stupeur*.

M. attonita.—In another group of cases the volitional arrest is equally complete, but the attitude is fixed and rigid, expressive of acute, painful emotion (often of remorse or dread); this is the form to which the name *M. attonita* is properly applied. A rare, extreme state of this form is that in which the patient stands upright with upturned eyes in the attitude of ecstatic terror or horror, and cannot be made to lie down (*M. ecstatica*).

The passive patients, but especially those suffering from the kind called attonita, instead of yielding to the impulse of others may resist every attempt to impel them to move, and to such cases the term "resistiva" has been applied; in some instances this resistance may become violent and even aggressive. This resistive form, when complicated with convulsive attacks, has been called "convulsiva"; in such cases there is usually also some degree of stupor.

The arrest of volition (aboulia) is often seen in an inability to decide or to choose, and in others in an inability to carry out an act when decided

upon. The volitional disorder may vary from a vague, purposeless restlessness, leading to a tendency to wander (*M. errabunda*), to a fixed unreasoned desire to get away from the place in which the patient happens to be. When the emotional pain is more acute the disorder is expressed in involuntary gestures, cries, or exclamations, these being characterised by their repetitive monotony. To such cases the name *M. agitans* or *agitata* has been applied. The motor restlessness may vary from a mere biting of the nails or wringing of the hands to the most frantic gestures; the exclamations varying from a mere moaning, or a repetition with monotonous iteration of some phrase, as "Save me, save me!" "Don't shoot me," "Don't burn me," "What have I done?" to frantic outcries. Often such sufferers pace to and fro like caged animals, with a facial expression of the most intense misery. The active expression of terror or horror in these cases makes a marked contrast with the dejection of the passive cases. Commonly they pluck out their hair, or rub their skin into sores. In its most extreme and acute form it may even rise to the height of maniacal excitement, and merits the name *M. mania;* some patients remain chronically excited (*M. excitata*), and may be aggressive and homicidal; usually they are actively suicidal, preferring violent means.

In other cases controlled quiescence is associated with occasional uncontrolled, impulsive activity (*M. impulsiva*). The acts may be entirely unpremeditated, being apparently suggested by some impression upon the senses, as in the breaking of fragile objects; or by vague resentments or antipathies, as in kicking or striking associates. In others the impulses may be persistently of one kind, such as the expression of foul, obscene, or blasphemous ideas (coprolalia); or the impulse may be to suicide or homicide. The impulse may be complained of and resisted, or it may be wholly uncontrolled.

The volitional manifestations vary and alternate in most cases, although they sometimes become fixed, and form the predominating character. Most patients are usually more quiescent after meals, and many are less controllable by night than by day.

Dr. Stoddart has recently asserted that motor rigidity is present in all cases, especially affecting the proximal groups of muscles; the peripheral being least affected. This statement, however, requires verification; it is very difficult to estimate and compare the degree of resistance in groups of muscles of such very different power.

Ideational varieties.—Intense emotional and motorial disorder may exist for long periods without producing such disorder of thought as to result in delusions; and the protracted resistance offered by well-developed minds is strongly contrasted with the feeble resistance of the youthful, ill-developed, or inherently weak minds.

Attention is the earliest process to be affected. This, in its higher voluntary form, has a large motor element, the sense of effort; in depressed states this sense of effort becomes painful, and is early complained of, as it destroys mental pleasure and the sense of capacity. Thus the higher intellectual efforts are shunned, and there is a tendency for the

mere reflex attention to the perceptions and feelings of the moment to predominate. Hence complaint is often made of inability to divert the attention from bodily sensations, passing events or impressions, business or family matters, in endless reiteration.

Hypochondriasis.—The arrest of attention on the bodily sensations, which constitutes hypochondriasis, may arise from the mere habit of self-attention, from actual bodily disease, or from centric causes. It may vary from a mere unreasonable fussiness about health to the most extraordinary delusions, with intermediate stages of doubt (*Folie raisonnante melancholique*).

The attention may be fixed on some local sensations, or may exaggerate every possible sensation, even recognising those bodily functions which ordinarily are unconsciously performed (for example, intestinal peristalsis or vascular changes). Several varieties arise in this way. The most common is the predominance of attention to the sensations of the digestive tract: the attention to deglutition often makes this process less easy, hence a notion of obstruction or even destruction of the stomach; or the sensations accompanying stomach and intestinal digestion are felt excessively, and are variously interpreted. The bladder, too, is usually associated in this hypochondriac attention. Commonly a painful sense of depression in these cases is referred to the epigastric or hypochondriac region.

Self-homicide may result in these cases from attempts by operation to relieve some imaginary condition of the bowels or bladder.

In *head hypochondriasis* (which, as Dr. Savage says, might rather be called *brain hypochondriasis*) the attention is fixed on sensations in the head. Sensations accompanying vascular changes would appear to be the basis of most of these: sensations of weight, pressure, want of pressure, hollowness, emptiness, lightness; with delusions of destruction, loss, or decay of the brain, in endless variety. In some the attention is concentrated on the mental operations which, by the very act of attention, are rendered difficult or impossible.

In *sexual hypochondriasis* attention is concentrated on the genital organs, and the mind is occupied by fears respecting their state—fear of impotence being predominant. These patients commonly also have illusions in regard to the bearing of others towards themselves, believing that aversion to be manifested in words or gestures. If such an one form a matrimonial engagement, his fears are often exaggerated, even to suicide or acute mental disorder. This form is much more common in men.

Nostalgia, as it especially affects the inhabitants of marshy and mountainous regions, is characterised by melancholic attention to sensations in the pneumogastric nerve area; I have suggested that this is due to the loss of the habitual lung sensations, arising from the extreme of atmospheric pressure to which they have been accustomed. Home-sickness, which rarely passes beyond depression, is probably due to the sense of loss of habitual social stimulations. The Japanese are said especially to suffer from it.

The expectant attention induced by melancholic ideas generates illusions, and probably also hallucinations, which are always simply the expression of these centric ideas.

Delusion.—The limitation of attention to the feelings and perceptions of the present tends also by repetition to strengthen them, and thus more and more to exclude the higher representative elements of thought; the subjective elements thus becoming more and more predominant. The patient, conscious of his changed feeling, at first may recognise it as due to his state of health; but if the change is more marked he may endeavour to account for it by some external cause, some bodily disease, or moral defect. He is constantly endeavouring to explain the changed self-feeling: for example, self-dissatisfaction passes on to a conviction of wickedness or criminality, then to the idea of a special form of criminality, or, in an extreme case, to the conclusion that the "ego" is changed, and that the self-feeling is that of the "devil" or other embodiment of evil; the reversal of this process may also be commonly observed in the devolution of delusion. The false conclusions, however, do not usually command belief at once; in many conditions they are doubted, although they cannot be dismissed; or disbelief or doubt alternate with belief. It is to be borne in mind, too, that, in melancholia, belief is often strenuously impressed upon others, and a portion of erroneous belief sometimes lingers from habit, or at times even from obstinacy.

The longer the false conceptions exist, and the more often they are repeated, the more firmly do they become organised; so that a mere apprehension of some noxious influence in the environment becomes a definite conviction of persecution, and later assumes the systematised form of persecution by particular persons or associations for very definite ends.

The delusions vary with their origin; if attention has been directed from the outset to the bodily sensations, as in hypochondriasis, they are usually expressive of some change of sensory impression: the delusion is that the body is brittle, or made of iron; that the sufferer is transformed into an inanimate object; that he is increased or diminished in size; is dead; that his internal organs are destroyed or putrid, and so on. Delusions of this kind frequently occur in ordinary melancholia, especially in epileptics, in the senile cases, and in general paralytics. In the two latter classes we see especially delusions concerning the digestive tract; for instance, that the throat, stomach, or bowel is destroyed. In such cases, too, the peristalsis of the bowels, being morbidly perceptible, is ascribed to the movements of animals; the rumbling of flatus to noises made by animals. The sounds of the heart or in the veins may likewise form the basis of illusions.

Morbid impressions of the special senses may, it is said, result in the delusion that the self is changed (for example, that the natural self-feeling cannot be recovered), or in the belief that the whole world is changed, often as a result of their evil state. It has been suggested that some morbid condition of the muscular adjustment of the eye or ear, by some change

in the perception of the environment, may account for this, but there is no proof of the suggestion.

When the external attention is governed by intellectual delusion, the expectant attention leads to confirmatory illusions to the effect that the acts, gestures, or words of those about him refer to the patient; or illusions of smell and taste may arise, especially that food is putrid or poisoned. Delusions of purely emotional origin usually correspond to the emotional habits of the patient, the description varying with his intellectual character. Thus in advanced age the delusions are especially likely to be concerned with property, such as pecuniary ruin; in later middle life, that character and reputation are destroyed; in early manhood, or in women, that the family is ruined, and so on; or if religion, politics, or society formed the leading interest of the normal life, these subjects form the basis of the delusions. Yet stranger delusions arise from the realisation of dreams; others again from adopting the delusions of companions (*folie à deux*).

Symptoms in conduct.—The melancholic, although shunning society and accustomed pleasures, may for a time continue to perform the habitual occupation or routine of duty; but ultimately he neglects even work and duty, and remains unemployed, brooding, and solitary; or he may wander aimlessly from home. Personal appearance and cleanliness are neglected; but it is only in very extreme cases that the calls of nature are not habitually attended to. Lastly, even self-preservation is forgotten; heat and cold pass unnoticed, food is neglected or refused, and very commonly attempts at self-destruction or self-injury are made.

Suicide.—The suicidal impulse of melancholia must be suspected in every case. In many the idea of self-destruction arises, but is firmly controlled; in others the desire to commit the act is openly avowed and attempted; in others again the desire is cunningly hidden, and the utmost ingenuity exerted to carry it out: this proclivity is usually the result of delusion, but not infrequently of a blind unreasoning impulse; the means of committing suicide may suggest the act; or again it is a persistent volitional obsession.

The passive forms of melancholia favour the less violent means of suicide, as by starvation, poison, drowning, and strangulation; the more restless patients incline to violent means, such as precipitation, burning, or throat-cutting.

The monotony of ideation in melancholia is sometimes apparent in the very refusal of other ways of self-destruction—in the pursuit of a chosen method; for example, one melancholic swam across a canal to throw himself under a train.

Self-homicide occasionally occurs in melancholia, as in patients who have died from the effects of self-mutilation (plucking out eyes, castration, etc.) without suicidal intent—perhaps, indeed, in the endeavour to escape from imaginary dangers.

The suicidal impulse is reported to exist in a more or less pronounced form in about 56 per cent of the cases admitted to English asylums; it

is more frequent in men than in women, and it increases with advancing age.

Causal characters.—Special characters occur in connection with special causes. Thus melancholia in the young, if associated with hysteria or masturbation, often leads to exaltation, which may take the form of expansive ideas of philanthropy and social effort, or of personal prowess.

The melancholia of the puerperal state is said to be frequently accompanied with perversion of the affections; love of husband and offspring may be replaced by aversion, or even by hatred and homicidal violence.

Climacteric patients are said, more frequently than others, to have lustful delusions, dreams, or impulses.

Gout, rheumatism, and arthritis give to melancholia a peculiarly irritable, querulous character, manifested by complaints and dissatisfaction, sometimes culminating in delusions of injurious treatment.

Phthisis, again, may be accompanied by great querulousness, complaining, discontent, sullenness, and irritability—a reversal of the "spes phthisica."

Disease of the aortic valves and mitral valvular incompetence are said to be accompanied by a predominance of anxiety and apprehension, together with irritability and querulousness (*vide* vol. v. pp. 950, 988).

The melancholy associated with general paralysis is commonly marked by great exaggeration; that accompanying epilepsy is usually impulsive, and sometimes aggressive.

Aberrant cases.—The course of the disorder gives rise to many varieties; it may be *remittent*, if intervals of sanity alternate with derangement. These remissions may be more or less complete, and the alternations may be of a day's or a week's duration. *Recurrent* is the term applied to cases in which the remissions are far longer and the periods less regular; as in cases which recur at special periods of the year, with the recurrence of pregnancy, and so forth. The daily, monthly, and yearly cycles of nutritional habit may be the foundation of some of these cases. Change of diet and habits, induced by season or occupation, may act in this way.

The name *mania à double forme* has been applied to cases in which mania alternates with melancholia; the alternations being daily or of longer duration. Stupor occasionally alternates with melancholia; and in circular insanity the patient again and again passes gradually from mania to melancholia: the circuits in a given case usually occupy a wonderfully uniform period.

Alternation is the term applied when the disorder alternates with the activity of other diseases. Alternation has been recorded in glycosuria, albuminuria, exophthalmic goitre, phthisis, gout, and asthma.

Bodily symptoms.—*Nutrition* is usually very defective. There is often loss of weight in the prodromal stage, especially if there be much sleeplessness. The decrease of weight is sometimes very rapid, and gives a serious aspect to the case. The muscles are diminished in bulk;

but the loss is especially in fat, even in the hard fat of the temporal region.

Wounds or injuries are repaired slowly, and are readily influenced for the worse by exposure to cold.

The *skin* becomes dry and harsh, and is often sallow from pigmentation, which is very marked around the eyes, etc. The hair is commonly harsh, dry, brittle, and consequently untidy; and grayness often increases rapidly in melancholia. The nails are thin and friable, often showing transverse furrows; in restless cases they are commonly broken or bitten down to the quick.

The *blood* in many cases (50 per cent) is deficient in red corpuscles; the hæmoglobin is also deficient. In some, the red corpuscles are normal in number, the hæmoglobin being in defect. The circulation is enfeebled. There is a tendency to venous fulness, dependent parts easily become congested, and the extremities are often cold. The pulse in acute conditions is quick, and is easily quickened by stimulation; the sphygmographic tracing usually indicates a feeble systole.

The *digestion* is usually disordered. The teeth are commonly defective; the breath offensive and even fœtid; the tongue large, flabby, and indented by the teeth. In restless patients the tongue is smaller. The stomach generally gives evidence of delayed digestion or even of dilatation, and may contain much alkaline or acid mucus. The bowels are almost invariably sluggish or constipated. The motions are dry or scybalous, and contain little bile. The appetite is usually bad or altogether in abeyance; or there may be the most strenuous refusal of food. The refusal may be based on sensory delusions in regard to the character of the food (of its being human flesh, poisoned, etc.); or on a supposed state of the throat, stomach, or bowels; on emotional delusions or hallucinations; on mere want of volition, or on the intention of committing suicide by starvation. In a few cases, however, the appetite is even excessive; or occasionally a patient will eat enormously with the intention of self-injury.

Menstruation is usually diminished or arrested; but metrorrhagia may occur, and commonly the mental condition is worse at these periods. The sexual appetite in both sexes is usually reduced or absent, but eroticism and self-abuse may be associated with the condition.

The *reaction time* in the majority of cases of melancholia is distinctly slowed.

Subjective symptoms.—The commonest bodily feeling is that of "sinking" in the præcordial or epigastric region; it is very variously described. Abnormal sensations about the head—of weight, pressure, fulness, etc., occur in great variety, but rarely amount to actual pain.

Sleeplessness is usually a very marked and troublesome symptom, especially in the early stages of the disorder, when also it is very closely related to the intensity of the suicidal impulse, and to the refusal of food. Dreams are often horrible and terrifying, patients sometimes saying that they fear to fall asleep. The dreams of melancholics are probably often the sources of delusion.

Progress and Terminations.—In very acute recent cases recovery may occur almost suddenly ; but such cases are very apt to relapse. When suicidal impulse has been well declared, a sudden recovery suggests simulation.

Recovery is ordinarily steady and gradual, but occasionally the improvement is intermittent. Improvement usually follows better sleep, resulting in better nutrition, increase of weight, more active circulation, and brightening complexion. In women, too, the menstrual function becomes more normal.

Mental improvement is usually first manifested by increased power of attention to the environment, so that occupation is gradually resumed. Attention to cleanliness and personal appearance returns, and is followed by return of affection and social feelings, and a gradual restoration of the habitual interests and pursuits. Delusions gradually diminish ; the belief, for example, of being a devil falls to one of ordinary criminality or wickedness, and doubt begins to alternate with belief.

Convalescence is sometimes attended with a certain degree of mental torpor and sluggishness, and at times there is even some exaltation, the patient becoming for a time brighter and more active-minded than in his ordinary condition.

In less favourable cases the condition may persist for many years, and yet end in recovery ; even after twenty years. In others the disorder passes on into stupor ; in others into mania, either by rapid or gradual transition ; in others again it loses its emotional character, and becomes delusional. Uncomplicated melancholia, however, tends but very slowly to dementia, that bourne of all chronic insanity.

Death in melancholia, apart from suicide or self-homicide, may occur from exhaustion, extreme sleeplessness, restlessness, or refusal of food. It is often ushered in by a low form of pneumonia.

Prognosis.—Melancholia justifies a more favourable prognosis than other forms of insanity. More than fifty per cent of those admitted to asylums recover ; of these Dr. Clouston estimates that one-half recover within three months, and four-fifths within the first year.

Recovery occurs after very long periods (even twenty years), and after intense forms of the disorder (even after three years of stomach-tube feeding).

Recovery, too, is often very complete, so that the highest and most active brain-work may be performed ; and persistent, so that patients may live a long subsequent life without a relapse.

Chronic uncured melancholics, too, are often long-lived, and in complicated cases tend very slightly to dementia.

Death in the acute stage is rare, unless from bodily disease. Dr. Clouston estimates its frequency at one per cent, but this is probably below the average.

No intensity of melancholia should deprive us of hope, so long as the delusions are not systematised, and there is no incurable bodily disease.

The conditions which make for chronicity are a marked heredity,

developmental stigmata, associated neurotic disorder, prolonged action of the proximate causes, slow evolution of the disorder, extreme youth or senility, and habits of self-abuse.

The unfavourable mental symptoms are rapid systematisation of delusions, especially with hallucinations; and the association therewith of loss of memory, incoherence, or mental confusion.

The restoration of nutrition without corresponding mental improvement is of bad omen.

The prognosis in cases of mental depression not amounting to certifiable melancholia is chiefly based on the association of hereditary psychoses or neuroses, and on the degree of disturbance of sleep and general nutrition. In the absence of these, the neurasthenic, the hysteric, the hypochondriac, climacteric, and depressed states may persist for a long time without leading to suicidal impulse or delusion.

A bad sign in climacterics is the excessive growth of the secondary sexual hair.

Pathology.—Melancholia has been regarded by some observers as merely the centric result of a vicious cœnæsthesia, from somatic abnormalities. This, however, is disproved, at least in those cases in which a single peripheral irritation is the cause. The essential centric condition, moreover, is not, at the outset, one implying pathological change of structure, for the symptoms may be marked one day or hour and be absent the next. Moreover, complete recovery may occur even after years of intense disorder. The conclusion may be drawn, therefore, that the essential condition may be one of nutrition, possibly in the nerve-cells, as seen in animals after prolonged stimulation; or be one of lymphatic stasis or altered blood-pressure, possibly from toxic or autotoxic conditions. In a series of cases examined at the Bethlem Hospital, Dr. Maurice Craig noted a prevalence of increased blood-pressure in melancholia, of decreased pressure in mania. The variations of the disorder probably vary with the area of the brain affected. Thus, to adopt Flechsig's views, we should expect in the hypochondriacal cases to find the sphere of bodily sensibility specially implicated; in those showing marked volitional disorder, the muscular sphere; and so on.

The "chromatolysis" of the cortical nerve-cells, as demonstrated by the newer staining methods, the pallor, distortion or displacement of the nucleus, and the varicose atrophy of the protoplasmic processes, found not only in melancholia but also in mania, have pathological significance; but the matter is not yet ripe for discussion.

In view of our great ignorance and of the daily progressing knowledge of this ignorance, it is well at present to abstain from a discussion of the many structural changes that have been described in connection with these states.

Treatment.—The causes of melancholia are usually complex: rarely is a case found in which two causal conditions, at least, are not present, more commonly several in combination.

In the early stages the removal of a cause will often arrest the progress

of the disorder; although when the disorder is thoroughly established the removal of a cause may have little apparent effect. The fully developed disorder, by the interaction of the cerebral and the bodily conditions, tends to its own prolongation. Hence those who have to deal principally with well-established disorder are apt to be sceptical of the effect of removing proximate causes.

The first point in treatment, therefore, is to relieve all unhealthy bodily conditions, such as disorders of mastication, indigestion (stomach dilatation), constipation, troubles of the sexual organs, of the organs of sense; thus an exhaustive bodily examination of every organ and function is necessary.

The habits of life require no less rigid a scrutiny; especially on the mental side, in regard to sexual, domestic, business, social, and religious worries.

Mental treatment.—The arrest of attention in melancholia is a good measure of the intensity of the disorder, and a good test of progress. By the diversion of attention—where this is possible—to simpler modes of mental action the functional expenditure can be definitely and systematically lessened; such a diversion probably implies comparative rest in those cerebral structures whose nutrition is specially affected.

The reduction of the emotions in melancholia to their simplest modes of expression must be remembered, and the painfulness of premature attempts to revive the higher forms of mental feeling should be avoided. The stronger the fixation of the attention in a given case, the lower in the scale of mental effort must we descend in our attempts to divert it. Where no voluntary attention is possible our efforts must be limited to mere sensory diversion. The appeals to sensory attention may be effected, in common sensation, by the various methods of massage; by cutaneous Faradisation, or Franklinisation; and by hydrotherapy, in which, by variations of warmth and force of jet, pressure and temperature sensations are added to those of touch. The hot air and vapour bath, the wet pack, and similar means act also in the same direction. Monotonous sounds were recommended by Burton, such as the sound of falling water. The diversion of attention by these means, though incomplete, is sometimes demonstrated by the production of sleep. A more powerful means of diversion is found in passive sensory impressions involving the lower forms of emotional feeling; for example, of familiarity or novelty, as in viewing new or familiar scenes, or in listening to music.

Volitional diversions of attention (occupation or games) must also be employed whenever practicable; and in using these we should ascend from those that are merely motor and almost automatic to those demanding sensory attention also: we shall then advance to those involving combined intellectual, sensory, and motor effort; and, lastly, to purely intellectual work. By thus arranging occupations in the order of the functional expenditure involved, the estimation of their value is more easily made; as well as of the extent to which they should be employed.

In cultivating the higher forms of volitional occupation patients

should be taught and encouraged to break off at the first feeling of imperfect attention, resuming it after a few moments of muscular exercise brisk enough to stimulate the circulation. In this way the duration of attention may be gradually extended from a few minutes to hours. The greatest efforts, too, should be made in the earlier part of the day. After the last meal the attention should be diverted by the most automatic of occupations, or by mere sensory diversions.

The attention in melancholia is often directed to some special area of consciousness—to the entoperiphery, the epiperiphery, to the mental operations, or even to the volitional side ; and benefit may be obtained by diverting attention from the affected to the comparatively unaffected areas. Thus where the attention is entoperipheral, as in the hypochondriacal, its diversion should be made by motor and intellectual appeals. When, on the other hand, the attention is concentrated on the environment, appeals to the motor side are especially indicated. The hallucinated insane are amongst the most industrious of our patients, and often seem to obtain relief in incessant occupation. Where introspection predominates, appeals to sensory attention and motor activity are specially indicated ; such patients being much benefited by change of scene and variety of surroundings. The whole of the patient's time, as far as practicable, should be occupied by such attempts to divert his attention by occupation, amusement, and therapeutical methods. Melancholics left to their own thoughts are assuredly beating the mill-round of their disorder deeper and deeper.

Changes of circumstance, with the passive influence they exert in directing attention and otherwise affecting health, demand a separate consideration. The stereotyped course that all melancholics should be removed from home must not be too readily accepted. Like every other means of treatment, it should be adopted only for good and sufficient reasons. Unless these are present, patients in the early stages can often be treated to advantage at home, until they are sufficiently improved to leave without suffering from the disadvantages which such a change commonly entails. Where the presence of certain relatives constitutes the drawback to home treatment they may perhaps be removed.

Change from home, travelling, asylum treatment, and the like turn much on the pecuniary means, the habits and experiences of the patient, the condition of bodily health, the mental state, and the prognosis—questions so complex that each decision must be arrived at on its own conditions.

Those patients whose attention can still be controlled may sometimes, therefore, be treated without removal from home (when other means of treatment can be added), by the revival of accustomed or even novel occupations and amusements.

When the attention is preoccupied by domestic and family troubles or worries, change under careful supervision from home, family, and friends becomes absolutely necessary. The effects of a simple change of place should, as a rule, be tried, before venturing on the complex changes

of travelling, or committing the patient to prolonged unalterable conditions, as on board ship. The danger of sending patients to travel without preliminary trial of the effect of change is very great. We must be assured that noisy hotels, irregularity of sleep, unaccustomed or unsuitable food, and the worries of travelling will not affect the patient unfavourably. However able the travelling companion, it is difficult to save the patient from some of these injurious influences, and from questions and decisions which are too trying to him. Incipience and convalescence are the proper stages for this remedial measure.

The social change may be limited to the companionship of a carefully selected person, medical or lay; to the society of a single household; or, in slighter cases, to the larger society of a boarding-house, hotel, hydropathic institution, or spa. Usually the social surroundings may be advantageously increased in this order, the frequency of change of place being regulated by results. Among the poor little can be done in this direction, and consequently a resort to more stringent means of supervision is often necessary in them, even in an early stage.

When the attention is volitionally directed to the self-feeling, when there is uncontrolled expression of the predominant feeling, delusive idea, or impulse, constant supervision and control become necessary, either in an asylum or suitably arranged home, with a much greater monotony of environment. The form of supervision is of course mainly dependent on pecuniary means; but that method is always to be preferred which brings to bear on the patient the greatest amount of skilful and individual attention. The influence of the discipline and routine of a large asylum is undoubtedly beneficial in later conditions, but in the early stages individual attention and consideration are all-important. On the care and skill brought to bear on the early stages of the disease much of the result of the treatment depends. Attendants and companions should be chosen therefore with very great judgment, and, if found unsuitable, changed without delay. As a rule, the more intelligent the companion the better; but the physician has no nicer duty than the selection of the person best fitted to deal with a given case. In the treatment of melancholia the first step is to gain the confidence of the patient. The most careful and exhaustive inquiry into the feelings and ideas of the sufferer is absolutely necessary. Until the fundamental melancholic idea is discovered complete confidence is not gained, and the physician's personal influence for good is greatly weakened. In the earlier stages of the disorder this influence is of the utmost importance. With the complete confidence of the patient reason and volition may often be actively enlisted, and the suggestions of the physician under these conditions have a great influence on the progress of the case. Hypnotic suggestion can rarely be employed in melancholia, and should be avoided, since by it volition is enfeebled rather than strengthened. The confidence of the patient must be retained by absolute truthfulness, by sympathy and firmness. An atmosphere of persistent hopefulness is not without its effect on these patients, strongly as they may deny its influence.

Arrest or recovery in melancholia sometimes follows physical or mental shock, or the excitation of strong emotions. Thus sympathy for friends in sickness and trouble, or the pressure of a real anxiety, will sometimes result in cure. Emotional influences, however, can rarely be brought into play therapeutically. Religious emotion has been tried, but in my experience it is a dangerous means of treatment. Fear also, although at times successful, is a double-edged weapon.

Against established delusions direct argument is hopeless, harmful, and to be avoided; those founded on illusion and hallucination may, however, be excepted. In the stage of doubt, whether in the inception or retrocession of delusion, reasoning and kindly ridicule, especially when indirect, are not without their effect. Fears and obsessions in the early stages may be combated by systematic volitional efforts made at the suggestion of the physician.

The degree of *rest* to be employed is of the utmost importance. Rest in bed at the outset has been recommended in all cases; but some patients are not thus benefited, and the point must be decided on the merits of each case. Rest in bed is indicated in acute cases with great nutritional disorder, when great insomnia, sitiaphobia, or suicidal impulse is present, but not isolation; on the contrary, companionship and amusement are to be provided, and massage if the rest be protracted. Yet in cases of extreme sensory irritability rest in bed with isolation may be indicated. Erotic persons, or those having sensory hallucinations or illusions, are not to be kept in bed if it can be avoided.

The amount of *exercise* taken should always be carefully regulated, for actual fatigue will often produce relapse. In the early stages, and wherever it is possible, muscular drill is of the greatest service at the outset; later, a carefully regulated exercise must be taken,—walking, golfing, cycling, boating, or riding, as the circumstances permit.

The melancholic should spend as much time in the open *air* as possible, consistent with the avoidance of fatigue; the best hypnotic is a day in the open air.

Physical treatment.—Attention to digestion is the first point. The teeth should be put in order, as bad mastication and the swallowing of contaminated saliva are very detrimental. The stomach should be examined for retention of food; and in many cases of loathing or refusing of food lavage may be used with advantage, hyperacidity, or the reverse, being neutralised by the wash.

Food should usually be in excess, in the young even largely so. If there be obviously much gastric irritability and disorder, a milk diet may be indicated; but the diet may vary from this to the choicest productions of the kitchen.

Alcoholic beverages may be needful for young adults; but in older persons, whose excretory organs are enfeebled, they must be used with caution or not at all.

Refusal of food may often be overcome simply by putting the food in the mouth with a spoon; in other cases a feeder (the nose being held) is

sufficient; but at times forcible feeding by the nasal or stomach tube, with chalice or pump, is necessary. The nasal tube has the advantage in cases where the resistance is very strenuous; but there is more danger of passing fluid into the air-passages, and only very liquid food can be given by it. The stomach-tube, passed into the stomach (there is no special advantage in one shorter than this), has in its favour the greater rapidity and the greater variety of nutriment. The resort to forcible feeding should never be delayed when refusal is once definite; it may be practised from two to five times a day, the intervals not being less than three and a half hours. Pounded meat, freshly made beef tea, milk, eggs, pulped cooked vegetables and fruit, in their due proportions, should form the basis of the feedings, which may be peptonised, or pancreatised, if indicated; and lime juice, alcohol, or medicines may be added if necessary. Rest in the horizontal position after each feeding is sometimes required to prevent vomiting, whether involuntary or self-induced. Rectal alimentation becomes necessary in extreme cases, and in this resort defibrinated blood has been found useful. Constipation must be treated by diet and the usual remedies; if allowed to persist, it increases the malady.

Sleeplessness.—Sleep is usually in defect in melancholic states, especially in the earlier stages; and a most important question arises in regard to the use of narcotics and sedatives. The habitual use of narcotics is well known to destroy the normal habit of sleep, and to result in various nervous and mental disorders. Moreover, the state of unconsciousness produced by narcotics is not physiologically identical with normal sleep; and it is difficult to believe that the addition of a toxic condition to an already disordered state of nutrition can be curative. Many competent observers, however, recommend and use them. My own observation and experience tell me that nothing is more prejudicial than their use in melancholia, and that only in exceptional conditions is even the most temporary resort to them justifiable. For further consideration of this subject the reader is referred to the article on Insomnia, vol. vii. p. 746.

Local treatment.—In many cases there seems to be an over-fulness of the cerebral venous system and probably a lymphatic stasis; and I believe that patients in early stages have relieved this condition and have obtained benefit by frequent deep inspiration, the hands being brought down over the large veins of the neck at the same time so as to empty them.

The application of cold to the head by douches and by alternations of heat and cold are distinctly beneficial. A jet of cold water over the cervical sympathetic is often of use. Shower baths in the young, when they can be borne, are most efficacious.

Galvanism of the head offers great promise of good, but as yet no satisfactory account of its systematic use in a large number of cases is on record.

The general treatment must be directed to keeping the skin, kidneys, and bowels in free action. The action of the skin should be promoted by hot air or vapour baths, and warm baths; also by daily friction with rough towels or brushes. Active muscular exercise, however, is the

best means when this is possible. Both skin and kidney action should be promoted by copious watery fluids, taken, if possible, apart from meals and digestion.

Tonics and stomachics may be given to promote appetite and digestion; iron is very commonly indicated, and at times phosphates and phosphorus appear to do good.

Intercurrent febrile conditions have often been followed by recovery in cases which had become stationary; and, in imitation of this, treatment by the thyroid extract has been tried with some success.

Associated diseases, such as gout, must of course receive their appropriate treatment, which often leads to amelioration or removal of the mental disorder.

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H. R.

MENTAL STUPOR

THIS name is used to indicate those mental disorders which serve as links between dementia and melancholia.

In cases of true stupor there is suspension of mental action, but not its destruction. The supply of nervous force seems to be cut off, but can be turned on again under certain conditions. It is quite impossible to distinguish sometimes between cases of stupor and of melancholia or dementia.

Stupor varies in degree, and consequently differs in appearance. Generally it must be looked upon as a defective power of reaction to ordinary surroundings; depending on suspension rather than on an absolute want of power, or on arrest of function due to some dominating idea. It is a state of mental confusion with want of will. In many cases little else than want of will power can be observed; and it is in such cases that the separateness and special work of the will are perceived. Stupor may be primary or it may be secondary.

There is still difference of opinion whether there be such a disease as acute primary dementia, apart from stupor; and certainly the same state has been described by authors under the two names. The general symptoms will be described later.

There are three groups of symptoms which produce almost the same appearances. First, there is melancholia attonita, or melancholia with stupor, in which shock—physical or moral—has arrested the mental expression; in such cases there is a form of prolonged panic, with a dominating idea or feeling; secondly, there is a form of dementia in which there is no dominating idea or feeling, but in which there is complete suppression of all reaction to the surroundings; lastly, there is an intermediate state in which there is no dominating idea or feeling, but in which there is automatic reaction to the surroundings exactly parallel to the hypnotic state.

The *causes* of these different states are similar. Neurotic heredity plays an important part in many instances. Severe sudden shock, whether pleasurable or painful, is often the immediate cause; the nervous exhaustions following epileptic fits or acute mental disorder are equally efficient causes; blood poisoning, whether due to poisons such as alcohol or fevers, may also leave conditions of stupor; prolonged exposure or wasting illnesses are no less dangerous. There seems to be some special relationship between mental stupor and sexual faults. Masturbation is credited with the production of a very large proportion of these forms of disorder.

Malnutrition of the brain tissue, mechanical interference with the circulation and rapid causes of nervous (discharge) exhaustion are the principal physiological causes of stupor.

Symptoms.—The onset may be sudden, following at once a sudden shock; on the other hand, the causation may be gradual and yet the onset sudden. It is often preceded by a period of malaise and unrest of variable depth and duration. It may last for long periods, and may pass off gradually or suddenly. It may be periodical or recurrent. It may take part in regularly systematised mental disorder (*vide* "Katatonia," p. 384). It may be the termination of other forms of acute or recurrent mental disorder. It may end in profound dementia, or in death. It may be part of general paralysis of the insane. The symptoms vary to some extent according to whether there is a dominating idea or not. As a rule, the patients are not emaciated; they are often flabby with sallow complexions and greasy skins, their hair is scurfy, lips soft with saliva either dribbling or retained in the mouth, pupils often large and mobile, tongue —if it can be seen—flabby and indented; there is often causeless smiling or laughing; the general weight of body may be maintained. The hands get a swollen, semi-transparent aspect; and are very blue, often waxy, with tendency to whiten when pressed on. Circulation is generally feeble, but not always slow; the heart's action also is feeble. The circulation is not greatly increased by such drugs as amyl nitrite, and the sensory reactions are slow, thus, snuff often will not produce sneezing. Appetite is not active, but food is taken when given; though the patient, if he had to help himself, would probably starve in the midst of plenty. The muscles may be rigid, but the tendency is rather to catalepsy; the sphincters act normally, but there is a disposition to retain excretions—thus saliva is often held in the mouth, urine in the bladder, and fæces in the rectum. There may be a recurring proclivity to masturbation, but this is not common in the profounder cases. Sleep may be good, but the patient, if left to himself, would neither undress nor wash. He may be emotional, and occasionally he is impulsive; and by his sudden outbreaks may become dangerous. There may be some sensory hallucinations to which on recovery the patient may refer. He may lead a kind of dream-life, thinking he is no longer among human being in this world, but that he has passed to another. The reflexes are often exaggerated.

In nearly all these states anæmia with reduction of the red blood cells are to be found.

Melancholia with stupor is considered on page 367. In these cases there is some dominating delusion; and memory and consciousness remain, though the delusions and sensory disorders may colour the recollection. The general aspect is that of mindlessness with some expression of dread and resistance, rigidity of muscles, and general opposition to everything that is being done to or for the patient; the sleep is bad, food refused, general bodily health failing. This state may gradually pass off, it may remain permanent, it may give place to maniacal excitement, or it may lead to simple dementia with limited mental power. The course may be of short duration; but as a rule such patients take many months in recovery; they need healthy country surroundings, regular attendance, good food, and, as a rule, frequent feeding. Massage

may be of use in a few cases, but generally speaking it fails. Hot baths with mustard in them are useful stimulants. Galvanism through the head has done good in some cases. Where the circulation is fairly good, shower baths are of use, but they must be watched carefully; sometimes the reaction is deficient.

Careful and constant watching may be necessary to control masturbation, and to see that the bladder and rectum are duly emptied.

The danger of suicide is not great, as a rule; but impulsive acts may occur. Death may come by accident; or some secondary disease, such as bronchitis or pneumonia, may supervene.

Acute primary dementia is the name of the second group of cases; such are met with after fevers, after epileptic fits, and in some cases after a shock. The aspect is much like that of melancholia attonita; but there is a silly look without any appearance of dread, and the attitude is less that of resistance than that of indifference. There may be catalepsy. The sleep is often fair, the appetite good, and food taken with assistance; there is no active opposition to anything which is being done for the patient; he may retain his water or fæces till taken to the closet, but when there he may pass the excretions normally.

He is apparently without any memory, and on recovery will not have any knowledge of what has been going on during his illness. In some cases there are periodical recurrences of states of this kind. They may be permanent, or may pass off suddenly or gradually; they are rarely replaced by mania or any other form of mental disorder. There is little tendency to impulsive acts. There is little danger to life. The patients often get gradually fatter. Healthy surroundings and general simple stimulation are the best remedies. The line of treatment depends, of course, to some extent on the cause of the trouble.

In epilepsy I have seen more harm follow from the indiscriminate use of bromides than from the fits themselves. In alcoholic cases I think the complete withdrawal of alcohol is indicated. Free purgation and the use of Turkish or shower baths, with galvanism, are of service.

In the third group I have placed the **cases of true stupor which resemble hypnotic states**. In these heredity, shock, acute illness, and the like causes of nervous exhaustion are generally the active excitants. There is a silly or abstracted look; a tendency to laugh or smile without external cause; evidence of subjective sensory impression; cataleptic muscular states, with some rigidity and inattention to needs of body as far as food and excretion. There is often a masked memory, so that the patient on recovery has a dream-like recollection of the past.

These hypnotic states may pass off; they may become recurrent or may lead to more permanent mental weakness.

KATATONIA.—Under this head Kahlbaum, in 1874, described certain cases in which stupor plays a part. There is considerable difference of opinion whether this state can be looked upon as a specific form of mental disorder; the general feeling among English alienists is against accepting

it as such. In this disease there are generally hysterical or hypochondriacal symptoms of a very varying nature; these may range from simple hysteria to hysterical paralysis; the hysterical stage may be followed by a period of melancholia or stupor, or the melancholia in turn may give rise to stupor —there being the three stages of hysteria, melancholia and stupor, the order of the occurrence of these symptoms varying. The symptoms not only vary in their order but also in their intensity. In severer cases, besides motor inhibition and dulness, there is a tendency to cyanosis of the extremities, and to salivation.

There is generally a stage in which there is catalepsy, and also a stage —which has been considered the most characteristic—of gesture and of "verbigeration," this latter being a term used for the repetition of a syllable; thus the word "incidence" would be thus pronounced in-in-in-in-in-ci-ci-ci-ci-de-en-en-ence, in many cases the voice rising in pitch as the word is pronounced.

There is no doubt that certain chronic cases of mental weakness pass into or through a stage which may be called katatonic, and certain epileptic cases also exhibit the same symptoms; but it is not clear that the phase ought to be ranked as a separate disease.

I have met with one or two cases in which similar symptoms present in highly neurotic subjects have recurred, and have been repeatedly recovered from. There is no special treatment for these cases, and in many instances they may be treated out of an asylum.

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G. H. S.

RECURRENT INSANITY

OVER and above the tendency to relapse in the ordinary forms of mental derangement, there is a well-marked class of cases in which this tendency is a prominent feature. Too often the tendency passes into a habit, and the habit becomes incorrigible. A brief reference to recurrent insanity is of importance to the student of mental diseases because it elucidates the laws of periodicity, it draws attention to facts of varying psychical phenomena in the same person, it emphasises a very real danger, and it indicates a line of treatment which must not be overlooked in practice.

We have to take into account the laws of periodicity in dealing with all classes of diseases. The annual round of spring, summer, autumn, and winter brings in its train such maladies as bronchitis, insanity, diarrhœa; each in its season. Suicides are most numerous in summer, just when nervous diseases attain their maximum. Similarly, in the individual there are periodic changes of condition, mental and bodily: changes consistent with health, and therefore indispensable; changes more or less morbid, and therefore antagonistic to personal well-being. When we pass from the consideration of mere moods and feelings, or from the ordinary effects of the menstrual molimen, to the study of actual disease, we are at once face to face with a great array of facts illustrative of periodicity. There are the phases of relapsing fever, of recurrent appendicitis, and so forth; and this character is certainly not less marked in regard to nervous diseases. The nerve-storms of megrim and epilepsy are familiar to us in professional life; and further, the metastases of nervous maladies, the see-saw between one and another, are not less evident to the careful observer. Dr. Blandford has placed these observations in their proper relation to insanity, and it is unnecessary here to follow them out in detail.

The forecast of the "recovery" of an insane patient is complicated by this tendency to relapse; and, as already pointed out, the net number of patients who remain sane—that is to say, who have recovered and do not relapse—is a very different figure from the gross recoveries. We hold no man recovered until his life-history is complete. The outcome of these inquiries, then, goes to prove that insanity illustrates the biological law of periodic changes, and that our aim must be to restrain these within the bounds of health. In their recurrent manifestations there is nothing to be added to the symptoms of mania or melancholia except to note the frequency with which the same ideas and acts are repeated in periodic cases. This is so marked that it might disclose the real nature of the malady to a watchful observer. Empirically, in a case twice maniacal or melancholic we may speak of "a second attack"; and on the third attack rename the case "recurrent

mania," or "recurrent melancholia," as may be. Although periodic insanity may begin at any age, it may be stated that if a patient, young in years, of hereditary tendencies to insanity, has a sharp attack of mental disease, and recovers speedily, the prognosis is unfavourable in this respect. Should there be signs of degeneracy on the first onset, dementia, or, more rarely, periodic insanity is to be feared. The omens are inauspicious, and treatment must be at once and constantly employed to avert such issues.

In addition to the ordinary forms of recurrent insanity above named, there are two special groups to which much attention has been given. These are *Circular insanity*, and *Katatonia* (p. 384).

Circular insanity was first specially described by Baillarger under the name of *Folie à double forme*, and by Falret under the name of *Folie circulaire*. It is a well-marked form of mental derangement occurring in cycles, the attacks being characterised by a sequence more or less regular—one period of depression being succeeded by another of excitement, which again is followed in some cases by an interval of sanity or quiescence. Much has been written about this malady, and stress has been laid upon the difference in the initiatory and succeeding stages in different cases. There is no need to recapitulate the symptoms in detail. The melancholic and the maniacal stages present the ordinary features of similar isolated attacks in other patients, with perhaps a predominance of the sexual proclivities. As with other periodic insanities, the influence of heredity, the more frequent occurrence in women, the unfavourable prognosis are all strikingly exemplified. It is not a common form of mental derangement in this country. The patients labouring under circular insanity, in Dr. Clouston's experience, were nearly all persons of education; and far more than a due proportion of them were members of old families. Two cases now under my care present these features, but conform to no law of seasonal or sexual periodicity. During the lucid intervals they appear quite sane to any ordinary observer, but on closer examination mental weakness is discernible. It is remarkable that these nerve-storms should be so severe, so long continued, and yet leave the patient, in many cases, with intervals of mental and physical well-being, it may be up to the close of a long life; although in advanced cases there is an undoubted tendency to dementia.

In the *treatment* of periodic insanity perhaps the most important consideration is in respect of the possibility of improvement, or control, by the effects of change. Should the vicious circle be established but little can be done towards cure. Therefore, when an adolescent patient, of hereditary predisposition to insanity, quickly recovers from an attack of acute mental disease, some risk must be accepted in urging a complete change of circumstances. It may be too late to resist the beginnings, but it may be possible to repair damages and to prevent iteration. To this end there is nothing more potent than change of scene and circumstances, repeated as discretion may dictate, together with a wise guidance on the lines of health and sanity. It is unnecessary to discuss the value of

hypnotics, rest in bed, exercise, occupation and amusement, baths and massage, tonics and stimulants. The physician must consider the individual case, and the particular stage of the malady; in no disease is the mere treatment of symptoms less appropriate, or the mere administration of drugs less effectual.

In former days much legal fine writing was spent upon the occurrence of "lucid intervals." These now merit no such exceptional consideration. The questions affecting responsibility and competency are to be decided in the individual case, and in the light of the whole circumstances of the patient.

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The Bibliography of recurrent insanity is very voluminous. Cf. *Index Catalogue of Surgeon-General, U.S. Army*, and articles "Circular Insanity" and "Katatonia" in Tuke's *Dictionary of Psychological Medicine*. Baillarger and Falret, separately and under the names of *Folie à double forme* and *Folie circulaire* respectively, first differentiated this form of mental disease in a scientific manner. Cf. *Bull. de l'acad. de médecine de Paris*, vol. xix. An important article in *Brain*, vol. v. 1882, by Dr. Foville, is accessible to English readers. *Katatonia* was first described by Kahlbaum in a work published by Hirschwald of Berlin (*Die Katatonie*), 1874. Dr. Mickle's article in *Brain* (vol. xii. 1889, and vol. xiv. 1891) gives a full account of a case.

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A. R. U.

SYSTEMATISED DELUSIONAL INSANITY

(PARANOIA)

Introduction. — That which chiefly distinguishes man from animals consists perhaps in this, that in mankind the adaptations of the individual to his environment do not take place along those lines of activity, practically invariable in the life-history of a species, the trend of which we name "instinct." In man the place of this invariable instinct is taken by the highly variable judgment.

In the mind, therefore, the judgment is the most important, as it is the most human of the faculties. The judgment is impaired in all forms of mental disease. Where general consciousness is clouded, or where the primary functions of perception, reproduction, and so forth are profoundly affected, impairment of judgment, though present, is not a prominent or distinctive condition.

In three forms of mental disturbance especially is impairment of judgment a fundamental symptom—in idiocy, in general paralysis, and in paranoia (delusional insanity). In the first of these, judgment, the most adult of the faculties, has never been developed; in the second, the chief type of degenerative mental change in the individual, it is lost, in accordance with the general rule that faculties degenerate in the reverse order to that of their development; finally, in paranoia, an affection which may be considered as the most definite form of hereditary degenerative mental disease, the judgment either develops from the first along abnormal lines, or slowly acquires a permanently morbid mode of growth.

Delusional insanity (paranoia) may be defined as that mode of mental unsoundness which is specially characterised by delusion; that is, by beliefs not common to the race, which arise from the uncorrected action of the imagination, are fixed and systematised, and are not immediately connected with a predominant emotional state.

Delusions may occur in every form of mental disease; but in the acute forms—mania, melancholia, dysnoia—they are associated intimately with the predominant emotional state wherein they appear to take their rise, and which at the same time they reinforce. Delusions in the acute forms and in general paralysis are varying, confused, unstable, and even contradictory. When they are very fixed, as they often are in melancholia, they are still not schematised, not reasoned out in a systematic manner. The peculiarity which has been called the "systematisation or organisation of delusion," together with fixity of the morbid idea and usually slow development, forms the characteristic note of paranoia.

It has been supposed that, because there is in ordinary cases of delusional insanity a relative integrity of the faculties of perception, reproduction, and memory, the affection is merely a partial one; and, indeed, the term "partial insanity" is still sometimes applied, chiefly by lawyers, to forms of paranoia. On the same grounds Esquirol adopted the now rejected title of monomania, under which name he seems to have included only the sufferers from fixed delusions of exaltation. Taking into consideration the profound impairment of the highest faculty of judgment which is connoted in the acceptance of delusion, we perceive the deep significance of the symptom and its value as a test of mental unsoundness, quite apart from its convenience as a concrete and commonly clearly demonstrable fact.

Delusional insanity occurs in two forms, the original and the acquired. The former condition (first described by Sander) is distinctly rare; it is characterised by a tendency to delusion, occurring in deeply-tainted persons at an early age, who exhibit also general eccentricity and a slight degree at least of moral defect (waywardness, perversity, and the like). In later life a chronic fixed delusional state is engrafted upon this, which appears to be, so to speak, the congenital mental state. The condition is interesting on account of its rarity, and on account of its analogies and alliances with moral insanity and chronic affective insanity (*folie raisonante*).

Usually paranoia is an affection of adult life. It is most frequent in persons having a strong bent towards insanity (5). Since the time of Snell (15) it has been generally accepted as a primary form of insanity. Probably Dr. Bevan Lewis is alone among modern authors in holding that it is always secondary to mania or melancholia. It has been held, however, that this affection, though not secondary in the individual, is secondary in the family, occurring in the children of those who have suffered from one of the acute forms of insanity. But the taint may be acquired during the life of the individual, and it is not rare to see paranoia in persons whose family history is clear, but who have themselves been exposed for long periods to some injurious influence such as alcoholism or sexual excess. It is generally a disease of slow manifestation, being profoundly constitutional in its nature. It often attacks persons who have been eccentric, irritable, or of neurotic habits for years, or always. This fact, together with the acceptance of untrustworthy or often delusional reminiscences of patients, has led to the classification of many more cases as original than should, properly speaking, come under that category. Though really insidious in its onset, the outbreak often appears to be very sudden. This may occur as a genuine exacerbation, or be due to a dissimulation of symptoms which is frequently put on in the earlier stage. The character of the person who is about to drift into paranoia is self-centred. He may or may not be solitary in habits, but he is self-opinionated and self-absorbed. He may be dull and dreamy, or bustling and fussy. In the latter case little result usually comes of his activity, for he is inconstant and whimsical. In the

merely intellectual sphere for the same reason he is rarely potent. He is at best a brilliant failure, sparkling but unstable. He is vain, greedy of praise, and deaf to reproof. He is suspicious, touchy, and, like nearly all the insane, "ego-centric." That delusions of the kind which occur in paranoia should arise in persons of this character is probably as natural as that maniacal or melancholic ideas should arise in the sufferers from mania and melancholia; nevertheless the delusions in the disease we are considering are rightly called "primordial" (Griesinger), for they do not appear to belong immediately to any emotional state, and they strike in upon the mind of the patient as a new train of events. With the appearance of delusion the prodromal stage is over. The forms which delusions take in paranoia are infinitely varied in detail, and yet present in their general aspects a singular degree of uniformity. They may be conveniently considered under two great heads.

Delusions of persecution (Lasègue).—These are the most frequent. Among cases of paranoia which come under treatment for the first time, not less than 85 per cent exhibit delusions of persecution. In many cases these first appear in the form of insane suspicion. The patient is constantly on the look-out lest he should be watched; he is constantly thinking that trifling and indifferent matters have some special reference to him, and so forth. In this stage people look strangely at him as he passes, look at each other significantly, talk in a low voice about him; of this he is sure: the clergyman's sermons are directed at him; he sees references to his private affairs in the "agony column" of the newspapers, and so on. Illusion, or the phenomenon which has been called delusional interpretation, now reinforces the delusive beliefs; thus the innocent conversation of passers-by is made to deal with or to refer to him. It is seldom long before more definite delusions appear. The patient is maligned, is threatened; efforts are made to poison him, or to torture him. At first his suspicions are connected with a narrow range of objects, and his persecution comes from some vague quarter usually indicated as "they." "They annoy me." Soon, however, everything acquires a bearing on the patient, and "they" become some definite body of people (the Jesuits, Freemasons, some particular family, or the like); or some one or more persons are found guilty of the patient's suffering. The patient, who usually retains considerable powers of explanation, explains all this by recounting a conspiracy, which, originating in one or several people, has spread to enormous dimensions, and assails him from every point. The growth of this system of delusion, which gradually fills the patient's whole mind, constitutes that "organisation," or "systematisation," which gives its special feature to paranoia. Eventually the sufferer's mind is so filled with his troubles that he often refuses to believe that his case is not known to every one. The whole world is engaged in his affairs, and his interlocutors' questions are often met with the saying, "Why ask questions? You know all about the matter." In some instances the patient, if he is clever and persuasive, succeeds in convincing some member of his family, or his dependents, of

the truth of some at least of his allegations, thereby adding a difficulty to diagnosis.

There may be a perfect system of insane delusion or suspicion without hallucination, but this is rare. Hallucinations are the rule; either hallucinations of hearing alone, or combined with hallucinations of the other senses. Hallucinations of hearing may at first be vague, such as indefinite noises, or hammering, ringing, and the like; but they usually take the form of human speech. Patients generally refer to them as "the voices." Sometimes a patient says that at first they were but whispers (perhaps delusional interpretation), but that later they have become distinct voices. In early stages the patient commonly hears a monologue; later, a second or many voices are heard. The matter heard is almost always unpleasant. Sometimes it consists of abuse, vile charges, threats, blasphemy, or obscenity; sometimes of silly gibing. Often the voices describe to the patient or to each other the mode of their action, their motive, or the nature of their conspiracy. Often they torment him by idly remarking on what he is doing or about to do: "Now he is getting into bed, now he is putting out his candle," and so forth. Sometimes they forestall his words just as he is about to speak. This is particularly apt to happen with regard to his prayers. On the other hand, the voices sometimes reply to the patient's thought, and occasionally in a strain which is so unexpected by him that he does not at once comprehend the meaning. Sometimes, of two voices, one threatens or abuses the patient, and the other warns or defends him, or expostulates. Clinically, both the last-mentioned symptoms are of bad import. It has been held that they point to a destruction of the sense of personality, but it is hard to see why on this supposition they should have a specially grave significance, considering that they both occur commonly enough in dreams. Some patients are tormented by hearing all their thoughts spoken. This has been called the echo of thought. The patient usually accounts for it in the belief that by some underhand means his thoughts are made public. Some patients recognise the voices they hear as the voices of persons whom they know (either used by such persons or stolen from them); patients who hear several voices distinguish them from each other by actual or fanciful names. Not infrequently patients say that they are conscious of voices without hearing them. Occasionally they feel them in various parts of their bodies, but most frequently they are rendered conscious of them by the movement of their own throat or tongue, which seems to frame the words. This phenomenon has been described under the name of psycho-motor verbal hallucination (12). The physiological explanations offered for this, and for some other problems connected with auditory hallucination, are far from satisfactory.

Hallucinations of vision alone are very rare in paranoia. Indeed, they are seldom a prominent symptom. In some patients the image of printed or written words, either habitually or occasionally, takes the place usually occupied by "voices" as a means of persecution or of cryptic communication (14). Many patients see hateful or revolting objects as it were at

second hand, and say, "I am made to see so and so"; "Such and such things are projected before me"; seeming to recognise that there is less of reality in the visual than in the auditory impressions.

Hallucinations of taste are probably always unpleasant. They are sometimes indistinguishable from delusive interpretations. They are most important in connection with delusions of poisoning, in which cases they are rarely absent. Sometimes filth of all kinds is placed in the patient's food, or introduced into his mouth when he is asleep.

Hallucinations of smell are also offensive. Patients complain of mephitic fumes, noxious gases, chloroform and other volatile poisons, odours of filth and decomposition. Certain patients perceive sexual odours, either produced in themselves or proceeding from others. Hallucinations of smell are very frequently associated with sexual delusions, especially in women at the climacteric period.

Hallucinations of the genital sense are common. They are more complained of by women than by men. On certain female sufferers from delusions of persecution all kinds of sexual outrages are perpetrated. They complain not only of being violated (by men, and in some cases by beasts, as a mode of torture and disgrace—outrages which they say occur mostly at night, or when they are asleep), but also of sensations produced by occult means in their genitalia when they are awake, such as dilatation, and so forth.

Hallucinations of tactile sensibility and of general sensibility are usually combined, though they may exist apart. The commonest complaints are of shooting, darting, or stinging pains, attributed to the operation of various powers, most commonly electric batteries. Various sensations, which are sometimes described, of the limbs being moved, or of weight or heat, seem to show that the muscular, the pressure, and the thermal senses, in so far as they are distinct, are also concerned.

In a well-established case of paranoia of some standing it is not rare to find hallucinations of all the senses. It is to be noted that hallucinations occasionally appear to be unilateral. This is particularly the case with auditory hallucinations, patients stating that they hear the voices with one ear only.

Besides the senses which bring the individual into relation with the external world, the inner sense, if we may so call it, of the operation of the intellect is profoundly modified; and what may be called hallucinations of this sense are variously combined with hallucinations of hearing and of the other senses.

Thus it is a very frequent complaint that the patients' thoughts are read; his thoughts also are influenced; he is compelled to think of horrible or degrading subjects; by mesmerism or some such means he is rendered stupid and unable to think; he is made to sleep or rendered somnolent; he is kept awake—this may be by voices, by tortures, or by direct action upon the mind preventing sleep; he is compelled to be silent, or to say things which he knows to be wrong, or which he did not intend to say, or sometimes which he does not understand. Acts

which have the appearance of impulse are sometimes accounted for in this way; that is, the patient states that he is made to do them by some external influence dominating his will. Some patients complain that their moral control is weakened, and that their moral feelings are tampered with; some assert that their mind is entirely in the hands of their enemies. A patient said to me, "They have my mind; they hold it in hypnotism." Quite apart from the patient's suspicion that people want to send him to an asylum, which may be a truth or a verisimilitude, he very often entertains the conviction that "they" are endeavouring to put him out of his mind, to make him really insane. This belief is clearly dependent in some cases on a sense of altered mental action, though not always. Sometimes it is oddly associated with the belief that the patient's relatives, or neighbours, or persecutors, are insane, by which he accounts for their injurious acts.

The emotional state of the persecuted paranoiac is usually indifferent. He bears the most astounding torments without becoming depressed. He looks upon his sufferings from quite a different point of view from the melancholiac. The latter feels himself a wretch who deserves his doom; he is humble, self-accusing, and abased. The paranoiac is the victim of foul wrong; he is proud, defiant, and self-centred. So with their complaints: M. Séglas has contrasted in a phrase of equal wit and propriety the litany of the melancholiac with the romance of the paranoiac. Nevertheless, there are no absolutely hard-and-fast lines in mental disease; and from time to time we meet with cases in which the symptoms of the two conditions are mixed. It is also to be borne in mind that paranoiacs occasionally commit suicide; sometimes to escape from their persecutors, sometimes in obedience to the command of a voice (divine or other); sometimes with the object of exposing and damaging their enemies.

On the other hand, the resentment of the persecuted in his own defence is a common thing, and often makes patients of this class very dangerous. There is an element of danger in all cases of persons who believe themselves persecuted, especially of those who have auditory hallucinations. Such people are apt to attack those around them suddenly, under the belief that they have somehow joined in the conspiracy against them, or have spoken injuriously of them. Many of the persecuted, however, are passive and retiring; others from the first resent the treatment they conceive themselves to be subjected to; others again endure their sufferings quietly for a length of time, and then arrange a counterplot, and try to avenge themselves. To these is especially applicable the expressive French phrase *persécutés persécuteurs*. The actual danger depends to a large degree upon whether the patient has personified his persecutors or not. A not infrequent danger originates in a notion, sometimes arising in the mind of the persecuted, which well exemplifies the peculiar crooked pseudo-logic which characterises him; namely, that if he murders some one he will have an opportunity of stating his case in court and exposing his enemies. It is often with this design that, in asylums, officials or fellow-patients are attacked.

Among the passive persecuted, especially among women, a common symptom is incessant change of residence, either in the form of travel or of merely moving from one house to another. This is done with the object of escaping persecutors, and usually at first the attempt is, for the time at least, successful (Foville and Ball). Change of scene produces a temporary amelioration. This migratory tendency often gives a useful clue in obscure cases.

When a patient is profoundly reticent, the suspicion which forms a fundamental element in his character will often show itself in his acts. Thus he may cook his own food for fear of poison; live on nothing but eggs for the same reason; plug his ears to keep out voices; barricade his doors; blind his windows; stuff his chimneys, or, as in a case that came under my notice, sit at (literary) work with a small tent over him, to prevent his persecutors from stealing his ideas as he writes. In cases of this class the physician will do well to note indications of delusion obtained at the first interview. Very frequently, on the second, he will find the patient in an access of suspicion, believing that his visitor has joined the enemy.

Delusions of exaltation may occur as primary phenomena, or may be secondary to delusions of persecution. They range over an immense variety of subjects. A patient may believe himself to be God, a prophet, a great inventor, possessed of great wealth, talents, or beauty. Exalted delusions are less prominently connected with hallucinations than the persecutory. On the whole, the exalted paranoiac shows less general intellectual acumen and mental activity than the persecuted. In many cases persecutory and exalted delusions are inextricably mixed. Thus, a patient will say that he is a child of noble parents, the heir to great wealth, and that he is cheated, tormented, and imprisoned on that account; or that he is a prophet or a saviour, tortured by the wicked or tempted by fiends. Not rarely a patient has visual hallucination of an exalted and cheering kind—as of God or angels; yet his auditory hallucinations are full of blasphemy, mockery, and insult. Occasionally a persecutory or a melancholic idea succeeds an exalted one, as when the saint becomes the victim of the ungodly; or the saviour feels that he must expiate the sins of his people. But more commonly the progress is in the reverse direction, and the persecuted becomes exalted. It does not always, indeed it does not generally happen that the advent of exalted ideas entirely drives out the persecutory notions. Usually, however, the latter become less pronounced. The change in the type of prominent delusion generally marks a downward step in the march of intellectual decay.

The followers of Dr. Magnan of Paris have laid down that there is a remarkable and very distinct form of insanity, which Magnan proposed to call *Délire chronique*, which is characterised by the occurrence of four definite stages:—(i.) Disquiet and suspicion. (ii.) Persecutory delusion, with hallucination of hearing. (iii.) Delusion of exaltation. (iv.) Dementia. A good many cases run a course resembling this more or less closely; but there are no sufficient reasons for making of them a separate form of

insanity. Many cases of paranoia are so slow in progress that a diagnosis depending on the succession of phases might need half a lifetime to confirm. In practice we find that the persecutory and exalted stages are not sharply delimited from each other. It has been held by some that the onset of exaltation after depression is due to the action of hallucination, but this is a superficial view. Hallucination and delusion do not stand to each other in the relation of cause and effect, but are the common result of that enfeeblement of judgment which allows a sensory impression or a figment of the imagination to be accepted without correction.

Further sub-varieties of paranoia are furnished by the sufferers from erotic delusions, delusions of jealousy, hypochondriacal delusions; and by the victims of what may be called litigious insanity (the *Querulantirresein* of v. Krafft-Ebing). A sexual tinge may colour all classes of delusion, but that which we specially note is the condition common in young men and elderly women, less common, but not rare, in young women, in which the patient conceives a passion for a person to whom perhaps he or she has never spoken, and builds up on little or no foundation an organised romance which occupies the whole attention. The pangs of misprised love often turn this patient into a veritable *persécuté persécuteur*. In this form, and in delusion of jealousy (beliefs of conjugal infidelity), actual hallucinations are occasionally very hard to demonstrate. Insane jealousy is very frequent in paranoia following habitual alcoholic excess; though it occurs in cases where such excess has not existed (16). Litigious insanity is usually unaccompanied by hallucination. Full of persecutory ideas and insane suspicion, its unhappy victims live in an atmosphere of legal actions, which last until the lawyers have sucked them completely dry, when they are prone to adopt means which the law does not approve to avenge their persecutions. In either phase, they are a source of great misery to their relations (whom they commonly ruin), and to their acquaintances, the most compassionate of whom are the most likely to be their victims.

The delusions of the paranoiac are very often intimately associated with religious ideas; and his hallucinations take the form of visions of saints or divine personages, or of the voice of the Deity. The common notion, however, that there is a special type of religious insanity is not correct. The nature of religion, its mystery, its capacity for covering the whole mental field, its strong hold upon the immediate personality, sufficiently account for the frequency with which religious conceptions predominate in the diseased mind. That the unknown, or little known, should afford abundant food for insane conjecture is natural enough. Similarly, the sense of mystery which oppresses the man who is conscious that he is different from other people, naturally makes him turn for explanation to the most mysterious of subjects. The same conditions caused the persecuted of old to attribute their sufferings to witchcraft. Nowadays, particularly among half-educated people, hypnotism is a favourite form of mystery, and medium of persecution. So it has been successively with various natural forces and their applications—steam,

electricity, the telegraph, the telephone, and most recently the Röntgen rays.

Connected intimately with this sense of mystery is the tendency which has been called *mystic interpretation*. In many cases the sense of something occult is always present, and every event of life, every detail of the environment, takes its place in the scheme of mystery, or has some hidden significance; some indirect bearing upon the patient which is not evident on the surface. It is singular to what a degree memory is warped in some cases by this tendency. Thus, a patient will recall incidents of many years back, often of the most trivial nature, incidents to which he himself admits he attributed no import at the time, incidents which he even says he had meanwhile forgotten; and he will now point to them as important links in the chain of evidence which confirms his beliefs.

The memory, in paranoia, often seems to remain acute for a long time. There may, nevertheless, be profound impairment of this faculty. Besides the errors arising from insane and mystic interpretation, and from actual delusions of reminiscence, we often find that though the patient's memory is keen on the subjects of his delusion, or on matters personal to himself, it is weak on other topics. In most cases delusions, though conforming to the general type, gradually change their precise form. One enemy or one form of persecution gives place to another; and the patient, who argues as vigorously for the reality of the second as he did for that of the first, has evidently forgotten the latter; sometimes he goes even so far as to deny point-blank that he ever entertained it.

The mode of origin of individual delusive beliefs is obscure, but can occasionally be traced. The apparent origin of a delusion in an hallucination or in a dream is, of course, not fundamental. The patient's own account of the beginning of his trouble is always untrustworthy. A symptom of his disease is a belief that he acts from the most logical motives, and he defends such belief with an appearance of close reasoning. Meanwhile, of course, he is quite inaccessible to reason on the subject of his delusions. A good example of this is given by the obedience to the commands of a "voice," even though the thing commanded may be wicked or absurd, or the voice recognised as demoniacal or hostile. Nevertheless, we can occasionally trace the genesis of delusion. Undoubtedly, patients are often accused by their voices of crimes or errors that they have really committed. Undoubtedly, also, real feelings of physical pain and malaise are interpreted as due to external agencies, and genuine feelings of mental confusion and failure are attributed to unseen influences. Positive antithesis and repulsion sometimes, too, suggest, or seem to suggest delusion; as, for example, delusions of violation and obscene hallucinations, which are most common in women of the class accustomed to banish sexual thoughts most completely from their minds. A curious further instance of the indirect origin of delusion on a sort of antithetical basis is to be found in the great prevalence of hallucination of hearing among those who have become deaf. This is sufficiently frequent to suggest that the vexation of losing a sense, and the temptation, common

enough in the deaf, to suspect that they are the object of conversation going on around them, may be active factors in determining delusion. Hallucinations of sight among those who have grown blind also occur, but are not so common.

Although it has often been supposed that the form of insanity which we are discussing is associated with high mental powers, either in the individual or in his family, we find in practice that while supervening dementia is neither so early nor so profound as in other forms of insanity, genuine intellectual power is very rare. The patient may be saturnine and reticent (in which case his dull self-absorption is usually evident enough), or he may be voluble and loquacious on subjects connected with his delusions; but in either case his mental activity is limited, and even in its narrow field it is barren. Two or three facts are to be noted: among patients of the communicative type there are many who, while they proclaim the strongest opinions, restrict their actions always to declamation or writing; who are perfectly happy in the exercise of the chief function that seems to be left to them, pondering over their wonderful story, and reasoning it out in the mode they deem convincingly logical. A good many find ordinary words not sufficient for them, and invent new ones, or apply existing phrases in new senses; this forming of new terms has been called "neologism." Thus, one patient complained that he was persecuted through a "system of vibration"; another suffered through an instrument called a "typhone"; the thoughts of another were "read by a hypophone, and translated into logarithms"; while another, a woman almost wholly illiterate, wrote that she was persecuted by "two wizards, called Harry Stottle and Leger de Main." Often the names or new words convey no suggestion of a meaning.

It frequently happens that the patient who is reticent in conversation, even to the degree of concealing his delusions absolutely, will yet reveal himself in writing. Some patients write all day. Some decorate their manuscripts with extraordinary drawings and mystic signs. Most of them repeat themselves without end. Self-revelation is common in the writings of the insane. Even among the sane, except in those who are trained to literary work, the difficulty of expression in writing is so much greater than in speaking that, once overcome, it leads the writer to forget to maintain his guard. Besides, there are many patients whose lives are largely a dream, and whom the contact with concrete existences will steady for a moment. These folks will often take a hint quickly enough from the facial expression, from the gestures, or from the tone of one who talks with them; and will therefore be discreet, while, when alone with their writing materials, they soliloquise on paper. But whatever be the explanation, it is certain that valuable indications are very often to be found in the patient's writings, and therefore he should be always induced to write, and on subjects which seem to require elucidation, especially if the case be one in which there is any doubt.

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C. N.

STATES OF MENTAL WEAKNESS

(DEMENTIA)

MENTAL weakness is the general characteristic of all cases of insanity. It is, as has been shown in the foregoing pages, associated with excessive self-consciousness and painful feelings in melancholia, as well as with loss of control and excitement in mania. It is evident in the hysterical, in the neurasthenic, and in the degenerate—in all the protean forms of mental disorder. In the less formidable it may only be apparent as a slight and temporary diminution of inhibitory powers; or it may prove to be, even if slight, the insidious premonition of a mental involution of the gravest import. It may be absolute, inherent, congenital—the fatuity of idiocy; or it may be absolute, degenerative, acquired—the senescence of a worn-out brain. Between these extremes the grades are infinite, and, for the purposes of description, are classed in clinical groups under esoteric titles which are yearly increasing in number and complexity; such as paranoia, confusional insanity, insanity of negations, and so on. The mental weakness which is congenital or acquired in infancy is recognised as *idiocy* or *imbecility* (p. 233). It constitutes a definite clinical group—definite in etiology, symptomatology, pathology, and treatment. The weakness which is partial, and involves, as the prominent feature, mental degradation in the department of ethics, has been named and described as *moral insanity.*

The immediate purpose of this section excludes consideration of these

specialised studies, and limits attention to cases of dementia—cases which are broadly characterised by evident defect in mental function, manifested after the age of puberty. To this class belongs the great majority of chronic lunatics. Dementia is, in fact, the common goal of insane patients.

Except in old age *partial dementia* is comparatively rare. In the blunting of the faculties, the loss of energy, or perhaps the slight stupidity consequent on advancing years, a partial dementia is frequently noticeable. We must also recognise in premature senility a similar train of symptoms, such as the underlying pathological conditions are capable of producing. It can be readily apprehended that physiological conditions of brain exhaustion must eventuate in dementia of a more or less pronounced kind; and this is a subject which merits more careful inquiry than has yet been entered upon. Krapelin has shown that bodily fatigue is demonstrably injurious to thought, and that bodily exhaustion weakens the brain power in definite curves and ratios. This may appear to be the proving of a truism; but it is among those transitory and slight aberrations that we must first seek for elucidation of problems as yet unsolved. Of late the mental symptoms of the period of convalescence from exhausting disease have also been subjected to careful analysis; and much more may be hoped from such investigations than has yet been discovered by the observers who have but entered on this field of work.

Dementia may be acute or chronic, primary or secondary. I shall deal with these forms of mental weakness seriatim, and afterwards refer to the general questions affecting care and treatment, and other points of interest.

Acute dementia is characterised by suspension of the intellectual, moral, and instinctive faculties—a loss of sensibility. It is, in fact, a mental stupor, and as such has been described in a preceding section (p. 382). The name *Anergic Stupor* was first applied to this disease by Dr. Hayes Newington, in order to mark the suspension of mental function which is the essential feature of the malady, and to separate from it *delusional stupor*, which is an entirely different condition (7). Inasmuch, however, as an anergic stupor is evidently a deprivation of mental function in direct consequence of disease of the brain, we must regard it as a true dementia. Reference is made to it here in order to emphasise the diagnosis between this form of stupor and melancholic stupor, with which it may easily be confounded. I cannot agree with those who would reserve the name "dementia" for such cases as prove incurable, and attempt to elude the difficulty by substituting the word "stupor" when, for instance, the apparent weak-mindedness so often following on mania proves to be curable. The prognosis in cases of acute dementia is often favourable, but that does not seem an adequate reason for confusing the issues by a change of name. Dementia, taking the name in a broad sense, does not imply a hopeless condition; it really marks a weakening of brain power, a set of symptoms which may be evanescent. If we understand by dementia that the cortical cells are either disordered in a manner which it is convenient to call "functional," or affected by degenerative lesions

of a grave and unalterable kind, it follows that the use of the name to denote states of mental weakness of various origin is not to be limited by mere consideration of prognosis. We are not yet in a position even to state definitely that such a profound change as vacuolation of the nuclei of these cells is incurable. It would appear, indeed, that the recuperative powers of the cortical cells may be greater than has been supposed (8).

Primary dementia is undoubtedly a rare form of weak-mindedness, although cases do occur in which blunting of the mental powers comes on gradually and insidiously, without any apparent acute stage to usher in the symptoms. Most commonly these cases are senile, and of course chronic. The physical basis is the cortical degeneration, which is progressive and incurable.

Secondary dementia is the condition of mental weakness into which so many acute cases subside. The great majority of insane patients detained in asylums, or otherwise cared for, is classed under this division. When we speak of a patient as being sunk in dementia we immediately picture a person who has passed through an attack of acute insanity, and has fallen into a permanently crippled or a permanently unstable state. Indeed this too common result has been graphically insisted on by Dr. Clouston in his definition of mental disease as "a tendency to dementia."

Some degree of dementia may be looked for in the course of ordinary mental disease. An initial stage of depression or irritability, followed by mania or melancholia, is very frequently succeeded by weak-mindedness, temporary or permanent. This, indeed, closely corresponds with our general experience of other maladies. The patient is conscious of malaise, the attack supervenes, and thereafter, during convalescence or decadence, there is a period of languor and exhaustion. We cannot make exception of brain disease in studying degenerative change. The cortical elements are exhausted, their fine processes are obliterated, the cells are subjected to destructive influences. The indications of treatment are towards repair and recuperation. If successful, the dementia is temporary; if unsuccessful, it is permanent. We have an analogous, though less prolonged, degeneration in the history of Bright's disease. The acute and curable form may be of short duration, dangerous to life, threatening the conditions of existence; while the chronic and incurable form pursues its course to the bitter end, alleviated, and in some degree controlled, by care and treatment, but in the essential nature of the malady unalterable.

The striking feature of all forms of dementia is the diminished mental power evident in thought and action. The controlling power is weakened; inhibitory power is damaged. Thereby the individual may manifest exaggerated normal impulses or perverted impulses; inasmuch as attention is enfeebled, memory is impaired, or even destroyed, and in consequence comparison (judgment) is incompetent. We are now considering secondary dementia; but these characteristic traits are also part and parcel of chronic mania, and of recurrent insanity, which must also be classed as

states of mental weakness. This was clearly apprehended by Griesinger in his classical treatise on insanity, previous to which the true nature of chronic mania was not recognised.

We have seen, then, that the clinical groups into which states of weak-mindedness may be divided fall into the same natural divisions as other maladies, and must now refer to the general array of symptoms by which dementia is to be measured. As the result of old age, degenerative brain disease, nervous exhaustion, mental shock, attacks of mania, or more rarely melancholia, dementia is gauged by the depth of mental degradation; and its nature is determined by the antecedent causes. The dementia consequent on fevers is very different, as regards prognosis, from the dementia following upon epilepsy. Alcoholic dementia may be curable, and syphilitic cases also are sometimes susceptible of cure. We may even be hopeful of the best results from operative interference when obvious weak-mindedness is caused by a tumour of the brain in an accessible position. It is true that the depth of mental degradation does not always correspond to the chances of curability. As in other forms of insanity, the defect or disorder may be less intense than indelible. Cases occur in which apathy is not apparent, where the ordinary duties of life are performed with seeming propriety, as in the case of Professor Titel (cited by Griesinger), who believed himself to be Emperor of Rome, yet continued to read his course of lectures in college. But in the course of medical practice the advice of the physician will generally be sought when the malady is more pronounced, when the mind and conduct are manifestly disordered.

The first step is to ascertain the cause. The history of the patient is of prime importance. Is the dementia the result of inherited mental disease? Dr. Clouston presses this point so far as to say that all pure cases of secondary dementia originate in hereditary and adolescent cases of insanity. Without entirely accepting this statement, for the prognosis may be good if the patient be young and the case free from degenerative lesions, it must be admitted that the hereditary element is of the gravest import. Still, the exceptional cases are numerous enough to encourage active treatment, and to sustain hope. Other considerations which must weigh with the physician are the influence of physical diseases of an exhausting character; the influence of poisons, such as alcohol or syphilis; the influence of such special nervous disorders as epilepsy or general paralysis. These diseases are dealt with in other sections, and do not require to be specially reviewed in connection with this subject. Suffice it to say that each must be weighed in consideration of the individual case.

While loss of memory is to be tested in relation to recent as well as to former events, and the judgment by reference to what may be competent to the individual, it must be observed (3) that judgment is less deeply affected if assistance be given by the examiner. The difficulty of dealing with more abstract questions, especially by persons originally of limited intelligence and poor education, must have due consideration. For instance,

Dr. Savage in investigating the case of Gamble, lately tried for murder, found him incompetent to resolve the simplest problem in school subtraction; but on stating the question in a concrete form, "You have four apples and I take away one," the correct answer was readily given.

It is of importance to recognise that the higher mental faculties, the results of refinement and education, being the latest added in the scale of civilisation, are often the first to deteriorate; but the exceptions are so many that it is impossible to lay down a definite rule. The diminished control over emotions, the fleeting impression made by the events of the day, the loss of natural affections and social qualities, the incapacity for or disinclination to the accustomed duties of life, constitute the evidences of that diminished mental power which is the prominent feature of dementia. Such are the negative symptoms; but dementia is not an affair of negation only, there are positive symptoms which in ordinary cases are not less noticeable. The attitude and expression of demented patients are characteristic. They frequently crouch or stoop, they seek to cover themselves with clothing over head and ears by day and night. These postures—as indeed are all rhythmic, automatic, fixed eccentricities—are of evil omen. The expression is equally noticeable: it is vacant, with fleeting traces of emotions which are irrelevant or too easily roused. The bodily habit is often spare, sometimes obese, never healthy. The ruddy hue of health is seldom seen, not even when these patients are constantly out of doors. The mental ruin, the moral degradation are written large upon those doomed to dementia. Cortical degeneration is evident to their finger-tips.

That would not be a complete description of dementia which failed to take into account those cases which present characteristics of excitement or destructiveness. Many patients require special attention, because of their faulty habits, throughout a long course of years; some bolt their food, and are often in urgent danger of suffocation; some neglect the calls of nature, and so demand constant vigilance; some are subject to sudden suicidal or homicidal impulses, for the storm which wrecked the mind does not entirely die down, but flashes up from time to time in brief and violent gusts.

Symptoms of untoward import are negative in character. Persistent apathy, inattention and loss of memory, degradation of the higher mental qualities down to the lower, a perverted nutrition, a lean body with a voracious appetite, a persistent attitude or habit of posture are all of evil omen. Should a patient increase in body weight, and at the same time present no real improvement in mental condition, his future must be regarded with grave anxiety.

No study of dementia can be complete without reference to Dr. Maudsley's vivid portraiture of this condition. At first sight it would appear that the degenerative changes conditioning it should be as disastrous to life as they are to well-being; but demented patients live long even under the most unfavourable conditions. In the end they are prone to fatal diarrhœa or insidious pneumonia; but neglectful of ordinary

sanitary precautions, forgetful of common decency, they survive in spite of many dangers.

The *treatment* of dementia must follow on the consideration of the individual case. If the patient is young, and it is apparent that the stage of weak-mindedness after a maniacal attack is unduly prolonged, every week of delay in convalescence tells against the chances of recovery. In such a case the treatment must be stimulating, the environment as healthy as possible. The patient should be discharged from asylum care at the earliest opportunity. Travel and interesting companionship are valuable aids to restoration. The indiscriminate prescription of travel in the treatment of mental disorders is much to be deprecated; in melancholia the risks run, and the injury thus caused, are often indefensible. In dementia, on the other hand, it is hardly possible to overrate the value of all reasonable means calculated to arouse the patient to occupation and diversion. On the energetic and systematic employment of such remedies as will awaken the system to a healthy metabolism, and strengthen the patient generally, depends in great measure the successful issue of the case. If, unhappily, the dementia should prove incurable, it will be difficult to sustain active interest in the slow progress of the malady. Still, intercurrent diseases have occasionally roused unpromising patients to sanity; and, proceeding on the experience thus gained, Dr. Lewis C. Bruce has recorded beneficial results from the effect of thyroid feeding. It does not appear that blistering of the cranium has any favourable influence on these cases; modern treatment is rather directed to the improvement of the general health by tonics and less violent measures.

If we are called upon to deal with a case of "organic" dementia, or a case where the mischief is wrought by brain tumours or other "coarse" disease, it would be manifestly absurd to pursue such methods as above indicated. To the classical symptoms of tumour is often added a profound melancholia, which demands early operative interference. Again, prognosis in the dementia of myxœdema is now most favourable. A few brief years ago such patients seemed doomed to progressive mental decay; now under thyroid feeding they improve and recover. These are indeed miracles of healing. In cases of alcoholic dementia there is no better remedy than iodide of potassium in full doses; while those of syphilitic origin are frequently susceptible of improvement under a course of the green iodide of mercury combined with small doses of opium. The educated physician will accept no rigid rule for the treatment of weak-mindedness, he will limit his endeavours by no stereotyped formula; he will deal with each individual case after consideration of the causes, on searching examination of the actual bodily state, and in conformity with the general indications.

The question of proper care must be solved by the same individual reasonings. If the dementia is profound and means are narrow, the case will probably be best dealt with in an asylum where adequate nursing and special appliances are to be found. If the weak-mindedness be less pronounced, precautions may be required for the prevention of injury to

the person, or disaster to his estate. It must not be forgotten that there is a possibility of recrudescence of the acute mental disease. As I have said, patients apparently in a state of harmless dementia have suddenly manifested symptoms similar to those of their first acute attack, and in that condition have committed suicide or murder. A powerful mental influence may reawaken old ideas, which have been to all appearance long dead; and after years have passed in apparent torpor elicit conduct appropriate to the occasion.

The proper provision for chronic dements is a question of the greatest importance, in view of the constantly increasing size and number of asylums for the insane. Dr. Clouston estimates that secondary dementia accounts for two-thirds of the insane population. I cannot go beyond the general rule that no solution can be regarded as satisfactory unless it provides for frequent medical supervision and competent care and treatment, as well as for suitable accommodation of a more material kind.

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GENERAL TREATMENT OF THE INSANITIES

FOUR leading principles on which rational practice is founded must be kept clearly in view when dealing with incipient or early cases of insanity. (i.) Insanity is not a disease; it is a symptom of various morbid conditions of the brain. Indeed mania, melancholia, and dementia cannot rank as diseases; each name merely indicates the general mental condition of a patient at a particular period. (ii.) Mental aberration forms only a part of the symptoms in a given case, and, from the physician's point of view, not always the most important part. To the public and the lawyer the mental symptoms are of the essence of a case; but the physician has to seek for an underlying morbid physical condition, and to gauge its effect on the nervous system. (iii.) The morbid cerebral conditions, of which insanity may be one of the groups of symptoms, are produced by the same causes as induce disease in other organs and systems. These may be roughly stated as over-exertion, idiopathic morbid processes, trauma, toxic agents, parasitism, diatheses and cachexiæ, evolutional and involutional processes, and defective rudiments and growth. (iv.) The condition of the insane person is one of great gravity, demanding active treatment in order to prevent the aberration becoming chronic, and, therefore, fatal to normal brain function.

These principles being accepted, it follows that the treatment of a given case must depend on the conception formed by the physician of the nature of the disease of which the insanity is a secondary feature; and this conception must be based on the same principles of medicine as guide him in the diagnosis of every other form of disease. As Griesinger said thirty years ago: "It has been supposed that the study of insanity was distinguished by some difficulty *sui generis*, that the study of ordinary medicine had no direct bearing upon it, and that the only entrance to psychiatry lay through the dark portal of metaphysics. And yet the other cerebral and nervous diseases, which, with the so-called mental diseases, form an inseparable whole, have not, so far as I am aware, been hitherto elucidated by metaphysics; and the time has quite passed away when psychiatry could be expected to be developed from a specially philosophico-psychological point of view. Etiology, diagnosis, and therapeutics are the departments in which we must now work."

If we accept the proposition that mental action is a function of connection (Foster), we may, as a corollary, assert that interruption of connection produces abnormal mental action. The neuron is the unit of psychical function; the name "neuron" indicating not only the cortical cell and its dendrites, but also the axon extending to the periphery. This organ may be affected morbidly at any point of its structure; but the evidence of disease is most marked in the cortex, where it forms by

contact multitudinous connections with various systems of films, and with other cells. Pathological details would be out of place here; but it may be pointed out that there is a vast difference between the contents of the term "mental disease" and of the term "disease of the neuron"; the first suggests merely a perverted function, the second disease of an organ, and consequent perversion of its function. The acceptance of the implication of the neuron in all cases of insanity is of practical value, for it tends to the avoidance of traditional error, and to the foundation of treatment on large therapeutical principles. It is of the utmost importance that the practitioner of medicine should fully realise that the subject of incipient or actual insanity is a gravely sick man or woman; for, if the cerebral disease be not relieved quickly, the consequences are worse than fatal.

It unfortunately happens that the physician rarely meets with a case in its incipient stage, during which, in the majority of instances, it is readily amenable to treatment. Notwithstanding vague anxiety on the part of the patient or the relatives, the suggestion of impending madness is ignored or fought against; and the physician is not consulted until overt symptoms present themselves. Even at this stage recovery can be obtained if the somatic nature of the complaint be recognised, and the patient submitted to treatment. The difficulty generally met with in early cases arises out of the vague and indefinite nature of the symptoms; their urgency does not obtrude itself; and the due relation of mental and bodily affections is not evident. One may, however, always be certain that something is further wrong than appears on the surface, notwithstanding that facts are minimised by relatives and friends; for the preliminary vague anxiety and alarm as to "the mind being affected" must have taken definite shape before the patient is submitted for medical advice. Under such circumstances the physician must employ the same methods of examination as he uses in every other obscure case of disease. If he "takes the case" by means of the systematic scheme of examination employed for hospital patients, he will gain an insight into it which can be obtained in no other way; it will come together as a "case" in the large majority of instances, and assume a definite position in the medical mind.

The etiology of the condition in ninety cases out of a hundred will be first determined either directly or by a process of exclusion; in the odd 10 per cent the case may be complicated by evidence of two or more assigned causes apparently acting together, or by the absence of trustworthy information. All classifications are matters of convenience. So far as the insanities are concerned experience shows that in the present state of knowledge etiology is the most convenient basis of classification. Certain groups of cases stand out prominently in which the relation of cause to symptom is so definite as to have made itself felt in nomenclature. Prominent amongst these groups are the insanities connected with utero-gestation, epileptic insanity, alcoholic insanity, the insanity following on certain fevers, toxic insanity, traumatic insanity, syphilitic insanity, the

insanity of adolescence, and of the climacteric and senile periods. These may be regarded as pathologico-clinical groups, and may be accepted as sufficiently definite for our present purpose; although from a strict nosological point of view the arrangement cannot be considered satisfactory. General paralysis of the insane stands as the nearer appearance to a uniform nosological type. The first result of examination is the determination, possibly provisional, whether the case can be ranged under one or other of these categories: if it cannot, it probably belongs to the wide class usually spoken of as "acute mania" or "acute melancholia."

The treatment of acute mania and of acute melancholia will be considered first, not only because this form of insanity constitutes a large and important class, but also because in many respects it opens up the subject of the general management of insane patients. Treatment of more special classes will be described subsequently.

Before proceeding to the general subject it is necessary to weigh the relative value of symptoms, in order to arrive at a conclusion as to the method of treatment. Study of previous articles in this volume must have shown that, in a considerable proportion of the insanities, certain common prodromal symptoms occur—the word "common" being used in both its senses. On the physical side we have, amongst other symptoms, painful or uneasy head-sensations, malaïse, disorders of digestion, impaired nutrition, modifications of the pulse, and of temperature, increase of oxalates and phosphates in the urine, sleeplessness, and frequently in women arrest of menstruation: on the psychical side, restlessness, irritability, inability to apply the mind to the ordinary affairs of life, morbid introspection, general change of disposition, depression and excitement. There are three points of view from which this congeries of symptoms may be regarded; and the system of treatment to be adopted depends upon the determination of the right one. In the first place, the bodily symptoms may be the result of the mental condition—the effect of the mind on the body; in the second place, the bodily may be the immediate cause of the mental symptoms; in the third place, the two sets of symptoms may be the common result of a morbid cerebral condition impairing psychical and trophesial function. If the first conclusion be arrived at, treatment is apt to be applied on psychological lines; if the second, symptoms must be treated as they arise; if the third, we go to the root of the matter, and yet are not prevented from treating symptoms individually, or from employing so-called "moral treatment" when the condition of the patient admits of it being applied with any hope of success.

Serious errors in practice may arise if we regard the prodroma of insanity as the outcome of a morbid psychical condition. We not infrequently hear of patients being ordered to take long voyages, to travel, or to be driven from one scene of excitement to another; in order to divert the mind, and to substitute new trains of ideas for concentration on self. Apart from the excitement, worry, and fatigue incurred by such a course, it is impossible to gauge the amount of brain mischief present,

or its immediate consequences in perverted mental action. The subjects of incipient general paralysis have been subjected to this foreign travel, with disastrous results. If the logs of ships sailing to Australia, America, the Cape, or the East were examined, many records would be found of the disappearance of insane passengers. The result of the indiscriminate use of this system of treatment is not encouraging. Doubtless in certain cases presently to be considered, and during convalescence, change of scene acts beneficially; but so long as the cortex is actively affected by disease no good can result from it. The period during which rapid recovery is procurable by therapeutic measures is wasted, and the patient returns home frequently worse, rarely improved.

To refer the production of insanity to disorders of digestion or of menstruation is also fraught with error. In the large majority of incipient cases there is loss of tone of the digestive, and impairment of the reproductive systems. As Professor Foster says: "The nutrition of each tissue is, in the complex animal body, so arranged to meet the constantly recurring influences brought to bear on it by the nervous system that, when these influences are permanently withdrawn (or morbidly affected), it is thrown out of equilibrium: its molecular processes, so to speak, run loose, since the bit has been removed from their mouths." Accordingly, we find as an immediate result of implication of the trophesial function of the cortex such prodroma as constipation, dyspepsia, amenorrhœa; not to speak of changes in the skin, hair and complexion, and general bodily weakness. Undoubtedly disorders of the alimentary system must be cared for at all stages; but to depend on such treatment for ultimate restoration of mental function is an evident mistake. The position is even better illustrated by consideration of the amenorrhœa which so frequently presents itself: this condition is coincident with many non-nervous diseases, and is regarded merely as an indication of malnutrition. The same is true of incipient insanity; and it is evident that attempts to restore the function by therapeutic measures can be of no benefit until the origin of the evil is overcome.

If we act on the principle that insanity is the result of a cortical lesion or lesions by which all phenomena, whether mental or physical, are produced, we establish a ground-work on which to establish our system of treatment. Without it we wander about in pseudo-psychological and empirical by-ways.

"Acute Mania" and "Acute Melancholia" are symptoms produced mainly by over-exertion of the brain. They are the result of so-called moral causes; anxiety, grief, domestic and other troubles, disappointment, and other sources of worry. Inasmuch as the conditions are produced by undue exercise of a cerebral function, and the effects are expended on the encephalon, the names "Idiopathic Mania" and "Idiopathic Melancholia" are strictly applicable, and are useful for purposes of distinction. The train of pathological events is over-prolonged functional hyperæmia, passing into pathological hyperæmia, congestion, and stasis.

All the brain tissues suffer, and markedly the brain-cells. The effect of over-excitation of the cortex can be demonstrated experimentally, and examination of recent cases fatal from some intercurrent disease, from the immediate effects of the cerebral condition or by suicide, demonstrates corresponding appearances. It is impossible here to attempt to trace all the pathological consequences of cerebral congestion; suffice it to say that they are in the main analogous to those occurring in other organs under similar conditions. What we have to treat in the initial stage is hyperæmia of the superior cerebral cortex, producing over-stimulation, and consequent psychical excitement. The word "excitement" is used advisedly; for although one case may be marked by exaltation, and another by depression of feeling, each is the subject of excitement of feeling. Excitement is at once the cause and the symptom. We are considering at present the case of the patient who, at the time he or she is submitted to treatment, suffers from no more overt symptoms than those already recounted as prodroma: the case is not one that, under the present condition of the law, could be "certified," notwithstanding that more manifest symptoms may be anticipated. The possibility of misapprehension of the relation of symptoms one to another has been indicated; and it is only necessary to warn against the danger of minimising their importance. Reviewing the whole facts of the case, it is evident that the first condition to be obtained is rest. This can be best obtained by confinement to bed. It may be thought cruel treatment to relegate a patient, whose bodily condition is not such as to preclude exercise, to a sick-room for days or weeks; and to submit one whose mind may still to a considerable extent be appreciative, to the monotony and irksomeness of such a position; but if we recognise the gravity of the case, the step is not only warrantable, but necessary, in order to arrest a morbid process which might become fatal to mental activity.

The condition is too serious for half-measures; it must be taken in hand firmly, and the patient placed in circumstances best calculated to procure recovery. It has been said (and with truth) that many a man's life has been saved by breaking his leg; which simply means that confinement to bed and compulsory withdrawal from the worry of everyday life have averted the malign influences of overwork. Congestion of other organs demands bed-treatment. Every one must have witnessed the spectacle of men "going off their heads" being allowed to continue as far as possible their ordinary ways of life, and thus to drift rapidly into asylums. In the large majority of instances, had such persons been relegated to seclusion at first they would have regained sanity. And it must be insisted on again that travel and "change of scene" are to be deprecated at this stage; they only serve further to fatigue an exhausted brain, which is not able to receive and convert new impressions in a normal manner. Monotony is what the congested cortex requires; the removal of all new excitation is of paramount importance. There is seldom any difficulty in carrying out this practice. Not infrequently the patient is

conscious of his malady, and gladly accepts treatment. In a certain proportion of cases, no doubt, bed-treatment is resented by the subjects of many non-nervous diseases; but in such cases the same influences must be brought to bear,—the moral compulsion of the physician, and the power of the sane over the unstable brain. In the congeries of symptoms called neurasthenia, which is the equivalent of exhaustion of the cortex without hyperæmia, little difficulty is experienced in inducing the patient to submit to a system of treatment which, in many ways, corresponds to that here recommended for incipient insanity. Experience enables me to say that in nine cases out of ten the ordinance has not been resented, and that, on the whole, the results have been satisfactory.

To carry out the system efficiently the services of two good nurses are required, one for day, the other for night. The patient should never be left alone. If the relatives are content to follow the advice of the medical adviser implicitly, it is possible to conduct treatment at home; but, as a rule, it is advisable to remove the patient to a country lodging. In either case, the position of the doctor must be paramount: the patient must be handed over to him and the nurses without reserve; no appeal against his orders should be admitted, and family visitation should be prohibited.

In attempting to procure sleep the physician is not merely treating a symptom. Under the condition of cerebral hyperæmia sleep is unattainable, and the return of normal sleep is the sign of its reduction. Every effort should be made to procure sleep without the administration of narcotic drugs. To this end five means are at our command—(i.) One method of bleeding the brain is to draw blood into the abdomen by means of food; and, therefore, frequency of meals is called for, and the night meal should be the most plentiful. The best supper is oatmeal porridge, with milk or cream; an equivalent in the form of some bulky starchy diet being substituted when porridge is objected to. The amount of nourishment at each of the five or six meals a day should be in slight excess of what is customary during health; in considerable excess when there is any marked falling off in the general bodily condition. Diet should be of the ordinary kinds, except that the excess should be in the form of oil, eggs, cream, and the like. Stimulants should be avoided; in fact, should never be administered except under conditions of great bodily exhaustion. (ii.) Mild counter-irritation, applied on alternate nights in the form of sinapisms to the nape of the neck and the upper part of the chest, frequently assists to procure sleep, and to remove pain and uneasy head sensations. The skin should be kept constantly in a state of blush, if need be for weeks; care being taken to avoid blistering. (iii.) Very gentle shampooing, or massage, applied to the head and neck four or five times a day for a few minutes at a time is often soothing. This should be done by the spread-out fingers starting from the sides and back of the head, and being carried gently down to the clavicles and the root of the neck all round. Pressure should be

slight. (iv.) An evening bath at 95°, continued for ten to twenty minutes, a cold, or rather tepid, cloth being placed on the head, generally conduces to restfulness. (v.) Doses of the tincture of digitalis, gradually increased from 10 to 20 minims, tend to restore the tone of the terminal vessels; it may, moreover, possibly act by maintaining diuresis, and thereby remove ptomaines from the system—the toxic alkaloidal basic products of decomposition.

In substitution for the important derivative action of exercise, general massage should be employed. The functional hyperæmia of muscle can be obtained better by this agent than by exercise. The patient is not in a fit state for exercise; his nervous system is undergoing waste, and to make unnecessary demands on it is to burn the candle at both ends. Fatigue, in any sense or in any degree, is to be deprecated. Massage supplies the place of exercise by producing a sufficient amount of muscular hyperæmia for the removal of the products of waste. It must be carefully applied, for, if overdone or continued for too long a time, it is apt to cause excitement. Gentle shampooing over the whole surface of the body with the open hand, working always from below upwards, is the best method. The abdomen should be carefully kneaded, as also the muscles of the trunk and limbs, if the open-hand work is stood well. Massage may be applied three or four times a day, from five to ten minutes at a time; the application being gradually extended to half an hour. It should not be used after six o'clock in the evening. In any case in which there is a distinct falling off in weight, the use of oil, rubbed in by the operator, is indicated; and whenever any degree of emaciation is present the patient should discontinue the use of sheets, and lie between the blankets which have become saturated with the oil.

Steady perseverance in the application of these measures will, in the majority of cases, be followed by sleep, which may not be continuous at first. If a patient, who for weeks has not slept except by snatches which may have been gained by the use of alcohol or opiates, gets from four to six hours of natural sleep in the twenty-four, although at intervals, much has been gained; and, moreover, between the sleeps the general tendency is to quiet indifference and lassitude—which is rest.

In cases in which there is an evening rise of temperature—from 99·5° to 101°—antipyrin may be given freely. In doses of from ten to fifteen grains given every two hours (say six doses in the twenty-four hours) it often procures rest and quietude. In this class of case it does not produce any of the bad effects ascribed to it in others; except, occasionally, nausea and vomiting, in which case it should be stopped. This drug has a direct action on the cerebrum, and is a vaso-constrictor. It may be found necessary to administer hypnotics, either to assist the general system of treatment, or on account of complete insomnia prolonged for more than twenty-four hours; in this case from two to four drachms of paraldehyde injected into the rectum will almost certainly procure sleep. This method of administration overcomes many of the disagreeables of

the drug; it must be diluted with four or five ounces of thinly-made starch, mucilage, or beef-tea.

Massage of the abdomen often suffices to overcome symptomatic constipation; should it not prove sufficient, ordinary cathartics are called for, and their action may be maintained by cascara. There is no better cathartic than calomel in such cases.

It rarely happens that a case fails to react to this treatment in from one to three weeks. So soon as convalescence has set in, the time comes when exercise and change of scene are desirable; but even then they must be prescribed with the greatest care. In like manner nervine tonics are of little avail till the case is well advanced towards recovery, when Easton's Syrup of the phosphates, the quinine being omitted, will be found one of the best. Its action appears to be assisted by substitution of five minims of liquor arsenicalis for the quinine.

If the case, when it presents itself, is already in a condition of acute mania or acute melancholia, or if the measures advised above fail to arrest the progress of the disease, it is still possible for the family medical attendant to conduct treatment to a successful issue. Of course greater difficulties will be encountered, but it is well worth while to make every endeavour to avoid removal from home. Where it is impossible, either on account of expense, domestic arrangements, or the dangerous nature of the case, to treat the patient at home, the sooner transference to an asylum is effected the better. The chances of recovery decrease in inverse ratio to the length of continuance of the disease; and it may become the duty of the medical man to advise removal at an early stage. Should his advice not be accepted he should, for his own protection, write formally to the nearest relative of the patient narrating thus what he may have stated verbally.

Under these more aggravated conditions the same system of treatment should be pursued. In the case of melancholia no great difficulty should be experienced, over and above the danger of suicide. The dread of such an event must be kept constantly before the minds of the nurses, and not only must the patient never be left alone for an instant, but also the clothes, room, and bed must be searched morning and night for articles which might be used for the purpose of self-destruction; pins, needles, glass vessels, cord, scissors, all kinds of knives must be removed. The physician and the nurse must in this matter act not on a suspicion but on the certainty that a suicidal impulse exists, or may exist. It may not be present in all melancholics; but one can never be absolutely certain: accordingly all must be watched.

The difficulties of home-treatment of course increase in the case of maniacs and excited melancholics; but, as such constitute the class which in asylums responds most readily to treatment, it is well within the province of the family physician to undertake their home management, if the chief conditions of asylum treatment can be obtained at home, or in hired lodgings. These conditions are supremacy of the physician, isolation of the patient, a large staff of nurses, and non-inter-

vention of relatives and friends. Under such arrangements the general principles of treatment already advocated should be adhered to, and carried out energetically. But it may be asked how is an excited patient to be kept in bed? Experience shows that this difficulty does not arise so frequently as might be expected if the services of competent nurses have been secured. Both in private and in hospital practice I rarely find that excited patients cannot be controlled easily. I lately visited a county asylum where five recent acute excited patients were lying in bed; two, certainly, required special attendants, but the others were easily controlled by the ward nurses. It may be admitted that in a certain proportion of cases further measures are demanded during the first few days of treatment; and it may have to be determined whether in order to procure quietude the patient should be drugged by narcotics, or whether some form of mechanical restraint should be employed. By the former method recovery is retarded,—possibly prevented; by its use the immediate intensity of symptoms may be reduced, but their duration will almost certainly be prolonged.

There is no doubt that morphine and chloral hydrate act directly on the cells, and that changes in their constitution can be detected as a consequence of the administration of these drugs. In the cases we are now dealing with, the cells are already implicated, and the administration of opiates is merely poisoning an already reduced organ. Moreover, in all excited cases, in order to produce any effect whatever, such drugs must be given in large doses; and we have, accordingly, to take into account the effects of most narcotics in producing intestinal atony and arrest of liver secretions. In asylums, patients who have been so treated before admission present themselves with foully furred tongues, offensive breath, and aggravated constipation; the whole alimentary system being in such a condition as to render the performance of its functions impossible. For every reason the use of opiates is to be deprecated; chloral hydrate is not so harmful, but even it should not be administered except under the severest pressure of circumstances.

It has become an article of faith with many physicians to deprecate the use of mechanical restraint in any form, or under any circumstances. This is not my faith. The alternatives to its use in seriously excited patients are (i.) narcosis by drugging; (ii.) allowing the patient to exhaust himself by muscular action, or (iii.) restraining him by muscular force applied by nurses. The objections to narcosis and fatigue have been already stated. So long as the efforts of attendants serve to restrain without actual violence they should be employed; but no more difficult duty falls to the nurse's lot than the exercise of such control. Not only is the command of temper difficult, but the graduation of muscular force, in order to avoid bruising and other injuries, is almost impossible; and the effect in producing irritation on the part of the patient must be taken seriously into account. Under circumstances of great excitement the use of mechanical restraint is occasionally called for, as the most humane method of control that can be adopted—which, instead of retarding,

may serve to produce recovery. It may be the means of procuring sleep. In the great majority of cases its application is needed for a few hours only. It is unnecessary to add that mechanical restraint in any form should not be used except under the direct order and immediate supervision of the physician; and I have no hesitation in saying that the rest system of treatment of recent cases of insanity reduces the necessity for restraint and drugging to the lowest point, and shortens materially the period of acute excitement.

The administration of sedatives should always be regarded rather as an adjuvant to the general system of treatment than as its leading measure. Used on this principle, and failing the action of paraldehyde, sulphonal is the most valuable drug; notwithstanding its occasional paretic effects, or production of hæmatoporphyrinuria. It may be given continuously in suitable doses for days or weeks; it should be gradually discontinued by reduction of the number of daily doses. The dosage of this as of other soporifics cannot be stated arbitrarily; in all nervous cases the determination of the dose is a matter of experiment. It is well, therefore, to begin with ten-grain doses, repeated every three hours, gradually increasing the amount if necessary, and watching carefully the state of the urine. It may be taken for granted that the minimum efficient dose of any narcotic is the best.

In private practice it may become necessary for domestic reasons to procure quietude. For this purpose the following prescription is useful:—℞ Potass. bromid. ℥ss., Chloral. hydrat. ℥iij., Tinct. cannabis ind. ℥ij., Aquam ad ℥vj. One drachm to be given every three hours. Hydrobromate of hyoscine, in doses varying from $\frac{1}{200}$ to $\frac{1}{100}$ of a grain, is perhaps more effective; it may be pressed even to $\frac{1}{50}$ of a grain, but the utmost caution must be exercised. Chloral hydrate and hydrochlorate of morphine may be also employed in full doses—forty grains of the former, and from thirty-five to fifty minims of the solution of the latter; in either case the dose being repeated in two hours if quietude has not been procured. But I repeat, such doses in the excited period are detrimental to the chances of ultimate recovery. They should never be used except as last resorts.

When a degree of excitement is reached which demands prolonged mechanical restraint, large doses of narcotics, or artificial feeding, it becomes almost hopeless to keep the patient at home; and the sooner removal to a special hospital is effected the better for all concerned. But, if cases are taken early, and are submitted at home to what is, in effect, strict hospital treatment, favourable results will be obtained in the great majority of cases in a comparatively short time.

As a rule, convalescence, that is, reduction of excitement, is procured in from one to four weeks. Reduction of excitement means arrest of morbid processes going on in the delicate tissues of the cortex produced by poisonous exudates. It is self-evident that such early arrest is of the greatest consequence, as the effect of continuance of diseased action is cumulative, and may soon render restoration to perfect brain health

impossible. What we have to fear is not acuteness of early symptoms, but the dementia caused by structural change. The probability of recurrence is also materially reduced. Although we may cure our patients after prolonged attacks, it is manifest that structural cortical changes must have been going on during the continuance of symptoms; and, although treatment may have overcome them, a greater permanent amount of weakness must be left than would have been the case had the disease been arrested at the outset, rendering the subject more liable to recurrent insanity or *folie circulaire*. A general mental weakness exists during the period of convalescence, which may last for weeks or even months, according to the intensity of the symptoms at the time when the patient was placed under treatment; still it is the weakness of convalescence, not the dementia of permanent structural lesions.

It is useless to try to force convalescence; the weakened brain will only do what it can do, and resents over-stimulation. As soon as the general nervous tone is becoming re-established, let the patient take his own way as far as possible. It is interesting to observe the original personality asserting itself step by step. Exercise should be very gradually administered; simple manual labour leads up to more active occupation. Amusements should be suggested to the convalescent, never forced upon him. The feeling of returning health and power is in itself generally sufficiently productive of satisfaction, without any artificial stimulus. The old "psychological" idea of forcing new ideas and feelings is at once unscientific and vulgar. Much in the same way the other systems are righted; as the brain regains its control over nutrition they reassume their normal condition. Mild nervine tonics may assist the restoration of function; or iron preparations. The return of menstruation does not mark a crisis; emmenagogues are not called for; the flow returns with general systemic improvement; its reappearance may be accompanied by brief and slight recrudescence of symptoms.

Acceptance of a general principle of treatment does not imply rigid routine. As in disease of every kind, treatment must be modified according to cases and circumstances. Keeping before him the general principle of rest, as the foundation of treatment of persons suffering from recent idiopathic insanity, the practitioner must modify details in accordance with the exigencies of individual cases.

The acute mania of adolescence is best treated by rest—enforced if need be. In no form of insanity is recurrence to be more dreaded, as it invariably occurs in hereditarily predisposed persons, and consists essentially in acute hyperæmia of the cortex acting on unstable brain constituents. Rapid reduction of hyperæmia is accordingly urgently called for in order to prevent extension of its effects. This condition may not be marked by any diminution of systemic tone at first; but, if it be not rapidly overcome, general constitutional degradation is apt to occur, even to an extreme extent; and we must, therefore, do all in our power to provide against such a contingency. In this, as in all other classes in which acute mania is the

leading mental symptom, the use of depressing drugs is strongly to be deprecated. In former times antimony used to be administered in order to reduce the symptom: more lately apomorphine has been suggested; but the administration of this class of drugs is contra-indicated by the fact that reduction of muscular and nervous tone is only too prone to result from the action of the disease itself.

In the dementia occurring at the adolescent period, more especially in those cases which are complicated by masturbation, I believe benefit may be obtained by the use of thyroid extracts. In two cases in which I have employed it a certain degree of improvement was the result. It may be freely admitted that it was tried in these cases almost purely empirically, as the condition, although resembling in many ways the mental symptoms of persons suffering from myxœdema, showed no definite physical indications of that disease. Thyroid extract has been strongly recommended in cases of melancholia and mania which appear to be lapsing into dementia, of stupor, of general paralysis, of old-standing terminative dementia, and of puerperal and climacteric insanity. The principles on which this treatment is founded are somewhat vague. It has been stated that thyroid extracts are cortical stimulants. This is a mere phrase, and is, moreover, misleading. The probable action is due to the increased metabolism accompanying pyrexia, which may help to remove the excess of waste products, and possibly to modify the character of toxic exudates. It not infrequently happens that patients, in whom recovery has been retarded, have recovered sanity after attacks of scarlatina or erysipelas; and the idea of producing pyrexia artificially suggested the thyroid treatment. But it must be remembered that in these diseases great hyperæmia of the skin and subjacent tissues occurs, and that under these circumstances a considerable "derivative" action may be exercised. Recoveries have been recorded, but in certain of these cases it is open to question whether they would not have ended in recovery under ordinary circumstances; as they belonged to classes which are by no means unamenable to treatment (for instance, adolescent, climacteric, and puerperal insanity). Thyroid treatment, moreover, involves confinement to bed, and some value must be attached to the enforced rest. I have submitted six such patients to its influence without any benefit to the mental condition; in one case with somewhat alarming results in emaciation and heart failure. Several physicians with whom I have communicated report similar experiences, and the results of experiment reported from America are not very encouraging. Still we have evidence that in certain cases recovery has followed its administration, and we must await further information as to the exact kind of insanity in which it is really beneficial. Thyroid extracts must not be used indiscriminately; and, until we have more definite data, the whole question of their administration must lie under consideration.

Treatment of the insanities which occur during **the climacteric and senile periods** must be directed towards building up a condition of obsolescence. These insanities are not dependent on hyperæmia, but on

involutional cortical degeneration. Most climacteric patients live through the period, and recover, in from six to eighteen months, without more special treatment than suffices to maintain the general systemic tone. Absolute rest is not demanded; change of surroundings with administration of mild narcotic and tonic agents may materially promote recovery. Much the same system can be resorted to in cases of senile insanity, with the exception of opiates; although here a greater degree of rest should be enforced. Acute senile mania is often difficult of management: soporifics in any form are of little avail, and nothing but careful nursing appears to benefit. The condition, however, is not by any means hopeless, as about 40 per cent of all patients under such treatment become, if not absolutely sane, at any rate very materially improved.

The **insanity of pregnancy** does not yield much to treatment; it generally runs its course, sometimes becoming arrested at the fifth or seventh month, more frequently running on for some weeks after confinement. The induction of premature labour is not warrantable. The treatment of the case must be founded on general principles.

If the symptoms of **acute puerperal mania** (systems which very closely resemble incipient delirium tremens, and which are probably due to septicæmia) are detected early, they may be cut short by the administration of full doses of chloral hydrate or paraldehyde per rectum. If these drugs procure deep sleep, mania may be averted; if not, the case must run its course, and treatment must be applied as directed in the special article on the subject. The state of the patient demands confinement to bed, which, with local antiseptic precautions, I consider the most important agent in procuring that large percentage of recoveries which rewards our treatment of acute puerperal mania.

The **insanity of lactation** is distinctly of anæmic origin. Strict hospital treatment on lines already indicated, generous diet, and, after excitement subsides, good malt liquor, good wine, and the free administration of iron bring about recovery.

The **post-febrile insanities** are divisible into two classes—the purely *anæmic*, and the *toxæmic*. The first class yields to the ordinary methods of treating anæmia. The treatment of post-febrile toxæmic cases is a much more difficult and anxious matter. The bodily conditions are so diverse, and the mental symptoms so varied in character, that we find it impossible to suggest any definite therapeutic measures for their relief. If we take the case of insanity following influenza, we find it remarked by all shades of mental alienation—simple suicidal impulse, depression, mania, delusion, and a condition closely simulating general paralysis. Under these circumstances it would be vain to say more than that each case must be treated on its merits, the propriety of submitting all such cases to strict hospital treatment being specially urged.

Acute alcoholic insanity is necessarily treated under circumstances of restraint. The immediate withdrawal of all stimulants is demanded. It has been thought that such withdrawal might prove dangerous to a patient accustomed to the continuous use of alcohol, and that the best method of management would be to "taper off" the daily amount of drink. This is an error, and I have no hesitation in saying that no danger accrues from promptly enforced total abstinence. The excitement of the condition is most rapidly reduced by the administration of chloral hydrate. So far as the withdrawal of the poison is concerned the above remarks hold good in the management of the victims of the morphia and cocaine habits.

Syphilitic insanity.—Morbid conditions of the cortex, the result of syphilis and productive of insanity, are by no means unamenable to treatment, if they are submitted during an early stage. Antisyphilitic treatment should be actively pushed. If the symptoms do not show symptoms of yielding within the first month the prospects of recovery are seriously lessened. Still treatment should be persevered with for considerable periods.

Traumatic insanity.—The effects on the brain of injury to the skull without fracture are very intractable; the subjacent cortex is generally bruised and studded with small punctiform clots, the membranes become thickened, the cells and vessels are injured, and the connections between area and area are more or less seriously implicated, so as to produce insanity. Counter-irritation severely applied, and continued for considerable periods, may be resorted to; but, should distinctly localised pain be indicated by percussion, the removal of a disc of bone should be insisted on. It is needless to add that when the skull is depressed surgical interference is imperatively demanded. Very slight injuries to the head in old persons may cause transitory insanity, which is recovered from under conditions of rest.

The treatment of epileptic insanity is that of epilepsy itself (vol. vii. p. 789).

The treatment of **general paralysis of the insane** is still an *opprobrium medicinæ*. When it has been determined that a group of particular symptoms does indicate general paralysis, and does not point to specific disease of the brain, chronic alcoholism, or some more occult condition, counter-irritation applied to the head and neck may be resorted to in the form of severe blisters continued for many weeks. I have known four cases arrested under this treatment. Notwithstanding that in almost every case in which trephining and draining have been employed, temporary amelioration has been obtained, and in seven recorded cases definite arrest of the disease has been procured, and life has been preserved, the general result of surgical procedure in general paralysis has not proved satisfactory. This, I believe, is due to the fact that the

surgeon has not yet devised a plan of operation by which permanent and slow drainage can be maintained without danger of sepsis. The wound heals too soon, the exudation fluid reaccumulates, and the case runs on. Indeed, in those instances in which arrest was procured the mental symptoms continued, life only being preserved. It may therefore be advisable to resort to trephining in certain isolated cases in which the continuance of life of the individual may, for family reasons, be desirable.

J. Batty Tuke.

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J. B. T.

Hypnotism in the Treatment of Insanity and Allied Disorders

Insanity.—According to Dr. Auguste Voisin, of the Salpêtrière, no one believed it was possible to hypnotise the insane until 1880, when he first succeeded in a case of acute mania. In 1852, however, Esdaile reported that he had hypnotised thirty-seven insane patients in the Calcutta Asylum. Few details are given, and he admitted that the therapeutic results fell far below his anticipations ; but one patient, who had cut his own throat, was easily influenced at the first attempt, and rendered insensible to pain during the subsequent operation.

From 1880 Voisin devoted himself largely to the treatment of mental disorders by hypnotic suggestion, and claimed to have cured many cases of undoubted insanity. The majority of the patients suffered from mania, or from melancholia with hallucinations, suicidal impulses and delusions of persecution. Many of the cases are of extreme interest, and are fully and carefully reported.

Dr. Répoud, of the Cantonal Asylum of Marsens, Fribourg, claims to have obtained results similar to those of Voisin in insane patients who were not hysterical. Burckhardt, of the Préfargier Asylum, records successful cases of delusional insanity and acute puerperal mania ; Liébeault, of Nancy, of hereditary suicidal monomania ; Dr. Brémaud, of Brest, of religious melancholia following confinement ; Dr. Velander, of Yonköping, Sweden, of melancholia with mutism.

Drs. Percy Smith and A. T. Myers published, in 1890, an account of the hypnotic treatment of twenty-one insane patients at Bethlem Hospital. Improvement followed in six instances, but the results gained would appear to have been due more to personal attention than to hypnotic influence.

Similar experiments were conducted at Morningside Asylum, in 1893, by Dr. Robertson. He does not claim to have cured any case of genuine insanity, but he was able to hypnotise and control the worst case of suicidal and homicidal mania there had been in Morningside for ten years. He also reports a case of hypochondriacal melancholia which he cured in six weeks.

The following is his summary of the uses of hypnotism among the insane :—

1. As a direct therapeutic agent.—(*a*) In insomnia it may succeed in intractable cases where narcotics have failed. As hypnosis is more closely allied to healthy than to drugged sleep, it must be of great service where the brain nutrition is already bad, and the effect of depressing drugs is undesirable. (*b*) When the brain is in a highly unstable condition, it may be of direct therapeutic value as a sedative, in preventing an outburst of excitement from passing into mania. (*c*) In dispelling fleeting delusional states and the minor psychoses it may be of service.

2. For purposes of management. — (*a*) In overcoming the morbid resistance of patients for their own benefit; for example, as regards the administration of food or medicine. (*b*) Hypnotism may be used in cases of excitement and violence instead of mechanical, chemical, or physical restraint. In reference to the latter point, it is interesting to note that, about forty-five years ago, Dr. Keen employed hypnotism extensively at the Berhampore Asylum, India, and found it of much service in procuring quiet and maintaining discipline.

Dr. Woods, of the Hoxton House Asylum, in 1897, reported the following cases of insanity treated by hypnotism. Of ten cases of melancholia (in eight there were delusions), six recovered, three improved, one was uninfluenced. One case of puerperal mania resulted in recovery. Of three cases of mania one recovered, two improved. In one case of dementia no result was obtained.

I have only attempted to employ hypnotic suggestion in six cases of undoubted insanity. In five I failed to induce hypnosis, while in the sixth, although able to produce sleep and relieve the pain of an organic malady from which the patient suffered, the suggestions were entirely without effect upon delusions of persecution which had existed for many years.

Dipsomania.—Forel claims to have obtained excellent and durable results in this disease, and there are few, if any, of those engaged in hypnotic work who are unable to report similar success. Amongst these the following may be mentioned: Voisin, Ladame, Tatzel, Hirt, Nielson, de Jong, Liébeault, Bernheim, van Eeden and van Renterghem, Hamilton Osgood, Wetterstrand, Schrenck-Notzing, Krafft-Ebing, Francis Cruise, Lloyd Tuckey, Kingsbury, Woods.

Ladame draws special attention to three cases treated by Forel. All had had attacks of delirium tremens, and were inmates of his asylum. They were extremely difficult to manage, and expressed their determina-

tion to resume drinking as soon as they were liberated; but, despite this, complete recovery followed hypnotic treatment.

A considerable proportion of my hypnotic patients have been sufferers from dipsomania. In the successful cases, including both sexes, the duration of the disease had varied from five to seventeen years; some had had several attacks of delirium tremens and epilepsy, and in most there was a family history of alcoholism. In more than one instance repeated and prolonged treatment in a retreat had failed. Some of the earlier cases have now remained over eight years without relapse.

Morphinomania and other drug habits. — The following table, published in 1896, gives the results obtained by Wetterstrand in fifty-one cases :—

	Men.	Women.	Total.	Died.	No effect.	Relapsed.	Cured.
Morphinism ; morphia injected subcutaneously .	16	22	38	2	5	3	28
Morphinism ; morphia taken internally . .	1	2	3	...	...	1	2
Morphinism and alcoholism	1	...	1	...	...	...	1
Morphinism and cocainism	2	1	3	1	1	...	1
Cocainism	1	...	1	...	...	...	1
Opium internally	...	4	4	...	...	1	3
Chloralism	...	1	1	...	...	...	1
Total	21	30	51	3	6	5	37

Many of the cases were extremely grave and of long standing, and with several the abstinence treatment had been tried without success—sometimes more than once. One of the successful cases—a medical man—had taken morphia for eighteen years, and during the last four cocaine also. Another patient, Dr. Landgren, published his own case five years after he had been successfully treated by Wetterstrand.

All Wetterstrand's cases, with the exception of one, were treated in private houses; and he finds residence in a retreat quite unnecessary. The following are the points which he considers most important in order to ensure success :—The patient must be placed under the care of an absolutely trustworthy nurse. The doctor must gain the patient's confidence, and treat him as a person who is ill and deserving of sympathy, not as one who ought to be scolded for having given way to a bad habit. The morphia should not be stopped at once, but rapidly decreased, and the patient constantly informed of the diminution. All injections of water instead of morphia are wrong, and ought to be scrupulously avoided. The sittings should be held once or twice daily, and, if possible, profound hypnosis induced.

Drs. Fulda, Marot, and others report cases of long-standing morphinomania which have remained several years without relapse.

In many of my cases of hysteria and neurasthenia a drug habit existed, especially where insomnia was a marked symptom. Some of these patients took morphia regularly, either by the mouth or hypodermically; and many of them were addicted to the use of chloral, sulphonal, etc. When hypnotic treatment removed the insomnia the drug habit was usually abandoned. The worst case of morphinism I have seen has now remained over five years without relapse.

Vicious and degenerate children.—Hypnotic treatment frequently affords good results in vicious and degenerate children; and the following are the general conclusions which Bérillon submitted to the International Congress of Hypnotism, Paris, 1889:—

(i.) Many carefully observed facts illustrate the therapeutic value of suggestion in the following diseases of children:—Incontinence of urine and fæces, nervous tics, nocturnal terrors, chorea, onanism, blepharospasm; and many disturbances of the nervous system of a functional character.

(ii.) So far, no appreciable results have been obtained by the hypnotic treatment of cretinism, idiocy, and deaf mutism.

(iii.) Suggestion is an excellent auxiliary in the education of vicious and degenerate children. This is especially indicated in cases of lying, cruelty, inveterate idleness, cowardice, or imbecility.

(iv.) Suggestion should be confined to cases where ordinary methods of education have failed, and medical men alone should employ it. It is not necessary to hypnotise normal children: ordinary education ought to be sufficient for them. When, however, children are addicted to theft and other vicious and repugnant habits, and afflicted with disgusting infirmities, we ought to try to cure them by hypnotism, especially when all other modes of treatment have failed.

These conclusions were adopted unanimously by the Congress, and were transmitted to the Minister of Public Instruction and the Minister of the Interior.

Successful cases—ranging from undoubted moral insanity to those presenting one or more bad habits or tricks—are also cited by Liébeault, Voisin, and others. Many of the patients suffered from enuresis nocturnalis, either alone or associated with symptoms of degeneracy. In 1887, Liébeault recorded 77 cases, 45 being boys and 32 girls. The youngest was three, the oldest eighteen years of age, the average being about seven. In all, with the exception of 9, the malady dated from infancy. The results were as follows:—Cured, 56; improved, 9; no result, 12.

Some of my successful cases might have been justly classified as morally insane, the patients being addicted to self-abuse, purposeless theft, and lying. Others suffered from violent attacks of temper, nocturnal terrors, insomnia, enuresis nocturnalis, nail-biting, and various nervous tics.

Sexual perversion. — Krafft-Ebing, Schrenck-Notzing, and others

report the successful treatment of sexual perversion, including cases of its grosser forms.

Obsessions. — Hypnotic treatment has yielded brilliant results in various forms of obsession, such as agoraphobia, claustrophobia, *folie de doute*, etc., and the following, amongst others, cite successful cases:— Liébeault, Schrenck-Notzing, Hecker, Wetterstrand, de Jong, van Eeden and van Renterghem, Bernheim, Gorodichze, Voisin, Burot, Mavroukakis, Bourdon.

In 1895, I published 9 cases of obsession; these, with the exception of one who died of influenza, remain well. The first was treated in May 1889, the last in October 1894 — the duration of the disease varied from sixteen years to six months. In 5 there were suicidal impulses, and one had attempted suicide; in 3 the obsession had passed into an insane delusion, and in 2 there were hallucinations.

Epilepsy.—Braid recorded a case of epilepsy in which there was no relapse after eight years; but amongst modern writers few, with the exception of Wetterstrand, report cases as cured by hypnotic treatment. The latter asserts that some of his earlier patients have now remained many years without relapse, and his general results are so startling that Forel said personal investigation alone enabled him to accept them.

Bérillon gives 20 cases, of which 4 are stated to have recovered, and de Jong also mentions a successful case.

In 1897, Dr. Woods published 14 cases. In 2 recovery is reported, and improvement in 10, while in 2 the results were nil. In the successful cases the ages were respectively thirteen and eight and a half years, and the duration of the disease had been two years in each instance: in one two years, and in the other sixteen months, had passed without relapse.

Putting aside a case of epilepsy associated with dipsomania, in which over three years have passed without relapse, I have treated 10 cases by hypnotic suggestion. Improvement occurred in five instances, but complete recovery in none. In one case of four years' duration, in which there were several attacks of *grand mal* per week and much impairment of intellect, there was a remission for twelve months; the patient then relapsed, but the fits ceased under renewed treatment.

Hysteria.—Possibly at least half of the hypnotic cases recorded may be classed as hysterical; these range from isolated sensory or motor disturbances to the graver forms of the malady, *la grande hystérie*, so seldom seen in England. For the purposes of this article only cases presenting more or less profound mental symptoms are deserving of notice. Bérillon states that for three years he watched the hypnotic treatment of *la grande hystérie* by Dr. Dumontpallier at the Pitié Hospital. In the majority of cases not only did the convulsive attacks disappear, but the other symptoms also. Some of these patients are now in excellent

health, married, and mothers of families, while others occupy important posts.

Voisin published a case of long-standing hystero-epilepsy with maniacal attacks. The patient recovered, and became wardrobe maid at the Salpêtrière. Dr. Burot cites a successful case of hysterical mania of two years' duration, with hallucinations of sound and delusions of persecution. Burckhardt, de Jong, Wetterstrand, van Eeden, and many others, also report good results in hysterical melancholia.

Amongst my own successful cases are to be found several instances of more or less marked hysterical or neurasthenic melancholia; in one the disease was of ten years' duration. The majority had suicidal impulses, and more than one had attempted suicide. Some of the earlier cases have now remained about eight years without relapse.

Therapeutic results. Summary.—*Insanity.*—The question whether insanity in its graver forms can be cured by hypnotism must still be regarded as an open one; but, in endeavouring to estimate the value of this form of treatment, we must not forget that our knowledge practically dates from Voisin's first case in 1880, and that comparatively few attempts have been made to give the method a fair trial. Certain forms of insanity are undoubtedly curable, and it seems reasonable to suppose that a method of treatment which can induce sleep without the aid of drugs, and remove excitement and other morbid mental conditions, may prove a valuable remedial agent.

While no one disputes the genuineness of Voisin's results, the accuracy of his diagnosis is by no means universally accepted. In Forel's opinion, Voisin's so-called insane patients simply suffered from hysteria, which, with analogous mental troubles of a fugitive character, can undoubtedly be cut short by hypnotism. Forel admits that he has been able to induce sleep by suggestion, and to obtain a temporary cessation of hallucinations; while in a case of dementia, with inactivity, vicious tendencies and intercurrent maniacal attacks, he succeeded in making the patient work, improved his moral condition, and arrested the maniacal attacks, which three years later had not returned. On the other hand, he has never succeeded in curing genuine insanity by suggestion; and, even in deep hypnosis, he has entirely failed to exert any permanent influence upon the morbid mental condition. In true melancholia, the most he has been able to do has been to make the patient sleep, and to hasten convalescence. The brain, he says, is the instrument we employ in suggestion, and if the instrument itself be spoilt, we are no longer able to make use of it, or only to a very small extent, as a means of reacting upon itself.

In reply to this, Voisin, while admitting that hypnotism could do nothing in somatic affections, such as general paralysis, cerebral softening, and the like, stated that many of his patients were genuinely insane, not simply hysterical. He asserted further that the successful treatment by suggestion of hysteria alone marked a therapeutic advance of no little

importance. Our asylums, he said, contain a large number of hysterical insane who are violent and dangerous, and who inspire both disgust and pity by their tendency to drink and steal, and by their lies, dirtiness, and obscene and unnatural acts. Some of those who had long been asylum inmates are now, thanks to hypnotism, leading active and useful lives, a fact which, in his opinion, goes far to prove the value of this form of treatment.

It is to be noticed also that, at a later date, Forel reported a case of hallucinatory insanity which he had treated successfully. The patient, who believed himself to be controlled by a spirit which entirely regulated his life, and forced him to do the most absurd things, was easily hypnotised by Forel; the hallucinations disappeared after the first séance.

Epilepsy.—Although the cases just referred to, particularly Wetterstrand's, are undoubtedly encouraging, I do not think we are justified in regarding them as conclusive. In some instances patients are reported as cured before sufficient time had elapsed to warrant this conclusion; while the description of others leaves some doubt as to the accuracy of the diagnosis. In France hystero-epilepsy, a disease frequently cured by hypnotic treatment, is common, and might possibly be mistaken for genuine epilepsy. On the other hand, few, with the exception of Wetterstrand, have employed prolonged sleep in the treatment of this disease, and it is possible that a more general use of this method may yield better results. According to Wetterstrand, too much importance is attached to suggestion and too little to the curative effects of prolonged hypnosis. Sometimes, when ordinary hypnotic methods have failed, Wetterstrand succeeds by putting his patients to sleep for several weeks at a time; they are fed at stated intervals by nurses put *en rapport* with them, and the action of the bowels and bladder is regulated by suggestion. This method adds genuine mental rest to the ordinary physical rest cure; awaking is not followed by discomfort or other bad effects, and there is usually a marked increase in weight.

Voisin frequently treated his obstinate cases in the same way. In patients suffering from mania, with exacerbations at the menstrual periods, he prevented the recurrence of the attack by putting them to sleep from before the beginning till after the end of the period. With one of my own patients a week's sleep effected what several months' ordinary hypnotic treatment had failed to bring about.

Other diseases.—Apart from insanity and epilepsy the therapeutic results must be regarded as satisfactory. I do not pretend that every case has been accurately diagnosed and its subsequent history carefully traced, but can this be said of medical statistics in general? On the other hand, a large proportion have been treated in hospital by medical men of high reputation, under the observation of keenly critical and often hostile colleagues. Some years ago, for example, the number of hospital patients hypnotised by Bernheim exceeded 10,000, and his results were carefully watched by Beaunis, the well-known professor of physiology, and by others.

Finally, in estimating the therapeutic results, we must not forget that, in this country at all events, the patient has for the most part already undergone careful, varied, and prolonged medical treatment, and hypnotism has been resorted to because everything else had failed.

Three other questions remain for consideration :—

1. *Susceptibility.*—As the result of extensive statistics we are apparently justified in concluding that the majority of mankind can be hypnotised. In 8705 cases, reported by fifteen observers in different countries, only 6 per cent remained uninfluenced. The weak-minded, the hysterical, and above all the insane, are, however, the most difficult to hypnotise. Amongst the latter, Voisin only claimed to have succeeded in 10 per cent, while in milder forms of nervous disorders I have only hypnotised about 70 per cent. Dr. Robertson asserts that between a third and a half of suitable insane patients may be hypnotised ; but it is to be regretted that this statement, confirmed by no other modern observer, is unaccompanied by a complete list of the cases treated.

2. *Time required for the induction of hypnosis and subsequent treatment.*—In a small proportion of cases, such as we are describing, hypnosis is easily and rapidly induced ; but, as a rule, the length of treatment required bears a direct proportion to the duration of the illness and the mental instability of the patient. Dr. Robertson considers one attempt of fifteen minutes sufficient, while Voisin often spent three hours over an insane patient, repeating this twenty or thirty times before success is obtained ; and I have sometimes not succeeded, even in milder forms of mental disorder, until after a hundred or more failures. The value of the Bethlem experiments is much lessened by the fact that in no instance did the number of attempts exceed nine, and in six cases only one was made.

3. Dangers.—As to the alleged dangers of hypnotism, Forel says : "Liébeault, Bernheim, Wetterstrand, van Eeden, de Jong, I myself, and the other followers of the Nancy school, declare categorically that, although we have seen many thousands of hypnotised persons, we have never observed a single case of mental or bodily harm caused by hypnosis ; but, on the contrary, have seen many cases of illness relieved or cured by it." This statement I can fully support, as I have never seen an unpleasant symptom, even the most trivial, follow the skilled induction of hypnosis.

According to the mesmerists, offences against the person might be committed in hypnosis, or crimes successfully suggested. Despite the fact that Braid proved these statements to be erroneous, they are still believed by some modern observers ; but, thanks largely to the late Professor Delbœuf, the number of them is rapidly diminishing. Those who believe in suggested crime have made no attempt to ascertain the real mental condition of the subject by careful questioning during hypnosis, but have founded elaborate hypotheses of cerebral automatism upon an imaginary mental state of which the existence is assumed by the operator. The most recent hypothesis, one which undoubtedly marks

an advance upon its predecessors, attempts to explain hypnotic phenomena by the intelligent action of a secondary consciousness; but to this in its turn many objections might be raised.

J. MILNE BRAMWELL.

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J. M. B.

ENGLISH LAW AND PRACTICE OF LUNACY

THE LAW OF LUNACY.—The lunacy legislation of this country, despite the Acts of 1890 and 1891, remains in an unsettled state; and the care and treatment of the insane is burdened with vexatious and unnecessary restrictions. Not only are the steps required for the placing of a person of unsound mind under legal care complicated and clumsy, but they result in many cases in a delay of that early treatment which is so important in cases of mental disease. The following is a brief abstract of the law which enables a person of unsound mind (not a pauper) to be placed under care and treatment as a private patient, either in an asylum (private or public) or hospital for the insane; or under what is technically designated "Single Care,"—that is, under certificates in the house of a medical man or other person.

Urgency.—In cases of urgency any person (but if possible a relative of the patient) who is twenty-one years of age may sign an order for the admission of an insane person into a lunatic asylum or hospital for mental diseases, or into single care (Form 1). Such order can only be given if the patient has been seen by him (or her) within two days before the date of the order; and it must be accompanied by a certificate of a qualified registered medical practitioner, who, besides stating the facts indicating insanity at the time of examination, must also certify that it is necessary, either for the welfare of the patient or the safety of the public, that the patient shall be removed at once for proper care and treatment (Form 2). He must also give his reasons in writing for arriving at that conclusion. (See "Statement" accompanying Urgency Order, which is part of the medical certificate.)

He must further certify also that the patient is in a fit state of bodily health to be removed. The medical practitioner certifying must have seen and examined the patient personally not more than two clear days before his reception, and must state in his certificate the place and date of such examination.[1]

An Urgency Order remains in force for seven days, or, if a petition for a Reception Order is pending, then until the petition is disposed of; and, during this time, the necessary formal proceedings must be taken to ensure the legal detention of the patient beyond that period; otherwise the patient will have to be discharged. The further steps necessary for detaining the patient are as follows:—A *petition* for a Reception Order, accompanied by the certificates of two qualified and registered medical men, and a "*statement of particulars*" must be laid before a "Judicial

[1] The forms for cases of urgency only are given here. The necessary forms in ordinary cases can be obtained from the institution for the insane whither the patient is to be removed, or from Messrs. Shaw & Sons, Law Stationers, Fetter Lane, London, E.C. The Urgency forms may be copied in manuscript if time presses.—EDITOR.

Authority," who is either one of the justices specially appointed by the Quarter Sessions to act as a judicial authority in these cases, or a County Court judge, or a Stipendiary or Police Magistrate; the order will not, however, be invalid, though signed by a justice who is not specially appointed, if approved and signed by one of such specially appointed justices within fourteen days after its date. If possible the petition must be presented by a husband, wife, or relative of the alleged lunatic. If not so presented, the reason why not must be stated.

The person presenting the petition must have seen the patient within fourteen days, and shall undertake to visit the patient duly, or appoint a deputy to do so. Whenever practicable, one of the medical certificates should be signed by the usual medical attendant of the patient.

If the justice before whom the petition is laid shall be satisfied by the documentary evidence that the person is of unsound mind he may make the *order* forthwith; or, if not satisfied, he may appoint a time, not more than seven days after the presentation of the petition, for the further consideration of the matter; he may, if he think it necessary, visit the patient.[1] If the petition is dismissed the justice shall deliver to the petitioner in writing his reasons for dismissing it, and shall send a copy of this document to the Commissioners in Lunacy.

The *Reception Order* of a justice is sufficient authority to take the patient to, and to receive him in, an asylum, or to detain him there if he has already been removed on an Urgency Order.[2] All these necessary documents must be delivered to the petitioner, who, in turn, must deliver them to the person receiving the patient. A Reception Order has to be kept operative for the detention of a lunatic by reports and certificates of continued insanity, sent by the medical officer to the Commissioners in Lunacy not more than one month, or less than seven days, from the end of the first, second, fourth, and seventh years from its date; and thereafter at intervals of five years.

If a private patient has been received into legal care, either in an asylum or private house, without having been seen by a judicial authority, he shall have the right to see one; and the medical attendant is bound to give him notice of his right, in writing, within twenty-four hours of his reception, unless he (the person receiving the patient) signs a certificate that the exercise of such right would be prejudicial to the patient. The

[1] A justice often fails to understand that the Act does not desire him to visit the patient unless in his opinion there be some special reason for his so doing—such as an inconclusive medical certificate, or some facts in the case which in his opinion call for further inquiry. It happens not infrequently that from a mistaken sense of duty, or prompted by his clerk, the justice makes a visit as a matter of ordinary duty. In this case the justice, being unskilled in diagnosis, may fail to recognise the insanity of a properly certified patient, and thus may bar himself from signing an order. In this way dangerous lunatics have often been set at large, to their own grievous harm or to the harm of others. The words of the Section are that the judicial authority "shall consider" (on the documents) "whether it is necessary for him personally to see and examine the alleged lunatic. . . . If not so satisfied" ("that an order may properly be made forthwith") he may appoint a time for consideration and further inquiry. Finally, "if not satisfied with the evidence . . . of the medical certificates, he may, if he thinks it necessary to do so, visit the alleged lunatic," etc.—EDITOR.

[2] It must be acted on within seven clear days from its date.—EDITOR.

patient is required to exercise his right within seven days, and he must express his desire to do so on form 7, which will be supplied to him.

Inquisition.—Another method of obtaining legal power to detain a person as of unsound mind is to have him proved so by "Inquisition"; this is generally resorted to when the patient is wealthy, his insanity is clearly marked, and he is not likely to be cured; or when owing to his infirmity business concerns are at a standstill. The steps to procure an inquisition (*de lunatico inquirendo*) are for a relative or some responsible person to instruct a solicitor, who, after obtaining affidavits from two medical men testifying to the insanity of the patient, makes application to the Judge in Lunacy for an inquiry. The Commissioners in Lunacy can also report to the Lord Chancellor that the property of a lunatic is not duly protected, or his income not properly applied, and such report has the effect of an application for an inquisition. The inquiry is held before a Master in Lunacy, who acts as judge; the patient may be defended by counsel and be tried by a jury if he wishes; and he may be present at the inquiry. A person found insane by inquisition becomes a "Chancery patient," and two persons are appointed, one as committee of his estate, and the other as committee of his person. The committee of his person can, with the consent of the Lord Chancellor's visitors, remove the patient from place to place. The committee of his estate manages his affairs under the supervision of the Judge in Lunacy.[1]

Lunatic not under proper care or control, or ill-treated.—Again, a person of unsound mind who is not a pauper, and not wandering at large, but who is not under proper care and control, or is cruelly treated and neglected, can be ordered by a specially appointed justice to be visited and examined by two medical men, and the justice, if satisfied that the patient is a lunatic, and is not under proper care and control, or is neglected or cruelly treated, may order him to be sent to an asylum. The law provides that every constable, relieving officer, or parish overseer shall give information to such justice upon oath, within three days of obtaining the knowledge, that such alleged lunatic is within his district or parish, and is not under proper care and control, or is cruelly treated.

Medical certificates.—It should be borne in mind that medical certificates of insanity must be based upon facts observed at the time of the examination, and when filling up the certificate these facts must be clearly stated. The certificate must not be based only upon facts communicated by others; and the medical man must be extremely careful not to act hurriedly, or without due care. It is always wise to spend a considerable time in ascertaining, as nearly as may be, not only the exact mental condition of the patient, but the physical condition also. By so doing the medical practitioner will be protected by law, and no charge of acting without good faith and reasonable care can successfully be brought against him.

[1] The Commissioners in Lunacy, moreover, have now considerable powers of inquiry into the property of insane persons, Sect. 50, subs. (2) 53, Vict. ch. 5.—EDITOR.

Single patients.—When any medical man or other person undertakes the care and treatment of a patient in his own house the case must be admitted under the same formalities, as regards Reception Order and medical certificates, as if he were being admitted into an asylum.[1] As a rule, only one such certified case can be received, but the Commissioners in Lunacy have the power, under special circumstances, to permit more than one, and their sanction must be obtained.

The law bearing upon the admission of cases of incipient or uncertifiable insanity into single care is now before the Legislature, and will probably be changed before long. Under the new Bill it is proposed that an "uncertifiable case" may be taken in upon one medical certificate for a definite period (see also following paragraph).

Commissioners' Rules.—In addition to the Act of Parliament, the Commissioners in Lunacy are empowered to make Rules for the guidance of those having charge of the insane, and these Rules are legally as binding as the Act itself. Therefore any medical practitioner who takes care of a certificated insane person must apply to the Commissioners in Lunacy for a copy of their Rules, so that he may inform himself of their requirements. These Rules specify the notices to be given to the Commissioners and others, the books and records to be kept, and the regulations to be observed by those having charge of lunatics. It is illegal for any person, whether a medical man or not, to take charge of an insane person for payment, except under a proper Reception Order.

Mechanical restraint must not be employed without conforming to the requirements of the Lunacy Acts, and the Commissioners in Lunacy have the power to determine, by regulation, what mechanical means of restraint may be used; a record of the use of any such restraint, its kind and duration, must be carefully kept from day to day in every case in which it is employed, and a copy thereof must be forwarded to the Commissioners quarterly.

The power of discharging a private patient (not being a Chancery patient) is given in the first instance to the petitioner for the reception order; failing him to relatives, or the person who pays for the patient: but powers of discharge are also given to the Commissioners, and to Justices who are Visitors of Provincial Licensed Houses.

Medical attendant.—A medical practitioner who certifies to the insanity of one of his patients is not allowed to act as his medical attendant while he is under certificates. This is a curious provision of the law, for care is taken in the Act that the usual medical attendant, whenever practicable, shall sign one of the certificates, though by so doing he is precluded from attending him while he is detained under his certificate. The patient and his family may be anxious to retain the services of their own doctor; but, if he sign one of the certificates, he is legally disabled from attending him.

[1] The necessary forms can be procured from Messrs. Shaw, Law Stationers, Fetter Lane, London, E.C.

53 Vict. cap. 5, Schedule 2.

FORMS 4, 2, 8, and 9.

Form of Urgency Order for the Reception of a Private Patient with Medical Certificate and Statement accompanying Urgency Order.

I, the undersigned, being a person twenty-one years of age, hereby authorise you to receive as a Patient into your (*a*) ..... (*b*) ..... as a (*c*) ..... whom I last saw at ..... on the (*d*) ..... day of ..... 1 .....

I am not related to or connected with the person signing the Certificate which accompanies this Order in any of the ways mentioned in the margin (*e*). Subjoined (or annexed) hereto is a Statement of Particulars relating to the said .....

.....

(Signed)

Name and Christian name at length) .....

Rank, Profession, or Occupation (if any)) .....

Full postal address .....

How related to or connected with the Patient) .....

Dated this ..... day of ..... 1 .....

To (*f*) .....

.....

(*a*) House, or hospital, or asylum, or as a single patient.

(*b*) Name of patient.

(*c*) Lunatic, or an idiot, or a person of unsound mind.

(*d*) Some day within two days before the date of the Order.

(*e*) Husband, wife, father, father-in-law, mother, mother-in-law, son, son-in-law, daughter, daughter-in-law, brother, brother-in-law, sister, sister-in-law, partner, or assistant. (If not the husband or wife, or a relative of the patient, the person signing to state as briefly as possible—(1) Why the Order is not signed by the husband or wife, or a relative of the patient. (2) His or her connection with the patient, and the circumstances under which he or she signs.)

(*f*) Superintendent of the —— asylum, —— hospital, or resident licensee of the —— house (describing the asylum, hospital, or house by situation and name).

Lunacy 4 and 2 (53 Vict. cap. 5, s. 11).

STATEMENT OF PARTICULARS REFERRED TO IN THE ANNEXED ORDER

If any Particulars are not known, the Fact is to be so stated.

(Where the patient is in the petition or order described as an idiot, omit the particulars marked *)

The following is a Statement of Particulars relating to the said . . . . . Name of patient, with Christian Name at length . . . . . Sex and age . . . . . *Married, single, or widowed . . . . . *Rank, profession, or previous occupation

(if any) . . . . . *Religious persuasion . . . . . Residence at or immediately previous to the date hereof . . . . . *Whether first attack . . . . . Age on first attack . . . . . When and where previously under care and treatment as a lunatic, idiot, or person of unsound mind . . . . . *Duration of existing attack . . . . . Supposed cause . . . . . Whether subject to epilepsy . . . . . Whether suicidal . . . . . Whether dangerous to others, and in what way . . . . . Whether any near relative has been afflicted with insanity . . . . . Names, Christian Names, and full postal addresses of one or more relatives of the patient . . . . . Name of the person to whom notice of death to be sent, and full postal address, if not already given . . . . . Name and full postal address of the usual medical attendant of the patient . . . . .

When the petitioner or person signing an urgency order is not the person who signs the statement, add the following particulars concerning the person who signs the statement :—

Signed : Name, with Christian Name at length . . . . . Rank, Profession, or Occupation (if any) . . . . . How related to or otherwise connected with the patient . . . . .

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53 Vict. cap. 5.—Form 9.

(*i*) If any urgency certificate is required, it must be added here.

(*i*) *Statement accompanying Urgency Order.*

I certify that it is expedient for the welfare of the said..... .....(or for the public safety, as the case may be) that the said..... should be forthwith placed under care and treatment.

My reasons for this conclusion are as follows :.....

.....

(*k*) Strike out this clause in case of a private patient whose removal is not proposed.

4. The said..... appeared to me to be (or not to be) in a fit condition of bodily health to be removed to an asylum, hospital, or licensed house (*k*).

5. I give this certificate, having first read the section of the Act of Parliament printed below.

Dated this..... day of.....

One thousand..... hundred.....

(Signed).....

(*l*) Insert full postal address.

of (*l*).....

Extract from Section 317 *of the Lunacy Act*, 1890.

Any person who makes a wilful misstatement of any material fact in any medical or other certificate, or in any statement or report of bodily or mental condition under this Act, shall be guilty of a misdemeanour.

T. Outterson Wood.

TESTAMENTARY CAPACITY.—The general idea of legal capacity is that the testator must, at the time of making his will, have had a knowledge of his property and of his kindred, memory sufficient to know his proper relations to those about him, freedom from delusions affecting his property and his friends, and sufficient physical and mental power to resist undue influence. A person may be unable to make a just will, because he believes (falsely) that he is without means, or that his relatives have turned against him. In melancholic states, therefore, a man may be incapable of making a just will; on the other hand, though suffering from profound melancholia, he may make a will which is consistent with intentions expressed during the healthy period of his life. Defect of memory is a very serious bar to will-making, but if the person recognise his loss of memory and act in a way consistently with his past expressed intentions, the will may be upheld: or, again, a man with very defective recent memory may have an accurate judgment on business matters placed before him; thus, even though he forget as soon as he has given his judgment, yet if this judgment is consistent with his previous intentions, it would be taken as a legal expression of such intentions. A patient with great loss of recent memory, when asked as to his wishes concerning certain property, always gave the same answer, though he forgot he had already done the same half-a-dozen times. If the testator does not recollect the number of his children, or whether they are living or dead, he may easily make a bad will; or there may be some loss of memory leaving in him a false impression of the conduct of some person:—for example, an eldest son for some years was a cause of worry and anxiety to his father, and the father intended to disinherit him; later, however, he reformed and was forgiven; but with old age the father forgot the last stage, and acted on the assumption that his son was still a waster. In some rare cases following shock or injury, a partial defect of memory may interfere with due capacity; thus it has repeatedly happened that a man after an acute illness or concussion of the brain has forgotten that he was married, and would not acknowledge his wife. This is more likely to happen soon after marriage.

Delusions are looked upon as very strong points against testamentary capacity; but, unless the delusions have some direct bearing on the property, or on the relations of the testator to his friends or to society, a jury will not pay much attention to them. That a man believes the moon to be of green cheese, or that he is himself a bottle of pickles, will not necessarily affect his judgment as to his property; although even here it is not always safe to say that a notion which in a sane person would not affect conduct, might not change the conduct of an insane person.

Delusions as to property, and as to the conduct of friends and kindred, are among the strongest points against the testamentary capacity of an individual.

Besides loss of memory and the presence of delusions we have to consider various forms of mental weakness. Idiocy and a marked degree

of congenital or acquired imbecility will be held to bar testamentary capacity; but there are many young men and women, morally defective, who if they come into property may rapidly dissipate it; yet they are not certifiably insane, or, in the eye of the law, incapable of making a will.

The plea of undue influence, however, may be raised in such cases; particularly if some such youth has been dominated and directed by a woman. Mental weakness resulting from previous attacks of insanity, recurring epileptic fits or apoplexy, may incapacitate the patient; but the jury will be more influenced in such cases by the nature of the will than by any medical evidence as to the testator's capacity.

In my experience litigation is most common in respect of the wills of persons who have been intemperate, and of those who have had apoplectic seizures. In the former cases the evidence, however true, may be very conflicting; as in the presence of some witnesses the testator may have been sober, and in the presence of others he may have been drunk. In drunkards, too, degeneration may be very rapid; so that a fairly reasonable man may fall into mental confusion in a few days, and wholly lose his memory. That a man has been long subject to epilepsy may be a ground for doubting full mental capacity; but this will not avail much if the will itself is fairly reasonable.

After apoplectic seizures more or less mental defect is generally seen. The most common and conspicuous affliction is aphasia. Lawyers and some juries have got a vague general idea that a person may have speech defect without any real intellectual loss, and it will be useless to refer to aphasia as a sign of mental defect if a fairly reasonable will is propounded. There is, in my opinion, always some mental failure with the aphasia, but this varies very greatly, and in examining such cases with a view of testing their capacity great care and patience are required. On the other hand, lawyers may endeavour to establish capacity when a testator afflicted with aphasia can express himself as satisfied with what is read to him; yet in many cases consent is only automatic; a mere "Yes" to a question does not necessarily import understanding. Aphasia, then, may be present with or without testamentary capacity; yet, as in many cases of aphasia the position of medical men called in to advise on testamentary capacity may be a very difficult one, I will set down here also the opinions of three other authors who have given special attention to the subject.

Dr. William Elder, in the *Brit. Med. Journal*, 1898, p. 585, publishes the following conclusions:—(i.) That organic disease of the brain may render a patient incapable of making a will, and that some form of aphasia may be produced also as one of the symptoms of the organic disease. (ii.) That some forms of aphasia may render a patient incapable of will-making. (iii.) That auditory aphasia, if at all well marked, incapacitates a patient from will-making. (iv.) That some other forms of aphasia, such as pictorial word blindness, pictorial motor aphasia, and graphic aphasia, may render a patient incapable of making a will, not

necessarily from being mentally incapable, but from the difficulty of carrying out the legal formalities. (v.) That these difficulties in carrying out the legal formalities necessarily vary according to the law of the particular country. (vi.) That patients in simple uncomplicated cases of infrapictorial auditory, infrapictorial visual, and infrapictorial motor aphasias are capable of valid will making.

Dr. Clouston, in the same Journal, states the following conclusion: (i.) test whether the document is his own and has not been suggested by others; (ii.) put the contrary proposition, or a different proposition twice at least as to sums disposed of, and as to the persons to whom the money or property is left: no will can be valid when these two points have not been carefully gone into.

Sir Wm. Bateman on *Aphasia*, 2nd ed. 1890, says: "Aphasia does not necessarily entail testamentary incompetency; in fact, wills, or other legal documents, should as a rule be recognised as valid when the parties understand fully what is put before them, and can express assent or dissent with certainty, whether by articulate, written, or gesture language."

Much has been made of lucid intervals, and therefore we must not lose sight of them. Many patients in asylums suffering from recurring attacks of mania or melancholia, and some suffering from *folie circulaire* or epileptic insanity, may be quite sane for long periods, or sane enough to make a will; though they might not be considered capable of committing a crime, they might be capable of disposing of property. Even in some chronic and incurable patients an acute illness may cause temporary sanity. In general paralysis of the insane there may be complete remissions, and the wills of some general paralytics have been established on the ground of such remissions. I think this has been carried too far, for, though remissions may occur, we do not expect them in the last stage of the disease.

The present bent of an English jury is to find for any will, not in itself unreasonable, if it express the wishes of the testator approximately. It has been established that a patient in private care, under lunacy certificates, may make a valid will; that a patient in an asylum may likewise make a good will; and that even a "Chancery patient" may be competent to dispose of his property.

G. H. Savage.

CRIMINAL LUNACY IN ENGLAND

In his *History of the Criminal Law of England*, Sir J. Fitzjames Stephens defines Crime as "an act or omission, in respect of which legal punishment may be inflicted on the person who is in default, either by acting or omitting to act." The same authority describes the Criminal Law as that part of the law which relates to the definition and punishment of acts or omissions which are punished as being (i.) attacks upon public order, internal or external; or (ii.) abuses or obstructions of public authority; or (iii.) acts injurious to the public in general; or (iv.) attacks upon the persons of individuals, or upon rights annexed to their persons; or (v.) attacks upon the property of individuals or rights connected with, and similar to, rights of property.

The Standard of Conduct by which Society expects members of the community to guide themselves is partly optional and partly obligatory. The observance of the optional rules of our everyday life may not always bring its own reward, but the power of inflicting punishment for transgressions of the obligatory rules constitutes the rigid means by which the law of the land is able to exert its authority in its endeavour to preserve and to safeguard public and personal rights. These punishable acts of transgression, or *crimes*, vary widely in their nature and in the amount and kind of injury which they inflict; the criminality finding its measure for the most part in the punishment awarded, regard being had in individual cases to previous conviction.

Speaking generally, serious crimes and minor crimes are respectively described as Indictable Offences and Non-indictable Offences. In the *Judicial Statistics*, Indictable Offences, which, with few exceptions, are tried at Assizes or Quarter Sessions, are taken as including "all serious offences which directly affect the person or property." They are 82 in number, and are divided into the following six classes:—(i.) Offences against the person. (ii.) Offences against property with violence. (iii.) Offences against property without violence. (iv.) Malicious injuries to property. (v.) Forgery and other offences against the currency. (vi.) Other Offences. Non-indictable Offences are tried summarily, and the great mass of them are acts which in their tendencies "are injurious to life or property or to the general welfare, but which cannot, as regards their immediate effect, be classified under the above specified heads." They include such offences as drunkenness, assaults, and vagrancy; and they also include offences against the game laws, the police regulations, and the Education Act.

Psychological genesis of crime.—In entering upon any systematic consideration of crime or criminality in its relation to normal mental life in individuals, we must, in the first instance, find some fairly stable

estimate or standard of occurring crime, taken as a characteristic element in the constitution of our social life. I do not think we are likely to find a better standard than the 82 Indictable Offences upon which, as we have seen, is based the official classification of crimes, as given annually in the *Judicial Statistics, England and Wales.* This official classification is excellent in itself and well adapted for statistical comparisons as to the numerical amount and the character of crime in successive years ; but as a preliminary to our present inquiry I found it necessary to rearrange the six classes into four groups, and ultimately to tabulate them under three primary divisions. Upon the returns given of the "Crimes committed" and the "Persons tried" in the five years 1889-93, I then marked out the percentage of persons tried in the various classes, groups, and divisions. I was careful, in carrying out this analytical condensation, to avoid making any such structural disruption in the classification as would dislocate the position of the official figures and percentages.

In the following table are given the crimes and percentage of cases in each of the three ultimate divisions :—

TABLE I.

Division.	Crimes.	Percentage of Cases in each Division.
I.	Violence to Person or Property .	15
II.	Sexual Offences	10
III.	Offences against Property for spoil or gain	75

This simplification of crimes into three primary divisions discloses to us the composition of the psychological counterpart of classified crime. Taking "Crimes generally," this counterpart or equivalent comes out in the following proportions, the term "Propensity" (an extension of thought towards action) being used to express the outward activity in a criminal direction of three primary emotions or psychical states which are

TABLE II.

Propensity (in Criminal Activity).	Dominant Mental Origin.	Percentage of Cases.
Thievish, etc. .	Acquisitiveness .	75
Malicious . .	Malice . . .	15
Lustful . .	Lust . . .	10

referred to under the generic term of "Dominant mental origin" (as regards crime).[1]

So far as crimes are concerned, it is shown that acquisitiveness, malice, and lust are the three dominant seats of origin in the mind, and in this threefold centre, therefore, crime is to be regarded as having its genesis. Their contiguous and allied emotions and ideas come into play in varying proportions in different individual criminal offences. To take one instance: just as the "dominant" malice stretches away down through hatred, resentment, anger, spitefulness, and the like, so does crime against the person and property stretch away down from murder, through manslaughter or assault with intent, to cruelty and neglect, or to an act of incendiarism or of cattle-maiming. And so in the cases of acquisitiveness and of lust.

In Table III. is shown the development of the scheme by which crimes (Indictable Offences) are traced to their origin in the minds of criminals.

I hope that this scheme may be of use in guiding us to a practical interpretation of the meaning or value of the word "Crime," which, as an abstract expression, is apt to be used vaguely and indefinitely. For instance, it is, I think, remarkable to find, in regard to crime, that as much as 75 per cent of it has reference to the acquirement of money or property by thievish and fraudulent means; or, in other words, that seven-tenths, or more, of our crime stand in some relation to the means used for earning a livelihood. The further question of the *criminality*—or the moral intensity—of any particular deed, has reference to the external circumstances in which that crime is committed, and to the motive which more directly led up to it. The criminality of the man who steals some bread for his starving family is to be viewed in a very different light from that of the man who robs his master to pay for an outing. Or again, the man who kills his neighbour whom he has caught in the act of adultery with his wife, is a criminal of a very different sort from the man who murders his mistress in order that he may marry another woman, or who murders a victim to rob him.

The criminal-like instinct for acquisitiveness or for violence is to be regarded as a factor of all mental life from its birth to its close without limitation as to social status, or as to the kind of ancestral or parental heritage or environment. This holds good, too, as regards the instinct for lustful indulgence, nature, however, having postponed for a few years the first development in individuals of the sexual passion, the feature of the mental life which leads up to the third dominant origin of crime. This threefold (criminal-like) instinct is a universal birthright which man shares with all animals; and it would be our natural and more or less prevailing characteristic through life, were it not for the gradual development in us of certain higher and inhibitory intellectual and volitional processes, such as prudence, reflection, and a sense of moral duty. These

[1] Throughout this article Indictable Crimes only are dealt with, unless it is otherwise so stated.

TABLE III.—The Psychological Genesis of Crime.

Crimes generally.

Number of Indictable Offences.	Class.	Description of Crimes.	Group.	Description of Crimes.	Percentage of Persons tried.	Division.	Propensity (in Criminal Activity).	Percentage of Cases.	Dominant Mental Origin (Primary Emotion).
26	I.	Offences against the person.	I.	Offences against the person :	21·5	I.	To violence to person or property.	15	Malice.
				(*a*) Crimes of violence.	12·2				
				(*b*) Sexual crimes.	9·2	II.	To sexual acts.	10	Lust.
10	II.	Offences against property with violence.	II.	Offences against property for spoil or gain.	71·4	III.	To thieving, fraud, etc.	75	Acquisitiveness.
14	III.	Offences against property without violence.							
8	IV.	Malicious injuries to property.	III.	Malicious injuries to property.	2·2				
4	V.	Forgery and offences against the currency.							
20	VI.	Other offences.	IV.[1]	Other offences.	4·7				
82									

[1] Group IV., which contains such offences as extortion, perjury, piracy, indecent exposure, and poaching, is absorbed in the three divisions, and fractional portions in the percentages of cases are merged in the general totals.

processes go to make up that self-controlling capacity which in the conflict of motives steers us aright and prevents the dominant emotion of the moment from exploding, or expending itself in some form of crime or vice. (*Vide* art. "Vice, Crime, and Insanity," p. 248.)

In proportion as this development is prevented, or stifled, whether from original brain defect or from lack of proper education and training, so is there a risk of the individual lapsing into criminal-mindedness or into actual crime. And this risk becomes intensified if the parents and their associates are people of vicious or drunken habits. Lastly, risk becomes compulsion when parents of the criminal class wilfully educate and train their children to a life of crime.

Whatever value we may attach, and rightly attach, to the influence of heredity as regards the quality of the brain in individuals, there can be no doubt of the value and influence of domestic environment, education and training in moulding and forming individual character during the more plastic periods of infancy, childhood, and youth.

The so-called science of criminal anthropology.—The factors with which we have been dealing prove stumbling-blocks in the way of "Criminal Anthropologists" and "Criminalists," who fail to give sufficient weight to them in building up their criminological science. Writers on "criminology" give us a copious and precise history of the anatomical configuration, the physiological eccentricities, the muscular anomalies, the complexion, the shape of the ear and the jaw, the tattoo marks, and so forth, in certain criminals. We get a striking and elaborated account of their many and fearful crimes, of their atrocious mental peculiarities and of their hideous moral obliquities. This analytical and biological process is applied by those who call themselves criminalists to a comparatively small group of criminals; and by implication, and even more directly, it is made applicable to criminals generally.

The criminalist searches for anatomical, physiological, intellectual, and moral evils and obliquities in the structure and personality of the criminal; he finds them, he tabulates them. He does not seek for good; therefore he neither finds it nor tabulates it. If we are to give the devil his due, why not the criminal?

The anthropological method of estimating the criminal must fail, because it does not include circumstance and motive in the computation, and because without these no standard of capacity, conduct, or responsibility can be regarded as trustworthy, or even possible.

Again, if the criminalist tells us no more and no less than the truth, and if the criminal is what he would have us believe, our hopes for the betterment of the class by education and training, and for the reformation of the individual by punitory measures, prison discipline, industrial occupation, and other available means, are crushed.

We have seen what a large proportion of crimes is due to acquisitiveness, and this close relationship of "crime" to the means used by criminals for obtaining a livelihood must not be overlooked; it is not

for us to stamp "criminals" as lunatics or quasi-lunatics, or to place them on a special morbid platform of mental existence, merely because they prefer thieving, with all its concomitant risk, to more reputable, if more laborious, modes of maintaining themselves.

Who is to say that the professional thief who is caught picking a pocket and does his "three months hard" is in reality more of a criminal than the fraudulent tradesman or financier who swindles families wholesale during the week, and collects the offerings in church on Sunday? Where do the anatomical peculiarities of the latter class find place on the criminal anthropologist's register? A criminal is a person who commits a crime, and not merely a person who is sentenced to imprisonment for committing a crime.

My objection to these criminological methods does not rest only on the injustice of crediting criminals generally with characteristics, anatomical, physiological, or mental, culled from the selected biographies of a few of the class under the guise of a so-called science. I object to it because it is not only useless but also misleading to us when we seek to apply it in detail in individual cases. I hope the day will never come when, in our official examination into the mental condition of suspected persons, or of persons lying in prison upon a criminal charge, we as medical men will be expected to produce our craniometer for the head measurements, and to place reliance upon statistical information as to the colour, size, or shape of any organ.[1] A man is sane or insane, criminal or lunatic, apart from and without regard to such sources of information. Each case must be taken on its own merits, and above all, and first of all, the man must be allowed to speak for himself, and to give his own account of the circumstances in which the act was committed and of the motives which led him to commit it.

Criminal lunacy.—Having considered briefly some of the relationships existing between crime and criminality on the one hand, and the normal mental life in individuals on the other, we now pass on to a consideration of some points bearing on the crimes which are the outcome of mental unsoundness, and on criminal lunacy and criminal lunatics generally.

According to the statutory definition, "criminal lunatic" means any of the following persons:—

(*a*) Any person for whose safe custody during Her Majesty's pleasure Her Majesty or the Admiralty is authorised to give order; and

(*b*) Any prisoner whom a Secretary of State or the Admiralty has in pursuance of any Act of Parliament directed to be removed to an asylum or other place for the reception of insane persons.

It may here be observed that this statutory or official definition of a criminal lunatic has reference essentially to the responsible authority by whom certain classes of persons are dealt with; and differs from what may be called the technical or professional meaning of the term, in which crime and lunacy are the essential ideas. Technically, and in practice,

[1] This of course is a totally different question from that of the utility of "anthropometry" in the identification of habitual criminals.

Table IV.

Offences.	Numbers detained on 31st December 1895.						
	Numbers.			Classification.			
				Queen's Pleasure Lunatics.		Secretary of State's Lunatics.	
	Total.	Males.	Females.	Insane on Arraignment.	Acquitted on ground of Insanity, or Special Verdict of Guilty but Insane.	Certified Insane before Trial.	Certified Insane after Trial.
Indictable Offences.							
Murder	342	203	139	79	187	43	33
Attempt to Murder	121	101	20	31	75	6	9
Threats or Conspiracy to Murder	6	6	...	2	2	2	...
Manslaughter	24	18	6	7	7	5	5
Felonious Wounding	48	45	3	10	25	6	7
Endangering Railway Passengers	3	3	...	...	2	...	1
Malicious Wounding (Misdemeanours)	35	33	2	4	24	5	2
Assault	5	5	...	...	4	...	1
Cruelty to Children	...	...	...	...	...	...	...
Child Stealing	1	...	1	...	...	1	...
Concealment of Birth	1	...	1	1	...	...	...
Unnatural Offences	6	6	...	3	1	...	2
Attempts to commit Unnatural Offences	4	4	...	...	4	...	...
Rape	8	8	...	3	...	1	4
Indecent Assaults on Females	6	6	...	3	2	...	1
Defilement of Girls under 13	13	13	...	5	3	...	5
Sacrilege	1	1	...	...	...	...	1
Burglary	14	14	...	5	2	1	6
Housebreaking	7	7	...	2	2	...	3
Shopbreaking	2	2	...	...	1	...	1
Entering with Intent to commit Felony	1	1	...	1	...	...	...
Robbery	2	2	...	...	...	...	2
Extortion by threats to accuse	...	...	...	...	...	...	...
Extortion by other threats	1	1	...	...	1	...	...
Larceny of Horses and Cattle	2	2	...	...	2	...	...
Larceny from the Person	2	1	1	...	...	1	1
Larceny in House	1	...	1	...	...	...	1
Embezzlement	...	...	...	...	...	...	...
Larceny of Post Letters	...	...	...	...	...	...	...
Simple Larceny and minor Larcenies	23	18	5	5	1	3	14
Obtaining by False Pretences	9	8	1	3	1	1	4
Receiving Stolen Goods	1	1	...	...	...	...	1
Arson	25	24	1	11	8	4	2
Setting Fire to Crops, etc.	1	1	...	...	1	...	...
Killing and Maiming Cattle	3	3	...	1	1	1	...
Malicious Use of Explosives	1	1	...	...	1	...	...
Other Malicious Injuries	3	2	1	1	1	...	1
Carry forward	722	540	182	177	358	80	107

TABLE IV.—*continued.*

Offences.	Numbers detained on 31st December 1895.						
	Numbers.			Classification.			
				Queen's Pleasure Lunatics.		Secretary of State's Lunatics.	
	Total.	Males.	Females.	Insane on Arraignment.	Acquitted on ground of Insanity, or Special Verdict of Guilty but Insane.	Certified Insane before Trial.	Certified Insane after Trial.
Brought forward . .	722	540	182	177	358	80	107
Forgery and Uttering (Felony) . . .	3	3	...	1	1	...	1
Forgery (Misdemeanour) .	...	...	...	...	...	...	...
High Treason . . .	3	3	...	1	2	...	...
Libel	2	2	...	1	...	...	1
Suicide (Attempting to commit). . . .	13	9	4	1	4	4	4
Total, Indictable Offences	743	557	186	181	365	84	113
NON-INDICTABLE OFFENCES.							
Assaults :—							
On Constable . .	2	2	...	...	...	...	2
Common . . .	1	1	...	...	...	...	1
Indecent Exposure . .	...	...	...	...	...	...	...
Intoxicating Liquor Laws, Offences against :—							
Drunkenness . .	1	1	...	...	...	...	1
Malicious Damage :—							
Other Offences . .	2	1	1	..	...	...	2
Military and Naval Law, Offences against :—							
Army . . .	1	1	...	...	...	...	1
Poor Law, Offences against :—							
Stealing or destroying Workhouse Clothes .	...	...	...	...	...	...	...
Prostitution . . .	...	...	...	...	...	...	...
Vagrancy Act, Offences against :—							
Begging . . .	3	2	1	...	...	...	3
Sleeping Out . .	...	...	...	...	...	...	...
Found in Enclosed Premises . . .	...	...	...	...	...	...	...
Frequenting . .	...	...	...	...	...	...	...
Total, Non-Indictable Offences . . .	10	8	2	...	...	...	10
Surety Prisoners . .	...	...	...	...	...	...	...
Military Prisoners . .	4	4	...	...	...	...	4
Grand Total . .	757	569	188	181	365	84	127

the term "criminal lunatic" is not applied except to a person who has committed a crime and who is for that reason under special detention as a lunatic; and it matters not whether the priority of occurrence was with the insanity or with the criminal act, that is, whether the individual in question was insane when he committed the crime or was a criminal when he became insane. Socially, of course, and in some senses psychologically (as in the matter of treatment), it is not unimportant to distinguish between an individual who whilst insane commits a crime, and a criminal —and more especially a habitual criminal—who becomes insane whilst undergoing imprisonment; in short, between a criminal lunatic proper and an insane criminal.

In England and Wales on the 31st December 1895 there were, according to the *Judicial Statistics* for that year, 757 criminal lunatics confined in asylums. Of this total 569 were males and 188 were females, a proportion of 3 males to 1 female.

The tabular statement on pp. 444, 445, taken from the *Judicial Statistics*, shows the crimes committed by these criminal lunatics. It also gives their classification as to the stage or period at which the insanity was officially recognised.

Dealing only with Indictable Offences it will be seen that the 743 criminal lunatics are classified under two heads, "Queen's pleasure lunatics" and "Secretary of State's lunatics."

"Queen's pleasure lunatics" are criminal offenders of unsound mind not sentenced to any term of imprisonment, but ordered by a Court of Law to be detained during Her Majesty's pleasure.

"Secretary of State's" lunatics are criminal offenders of unsound mind who are detained upon the authority of the Secretary of State, having been certified insane—

(*a*) Before trial or judgment.

(*b*) Whilst undergoing a term of penal servitude or imprisonment.

(*c*) After sentence to death.

All criminal lunatics are detained for indefinite periods, with the exception of those undergoing sentences to penal servitude or shorter terms of imprisonment; the latter at the expiration of their sentence cease to be "criminal" and become "pauper" lunatics.

The following table gives the results of analytical inquiry into the mental origin of the crimes (Indictable Offences) of criminal lunatics:—

TABLE V.—Psychological Genesis of Crime.

Crimes of Criminal Lunatics.

Division.	Propensity (in Criminal Activity).	Percentage of Cases.	Dominant Mental Origin (Primary Emotion).
I.	To Violence to Person or Property	86	Malice.
II.	To Sexual Acts	5	Lust.
III.	To Thieving, Fraud, etc. . .	9	Acquisitiveness.

The following interesting and instructive comparison shows that the criminal tendency in the sane is towards *plunder*, while in the insane it is towards *violence*:—

TABLE VI.

Division.	Percentage: Crimes generally.	Percentage: Crimes of Criminal Lunatics.
I. Violence .	15	83
II. Sexual Acts .	10	7
III. Thieving, etc.	75	10

Population of Broadmoor Criminal Lunatic Asylum. — Of the 743 criminal lunatics (Indictable Offences), as many as 640 were under detention in Broadmoor Asylum. The remaining 103, consisting chiefly of individuals undergoing short sentences for minor offences, were distributed throughout forty county and borough asylums of the country, and will not be further referred to.

The statistics referring to Broadmoor are taken from the report on that Asylum for the year 1895.

The table on p. 448 gives the crimes and classification of the patients in the Asylum on the 31st December 1895.

A glance at the table shows that as many as 527 inmates were under detention for crimes of personal violence, namely, murder, manslaughter, and attempt to murder; leaving only 113 under detention for other offences.

Of the 640 patients, 356 had committed homicide (332 cases of murder and 24 of manslaughter). Of these, 218 were men and 138 were women. With few exceptions the death caused by the women was that of their own child or children.

The proportion of cases of homicide for the whole population was 55·5 per cent, for the male inmates alone 45·9 per cent, and for the female inmates alone 83 per cent. If we take the whole 743 criminal lunatics (Indictable Offences) in Broadmoor and other asylums, the proportion of homicidal cases is 44 per cent.

The Broadmoor population, at the end of 1895, included 64 inmates who were certified to be insane whilst undergoing sentences of penal servitude, leaving 576 patients who may be regarded as having been insane at the time they committed their crimes.

The following is the numerical list of these crimes:—

Murder	320
Manslaughter	19
Attempt to murder	156
Other offences	81
	576

TABLE VII.—Crimes and Classification of Criminal Lunatics in Broadmoor on the 31st December 1895.

Crimes.	Total Number remaining in the Asylum on the 31st December 1895.			Classified with reference to the Period at which Insanity was recognised.																	
				Certified to be Insane whilst awaiting Trial or Judgment.			Found Insane by Jury on Arraignment.			Acquitted on the ground of Insanity, or found Guilty but Insane (in terms of "Trial of Lunatics Act, 1883").			Reprieved on the ground of Insanity.			Certified to be Insane whilst undergoing Sentences of Penal Servitude.			Certified to be Insane whilst undergoing shorter Terms of Imprisonment.		
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
Murder	200	132	332	22	16	38	46	31	77	102	82	184	20	1	21	10	2	12	...	...	...
Manslaughter	18	6	24	3	2	5	7	...	7	4	3	7	...	...	...	4	1	5	...	...	...
Attempt to murder, maim, etc.	151	20	171	10	...	10	32	6	38	94	14	108	...	...	...	15	...	15	...	..	...
Concealment of birth	...	1	1	...	..	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...
Desertion of child and child-stealing	...	1	1	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Rape	6	...	6	...	...	...	2	...	2	...	...	...	...	...	...	4	...	4	...	...	...
Assault, common	5	...	5	...	...	...	...	...	...	4	...	4	...	...	...	...	...	...	1	...	1
,, with intent to ravish	14	...	14	...	...	...	7	...	7	3	...	3	...	...	...	4	...	4	...	...	...
Unnatural offences	10	...	10	...	...	...	3	...	3	5	...	5	...	...	...	2	...	2	...	...	...
Treasonable and seditious offences	3	...	3	...	...	...	1	...	1	2	...	2	...	...	...	...	...	...	...	...	...
Burglary and housebreaking	15	...	15	1	...	1	4	...	4	4	...	4	...	...	...	6	...	6	...	...	...
Robbery with violence	2	...	2	...	...	...	...	...	...	...	..	...	...	...	...	2	...	2	...	...	...
Horse-stealing	1	...	1	...	...	...	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...
Larceny and petty thefts	5	4	9	1	...	1	3	...	3	...	...	...	...	...	...	1	4	5	...	...	...
Receiving stolen goods	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...
Obtaining goods by false pretences	4	...	4	...	...	...	2	...	2	1	...	1	...	...	...	1	...	1	...	...	...
Arson and malicious burning	20	1	21	2	...	2	9	...	9	7	1	8	...	...	...	2	...	2	...	...	...
Forgery	2	...	2	...	...	...	..	...	...	1	...	1	...	...	...	1	...	1	...	...	...
Libel	2	...	2	1	...	1	1	...	1	...	...	...	...	...	...		...	...	...	...	...
Under the Vagrant Laws	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1
Felony (not otherwise described)	4	...	4	...	...	...	1	...	1	3	...	3	...	...	...	...	...	...	...	...	...
Threatening by letter	5	...	5	...	...	...	2	...	2	3	...	3	...	...	...	...	...	...	...	...	..
Deserters from the army and navy	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...
Insubordination as soldiers	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...
Attempted self-murder	3	1	4	...	1	1	...	...	...	3	...	3	...	...	...	...	...	...	...	...	...
Total	474	166	640	40	20	60	120	38	158	237	100	337	20	1	21	55	7	62	2	...	2

Of the 81 cases where the offences were other than murder, manslaughter, and attempt to murder, the principal crimes were: arson and malicious burning, 19; assault with intent to ravish, 10; burglary and housebreaking, 9; unnatural offences, 8.

The following are the principal offences of the 64 insane convicts ("insane criminals") under detention in Broadmoor:—

Murder	12	Burglary	6
Manslaughter	3	Larceny	9
Attempt to murder	15	Other offences	11
Rape and assault with intent to ravish	8		64

Murder cases.—The classification of the cases of murder by insane persons with reference to the stage at which their insanity was officially recognised gives the following figures. It may be observed that the death or discharge of 271 of the total murder cases admitted did not to any great extent alter the percentages in each class of those remaining under detention.

TABLE VIII.[1]—Murders by Insane Persons.

Class.	Stage at which Insanity was officially recognised.	Murder Cases under detention in Broadmoor on 31st December 1895.		Total number Murder Cases admitted into Broadmoor from date of opening in 1863 till end of 1895.	
		Total.	Percentage.	Total.	Percentage.
I.	Certified to be Insane whilst awaiting Trial or Judgment	38	11·8	76	12·8
II.	Found Insane by Jury on Arraignment	77	24·0	135	22·8
III.	Acquitted on the ground of Insanity or found Guilty but Insane (in terms of "Trial of Lunatics Act, 1883")	184	57·5	346	58·5
IV.	Reprieved on the ground of Insanity	21	6·5	34	5·7
		320	100	591	100

Of the 320 insane persons who committed murder, 190 were men and 130 were women. Table IX. gives the degree of relationship of the persons killed to the lunatics who took their life.

[1] This table does not include murder cases where the death penalty was commuted to penal servitude for life, and where the convict was transferred to Broadmoor from a convict prison.

TABLE IX.—Degree of Relationship or otherwise of Persons killed.

	M.	F.	T.
Father	3	...	3
Father and another person	1	...	1
Stepfather	1	...	1
Mother	14	1	15
Both parents	1	...	1
Husband	...	1	1
Husband and child	...	1	1
Wife	28	...	28
Wife and child or children	3	...	3
Own child or children	34	116	150
Own child and police officer	1	...	1
Brother or brothers	5	1	6
Brother-in-law	1	...	1
Sister	1	1	2
Sister-in-law	1	...	1
Uncle	1	...	1
Nephew	1	1	2
Niece	2	1	3
Grandchild	1	1	2
Man or woman with whom cohabiting	6	...	6
Women to whom engaged	6	...	6
Fellow-patients in asylums	13	2	15
Commissioner in Lunacy	1	...	1
Attendant	4		4
Police officer in charge	1	...	1
Surgeon attending	1	...	1
Other persons while under care as lunatics	2	1	3
Other persons	57	3	60
Total	190	130	320

It will be seen that 116 women and 34 men took the lives of their own child or children, 14 men and 1 woman killed their mother, 28 men killed their wife, and 3 their wife and child or children. Thirteen men and 2 women killed fellow-patients in asylums, and 4 men killed asylum attendants.

Amongst the women there were only 14 cases out of a total of 130 where the person killed was other than their own child. These figures all refer to cases in Broadmoor. With the view of arriving at some comparative idea of the relationship in cases of murder by men, I have drawn up the following table which shows the relationship in 200 cases of men executed, and 200 cases of men found insane. The table also shows the mode of killing in these cases; but the information arrived at is of a negative character and to the effect, as one would have expected, that the mode of killing affords no guide to the insanity or otherwise of the murderer—unless perhaps it may be noted that poison is administered in 7 cases by sane men, in 2 cases by insane men.

Where close blood relationship existed, insanity was established in

TABLE X.—Murder Cases: showing Relationship of Person killed and Mode of Killing.

Relationship.	200 men executed.	200 men found insane.	Mode of Killing.	200 men executed.	200 men found insane.
Father . . .	2	5	Cutting throat . .	51	67
Mother . . .	1	11	Shooting . . .	42	40
Mother or sister .	0	7	Beating on head, etc.	52	48
Wife	52	45	Stabbing, cutting, etc.	23	23
Own child or children	7	43	Strangulation or suffocation . . .	10	6
Other ,, ,,	11	11	Drowning . . .	4	5
Other adult relatives.	3	6			
Women with whom cohabiting . .	27	6	Poisoning . . .	7	2
Other women . .	32	16	Kicking, etc. . .	4	3
Policeman, warder, gamekeeper, etc. .	26	3	Other modes . .	7	6
Other men . .	39	47			
	200	200		200	200

the great majority of cases; thus, of 76 men who murdered their father, mother, brother, sister, or own child, as many as 66 were found to be insane, a ratio of 6 to 1. Cases of wife-murder supply some of the most complex problems in medical jurisprudence, when the question of insanity is raised, because of the difficulty that often exists in proving satisfactorily whether the jealousy which in most cases has led to the murder has any foundation in fact, or was merely the outcome of insane delusion. And curiously enough the results show a very even balance; for of 97 cases of wife-murder (a large proportion, be it noted, out of 400 murders) 52 men were executed and 45 were found to be insane. While, therefore, there would appear to be a 6 to 1 element of presumption in favour of insanity where a close blood relation is murdered, there is rather more than an even chance in favour of execution for a wife-murderer as compared with a verdict of insanity. Again, where men murder women who are not their wives, their chances of being executed and not found insane are very nearly 3 to 1. Where a policeman or warder, or other person in authority, is murdered, a verdict of insanity would appear to be very unlikely; while if one man murders another man, the chances are slightly in favour of his being found insane, as compared with the chances of his being hanged for his crime. It must be noted, however, that all these proportions refer to a verdict of the insanity, as compared with the execution, of the individuals; and that they do not take into account the fairly numerous cases where for various reasons a murderer is neither found insane nor executed, but is sent to penal servitude for life.

The discharge of criminal lunatics.—The Criminal Lunatics Act, 1884, sect. 5 (2) provides that "a Secretary of State may absolutely

discharge any criminal lunatic, and may also discharge any criminal lunatic conditionally, that is to say, on such conditions as to duration of such discharge and otherwise as the Secretary of State may think fit."

Since the opening of the Asylum in 1863, up to the end of 1895, 104 out of about 600 murder cases admitted into Broadmoor were discharged conditionally on Secretary of State's Warrant to the care, in nearly all the cases, of relatives who undertook to report if any signs of a relapse showed themselves. As would naturally be expected, the great bulk of these, numbering 72, were women who, under a variety of circumstances, but mostly at puerperal or lactational periods, had taken the lives of their children. It would, on the one hand, be too terrible if Broadmoor were to be made a place for the abandonment of all hope of discharge, while on the other the utmost care has to be taken in order that the persons and property of the community should be safeguarded.

Each case is considered on its own merits, and it is not until after careful and prolonged observation of the individual on the part of the responsible authorities that a favourable decision is arrived at in the matter of release; and stringent conditions are imposed upon those into whose care recovered cases are sent. Official cognisance of those discharged is kept up for years, and it is very satisfactory to be able to record that in no instance has the crime been repeated by homicides who have been set at large.

Of these 104 persons discharged recovered from Broadmoor, only 17 (7 men and 10 women) had to be re-admitted on relapse, and in several of these cases the individuals came back of their own accord, not caring to trust themselves or feeling unequal to the battle of life. Two or three other patients found their way into ordinary asylums on relapse, but the small number of relapses affords satisfactory testimony of the care exercised in discharging cases; while the safe return to asylum of relapsed cases shows the vigilance exercised in carrying out the conditions of release, by those who undertake the duty of supervision.

The following are the chief points that have to be considered and weighed before the Secretary of State sanctions the release of a criminal lunatic:—(i.) The crime, its nature and the circumstances under which it was committed. (ii.) The insanity, its character and history; whether hereditary or due to any special cause, and whether first attack. (iii.) The duration of the attack of insanity. (iv.) Whether relapse occurred, and if so, how brought about. (v.) The length of time since last attack, or since last active indication of insanity. (vi.) The completeness of the recovery, and whether there remain any after mental effects such as weak-mindedness, undue irritability or suspiciousness. (vii.) The likelihood of remaining well if out in the world. A person who has committed murder and been for years in an asylum is somewhat handicapped in starting social life again, and may not unnaturally show some sensitiveness to his position. (viii.) Capacity for earning livelihood or contributing to own maintenance; industrious disposition or otherwise; whether a former master or other person has offered employment. (ix.) Disposition to drink, often a

difficult inquiry. (x.) The home he goes to, and the kind of person or persons who undertake to look after him and report periodically, usually every three months to begin with, as to his condition, or immediately in the event of signs of relapse showing themselves.

In proportion as the answers to all these points are satisfactory would a criminal lunatic's chance of conditional discharge be likely to receive favourable consideration.

In Table XI. will be found a complete and interesting summary of the changes which have taken place year by year in the population of the Criminal Lunatic Asylum at Broadmoor since it was opened in 1863 up to the end of 1896.

The insanities of criminal lunatics.—So far as this country is concerned, I am not aware that there are any trustworthy statistics on the insanities of criminal lunatics; but in any case it is not within the scope of this article to do more than refer in brief and general terms to the subject.

The tendency—I might say the essential characteristic—of all lunacy is to set at naught first and most frequently the *optional* and then the *obligatory* rules of conduct; and the object of all lunacy legislation from a public standpoint is to prevent the lunatic from becoming actually dangerous to himself or others—to prevent him, in short, from becoming a criminal lunatic. No stronger confirmation of the truth of this is needed than the fact that as much as 86 per cent—or let us say the great bulk—of the crimes of criminal lunatics are crimes of violence.

What, we may ask, is the mental attitude of lunatics who commit crimes of violence? Putting aside the small percentage of violence to property committed by lunatics, and consisting mostly of arson, which is usually the outcome of ill-conditioned imbecility, it will be found that personal violence by a lunatic is mostly referable either to mental exaltation or to mental depression in one or other of their varied forms, accompanied by delusion.

In conditions of *mental exaltation or mania*, the delusion which leads to the violence is usually one of suspicion, persecution, or conspiracy. In some cases the insane mental excitement is comparatively transient, but leaves the delusion well marked and active; and these are cases which prove very difficult when the plea of insanity is urged.

In conditions of mental depression or *melancholia*, the delusion consists very frequently in an insanely exaggerated extension of religious feeling, whereby the patient comes to believe that she (for the case is more frequent among women) has committed "the unpardonable sin," is deserted by God, and is condemned to eternal damnation for the commission of fancied crimes and disgusting enormities.

Epilepsy is not found to be of so frequent a precursor in the crimes of criminal lunatics as might be expected. Out of a population of 640 criminal lunatics in Broadmoor, not more than 28 are classed as epileptic.

Drink is doubtless a potent factor, either directly or indirectly, in the

TABLE XI.—Showing the Admissions, Discharges, Deaths, and Escapes, with the Mean Annual Mortality and the Proportion of Recoveries, for each Year since the opening of the Asylum.

Years.	Admitted.			Discharged.									Died.			Escaped and not Recaptured on 31st December of each Year.			Remaining on 31st December of each Year.			Average Number resident.			Percentage of Recoveries on Admissions, including those recovered and removed to Prison.			Percentage of Deaths on average Number resident.		
				Recovered.						Transferred to other Asylums, Workhouses, or Private Care.																				
				Discharged.			Removed to Prisons.																							
	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.	M.	F.	T.
From May 27 to Dec. 31, 1863	..	99	99	..	1	1	..	..	..	..	3	3	..	..	..	..	..	..	..	95	95	..	89	89	..	1·01	..	..	..	..
In the year 1864	222	6	228	4	3	7	..	..	..	..	..	..	4	3	7	..	..	..	214	95	309	114	94	208	1·80	50·00	3·07	3·50	3·19	3·36
1865	131	4	135	5	..	5	5	..	5	..	..	..	12	1	13	..	..	..	323	98	421	300	96	396	7·63	..	7·40	4·00	1·04	3·28
1866	35	8	43	2	2	4	2	..	2	..	..	..	12	6	18	..	..	..	342	98	440	328	98	426	11·42	25·00	13·95	3·65	6·12	4·22
1867	47	28	75	4	1	5	2	..	2	43	29	72	8	2	10	..	..	..	332	94	426	338	95	433	12·70	3·57	9.33	2·36	2·10	2·30
1868	173	16	189	4	4	8	..	..	..	121	19	140	6	1	7	3	..	3	370	86	456	355	86	441	2·29	25·00	4·21	1·69	1·16	1·58
1869	29	6	35	2	1	3	3	..	3	9	2	11	11	3	14	..	1	1	375	85	460	375	87	462	16·66	16·66	16·69	2·93	3·44	3·03
1870	27	4	31	3	2	5	3	2	5	9	1	10	10	3	13	..	..	..	377	81	458	371	81	452	22·22	100·00	32·25	2·69	3·70	2·83
1871	60	17	77	4	4	8	6	3	9	12	4	16	9	5	14	..	..	..	406	82	488	400	83	483	16·66	41·17	22·07	2·25	6·02	2·89
1872	40	28	68	2	7	9	3	..	3	27	1	28	8	1	9	..	..	..	406	101	507	410	93	503	12·50	25·00	17·64	1·95	1·07	1·78
1873	44	11	55	3	4	7	2	1	3	19	1	20	11	1	12	2	..	2	413	105	518	407	101	508	11·36	45·45	18·18	3·70	0·95	2·36
1874	19	12	31	..	3	3	6	1	7	15	..	15	11	7	18	..	..	..	400	106	506	406	107	513	31·57	33·33	32·25	2·70	6·54	3·50
1875	30	12	42	1	..	1	10	1	11	13	3	16	12	2	14	..	..	..	394	112	506	394	109	503	36·66	8·33	26·19	3·04	1·83	2·78
1876	36	9	45	2	5	7	8	1	9	17	5	22	14	6	20	..	..	..	389	104	493	392	106	498	27·77	66·66	35·55	3·57	5·66	4·01
1877	34	9	43	7	5	12	..	..	..	24	4	28	12	3	15	..	..	..	380	101	481	387	106	493	20·58	55·55	27·90	3·10	2·83	3·04
1878	26	16	42	6	4	10	..	..	..	17	3	20	9	1	10	..	..	..	374	109	483	375	104	479	23·07	25·00	23·80	2·40	0·96	2·08
1879	33	16	49	4	1	5	..	..	..	18	6	24	17	3	20	..	..	..	368	115	483	365	114	479	12·12	6·25	10·20	4·65	2·63	4·17
1880	46	16	62	3	5	8	..	..	..	25	2	27	16	4	20	..	..	..	370	120	490	368	119	487	6·52	31·25	12·90	4·34	3·36	4·10
1881	51	13	64	2	5	7	..	1	1	32	1	33	8	3	11	..	..	..	379	123	502	373	122	495	3·92	46·15	12·50	2·14	2·45	2·22
1882	46	16	62	2	3	5	..	..	..	25	3	28	17	1	18	..	..	..	381	132	513	380	127	507	4·34	18·75	8·06	4·47	0·78	3·55
1883	58	17	75	5	1	6	..	..	..	22	3	25	20	2	22	..	..	..	392	143	535	384	138	522	8·53	5·88	8·00	5·20	1·44	4·21
1884	44	12	56	1	1	2	..	..	..	17	4	21	12	7	19	..	..	..	406	143	549	406	143	549	2·27	8·33	3·57	2·95	4·89	3·46
1885	30	14	44	3	7	10	..	..	..	22	10	32	10	4	14	..	..	..	401	136	537	408	140	548	10·00	50·00	22·72	2·45	2·85	2·55
1886	26	14	40	6	4	10	..	..	..	15	4	19	14	3	17	..	..	..	392	139	531	394	138	532	23 07	28·57	25·00	3·55	2·17	3·19
1887	29	14	43	3	..	3	..	..	..	1	3	4	11	3	14	..	..	..	406	147	553	396	143	539	10·34	..	6·97	2·77	2·09	2·59
1888	101	12	113	2	3	5	..	..	..	19	4	23	14	5	19	1	..	1	471	147	618	419	148	567	1·98	25·00	4·42	3·34	3·37	3·35
1889	42	12	54	2	..	2	1	..	1	22	6	28	20	1	21	..	..	..	468	152	620	460	148	608	7·14	..	5·55	4·34	0·67	3·45
1890	46	14	60	4	4	8	2	..	2	9	9	18	25	3	28	..	..	..	474	150	624	473	151	624	13·04	28·57	16·66	5·28	1·98	4·48
1891	41	15	56	8	1	9	7	1	8	7	4	11	11	2	13	..	..	..	482	157	639	477	154	631	36·58	13·33	30·35	2·30	1·29	2 06
1892	33	10	43	5	5	10	5	2	7	8	..	8	16	1	17	..	..	..	481	159	640	480	159	639	30 30	70·00	39·53	3·33	0·62	2·66
1893	30	13	43	4	4	8	9	2	11	9	4	13	16	3	19	..	..	..	473	159	632	475	159	634	43·33	46·15	44·18	3·36	1·88	2·99
1894	35	13	48	7	4	11	..	..	..	7	..	7	10	3	13	..	..	..	484	165	649	476	162	638	20·00	30·77	22·92	2·10	1·85	2·04
1895	37	13	50	8	5	13	6	1	7	15	2	17	17	4	21	..	..	..	475	166	641	477	164	641	38·88	50·00	41·66	3·56	2·41	3·28
1896	37	11	48	10	9	19	3	..	3	7	2	9	11	1	12	..	..	..	481	165	646	478	166	644	35·13	81·82	45·08	2·30	0·60	1·86
Yearly																														

production of crime and insanity; but it is very difficult in the consideration of its influence accurately to understand how far it is the original, or, it may be, sole cause of the one or the other; or how far the drinking habit or drunkenness is more or less the effect of pre-existing mental weakness or nervous instability. Each case has to be considered separately; and while excessive indulgence in drink cannot be held to absolve from responsibility for criminal acts committed under its influence, there are cases no doubt where the absolute rigidity of the rule may to some extent be justifiably departed from.

Causes of criminal lunacy.—The doctrines or hypotheses of the causation of insanity in general must be held to apply to criminal as well as to non-criminal insanity; and a study of the reasons why a lunatic becomes a criminal in one case and not in another, really resolves itself into a study of the circumstances under which a certain proportion of lunatics are allowed to become criminal lunatics.

One day at Broadmoor a friend of mine, one of Her Majesty's Inspectors of Schools, asked how the lunatics were getting on. I replied, "Oh, much as usual." He then volunteered his opinion (as so many do who have avoided any knowledge on the subject) on the "responsibility and crime" question by saying, "I would hang all lunatics who commit murder." "Well, but," I said, "if you had a grown-up son who had the misfortune to become insane, and if you neglected him, and if he by reason of his insanity and your neglect murdered some one, do you think hanging, then, the proper treatment for him?" "Ah," he said good-naturedly, "that is a home-thrust, and I'll say no more about the matter." And so it is: society stands *in loco parentis* to the lunatic, and perfect government would ideally imply a perfect supervision and care of all lunatics. Meanwhile our lunatics are to a large extent allowed to become criminal lunatics. That our criminal lunacy is largely preventible there is no doubt, and the responsibility for its occurrence is often traceable either to (*a*) *delay in certifying* an insane person for lack of evidence of insanity, or from fear of prosecution or annoyance, or in a fatal deference to the pleadings of relatives; or to (*b*) *dilatoriness in removal* of certified lunatics to an asylum; or to (*c*) *premature discharge from an asylum.*

The number of murders and attempts to murder that result from the condition of things here mentioned is very considerable. There are walking about in our midst plenty of potential criminal lunatics whose insanity indeed is not unrecognised; nobody knows when it may be his turn to enact the part of victim in a realistic drama of blood.

Procedure in criminal cases where insanity is present or pleaded.—There are six stages at which a criminal offender may be officially recognised as insane and placed under detention as a criminal lunatic:—(i.) Whilst awaiting trial. (ii.) On arraignment. (iii.) When found guilty of the act, but insane at the time it was committed. (iv.) Whilst awaiting judgment. (v.) When reprieved on the ground of insanity. (vi.) Whilst undergoing a term of penal servitude or shorter term of imprisonment.

Stage 1.—When the accused person is found to be insane whilst

awaiting trial or under remand, and when the insanity is of such a character that he cannot properly be treated in prison, it becomes a necessary provision that he should be transferred to an asylum before his health suffers unduly. The individual on becoming sane is liable to be sent back to prison for trial, but this course is very seldom pursued.

Stage 2.—Here the accused person, if found by the jury to be insane and unfit to plead to the indictment, is ordered to be detained during Her Majesty's pleasure. This is a wise provision; but it is extremely desirable that the prisoner, although insane, should be allowed to plead if he be at all capable of understanding the position he is in; for a trial gives him an opportunity of speaking through his counsel, and enables a decision to be arrived at as to his guilt or innocence. In one case a lunatic escaped from an asylum and killed a stranger on the roadside. At his trial he was able to show that he acted in self-defence and he was acquitted and discharged. His friends were waiting and removed him back to the asylum.

Stage 3.—After the trial of Roderick Maclean for shooting at Her Majesty, the "Trial of Lunatics Act, 1883" abolished the old verdict of acquittal on the ground of insanity in favour of a special verdict of guilty but insane at the time of the act. If in some senses this verdict is less logical than the old one, it has the advantage of definitely asserting the guilt of the prisoner. This stage is the only one where, in the process of making a criminal lunatic, the legal dictum (arising out of the Macnaghten case) of a "knowledge of right and wrong" is submitted to the jury in limitation of the area of the insanity which ought to suffice, according to the law, in establishing the irresponsibility of the individual. The dictum is not a satisfactory one; and if it were insisted upon to the bitter end, it would have been the means of hanging more than half the women who are now in Broadmoor as criminal lunatics for the murder of their children.

After many wordy contests and much, perhaps needless, wrangling, I think the outcome has been that there is a general consensus of opinion that the legal dictum is too rigid on the one hand, and that medical opinion is too elastic on the other.

In 1894 a Committee of members was instructed by the Medico-Psychological Association to investigate and report on this most difficult and delicate question. The report of this Committee was submitted at the annual meeting of the Association in July 1896. After discussion it was unanimously agreed (quoting from the official account in the *Journal of Mental Science* for October 1896) that the "Report as amended be received and adopted by the Association." The concluding amended paragraph of the Report reads as follows:—"Under the circumstances disclosed by their investigation, your Committee, while not approving the doctrines and definitions contained in the Judges' answers to the House of Lords in 1843, are at present unable to make any recommendations for the amendment of the law."

Stage 4.—It very seldom happens that insanity intervenes between

conviction and judgment. There are only two such cases at Broadmoor.

Stage 5. — The Criminal Lunatics Act, 1884, sect. 2 (4) provides that in the case of a prisoner under sentence of death, if it appears to a Secretary of State, either by means of a certificate signed by two members of the visiting committee of the prison in which such prisoner is confined, or by any other means, that there is reason to believe such prisoner to be insane, the Secretary of State shall appoint two or more legally qualified medical practitioners, and the said medical practitioners shall forthwith examine such prisoner and inquire as to his insanity, and after such examination and inquiry such practitioners shall make a report in writing to the Secretary of State as to the sanity of the prisoner, and they, or the majority of them, may certify in writing that he is insane.

Every opportunity is given in this section of the Act for the question of insanity to be raised after sentence of death has been passed; and the Home Secretary is empowered to cause further medical inquiry to be made into the actual mental condition of the convict. If the prisoner under sentence of death is found to have been insane at the time the crime was committed, and if he is certified to be insane at the time of the statutory inquiry, he is removed to Broadmoor on the Secretary of State's Warrant. But if the prisoner is found to have been insane at the time he committed the crime, and if no certificate of his insanity at the time of the inquiry can be given, the death sentence is commuted to one of penal servitude for life.

It may be to some persons a matter of surprise that in not more than 34 cases has the death sentence been reprieved on the grounds of insanity and the prisoner sent direct to Broadmoor; and this over a period of upwards of 32 years, during which time close upon 600 criminal lunatics who have committed murder were admitted into Broadmoor.

Stage 6.—Sixty-four prisoners undergoing penal servitude or shorter terms of imprisonment were under detention as criminal lunatics in Broadmoor on 31st December 1895. Of these 32, just one half, had committed crimes of violence to the person, and 12 had committed murder.

DAVID NICOLSON.

DISEASES OF THE SKIN

(Edited with the kind help of Dr. Payne)

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SUPERFICIAL DIFFUSE INFLAMMATION

ERYTHEMA

THE name Erythema (Ἐρύθημα, a blush) conveys the idea of redness of the skin; it has therefore, with much confusion, been applied indiscriminately to a host of conditions in which a redness of the surface is the striking clinical feature. At the present day the name is more strictly used to denote, on the one hand, states of non-inflammatory congestive hyperæmia of the skin (E. hyperæmicum), and on the other certain inflammations (E. exudativum). Other early stages or mild degrees of inflammation are often spoken of as "erythematous"—that is, erythema-like; for example, erythematous lupus, eczema, dermatitis, syphilodermia, leprosy, and so forth.

The name *erythrodermia* has been coined by Besnier, and is used in France to denote extensive areas of reddened skin (usually accompanied by some degree of infiltration) of doubtful nature, such as are met with in the preliminary stages of mycosis fungoides.

The term *exanthem* is applied by most authors to denote a cutaneous efflorescence, and not a malady. Indeed its application is often limited by authors to the rashes of the acute specific fevers. Bazin applied the term *pseudo-exanthems* to denote a group of erythemata simulating the erythematous pyrexias, but Besnier prefers, as more correct, the term *exanthematic pseudo-pyrexias*, or *pseudo-pyretic*, or *pyretoid erythemata*.

Heinrich Auspitz proposed to denote the whole picture of the objective skin symptoms, as seen in a patient, by the term *exanthem*. The elemental forms present he designated as *anthemata*, and the various secondary and later groupings, which go to make up the whole *exanthem*, as *synanthemata*. Under the term *erythanthema* he referred to "all those symptom-groups upon the skin which are characterised by the combination of various primary forms, such as nodules, vesicles, pustules, wheals, which occur with a variable arrangement upon a reddened (inflammatory) base."

Hyperæmia is divided into two classes, congestive hyperæmia or erythema, and stagnatory hyperæmia or cyanosis. By *congestive hyperæmia*

we denote an excess of blood in the vessels, with diminished resistance and increased rapidity of the blood-stream, producing increased warmth and redness temporarily effaceable by pressure, sometimes a degree of swelling, and some trouble of sensation, such as heat and itching. Unna contends, though not very convincingly, that the term "active" usually applied to this state is inappropriate, since the vessels are paralysed; so also the term "arterial," because the veins are equally affected with the arteries. "The more intensely developed the redness," he says, "the darker and bluer it appears; not, as has been suggested, because every 'arterial' hyperæmia passes into a more 'venous' one, but because in more marked congestion the deeper-lying veins and arteries of the skin are more filled, and then appear bluish through the higher red of the superficial vessels." "Our comprehension of simple congestion, as opposed to inflammation, lies in the absence of every secondary tissue change"; and Unna affirms that in pure erythema, even though long-standing, there is no œdema and no pigmentation; though these may occur in stagnatory congestion. But other observers hold that simple congestion, unless very transient, may be followed by passing pigmentation and even slight desquamation; or may be associated with transudation of blood plasma and colouring matter and even leucocytes; and that only the issue of coagulable serosity and the active proliferation of connective tissue cells proclaim inflammation. We appreciate, therefore, at once the great difficulty of delimiting simple congestion clinically; and this the more as it often passes insensibly into inflammation, and other nutritive perversions.

The congestions are of various importance; they assume diverse patterns; and they differ in their course (fugacious, acute, cyclical, persistent, chronic). The smallest vessels of the papillary layer, or of the upper corium, or of the periphery of the follicular ducts, are usually implicated; and the patterns of eruption stand in relation to these groups of vessels, and to what Unna calls the "vascular cones" and their surrounding "collateral nets." Thus the eruption may be punctiform or finely papular, or from a lentil to the finger-nail in size, or larger still and in diffuse patches; it may be uniform, or figured or marbled; in contour regular or irregular.

These congestive hyperæmiæ or erythemata may be localised, or more or less generalised; and they have been divided into (I.) those due to local irritation (so-called idiopathic), and (II.) those due to internal causes (symptomatic).

I. Those in the first group are readily transformed into inflammation, and it is questionable whether they should not rather find a place under Dermatitis. Thus an *erythema caloricum* is induced by the influence of chemical rays of the sun, the electric light, Röntgen rays, a current of hot or cold air, or very hot or cold baths. The old title *Erythema ab igne* was applied to the well-known congestion resulting in blotches, rings, or marblings of pigment on the shins and other regions of persons long exposed to the heat of fires. The *chilblain* is often named *E. pernio*

(πτέρνα, the heel). *E. venenatum* is determined by a host of chemical substances, such as mustard; or by irritating discharges, for instance in babies. *E. traumaticum* arises from the pressure of garments, or by scratching and rubbing, and is probably due to a local reflex. *E. intertrigo* or *Intertrigo* (*inter*, between, and *tero*, I chafe) is very rarely a simple erythema. Two old-fashioned terms may also be referred to here, namely, *E. paratrimma* (παρατρίβω, to rub against) and *E. lœve*; the former relates to the erythematous condition arising from the pressure or friction of ill-fitting clothing, bedding, the saddle, and the like, and so to the condition preceding a bedsore; the latter signifies the redness seen on the surface of smooth dropsical skin. The name *E. gangrænosum* has been applied to patches of eruption often becoming gangrenous, which some authors ascribe to the use of artificial irritants, but which others consider neurotic. *E. keratodes* is a rare form of congestion of the palms with secondary keratosis. Lastly, we may mention the well-known "tâche cérébrale" of certain febrile conditions, which is so closely allied to "dermographism" (p. 490).

II. The congestive erythemata due to internal causes are many, and of most diverse nature. The part played by the nervous system in their production is very important.

(*a*) First comes the psychical blushing, induced by emotions, such as joy, shame, or anger. (*b*) Apyretic reflex flushings associated with the climacterium and menstruation are well known; and in infants irregular patches are met with arising from troubles of dentition or various kinds of gastro-intestinal irritation. In the adult certain areas of the face ("flush-patches") are specially the seats of the reflex flushing brought about by disorder of the gastro-intestinal tract or the female genital apparatus (see *Rosacea*). Dr. Payne has called attention to curious cases of *persistent flushing*. Here may be mentioned the hyperæmia immediately preceding certain forms of hyperidrosis. (*c*) Local congestive erythema may also occur with attacks of neuralgia; and in this connection the *erythromelalgia* or red neuralgia of Weir Mitchell may be alluded to (vol. vi. p. 607). (*d*) There is a heterogeneous collection of congestive erythemas, local or more generalised, associated with febrile states: for example, the hyperæmia following a rigor; the irregular areas of flush met with in the course of fevers (*E. fugax*); the flush of the cheeks in pneumonia and phthisis; and the more extensive prodromal erythema seen in small-pox, and sometimes in varicella and other fevers, which approaches in character the roseolas about to be mentioned. (*e*) The introduction of drugs into the circulation is the cause of many local or widespread toxic "erythematous" eruptions, but few of them are pure erythemas, for example, from atropine and amyl nitrite (see later art. on "Drug Eruptions"). The eruptions of the acute specific fevers are elsewhere considered, as also toxic pellagra and acrodynia. (*f*) Next we come to a vast array of more or less generalised "rashes," which are commonly included in the congestive erythemata. They are of great interest by reason of their frequency, pathogeny, etiology, and the

diagnostic difficulties. They assume an infinity of patterns, but may be roughly grouped into the *scarlatiniform*, *morbilliform*, and *macular* types, the latter often tending to form rings. Some authors would apply the name roseola, which may well be dropped, to all these eruptions; others confine the application of this name to particular phases. Certain comparatively indolent macular forms characterise the early infection of syphilis, and a phase of leprosy, and have special characters which distinguish them. These excluded, we find that the majority, like *E. exudativum multiforme*, are symptomatic of all sorts of toxic and infective conditions of the blood (blood-poisoning), and of all degrees of benignity and gravity. Thus they are met with in the course of many such affections as vaccinia, septicæmia, diphtheria, typhoid fever, and a host of similar states; and also arise from the various antitoxins which are injected for remedial and preventive purposes (*vide* "Serum Eruptions"). It is also evident that "poisons" manufactured within the economy can act in a similar manner, as evidenced by uræmic poisoning, the effect of simple enemata, and, probably, by "auto-intoxication" arising from various disorders of the gastro-intestinal tract. In many cases the cause escapes us. There is generally some febrile movement and constitutional disturbance, and perhaps injection of the synovial membrane of some of the joints; but these symptoms may be so slight and transient as to escape notice. These rashes often simulate those of scarlatina, measles, and rötheln in the closest manner. As in E. multiforme, they may on rare occasions be hæmorrhagic.

In an interesting appendix to Kaposi's lectures on the *Pathology and Treatment of Diseases of the Skin* (French edition by Besnier and Doyon) the editors group these disorders into two distinct classes:—The first group, which they call *Rubeoloids* and *Scarlatinoids*, comprises the erythemas which simulate the erythematous eruptive fevers during all their course, and which are regularly febrile and acute; the second group, which are called *Scarlatiniform erythemas*, includes a number of erythrodermias which are pyretoid, especially at their beginning, subacute, and prolonged beyond the extreme limits of the eruptive periods of the exanthematic fevers. These scarlatiniform erythemas may recur, and may be accompanied by more or less profuse desquamation.

All these generalised congestive erythemas are, in Hebra's classification, completely divorced from their natural allies, forming the next group for consideration, namely, E. exudativum multiforme.

Erythema Exudativum Multiforme (Hebra)

Syn.—*E. multiforme* (Kaposi); *Eryanthema essentiale* (Auspitz).

Definition.—The name E. multiforme denotes a special group of non-contagious inflammatory eruptions, probably for the most part symptomatic of some blood-poisoning; running an acute or subacute course like an

exanthem; distributed bilaterally and even symmetrically, with certain favourite seats; and characterised by the formation of special macules or papules with a marked tendency to eccentric extension, or of nodules, nodosities, or nodes of an exudative "erythematous" type, more rarely by vesicles and bullæ; which eruptions are apt to occur in various combinations, and are frequently multiform.

History.—In his genus Erythema Willan included certain species described as E. marginatum, papulatum, tuberculatum, and nodosum; and whilst his work was in the press, he announced the existence of a new genus, Iris, characterised by concentric multi-coloured rings. Further experience of more severe vesicular forms of iris compelled him to transfer this affection to the genus Herpes, in accordance with his own definitions. Rayer subsequently restored it to its natural place. Bazin, unaware until later of Willan's discovery, described iris independently under the term *Hydroa vesiculeux*, which name has survived as *E. hydroa* (Besnier). Willan's genus Erythema was pruned and consolidated, and the group, as it stands now, was thus constituted by Hebra, because his experience taught him that the various species included were but phases of a single morbid process.

Symptoms.—The eruptive elements are primarily of a lively red colour, but are subject to many modifications in this respect, as will be explained. They pale on pressure, and the coarser ones are firm or elastic to the touch. They are scanty, or numerous and crowded, and are generally disposed without order, though there is a marked tendency to symmetry. Occasionally the elements are grouped in lines, rings, semicircles, or crescents (E. circinatum). The outline of the lesions is primarily round, but liable to be modified by the lines of tension in the skin in different regions. The skin may be involved superficially, or even to the hypoderm; and the eruption commonly consists of macules (*E. maculatum*),[1] papules (*E. papulatum*), nodules (*E. tuberculatum*), or nodosities or nodes (*E. nodosum*) as large perhaps as a split walnut. There is a tendency to some enlargement of bulk after their first appearance, and by confluence large irregular plaques or infiltrations may be formed.

Out of these fundamental forms numerous varieties may be evolved. In the more superficial kinds there is a marked tendency to a limited centrifugal expansion, and to the formation of rings, as in ringworm of glabrous parts (E. annulare, marginatum). The extending circles may be imperfect, or by intersection serpentine lines and various figured patterns may be produced (E. gyratum et figuratum). A rare but striking development of the ring-formation is the production of multi-coloured concentric circles (*en cocarde*), which suggested the name *Iris* to Willan. A lesion appears, and, as it extends peripherally, the inflammatory process undergoes alternating abatements and exacerbations, reminding us of the rhythmical growth of a culture of Microsporum Audouini.

[1] The macular forms of E. hyperæmicum (roseola) are distinguished by authors from the larger and bolder lesions of E. exudativum.

Another phase is brought about by the intensity of the inflammation. In exceptional cases vesications are produced (E. vesiculosum, E. bullosum, E. hydroa (Besnier)), whose contents may become sanguineous or puriform, and thus crusting and even scarring result. Very commonly the effusion of serum is insufficient, or not active enough, to cause vesication, but produces an opalescence of a papule, simulating urticaria (*E. urticatum*), or of parts of a lesion causing variegation of colour and aspect. On the other hand, the vesication may be so intense and complete as to rise from the skin like a pemphigus bulla or phlyctena. The more intense zones of the concentric ringed lesions (*E. iris*) are especially prone to vesication. A more or less perfect vesicle or bulla forms in the centre, and as the lesion extends other rings of vesicles may be thrown up (*Herpes iris*), and become more or less confluent; or the whole lesion may vesicate (the so-called *Pemphigus iris*). A marked tendency to the production of a diffuse angio-neurotic œdema exists, with consequent swelling of the part attacked; also for the transudation of red blood corpuscles and the colouring matter of the blood; so that lesions, instead of appearing simply hyperæmic and œdematous, as they commonly do, may be blood-stained or actually hæmorrhagic. Hence the eruptive elements, especially the more massive ones, tend to pass through bruise-like changes of tint, and to leave temporary pigmentation. Rarely cases are met with in which the erythematous inflammation is entirely masked by hæmorrhage, or the latter occurs independently, and seems to supplant the natural eruption, as in hæmorrhagic small-pox. Deep-seated, copious hæmorrhage may lead to sloughing of the parts. The fundamental red colour of the eruption is thus apt to be modified in several directions; by the presence of fluid, insufficient to produce vesication, but enough to cause various opalescent and iridescent shades (E. urticatum and E. iris); and by the presence of blood, or its colouring matter, producing various tints of purple with ulterior changes. The hands and feet are often cold, and the eruption then assumes a cyanotic tint resembling chilblains. Desquamation is not marked, except as a sequel to vesication and its consequences.

Now, although the protean symptomatic picture is rightly insisted upon, it must be explained that this multiformity refers more particularly to the picture of the affection as a whole, and is chiefly brought about by the wide range observable in a long series of cases in the area, bulk, form, colour, grouping, and aggregation of the primary lesions, and by the varying intensity of the inflammatory process. It is hardly an exaggeration to say that, in contrast with psoriasis, for instance, no two cases are alike. Different degrees of multiformity are also seen in particular cases, due to the changing aspect of the lesions during their life-history; to their evolution one after another, or in successive crops; and, as not infrequently happens, to the coexistence of different forms. It must, however, be clearly understood that the lesions, in any case, may conform to the original type throughout, or each may tend to go through similar changes, so that a fairly uniform eruption is not uncommonly met with

(E. maculatum, papulatum, urticatum, nodosum, iris). In some forms, such as E. iris, there is a strong tendency to frequent recurrence, and it is notable that in successive attacks the same form is apt to be preserved.

The duration of individual elements, and of the eruption as a whole, will vary as the depth to which the skin is involved, the intensity of the inflammation, and the quantity of the eruption. Individually, and as a whole, the eruption pursues an acute or subacute course, and may last only a few days or a few weeks. In two to six weeks, as a rule, the process is completely ended. The subjective symptoms are usually unimportant, and consist of slight burning and itching.

The *locality* is to be noted. Being bilateral, with a strong disposition to symmetry, the eruption affects the backs of the hands and forearms, the face, neck, and behind the ears; also the dorsum of the feet and the knees; in other cases the extremities more extensively, and the trunk. Or it may be generalised. Nodes select the shins especially. The mucous membranes of the eye, mouth, and nose may be invaded, particularly in the phases known as E. iris; and in rare cases the mouth lesions may quite overshadow those of the skin. Herpes facialis, or progenitalis, as in other febrile states, may be present.

When the causes are discussed it will appear that E. multiforme may occur under a variety of pathological conditions, benign or grave, and therefore the *constitutional symptoms* will vary widely. Yet even when complicating some infective process (so-called secondary cases) the evolution of the eruption is generally associated with special symptoms, as in the so-called primary cases. As a rule the constitutional symptoms are slight, and may pass undetected. There may be some antecedent malaise for a few days or weeks, or the eruption may surprise a patient apparently in good health. The diseased process may be apyretic, or may be associated with all the variable phenomena of febrile reaction; of such are general malaise, quickened pulse, shiverings, aches and pains, especially in the joints; tonsillar, pharyngeal, or bronchial congestion; gastro-intestinal disturbance; transient albuminuria, and so forth. The fever, which may be high, may decline, continue or even increase with the appearance of the eruption; or it may be confined only to the eruptive period, and be ephemeral, remittent, subintrant, continuous, typhoidal, according to circumstances (Besnier). In exceptional cases endocarditis, pericarditis, pleuritis, meningitis, pneumonia, or arthritis may supervene; but it will be readily understood that it is often difficult to distinguish the constitutional symptoms immediately associated with the outburst of eruption from those of the malady it complicates. Kaposi has observed a hæmaturia with each recurrence. The analogies of E. multiforme with the eruptive fevers are often striking in many respects.

E. nodosum.—Some observers would separate E. nodosum as an independent symptom group, because the nodose form of eruption is peculiar,—not, like all other phases, evolved out of the maculo-papule, and because of its peculiar localisation over the shins. Others regard it as a simple variety of E. multiforme, since smaller nodules are frequently

present on the arms; and other rare instances have been recorded in which other phases of E. multiforme have been present. Moreover, the conditions under which it arises, its course, and the general symptoms attending it, do not differ materially from other phases of E. multiforme. The pathognomonic eruption is constituted by the bilateral manifestation of round, or oval, tender nodosities or nodes on the shins, from a pea to a split walnut in size, projecting more or less from the hypoderm, and, as a rule, very evident; at first of a bright intense red, afterwards deepening in colour, and becoming violaceous; arranged with their long axis parallel to that of the limb, and often set in œdematous tissue. As they disappear the lesions take on various ecchymotic shades, as in a contusion. Patches may be formed by confluence. The number of nodosities present varies from a few to a couple of dozen or so. They are sometimes found—beyond their special site of predilection on the shins—on the thighs and arms, more rarely on the face and trunk, and, it is said, even on the mucous membranes. Recurrences are uncommon, but one or even two may occur (T. Barlow, S. Mackenzie, Lendon, Gorlitz). It disappears spontaneously in three to four weeks.

The *E. iris* phase, again, is often described apart on account of its special aspects, its remarkably frequent association with vesications of the mucous membrane of the mouth and nose, and its marked tendency to recurrence. Such recurrences may occur perhaps once or twice a year, or at wider intervals over many years; or occasionally they may follow one another so closely as to simulate a chronic malady. The peculiar concentric arrangement of the lesions has already been discussed, and the eruption in well-marked cases is a very striking one, and is portrayed in most atlases of diseases of the skin. Very frequently the maculo-papules, commonly the size of the finger-nails, are centred by a vesication which may only be evidenced by a thin brownish crust. In other cases alternating concentric rings of redness and opalescence (from œdema), or more or less complete vesication, characterise the lesions; and, as explained before, the vesications may be broken up into vesicles, or become more or less confluent, even to cover the whole lesion in a bleb. The backs of the hands are particularly attacked, and the buccal mucous membrane; frequently also the palms, knees, insteps; and in rare cases it is more widely spread. The constitutional symptoms vary in severity; sometimes they are slight, sometimes the patient is very ill. The cause, as a rule, quite eludes detection.

Causes.—The causation of E. multiforme is far from being established on a sound basis. It has been regarded as an essential and specific disease, as arising from various causes, or as symptomatic. The accumulating evidence points to the conclusion that the eruption, at any rate in many cases, is but an expression of various blood-poisonings; in this respect it is closely analogous to the generalised hyperæmic erythemata (roseolas) and some purpuras. To make matters clear it is desirable to follow the evidence in some detail.

Drugs.—Almost every drug, whether administered by the mouth or

rectum, by inunction or hypodermically, is capable on occasion, and in certain persons, of exciting various "rashes," mostly of a scarlatiniform, morbilliform, or macular type, which may urticate or vesicate. Such rashes are often correctly described as multiform in aspect, and also as exudative erythema. Hence it is said that E. multiforme (that is, in Hebra's sense) follows the ingestion of drugs. This important statement, however, must be accepted with caution, as the forms, as a rule, do not quite correspond; though, it must be confessed, the distinction is difficult. Polotebnoff observed a case of generalised erythema papulatum following friction with tincture of iodine; and Kaposi says he has several times seen E. iris to follow a friction with Neapolitan ointment. The latter cases may possibly have an explanation other than toxæmia.

Certain aliments have been regarded as causes. And here we may point out that it is a very nice question whether the macular, urticate, centrifugally enlarging, and figured eruptions so commonly seen after poisoning by tinned food and shell-fish should be considered as Urticaria, or, as seems more fitting, Erythema urticatum (p. 480).

The Serums and Antitoxins, much in use at the present day, can cause an eruption after the E. multiforme type in place of the commoner smaller-patterned rashes. Berg records such cases (*vide* art. "Serum Rashes").

Septicæmia and Pyæmia, again, in their many phases—medical, surgical, and puerperal—can unquestionably give rise to the eruption. Many cases could be mentioned, such as those of Demme and Finger. I have myself recorded a case of E. urticatum in the course of acute infective osteomyelitis; and Barth and Dr. Thomas Oliver mention it as an accompaniment of infective endocarditis.

Acute specific fevers and other infective maladies are also to be mentioned, and many French theses deal with these facts. E. multiforme has been seen, though rarely, in the course of erysipelas (Pertat's Thesis), variola (Kaposi), typhus and typhoid fevers, glanders. I have myself seen it in diphtheria and vaccinia. Kaposi records the appearance of E. annulare on the backs of the hands with each recrudescence of a blenorrhagia (also Tenneson). Hutinel has met with E. iris in the course of typhoid fever. Hebra contends that the so-called roseola cholerica of the secondary fever is really an E. maculatum et papulatum. R. W. Taylor, whilst holding that Mauriac and others have mistaken precocious syphilitic gummata for E. nodosum, accepts certain cases recorded by Danielssen, Lipp, Finger, and Bronson as examples of the coincidence of true E. multiforme and syphilis. E. nodosum alone has been noted in the course of typhoid fever (Langenhagen, Gillet, Thibierge), cholera (Lacome), diphtheria (Jouillié), infective angina (Legendre and Claisse), measles (Richardière), la grippe (Comby), gonorrhœa (Fournier-Bès), malaria (Moncorvo, Wilhelm, Boicesco), septicæmia (Brodier). It has also been met with in the "rheumatism" complicating scarlet fever (Ashby and others), and in myelogenous leucocythæmia (Wallace Beatty). Uffelman and Oehme, in 1876, attempted to trace a relationship between

E. nodosum and tuberculosis. Lailler saw it in phthisis, Levy in acute tuberculosis; and Schamaun has recently published a thesis in which all the information on the subject is collected.

Should the circumstances thus reported be considered merely as accidental coincidences, or is the evidence sufficiently strong to warrant the conclusion that an intimate association exists between such infective diseases and E. multiforme? It may be remarked that in the case where this eruption occurs during the progress of such a disease as typhoid fever, or during convalescence from it, we have to weigh the probability of the eruption being due either directly to the specific poison of the fever, or to some secondary infection, or to the influence of a drug.

Rheumatism, however, is the disease of all others which calls most for discussion here. The association of both E. nodosum and the other phases of E. multiforme with rheumatism has been noted since the first quarter of this century, and has never been without numerous distinguished upholders. Dr. Stephen Mackenzie, who, in this country, has long been a strenuous advocate of the association, points out that E. multiforme frequently occurs in the course of a malady characterised by all the symptom-complex recognised as rheumatic fever: such as fever; definite, fleeting, multiple arthritis (which may be recurrent); general pains, sour sweats, endocarditis, pericarditis, tonsillitis, pleurisy, and pneumonia; and followed by anæmia: that in cases of E. multiforme a history of precedent or subsequent rheumatism may be obtained in greater proportion than, say, in lichen planus or lupus; that there is a preponderance of attack in the first three decennia of life, especially in the second and third, corresponding with the incidence of acute and subacute rheumatism. Dr. Cheadle, also, has argued that before puberty, when the arthritis is a less prominent feature of rheumatism, the association or sequence of E. multiforme and various rheumatic phenomena, occurring singly or in various combinations, such as chorea, endocarditis, subcutaneous nodules, and torticollis, is so well marked as to be highly significant. These authors represent numerous observers who go so far as to say that we are justified in regarding the majority of cases of E. multiforme as an expression of rheumatism, even in the absence of other definite symptoms of the latter affection. E. multiforme is said, like rheumatism, to occur most frequently in the spring and autumn, and to be prevalent at certain seasons; but this argument has not yet been placed on a secure basis. Likewise with regard to sex and age there is still something to be learned before a proper comparison can be carried out. E. nodosum is certainly most frequent in young women; but the other phases seem to occur pretty equally in the two sexes and mostly in young adults, though any phase may be met with at any age.

On the other hand these various arguments are contested. The rheumatic character of the joint affection, for instance, has been disputed by many distinguished observers; and it is pointed out that the symptom-complex relied upon in the diagnosis of rheumatism is common to many infective states. Besnier says only very exceptionally has he seen a true

acute articular rheumatism as part of the E. multiforme process, and his study of rheumatism confirms this.

The general opinion has long been tending in the direction that rheumatism is a general malady due to an infection of the organism by an agent of microbial nature; but until we possess some definite criterion by which to test this affection, and until its natural history is more perfectly known, the diversity of opinion as to the part played in causing E. multiforme will probably continue. Meanwhile it is significant that the great majority of observers see in E. multiforme the expression of a toxic or infective malady, primary or secondary. Various possible sources of the entry of the poison are pointed out, such as the tonsils, wounds of the mouth or genito-urinary organs, or skin. The modern views concerning "auto-intoxication" also afford a seductive explanation of some cases. The invasion, the mode of reaction of the body, the prodromal period, the eruption and decline, the occurrence and nature of the visceral localisations, and the occasional gravity of the affection are all presumptions in its favour. Lastly, mention should be made of epidemics, such as that observed by Gall in Bosnia amongst soldiers; and of the occurrence of several cases in a family, or in a particular house or barrack, where emanations from drains have been discovered, or suspected.

This account of the causes would not be complete without some mention of the *hypothesis of a nervous origin.* Cases have been attributed to mental shock, physical overwork, or such causes as incipient menstruation in neuropathics. Lewin called attention to its association with irritation of the genito-urinary tract, which he suggested brings about the eruption reflexly. This reflex hypothesis has been stretched to explain cases following tonsillitis or disturbances of other organs, including local irritation of the skin. Such agencies as exposure to cold, heat, or sudden alternations of temperature or exposure have also been evoked.

Many remote causes have been pointed out, such as anæmia, chlorosis, disordered menstruation, debility from some infective disease, as measles, diphtheria; and so forth. Idiosyncrasy, as in drug eruptions, is probably a strong element in determining the occurrence of the eruption. Whatever the cause may be, certainly in many cases, if not in the majority, it is not apparent.

Pathology.—E. multiforme forms a well-defined group, histologically as well as clinically. To the simple appearances of inflammation, according to Unna, is added an angio-neurotic spastic œdema; he therefore separates the group, on the one hand, from the pure angio-neuroses—such as urticaria—on account of the textural changes; and on the other hand it is distinguished from other inflammations both on account of the presence of the special spastic œdema, and of the limitation of the inflammation to the vessels and their immediate surroundings. The angio-neurotic view of its pathogeny is widely held, and it is suggested by one and another that influences may issue directly from the cortex

(emotional), or arise in the peripheral terminations of the sensory nerves and act reflexly, or be due to the circulation of substances in the blood. The histological appearances consist in a dilatation of the vessels, cell proliferation around the vessel walls, some emigration and œdema of the lymph spaces round the vessels and in the cutis, in different distribution. In E. nodosum, Unna says, "the whole vascular net of the cutis and papillary body is dilated and closely surrounded by densely packed cells," consisting of a slight emigration of leucocytes and distinct spindle-cell proliferations, contrasting with the paucity of cells in the cutis, which also arise from the spindle-cells. These perivascular cells consist partly of leucocytes and partly of swollen spindle cells in a state of mitotic division. There are no true plasma cells. Leucocytes are often massed in the vessels. The elastic fibres of the cutis are well preserved, but in the perivascular sheath they disappear. Mast-cells are in no great abundance. The coloration Unna attributes to the breaking up of hæmoglobin within the vessels. In the papular forms and its developments the papillary body is mainly involved. The tissues here are much swollen, the elastic substance almost unrecognisable. Emigration of leucocytes is more marked than in E. nodosum, and with the œdema implicates the epidermis, which proliferates (acanthosis) in places where the leucocytes congregate. Vesicles form under the horny layer by displacement of cells. The fluid exudation is purely serous.

The presence of various kinds of cocci has been detected by various observers in the blood or affected tissues, but their significance is undetermined. Finger and others have found the capillaries plugged with an organism.

Prognosis.—From what has been said it will appear that in the so-called secondary cases the prognosis has to do rather with the primary malady, such as cholera, typhoid fever, rheumatism, septicæmia, and so on. The problem really is to find out whether there be any grave malady underlying the eruption; for otherwise the affection runs a definite course, and usually ends favourably in from two to six weeks. Nevertheless patients are sometimes very ill, and in rare cases succumb. Recurrences may occur, though in E. nodosum they are rare. They are seen especially in "Herpes iris," which relapses again and again for years.

Diagnosis.—From what has been said of the protean aspects assumed by this eruption, it is evident that much space might be occupied by the consideration of many conditions requiring careful discrimination. E. multiforme, however, conforms, in the majority of cases, to a perfectly characteristic clinical type. The features of the eruption, whether monomorphous or polymorphous, its essentially "erythematous" character, its sudden onset and definite course, and its localisation are, as a rule, all characteristic. The features of E. multiforme once mastered, difficulty will only be experienced in aberrant cases, and chiefly in respect to morphology and locality. Certain rare exanthematic febrile outbursts of lupus erythematosus may occasion considerable difficulty for a time, especially when such an eruption invades the upper extremities as well

as the face; or in more generalised outbursts, or when fleeting and so leaving no scars. Urtication sometimes renders the distinction from urticaria a delicate matter. Circination of macules, or papules, or more rarely of nodules, brings the eruption, in its aspect, though not in its course, near to ringworms of glabrous parts (sometimes generalised), to some phases of pityriasis rosea, or to the more indolent or chronic eczema seborrhœicum, macular leprosy, or macular and papular syphilides. Vesication of the macular or papular forms, or the circinate iris forms, may cause the eruption to simulate closely an acute outburst of pemphigus, or dermatitis herpetiformis, or impetigo contagiosa (sometimes ringed).

The central umbilical crust is important for the diagnosis of E. hydroa in confluent and other conditions where the form of the eruption is effaced or obscured (Besnier).

Nodular forms are closely mimicked by the generalised febrile outbursts of nodular leprosy, by multiple precocious syphilitic gummata, by the early stages of some bromide and iodide eruptions, and by some rare forms of nodose urticaria or angio-neurotic œdema. The chronic scrofulo-tuberculous gummata, whether disseminated or occurring in a chain up the lymphatics, or the phlegmons of glanders, septicæmia, and phlebitis, can hardly be mistaken. Moreover the nodules of Bazin's erythema induratum, which are apt to occur on the legs of young women, are chronic and particularly affect the legs below the belly of the gastrocnemius, have a certain tendency to suppuration, and are not very tender. Intensely hæmorrhagic forms are distinguished with great difficulty from some other hæmorrhagic eruptions and purpura, and there is a closely allied phase of disease known as peliosis or purpura rheumatica (*vide* vol. v. p. 577). Occasionally the eruption of E. multiforme is very restricted to the forehead or infraclavicular regions, or hands, for example, and then ringworm, syphilides, dysidrosis, herpes, mosquito bites, chilblains, etc., may be simulated. In rare cases the mouth may be attacked alone, as in pemphigus, and diphtheroid lesions form; or lesions elsewhere may be very few, and the unwary are thus entrapped. Outbursts, renewed repeatedly before a prior attack has cleared away, or at short intervals, may simulate a more chronic process, such as pemphigus or dermatitis herpetiformis.

Treatment.—The rational treatment of E. multiforme depends on the discovery of the causes of each case, when we may deal wisely with the particular attack, and ward off a recurrence. The attempt must be made to determine whether the eruption in any given case is an expression of poisoning by a drug, or a food; or is an "auto-intoxication," especially from the gastro-intestinal tract; or a septic or other infective process, especially rheumatism; or whether it be due to external seasonal influences; or to any impression on the nervous system by way of direct shock, or reflexly from some genito-urinary or other such trouble. The appropriate methods must then be adopted to hasten the elimination of the poison by way of the bowels or kidneys; or to counteract it by the suitable antidote, and to prevent visceral complications; or

to guard against renewed action of the cause. Rest in bed is nearly always desirable, and the possibilities of visceral complications must be kept in mind. Those who believe that rheumatism is the most frequent cause rely for the most part on such drugs as salicylate of sodium, salicin, salol, salophen, and salipyrin during the actual attack; and will seek to build up the general health, and take measures likely to ward off future attacks. As the eruption pursues a definite short course without urgent or grave symptoms, and as the cause is frequently obscure, many practitioners content themselves by adopting a purely expectant treatment, or by promoting purgation and diuresis; for instance, by sulphate of magnesia and acetate of potash, followed or accompanied by the administration of quinine. Certainly it is wise to ascertain and correct any such states as physical exhaustion, anæmia, or disordered menstruation. Secondary anæmia or debility must be removed by tonics, such as the iodide of iron, recommended by Wade. Boeck in very acute cases strongly recommends antifebrin. Villemin, and others since, have recorded excellent results from iodide of potassium in E. nodosum (30 grains in the twenty-four hours), but its efficacy is very doubtful. Locally the indications are to soothe the inflamed skin and to relieve uncomfortable disordered sensations such as itching, or burning, or pain. Generally all that is required is the application of a powder, such as the zinc and starch powder, or the pulv. acidi borici subtilissimus, to which a more active antipruritic, such as camphor, may be added if necessary; or a lotion may be dabbed on frequently, such as lotio zinci oxidi, or the subacetate of lead lotion (5 minims to the ounce), the lotio hamamelidis, or an evaporating lotion. Weak resorcin or ichthyol lotions, or diluted lotio nigra, may also be used. Where much itching occurs, carbolic acid or an alcoholic solution of coal tar may be added. If crusts form they must be gently softened and cleansed away, and a soothing, bland ointment or varnish be applied. In the more painful nodes on the shins characteristic of E. nodosum hot fomentations are sometimes useful, in addition to painting with soothing applications.

T. Colcott Fox.

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Erythema Elevatum Diutinum

In the *Illustrated Medical News*, May 18, 1889, Dr. Judson Bury of Manchester recorded, with a coloured portrait, "A case of Erythema with remarkable nodular thickening and induration of skin, associated with intermittent albuminuria." A girl, in good general health, without personal history of chilblains or family history of gout or rheumatism, had post-scarlatinal "rheumatism" at nine years of age; and at twelve there appeared on the palms, flexor aspects of the wrist, some of the fingers, the backs of the elbows and knees, the toes, and left lumbar region, incompletely symmetrical purplish thickenings (not tender), with well-defined raised edges, which became nodular. The hands were warmer than normal, and the lesions itched and tingled at night. The apparent sequence was the patches of erythema exudativum first, later the nodules. On the elbows bright reddish purple papules appeared in the centre of fading erythematous patches, and enlarged into hard nodules. On the anterior aspect of the phalanges the induration was more diffuse, and more deeply seated. Small doses of arsenic did not appear to influence the condition. Mr. Hutchinson recapitulated this case, with additions, at p. 300, vol. ii. *Archives of Surgery;* and reproduced the portrait. In his *Archives* for January 1894 he states that the case continued to be slowly aggressive, some patches increasing, others disappearing.

Under the title "Erythema elevatum diutinum" Dr. Radcliffe Crocker and Mr. Campbell Williams recorded, with a coloured portrait, a somewhat analogous case of erythematous, raised, persistent nodules in a girl six years old, with a good personal history, but a marked family history of rheumatism and gout. The eruption began five months previously on both knees,

and subsequently extended to the buttocks and elbows, and finally to the hands, on the thumbs and some of the fingers, with incomplete symmetry. The lesions were raised, convex, sharply defined, pale purplish red with a few dilated vessels, mostly quite smooth, somewhat warm and very tender on pressure, firm to the touch, without itching or burning, and leaving on retrocession a temporary stain. Histologically the process was shown to be a chronic inflammation lying between the epidermis and the deep portion of the corium adjacent to the coil glands. The normal fibres of the corium were to a great extent replaced by a fibro-cellular structure—in some places cells predominating, in others fibres. There was no thickening of the vessel walls. The eruption disappeared in a year (whilst under treatment by arsenic) except for some thickening of the palmar fascia. Dr. Crocker called attention to the similarity of model 1599 of the hand of a child in the Museum of the Hôpital St. Louis, deposited by Quinquaud, and entitled "*Fibrômes multiples nodulaires des extrémités, histologiquement fibrômes fasciculés.*"

In the *British Journal of Dermatology*, vol. vi. 1894, p. 144, Dr. Frederick J. Smith published a case remarkable, amongst other things, for the size of the lesions, and their persistence. Miss U., a well-grown and fully developed but rather anæmic girl of eighteen or nineteen years, began to be troubled by rheumatic pains in the arms for a year before she was seen in November 1890, and coincidently, according to the patient's statement, pale spots appeared, which gradually thickened and enlarged. All the lumps were more or less circular or oval, firm, blue and congested in colour and appearance, raised one-twelfth of an inch above the level of the surrounding skin, apparently situated in or just below the epidermis, and freely movable over tendons and fascia. In some places the thickening was diffused with specialised lumps. They were situated with imperfect symmetry on the olecranon on each side, thumb, several fingers of each hand, and left wrist. Two years later there was no change. Histologically the growths were pure fibroma with hardly any cells or nuclei. This case also has been recorded by Mr. Hutchinson, who adds that the girl had suffered from quinsy, and that there was a strong family history of gout and tendency to torpid liver. The eruption began on the elbow, and attacked the knees and one heel. Still another case, which probably belongs to the same category, was published in the *Clin. Soc. Trans.* vol. xxvii. p. 272, 1894, by Dr. Cayley.

I simply refer without comment to this interesting group of cases.

In considering the diagnosis from other growths of these localised inflammations with a tendency to fibroid overgrowths, the reader will bear in mind the occurrence of lipoma and pure fibroma confined to the hands. The following references may prove useful :—

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T. Colcott Fox.

LICHEN URTICATUS (BATEMAN)

Syn.—*Lichen pruriginosus*, *L. strophulosus* (Rayer, Biett); *Strophulus pruriginosus* (Hardy); *Urticaria papulosa* (Kaposi, Duhring, Crocker); *Prurigo infantilis* (J. Hutchinson, Pye-Smith, Payne); *Prurigo temporanea autotoxica* (Tommasoli); *Prurigo simplex* (Brocq).

Definition.—An exceedingly common, non-contagious eruption; chiefly of infancy and of the summer months; characterised by the successive evolution of transient, rounded, erythematous macules or urticarial wheals about the size of a split pea or the little finger-nail, centred by a more lasting inflammatory infiltration, which can be seen as a darker, or felt as a firm, miliary or prurigo-like papular projection, or more rarely as a vesicle or pustule; accompanied by great irritation.

Description.—It is customary to include a few lines descriptive of this very frequent infantile eruption under urticaria; but its peculiar characters, connecting urticaria and prurigo, appear to warrant a separate description. Although it is evident that some of its phases were included by Willan and others under the name Strophulus, it is to Thomas Bateman that we owe its discrimination. As commonly met with, the eruption consists of circumscribed papules, disseminated scantily or copiously over the skin without apparent order, but sometimes clustered here and there, of a pale rosy hue, varying in size from a millet to a hemp-seed, firm to the touch, and tending after some days to disappear spontaneously (Lichen prurigo of Hutchinson). These papules are inclined to be obtusely conical at first, but flatten down; in the course of retrogression they become pale, polished, angular in outline, often disclose a central punctum, and then indeed simulate very closely the papules of lichen planus. It is very unusual not to find a certain number of quite recent lesions, and these will be seen to consist of erythematous macules

centred by the papules, or of true white wheals leaving papules. The remains of these evanescent macules will also be detected around older papules. The mother will usually state that the child is covered at night with congestive or urticarial blotches, or, as she expresses it, "smothered with blisters." It is obviously impossible, however, to prove that every papule is thus evolved. Some authors describe the pruritus as the essential underlying state and the eruptions as secondary; and most hold the papule to be the primary lesion, and state that erythema and wheals may be consecutive. Others speak of "wheals" on which papules or vesicles arise secondarily. There is thus much diversity of opinion and confusion in this matter. The irritation is excessive, and the child is constantly rubbing and scratching, and excoriating the papules. The restless and often sleepless nights gradually cause a marked deterioration in the child's health, and make a serious demand on the patience and health of those sleeping with the patient. A certain degree of vaso-motor excitability and response to mechanical irritation often exists (factitious urticaria); indeed Barthélemy says the "petit état dermographique" is extremely frequent in infants, even in very young ones. I have not, as a rule, found this very well marked. It is notable, however, that the freshly evolved papule is often œdematous, and an urticarial response certainly may be excited by rubbing and scratching, as in the true prurigo papule. The heat of the fire, of bed, or of a warm bath, or an access of passion, will make the lesions red and tumescent. The hands and feet on every aspect may be invaded, as well as the face and scalp; but not the mucous membranes, so far as I have seen. The incidence is, however, chiefly on the trunk and limbs, but the larger flexures are apt to escape as in ichthyosis and prurigo Hebræ. The legs are specially affected.

In a minority of cases the process is so intense that the papule is capped or replaced by a vesicle. All degrees of this are seen. Sometimes it is partial, and a varioloid lesion results. Sometimes it is perfect, and the eruption may exactly resemble varicella. This is Hutchinson's varicella prurigo. It is also not uncommon to see perfect small bullæ or large vesicles on the hands and feet, as in scabies. Such a vesicular eruption can be seen preceding or following the usual papular phase, or mixed with it.

In rare cases the contents of the vesicles rapidly become puriform, and a pustular eruption results, which I have seen mistaken for variola (see Sydenham Soc. *Atlas*, pl. xxxii., entitled "Pruriginous impetigo following varicella").

To this picture must be added the secondary results of scratching; namely, the excoriation and crusting of the lesions, and the occasional auto-inoculation of pus setting up impetigo and ecthyma. Brocq points out that the "lichenification" and "eczematisation" so rapidly produced in Hebra's prurigo are here absent, as a rule. Nor are the glandular enlargements conspicuous.

An infant may have a few lesions from time to time, or only a

passing outbreak; but too frequently the affection is chronic and refractory. Thus it may die down in a cold season, be active again in warm weather, and so continue from earliest infancy to five, six, seven, eight, nine years of age, and perhaps later. In the cases I have watched it has always kept to the same type. It is frequently seen soon after birth, and generally begins in infancy; but Dubreuilh has seen it in a boy of fifteen years, and in a woman over thirty in whom rubbing excited a lenticular elevation centred by a firmer point.

Etiology.—As with the prurigo of Hebra, there is a difference of opinion whether the irritable eruption be primary, or whether a pruritus and tendency to certain nutritive disturbances be the essential features on which the eruption is engrafted by various external irritants. Mr. Hutchinson for many years has strenuously advocated the latter opinion in this country, as have Vidal and others in France. Hutchinson thinks varicella, varioloid, vaccinia, and other exanthems possess the power in exceptional cases of making the skin "irritable," and leave behind them a special pruriginous tendency; but, he adds, whatever the initial cause, prurigo causes itching, and the latter scratching, and this again extends the prurigo. "If we could entirely prevent scratching very few prurigos would assume a severe type." It is certain that the eruption often follows closely on the acute specific fevers and vaccinia, and occurs also frequently in the subjects of hereditary syphilis and rickets, and possibly these affections simply dispose to the ensuing debility, acting perhaps specially on the nervous system, or disordering the digestive functions. Hutchinson believes the papular form to be mainly excited by the bites of insect pests, more especially bugs and fleas (see etiology of Urticaria, p. 489); but against this view may be instanced the occurrence of the affection under circumstances where the presence of these insects can be confidently excluded, the experience of mothers to the contrary, and occasionally the presence of definite flea-bites side by side with the eruption. That scratching urticates the lesions is undoubted, but they arise also in regions inaccessible to the infant. Dr. Pye-Smith, who also regards the pruritus as primary, suggests the irritation of sweat, and the incidence of the eruption and its increased severity in the hot months is very striking.

It has been said that because reflex action is the chief feature of the nervous system of the new-born infant, therefore its manifestations are the more pronounced as the highest restraining centres are as yet undeveloped. "The reflex sensory area is more extensive in the child, and the discharge of the centre upon excitation is at once more decided and widespread." Thus dentition troubles have always been held to be an important exciting agent. All authors agree that dyspepsia from improper feeding or feeble digestion, and chronic intestinal catarrh, are leading factors in the etiology. Funk and Grundrach support Comby's conclusion that dilatation of the stomach is frequently present. The mechanism by which the eruption follows from the gastro-intestinal disturbance is also debatable, whether by reflex action or by intoxication.

Pathology.—Kaposi says the eruption consists of papules infiltrated with serosity. For the rest, some authors describe the papules as a peculiar form of small wheal (U. papulosa) for the most part peculiar to infancy; others, on clinical grounds or histological (Tommasoli), as essentially prurigo papules. Genuine urticaria, as seen in the adult, may occur, though rarely, in the infant, and conforms to the type. Hutchinson, Payne, and Brocq differ from M'Call Anderson, thinking it impossible to range "L. urticatus" in the same group with true urticaria. The question has also been raised whether a minority of these cases take on the form of Hebra's prurigo, which is said to begin as an urticaria, and with which it has many affinities. Hebra's prurigo is uncommon in this country, and the subject is a difficult one to dogmatise about; so far as my experience goes, I doubt the transformation.

Diagnosis. — *Hebra's prurigo* is distinguished by its site; it remarkably avoids the great flexures, palms, and soles, and, to a less extent, the face; and is most pronounced on the lower extremities. The hemp-seed sized papules, in my judgment, though analogous, are for the most part distinguishable in aspect and size; but they can urticate and be mixed with some wheals. There are no erythematous macules centred by a papule. Brocq insists on the tendency to "eczematisation" and "lichenisation" which is absent in L. urticatus. Nor are enlarged glands common in lichen urticatus. Hutchinson says we have no reason to believe that any considerable proportion of lichen urticatus cases are prolonged into adult life.

Scabies is often most closely simulated in all its phases, even to the vesicles on the fingers and toes, and the nocturnal irritation; but cuniculi are absent from the sides of the feet and hands, and, though the case may be chronic, no one else in the family, as a rule, will be affected. Frequently also the characteristic macules will at once suggest lichen urticatus.

Reference has already been made to the close simulation of *L. planus* by retrograde papules. Several cases of extraordinarily copious "L. planus infantum" have been shown at the Dermatological Society of London, where not a wheal or erythematous macule was visible, but which subsequently proved to be "L. urticatus."

Lastly, let the reader remember the simulation of *varicella*, which may momentarily deceive him.

Treatment.—It will almost suffice to refer to the etiology discussed, and then to the treatment laid down for urticaria, allowing for the affection being infantile.

It is advisable to regulate the hygiene of the child with respect to the clothing, the heating and ventilation of rooms, and over-heating in bed. The possibility of insect attacks should be inquired into, and their ravages prevented by the use of insecticide powders, or other means. Easy dentition must be favoured, and scratching prevented as much as possible. All debilitating influences, such as hereditary syphilis, rickets, and the effects of the acute specific fevers, must be met by

appropriate treatment. Lastly, attention must be concentrated on the strict regulation of the diet as to quantity and quality, and on the endeavour to promote perfect digestion of food and proper evacuation of the bowels. The most careful investigation must be made for any clue to fermentation and decomposition of food in the gastro-intestinal tract, and to catarrh or dilatation of the stomach. Yet when all this is done, or little is found wrong, our efforts to control the eruption may be unavailing. The intractability of many cases is evidenced by the fact that almost every drug in the Pharmacopœia has been recommended by one physician or another. Belladonna I have not found of very great service. It is absolutely essential in some cases to administer a hypnotic at night, both for the sake of the child and others; and I have found opium carefully administered of service. Antipyrin is highly recommended also.

Locally, the lotions recommended for urticaria, such as vinegar lotions or camphorated aromatic vinegar, or carbolic or ichthyol (10 per cent) lotion, or Hutchinson's lotion (℞ Liq. plumbi diacetatis ♏ v., liq. carbonis detergentis ♏ x., to the ounce of water), are useful; followed by powdering. I also use ℞ Hydrarg. perchlor. gr. iss., chloroform ♏ xx., glycerine ℥ij., rose water ℥viij. Barendt recommends an ointment of 1 per cent carbolic acid, or 2 per cent naphthol, in benzoated lard. The recently introduced varnishes, such as gelanthum and casein, promise to be very useful. Pustulation calls for dilute ammoniated mercury ointment.

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Urticaria (perstans) pigmentosa

Definition.—U. pigmentosa is an uncommon affection, beginning almost invariably in the first days or months of life,—rarely in the adult, and tending even in the most severe cases gradually to die out in the course of years; characterised by the successive evolution or by outbursts of persistent wheal-like formations, sometimes vesicated, which quickly acquire a peculiar brownish red, and eventually a tawny, buff, or darker colour, which, when in time they flatten down, possess for a long period the quality of reassuming turgescence on excitement; associated with the phenomena of factitious urticaria; and histologically known by the presence of mast-cells closely packed in columns in a rarefied tissue.

Description.—Morrant Baker and Tilbury Fox first attracted attention to this eruption in 1875; but Nettleship had briefly mentioned a case in 1869. There does not appear to be anything to remark in the family antecedents, and it is not a family disease. The infants attacked present

no particular departure from health, and are generally well grown and otherwise healthy. The eruption appears suddenly and without warning, as itching typical urticarial wheals; or as red projecting blotches from a split pea to a finger-nail in size; or again, it is said, directly as pigmented macules. Morrow has seen pigmented macules left by very ephemeral spontaneous lesions.

The fundamental red colour of various shades of the freshly evolved lesions gives place, as the congestion disappears and the nodule flattens down, to the yellowish or brownish tints. The colour, however, which makes the eruption so characteristic varies somewhat with the region invaded. In dependent parts, or those farthest away from the heart, an element of lividity is often seen in the lesions, and this is intensified by exposure to cold. On the trunk they assume a yellow or buff chamois-leather colour, mixed with other shades, such as café-au-lait, pale yellow, or olive. Sooner or later complete subsidence into pigment macules takes place.

It is one of the characteristics of this eruption that the elements long retain the power of renewed turgescence, so that congestion, urtication, or even vesication, may be excited in them by mechanical irritation or heat, or by febrile or emotional excitement. In this way eruptions are repeatedly re-excited or kept constantly in a state of more or less turgescence. Factitious urticaria can also be excited in nearly all cases on the apparently normal skin; and it is very curious that such urticaria completely disappears without leaving pigmentation; at any rate as a rule. The consistence of the raised patches is sometimes velvety and soft, sometimes thickened. They may be raised 1-6 millimetres or more (see Tilbury Fox's remarkable nodular case portrayed in his *Atlas*), and have a granular or corrugated surface from stretching and subsequent subsidence. The macules, on the contrary, are smooth and polished.

As with the colour and dimensions of the lesions, so the number and configuration vary. I have seen a case with under a dozen macules. On the other hand, the eruption may be copious and confluent, so that the greater part of the surface is covered. The configuration is rounded or ovoid, but may be elongated in conformity with the tension of the skin in various regions. So also, though distributed without apparent law, they tend to follow certain lines, as do other generalised eruptions; for example, along the transverse folds of the neck, parallel with the ribs, and down the arms. The rubbing of clothes also appears to have some influence in determining their site and number. Their first evolution may occur anywhere, but generally on the trunk; and the eruption may be confined to that part, or extend to the neck, extremities, scalp, genitals, and even to the face, and palms and soles, and the buccal mucous membrane and palate. Itching is variable in intensity and far from constant. Turgescence of the eruption, from any cause, increases the pruritus. Some degree of adenopathy has been noted.

According to Paul Raymond the eruption is continuous, but not progressive; for it constitutes itself in one or two outbursts, or most

often after several spread over some weeks, or occurring in the course of 6-8-12 months. After its constitution the formed lesions persist, and peculiar febrile explosions, with excitement of the existing skin trouble, may occur with diminishing intensity. We do not observe the incessant change of site so characteristic of ordinary urticaria. Gradually the affection dies out, but several cases have been traced into adult life.

Raymond judiciously classifies the phases met with as the *nodular* (type, Xanthelasmoidea of Tilbury Fox), the *macular* (type, Cavafy), and the *mixed* form.

Pathology.—The name urticaria was applied to this affection because a process of wheal-formation, excited by various external and internal irritants, is often a conspicuous clinical feature. Unna, however, contends that the urticarial features are not essential and primary, but complicate a primary persistent trophic disturbance of the skin. They consist of "an almost purely cellular accumulation in a very fine, rarefied connective tissue framework." Unna showed that these cells are very large *mast-cells*, cuboidal from mutual pressure. "They lie closely packed and arranged into columns separated by the persisting collagenous tissue, between which, when spastic œdema is added, wide lymph spaces open." Unna says the œdema contrasts with that of urticaria proper in being limited to the papillary body. Wandering cells are absent. The peculiar brown colour is ascribed to the pigment present in the basal prickle layer. In old patches the mast-cells disintegrate, and hæmatin collects. Hallopeau lays special stress on the curious distribution of the eruption round the trunk, and on the formation of atrophic patches (see his plate, St. Louis Museum *Atlas*).

Prognosis.—The eruption is a chronic one and may last some years (six or ten), and has been observed to persist into adult life; then, if not before, it finally dies out. The affection does not seem materially to interfere with the growth and nutrition.

Diagnosis.—The eruption is so characteristic that there is no serious difficulty in making a correct diagnosis. In the turgescent state E. multiforme may be suggested. The chamois-leather-like patches may simulate xanthoma, especially when the eyelids are affected, and in the rare giant forms. The only other error to be guarded against is confusion with pigment macules left by other eruptions, as by syphilides, or, rarely, by a true urticaria. This danger is, of course, most likely to arise in the adult. None of these states, however, possesses the property of turgescence under excitement.

Treatment.—It seems impossible to remove existing eruptions, but, as with L. urticatus, all excitements arising internally or externally should be guarded against as far as possible, especially in the period when the febrile outbursts threaten. Itching should be controlled by the remedies mentioned under urticaria (p. 494) and L. urticatus (p. 481). A word of warning may be given as regards stimulating baths, which in some cases have appeared to excite an outburst.

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T. C. F.

URTICARIA

(*Urtica*, *urere*)

Syn.—*Cnidosis* (κνίδη, a nettle; κναίειν, to scratch), *Nettlerash.*

Definition.—An eruption characterised by wheal-formation. Wheals, as exemplified by the local result of a nettle-sting (*nettlerash*), are circumscribed, firm and elastic, non-inflammatory elevations or infiltrations of the skin, rapidly formed and more or less transient; due to the sudden active congestion and collection of serous fluid in the dermis, brought about by a peculiar spastic angio-neuritic process; and usually attended by remarkable itching, burning, tingling, or stinging sensations.

Description.—Wheals differ in area, bulk, colour, and shape; hence, within certain limits, there is considerable variation in the objective features of the eruption in different cases. Usually they are about the area of a split pea or finger-nail, but authors describe them as being sometimes much smaller (see U. papulosa); or on the other hand they may cover an area equal to any of our coins, or, in rarer cases, form large welts as big as the palm of the hand. So also the bulk varies, for, though as a rule superficial, they may form deep-seated, brawny, extensive infiltrations, or more circumscribed nodes (*U. nodosa*, *U. tuberosa*, *U. gigas*, *U. œdematosa*), all included under the name *tumescent urticaria* by E. Wilson. Besnier says that, besides urticaria strictly so-called, the term includes U. papulosa, a false acute lichen of many authors, nodes simulating E. nodosum, erythematous urticaria in sheets (roseoliform, rubeoliform, scarlatiniform), urticaria in discs, rings, and festoons, U. œdematosa, etc. The old name, U. subcutanea, has been applied both to the deep-seated massive lesions and to pruritus without wheal-formation. The typical smaller wheals are distinctly circumscribed, project a millimetre or more, and are flatly convex, firm, tense, and elastic to the touch. The colour is notable, and has an intimate bearing on the pathogenesis: thus, when typical, they are of a white hue, often comparable to porcelain, wax, or ivory, generally set in an erythematous aureole; but they may be red. The explanation given is that the wheal

at first is red from active congestion, later more or less white; whilst during retrogression the reverse obtains. Usually, however, the evolution is so characteristically sudden that these stages of formation are not observable. In the more massive, deeper-seated eruptions this peculiar colouring is not so evident. Hirtz has observed the phenomenon of capillary pulsation several times upon the erythematous aureole, and Wilson noted slow periodic variations of colour not synchronous with the pulse. The configuration of the wheal tends to be round, with the usual variations due to the different directions of tension in various regions of the body. Where, however, wheals arise in response to a mechanical irritation, such as scratching, a linear or other arrangement corresponding to the excitement is often seen. A wheal may arise singly, or the eruption may be scanty or copious, and then often confluent into large patches or sheets, covering the greater part of the surface. They are disseminated and not grouped in any special manner. In the cases arising from internal excitements the wheal may be confined to one locality, or be generalised; or may characteristically attack different parts of the body without regular order or succession, and without special predilection for certain sites. The mucous membranes are liable to attack—certainly the nose, mouth, tongue, pharynx, glottis, and vulva; in these situations, as on the lips, eyelids, and foreskin, considerable œdematous swelling is apt to occur, and alarming suffocative symptoms may result, and even end fatally. It is generally conceded that the bronchial mucous membrane may be involved and a true asthma result, coinciding or alternating with outbursts of cutaneous urticaria. The implication of the digestive tube is less certain; but many authors, such as Guéneau de Mussy, accept the doctrine and thus explain certain intestinal attacks characterised by pains, diarrhœa (sanguinolent or not), melæna, or tympanites. Drs. J. J. Pringle and Hillier Chittenden have recorded cases of hæmatemesis suspected to own a similar cause, and Dr. Galloway has observed a wheal in a rabbit's stomach (7, 6, 4). Gull in 1859 said wheals could be formed on the stomach and intestines of a cat or dog, immediately after death, by passing a point strongly over the surface. Wheals have also been supposed to arise in the Eustachian tube and middle ear, and even in certain solid viscera, as the liver, or on serous membranes.

The history of the wheal is characteristic. It is sudden in appearance, fleeting and fugitive; comparatively so even in the more massive lesions. The only exception is in rare cases where the individual wheals are persistent (*U. perstans*, p. 482), a name not to be confounded with *U. chronica*. It has long been noted that certain wheals may persist an unusually long time, and that in rare cases the majority of the wheals may do so. Boeck relates a case in which they persisted for three months, and disappeared under the administration of sodium salicylate, without leaving pigmentation. Mr. Morrant Baker exhibited a remarkable case at the Dermatological Society of London, in which persistent wheals appeared to undergo a fibromatous change.

Only exceptionally does any desquamation or pigmentation follow, but examples are recorded in which pigmentation had resulted apart from the results of scratching. Such cases must be carefully distinguished from true *U. pigmentosa* (Sangster) (p. 482).

Hæmorrhage may take place into wheals (*U. hæmorrhagica*) as into other eruptions; and its occurrence often indicates renal disease, alcoholism, or some condition of like gravity. This subject is a very complicated one, as cutaneous hæmorrhages may occasion some urtication *in loco*, and may not only infiltrate a wheal, but also form side by side with wheals. The distinctions between these conditions are sometimes very delicate and difficult; and the different phases have given rise to many descriptive terms, and to as much confusion.

A rare phenomenon is the vesication of the wheal and the formation of bullæ (*U. bullosa*). S. Mackenzie, P. A. Morrow, and Kaposi have seen bullæ produced in factitious urticaria.

Some authors (Kaposi, Duhring) hold that the wheal is capable of excentric expansion, like a ringworm or E. multiforme; and in such cases ringed lesions may be produced (*U. annulata*, *gyrata*), the usual figured patterns being formed by intersection of the curves. Such cases are generally caused by blood-poisonings, but some authors refer such eruptions to E. urticatum [see also next paragraph, "Wandering Œdema"].

Besnier says that a variety of urticaria merits the qualification *U. œdematosa* (Hardy). The localised swelling, in situations where the connective tissue is lax, is sometimes very marked; and, further, a notable œdema of extensive regions, especially of the face, even simulating renal disease, accompanies the urticarial eruption, which may be slight; but the name may be understood to apply to the occurrence of large, deep-seated nodosities and nodes, and extensive brawny infiltrations (urticaria with excessive volume). The overlying surface may be unaltered or reddened, and the characteristic disordered sensation is often absent. Such cases, which are seen in either sex and at all ages, have been considered distinct from urticaria; but ordinary wheals may be present also, and there are many intermediate forms. Certain regions, such as the face, limbs, or genitals, may be attacked, or any part of the surface, and the mucous membranes. Lesions arise like wheals brusquely, with or without prodroma, and attain their maximum in two or three hours without inflammatory phenomena. They last on an average twenty-four hours, and cause uncomfortable tension; or there may be antecedent pain. W. C. Brown of Penang has described (with others) a very peculiar phase, in which the œdema beginning in the feet or hands "wandered" up the limb. There is no fever, but often intestinal colic, malaise, backache, somnolence, palpitation, constipation, vomiting, oliguria, and even albuminuria. Milton, in 1876, described and figured an eruption as "giant urticaria," Quincke as "acute circumscribed œdema of the skin," Strübing as "angio-neurotic œdema," Rapin as "massive urticaria," and others as "ephemeral congestive tumours of the skin," or "ephemeral cutaneous nodosities in arthritics." Such cases may show a remarkable hereditary

or family tendency. Prof. Osler has described an example of its running through five generations. Mr. Morrant Baker noted a persistent ulcerating U. tuberosa.

In the cases just mentioned, and in many other phases of chronic urticaria, a striking periodicity is observable, apart from malarial origin. The recurrence at stated times, as after a meal, or when heated in bed, or when undressing, or leaving the warm bed, or at the menstrual epochs, may be easily explained; but the periodicity in other cases is more difficult to account for.

Urticaria may be momentary, repeated, periodic, or persistent; and the widely varying constitutional symptoms which may be present in different cases will be more fully appreciated when we discuss its causes. In the simplest examples, as from a bite or nettle-sting in a healthy person, a wheal arises at the irritated spot, and, after lasting a few minutes or hours, disappears without, as a rule, any multiplication of lesions by scratching. The ingestion of certain aliments or drugs, or the circulation of certain morbid products and other poisons, or occasionally the stings or punctures of leeches or insects, suffice in certain people, especially if they have a peculiar idiosyncrasy, to determine a more or less generalised outbreak, usually of an acute character and with marked constitutional symptoms. Almost instantaneously, or after some minutes or hours, a widespread eruption of wheals occurs, perhaps in successive crops, with intolerable itching. After its disappearance, in some hours, fresh outbursts may take place for a day or two with diminishing intensity. In such cases there is often present an independent pruritus, and a more or less intense excitability of the vaso-motor system, which favour the turgescence of the wheals and the multiplication of others by the rubbing and scratching induced. The constitutional symptoms in such acute cases may be very pronounced and grave. Preceding or accompanying the eruption there may be high fever, headache, backache, joint injection, coated tongue, loss of appetite, great thirst, nausea, vomitings, smart diarrhœa, and so on. In some blood-poisonings the issue may be fatal. In other circumstances, where the causes leading to the urticaria are of a recurrent or more lasting character,—such as chronic dyspepsia or genital disease in women, or "auto-intoxications,"—the succession of wheals may be prolonged over weeks, months, or years. The individual wheals run their characteristic fugitive course, and come and go without apparent law or order; but the process, as a whole, is recurrent, relapsing, or chronic.

Causes.—Wheals are a symptom, a mode of reaction of the vaso-motor system, due to various causes. There are three factors to be kept constantly in mind: First, a particular immediate cause, such as the sting of a nettle locally, or the circulation of the special poison of diseased mussels, may be potent enough under any circumstances to excite an urticarial response. Secondly, agents ordinarily harmless will prove noxious, or a potent agent will be rendered still more effective, if the person have an idiosyncrasy favourable to the particular reaction. Thus a wasp-sting, a

strawberry, or iodide of potassium have been known to cause a generalised urticaria. Thirdly, in a large number of cases there is a neuropathic susceptibility, which may be hereditary or acquired. It may exist independently of the immediate cause of the urticaria, or it may be induced simultaneously. Such a nervous susceptibility may be part of the natural constitution of the individual, or be disclosed by some passing or continued departure from health, when it takes the form of a weakening of control by the higher centres, or of an exalted excitability of the vaso-motor system. Sometimes the sensory nerves also are notably concerned (pruritus), independently of the eruption. It will, therefore, be readily comprehended that the causes, immediate, remote, and contingent, are often very complex.

The immediate causes comprise certain influences, which may radiate from the higher nervous centres directly or reflexly in response to stimuli arising in the skin, or in some viscus, or circulating in the blood; or possibly the peripheral centres may sometimes be involved alone. Their number is endless, sometimes simple and manifest, sometimes elusive. They may be in action momentarily, repeatedly, periodically, or persistently. They may be conveniently considered as follows:—

A. *External Causes.* (*a*) Vegetable.—The contact of certain species of urtica or nettle (*U. urens* and *dioica*) illustrates the type, and the immediate agent is said to be formic acid. No skin, however healthy, seems to be proof against the nettle. The down which surrounds the pods of cowhage (Heberden), and the squill (Galen), may also be cited as examples. The contact of a quinine lotion (several authors) and of ipecacuanha (Newton Pitt) afford good examples of idiosyncrasy.

(*b*) Animal.—The attacks of gnats, mosquitoes, bed-bugs, lice, and fleas often evoke wheals in the susceptible at the points of contact. The stings of jelly-fish, and of certain hairy caterpillars, such as the woolly bear (*Odonestis potatorum*), and especially of some of the genus *Bombyx*, are familiar examples. Dubreuilh gives three species of *chenilles processionnaires* as producing the so-called *U. endemica* or *epidemica*. They live in communities and form compact nests, which they change at each skin-casting. One species makes a nest in the moss at the foot of the Pinus sylvestris, another at the top of the branches of the Pinus maritimus, a third against the trunk. Certain dried secretions in the form of barbed hairs on the back of the caterpillar determine an urticaria, especially in persons who frequent the woods or disturb the nests; and it is said that animals and birds also suffer. These chenilles are a pest at certain times and in certain places. The bites of leeches applied to the sacrum, and the presence of a guinea-worm, have been known to produce the eruption.

(*c*) Mechanical.—Such a stimulus as a sharp slash with a switch, or whip-lash, may be powerful enough in itself to excite wheal-formation. Indeed Gull wrote that the susceptibility to wheal-production in response to a more or less forcible stroking of the skin with a pointed instrument is common in a greater or less degree to all persons, and

can be called morbid only when extreme. The term "factitious" (U. factitia) is applied "to mark a form of urticaria which shows itself when the skin is rubbed or scratched, as distinguished from ordinary chronic urticaria, with wheals arising spontaneously." Such a factitious urticaria is seen in all acute cases where a high degree of vaso-motor excitability may be reached, and very commonly in chronic cases; it is a frequent complication of many pruritic dermatoses in which rubbing and scratching are induced. The formation of the wheal is usually associated with characteristic intense itching, burning, tingling or stinging; and at the same time the vaso-motor system is rendered unduly susceptible to excitement, or such susceptibility already exists as part of a neuropathic state. The rubbing and scratching, even the contact of clothes, pressure, the change of temperature of the skin, the wanderings of insects, and various excitements at other times, or in other persons, innocuous, tend to stimulate existing wheals, and to excite fresh ones in every direction. Thus in special cases the succession may be kept up although the immediate cause may have been slight or temporary. Some authors attach an excessive importance to this factor, and the principle has undergone great extension and development in recent years in France. Jacquet noted that when, in a case of acute generalised urticaria, a part of the surface is hermetically protected, the itching and wheal-formation cease in the part so long as the covering is applied. This would seem to point to some external stimulus being necessary to the production of the wheal; but it is necessary to be cautious in our conclusions, for factitious wheals cannot be excited in all urticarial states. Some writers draw a distinction between *U. factitia*—which is now described as the wheal effect of an external stimulus acting on an excitable vaso-motor system, which complicates a coexistent urticaria or other pruritic dermatoses—and *dermographism* or *autographism*, in which the vaso-motor excitability, usually strongly marked, is the essential and primary condition. In the latter case wheals do not arise "spontaneously," but only in response to various external stimuli. Gull found that factitious urticaria could no longer be produced on regions where chloroform was dropped; Caspary, on the other hand, found that it could be excited even when the patient was anæsthetised by chloroform. Dermographism may be produced on the skin in cases of hysterical anæsthesia, unilateral or generalised.

(*c*) Mineral substances are not much in evidence, but bathing in salt water is a frequent cause of wheals, and perhaps the influence of the exudation of salt sweat in the Turkish bath and otherwise may also be classed here. In a patient under the care of the editor of this work the use of a little boric acid ointment (gr. 20-℥j.) on the groins, to prevent intertrigo, was followed over and over again by a tendency to severe urticaria all over the trunk and thighs. The attacks were determined by the towel, or other chafing. It was associated with acute erythema around and beyond the wheals, and with large areas of brawny skin. The cause escaped recognition for some time.

(*d*) Meteorological influences and disturbances of the circulation are

frequently alleged as causes; such are exposure to cold or east winds, the change from a hot to a cold atmosphere, or, conversely, bathing of the face or hands in hot water, and changes in the circulation and exposure of the skin on removal of various articles of clothing on retiring for the night, or after getting warm in bed, or again on leaving the bed in the morning. The application of a cold body to the skin may excite a wheal, or the contact of an ice with the œsophagus. Such causes, however, are only effective in the presence of a neuropathic state, or when from the circulation of certain irritating agents the vaso-motor system is unduly excitable.

B. *Internal causes* are often less susceptible of demonstration, and are often complex. They may act directly through the blood-current, or reflexly.

(*a*) Diet.—A very long list of dietetic causes might be compiled, comprising various kinds of tinned foods, fish, shell-fish, pork, eggs, honey, mushrooms, cucumbers, berries and fruits, kernels and skins of nuts, and so forth; some difficult of digestion, some operative only in particular people and on special occasions. The mode of operation is often difficult to determine. Urticaria occasionally ensues so rapidly that a mental effect has been supposed, or a reflex action through the nerves of taste. In the majority of cases the influence is a reflexion from gastro-intestinal disturbance; in others, again, some poison contained in the food, or manufactured in the canal, entering the circulation acts directly on the vaso-motor centres.

(*b*) Disorders of internal organs (functional and organic).—The digestive system stands pre-eminently in the front rank. Quite apart from errors of diet, a weak or disordered digestion may lead to urticaria; and such digestive disturbances may constitute the primary factor, or be secondary to various constitutional states, such as anæmia or gout. Gull long ago discussed the influence of hepatic derangement in this direction. Too free eating and drinking are frequent causes, especially as alcoholism weakens the control of the nerve-centres. Jacquet has observed a case of helminthiasis in the adult causing urticaria. Indicanuria has been reported by Sänger to be a frequent accompaniment of this eruption. Probably in some cases a secondary blood contamination is the immediate agent. So also disturbances connected with the genito-urinary organs by their action on the nervous system are nearer or remoter causes. The passing of a uterine sound (fifteen successive recurrences), or leeches applied to the os uteri (Rosenberg, Schramm, Scanzoni), may be cited as examples of such reflex action. The occurrence of urticaria in pregnancy (Hebra), in successive pregnancies (Saundby), or immediately following parturition apart from sepsis (E. Wilson), or in ovarian and subacute uterine irritation acting with a naturally sensitive nervous system at the menstrual epochs (E. Long Fox), or during the climacteric changes, may also be mentioned. Frank of Prague reports the case of a woman who at each menstrual epoch was attacked by a very severe generalised urticaria. A successful salpingo-

tomy for a hypertrophied left ovary and thickened tube stopped all further outbreaks. Barduzzi and Pick have observed similar cases.

(*c*) Neurotic states.—The prominent part played by the nervous system in more than one direction has already been insisted upon; but occasionally a neurosis, such as hysteria, seems to dominate the scene; or at any rate the neurosis is very prominent, and the more immediate causes obscure. Nervous perturbations from sudden emotion or mental excitement may be noted as a cause. Urticaria has been recorded in exophthalmic goitre, in the area of the lightning pains of tabes dorsalis (Charcot), and in neuralgia.

(*d*) Blood contamination.—Urticaria occurs as a premonitory, prodromic, or concomitant phenomenon in a great number of morbid states, acute and chronic (Besnier). The production of urticaria by the ingestion of various drugs in those persons possessing the requisite idiosyncrasy or nervous susceptibility is well known. I may mention quinine, cinchonidine, sodium salicylate, chloral, santonin, pimpinella, guarana, potassium iodide.

Amongst toxic agencies are included the various serums and antitoxins.

Lichtheim, Joseph, and others have met with urticaria during an attack of periodic hæmoglobinuria, and Lichtheim notes that this eruption is a tolerably common sequence of the transfusion of the blood of one animal into the circulation of another.

It is now well known that the contents of hydatid cysts, from which Brieger has isolated a highly toxic material, passing into the pleura or peritoneum can cause urticaria; or, as it is said, on very rare occasions without rupture or puncture of the cysts (Dieulafoy): Debove produced it in two subjects by hypodermic injection of filtered hydatid fluid. Achard recites an instance of two operators being affected after a prolonged necropsy on a case of hydatid cyst.

There are many infective states of the blood any one of which may be the cause; and Besnier remarks that as with E. multiforme so urticaria can show itself during the prodromal stage, course, decline, or convalescence of diverse maladies, acute and chronic, especially of the infective diseases. Its occurrence in the paroxysms of the intermittent and remittent malarial fevers must be especially mentioned; this was pointed out in the last century by Cleghorn and Lionel Chalmers.

It is seen like the scarlatiniform rash in the different degrees of sepsis after operation; as after paracentesis, the opening of an abscess, an ovariotomy, or other abdominal section (L. Tait).

Gouty and lithæmic conditions must be especially noted, and rheumatism is said to be an occasional cause. Prof. A. E. Wright has suggested that diminished blood coagulability may be a strong proximate cause, and he records the production of urticaria in dogs after the intravascular injection of peptone or leech-extract, or crab or mussel extract. This leads us up to the subject of poisoning by various alkaloids contained in certain shellfish, and in tinned and other foods. The symptoms, both cutaneous and constitutional, are often

severe, and the issue may be a fatal one. A distinction has been drawn between the effects of indigestion and the rarer true poisoning; but the symptoms described are too severe for mere indigestion. All sorts of mussels, and in all countries, and independently of particular seasons of the year, are at fault. Wolf localised the cause in the liver of the mussels. Salkowski and Brieger and others have isolated a poison named *mytilotoxine;* and Lustig detected a pathogenetic organism. "Auto-intoxication," from the intestine and other sources, has been alleged in these later years.

Sex has little influence in the incidence of urticaria, and the latter may occur at any *age;* though typical urticaria, as seen in the adult, is decidedly uncommon in infancy (see *L. urticatus*, p. 481). In childhood I have met with the ordinary true and the massive urticaria, but in my experience it is less common in the child than in the adult.

Histo-pathology.—Wheal-formation is a vaso-motor spastic disturbance, confined to the territory of the vessels concerned (vascular cone of Renaut), and "without any persistent histological substratum" (Unna). The œdema is non-plastic, and there is no trophic disturbance. Auspitz concluded that the wheal is produced by a reflex irritation from sensory to vasal nerves; causing paralysis of the vaso-constrictors, or irritation of the vaso-dilators. Stimulation of sensory nerves was shown by Loven, he says, to be capable of producing dilatation of the neighbouring arteries. This may be possible by means within the skin itself, as well as through the agency of higher centres. The microscope discloses a sudden and forcible œdematous dilatation of the lymph vessels and spaces of the deeper and middle layers of the skin, which, exceptionally, leads to vesication. Its force and sudden onset are seen in the stretching and rupture of elastic fibres. There is much difference of opinion as to the immediate cause of this acute œdema. Judging from the series of appearances observed in factitious wheals, it would appear probable, according to most authors, that a momentary spasmodic contraction of the vessels is followed by a temporary paralytic dilatation with stasis or retardation of the circulation and engorgement of the vessels, causing redness in superficial lesions. The remarkable acute œdema either masks the congestion or causes anæmia by compressing the blood-vessels. Unna believes the œdema to be due to stagnation of blood brought about by a spasm of the larger veins, causing a sudden hindrance to the normal absorption of lymph by the venous capillaries. Gull and others considered that a spasm of the skin muscles is the essential factor. For the rest Unna describes changes in the blood-vessels met with in different degrees in all his eryanthemata; namely, increase of simple spindle connective tissue cells in their walls, with increased volume of their nuclei; a few small mast-cells, and thickening and deeper staining of the collagenous intercellular substance. Symptoms of inflammation are absent, especially leucocytes. Corpuscular diapedesis, however, is described in various degrees by most authors; and also engorgement of the blood-vessels.

Prognosis.—Life is only endangered by the eruption in some rare cases where important portions of respiratory or upper digestive tracts are the seat of wheals; and, alarming as the symptoms may be, recovery usually takes place. It must be borne in mind, however, that urticaria is occasionally symptomatic of grave conditions, such as mussel poisoning, infective fevers, and the chronic mycosis fungoides. I have also learnt to be cautious in the presence of urticaria in elderly persons, as I have seen it prelude degenerative troubles connected with the blood-vessels of the brain and carcinoma of the viscera. Urticaria, as a rule, is amenable to judicious treatment; but some cases are extremely intractable, and cause the patient much misery.

Diagnosis.—Wheals in their typical forms are easily recognised by their appearance and consistence, their sudden evolution and fugitive course, and the accompanying characteristic disordered sensation and distribution. Again, the eruption as a whole is uniform, irregular and apparently capricious in distribution, not selecting any special nerve territories or particular sites. In the presence of wheals we have to determine whether a susceptibility to factitious urticaria exists; whether the wheals are the primary and essential eruption, or whether they are only incident to or part of some other malady such as malaria, or mycosis fungoides, or septicæmia, or dermatitis herpetiformis; or a complication of some pruritic state, such as scabies, pediculosis, or prurigo.

Unusual forms of wheals, such as the giant or massive forms, may for a time occasion more difficulty, and may simulate phlegmons, erythema nodosum, acute leprosy eruptions, gummata, or sclerodermatous patches; but the ephemeral course of the wheals and their irregular occurrence will attract attention. Where diffuse œdema exists, erysipelas or renal disease may be simulated. The cases in which the œdema "wanders" up a limb are very curious. Further, the observer will bear in mind the remarkable amount of œdema which occurs where the connective tissue is lax, as in the eyelid, lip, and prepuce.

Acute cases from blood-poisoning may closely simulate E. multiforme; and some drug eruptions, for example, that of copaiba.

Wheals infecting the tongue, nose, glottis, or other mucous membranes may occasion difficulty; but the usual concurrence of cutaneous wheals will generally afford the clue.

Lastly, it is quite common for patients to present themselves in the daytime without existing wheals, and with the signs of scratching only. The history given of an ephemeral itching eruption will generally give a correct clue. In rarer instances the irritation is so intense that the patient in a frenzy digs out the wheal to the size of the little finger-nail, and comes before the practitioner studded with such excoriations.

The diagnosis of the cause is much more difficult. Periodicity may suggest a malarial origin, even in the absence of typical attacks. Nocturnal outbreaks should always lead to a thorough search for an animal origin.

Treatment.—The rational and often the successful treatment depends

on the correct unravelling of the etiological factors, often in complex combination, including any undue excitability of the vaso-motor system, or any possible idiosyncrasy. This done, our object is first to remove or suppress such factors as far as possible, and, secondly, to carry out a symptomatic treatment with a view to mitigate the effects by soothing the skin and relieving the disordered sensation. The second indication is often urgent.

Internal treatment.—Acute urticaria is ephemeral, and usually demands no more than expectant treatment. When dependent, as is so often the case, on the ingestion of irritating substances, we may administer an emetic of zinc sulphate, mustard, or apomorphine, if the case be seen early enough; at a later stage purgatives and diuretics may be given to eliminate any peccant matter. It must be remembered, however, that acute urticaria may occur in association with grave blood-poisonings. Periodical outbursts should always bring to mind malaria, even though the more characteristic features be ill-marked; when malaria is the cause the preparations of quinine are called for. Talfourd Jones says nothing gives such speedy relief as a hypodermic injection of atropomorphia.

To discuss the treatment of *chronic urticaria* is almost to write an essay on the treatment of disease generally; the key must be found in a careful study of the causes. It will only be necessary here to point out the chief lines on which treatment proceeds, and to indicate some particular remedies of repute. The length of the list of methods and drugs recommended is due not so much to our ignorance as to the multitudinous and complex causes of the disorder.

Although nocturnal outbreaks will always suggest the possibility of an animal origin, such is by no means always the cause.

Derangements of the abdominal viscera, especially of the gastro-intestinal tract, are by far the most frequent causative conditions; and such remedies as aids to digestion, sedatives of the gastric mucous membrane, checkers of fermentation, cholagogues, and evacuants and disinfectants of the intestine, are frequently called for. The diet bespeaks careful investigation and regulation, and sometimes particular kinds of ingested articles, such as butcher's meat and alcohol, have to be wholly interdicted. Idiosyncrasy must be borne in mind. Gouty and lithæmic states are frequently in evidence, and blood contaminations, where they exist, often require elimination by the bowels, kidneys, and sweat. Urticaria may complicate acute rheumatism, and probably arises in other phases of rheumatism. Both in gouty and rheumatic states salicylate of sodium (gr. j.–ij. every hour, or gr. xv. ter die, in Vichy water) has proved useful. When the specific gravity of the urine was found to be low, Dr. T. J. Maclagan successfully administered colchicum. Professor Wright of Netley has suggested the exhibition of chloride of calcium to increase the coagulability of the blood: he advises eighteen grains dissolved in half a glass of water—to which a teaspoonful of tincture of bitter orange peel and two dessert-spoonfuls of chloroform water are added—to be taken after meals; in obstinate cases he increases the dose to twice the quantity.

The nervous system plays such a prominent part that it is not surprising to find various nerve tonics have won a good reputation, such as nitric acid (Willis), strychnine in full doses, quinine in full doses, and sometimes arsenic; quinine given before the time for an attack is useful in other periodic cases than true malarial ones, and it should always be kept in mind that the malaria may be masked. Startin the elder strongly recommended quinine, given with an alkali. As lesseners of nervous excitability may be mentioned tincture of belladonna in full and increasing doses, atropine (gr. $\frac{1}{150}$ subcutaneously at night, or night and morning, and cautiously increased, or in pill form), bromide of potassium, with or without atropine, and the analgesics antipyrin (gr. x.–xv. ter die, or gr. xx.–xxx. at bedtime), phenacetine, acetanilide. The continuous current has also been recommended for ten minutes night and morning, with the positive pole at the top of the spine and the negative at the bottom. Hypnotics are sometimes imperatively demanded, and are most useful in securing for the patient a quiet night, free from irritation and the exhaustion of sleeplessness. Fluid extract of ergot (Heitzmann and Morrow, ℥ss. doses), ergotine, perchloride of iron, and hamamelis have been used to act on the vaso-motor system.

Amongst miscellaneous remedies may be mentioned tincture of strophanthus (Riffat), iodide of potassium (Stern), ichthyol (which Mr. Malcolm Morris highly recommends), fresh tincture of aconite (Duchesne-Duparc), sulphuric ether (Trousseau, gtt. xx.–xl. in water), gelseminum, pilocarpine (Pick), and nettle tea.

Lastly, it may be said that some cases resist all treatment until a thorough change of scene and air is sought, and with this may be combined the active treatment of a suitable spa.

In massive swellings of the tongue and throat relief has been given by scarification; and it may be noted that in France it is a practice in "internal urticaria" to "recall" the eruption to the skin by dry friction or flagellation, artificial urtication, or a hot mustard foot-bath.

External treatment.—The indications are to relieve the erethism and vaso-motor excitability, and by this means, or independently, to allay the pruritus, and thus to remove the incitement to scratching and rubbing. Baths are not always useful. They should be given tepid and generally at night, and the skin should afterwards be dusted with powder. Starch, alkaline, vinegar, or sulphurated potash baths are in most request, but borax, sublimate, and carbolic acid are sometimes used. Lotions, sprays, powderings, and compresses are the usual forms of local applications. Besnier says it is often a mistake to apply cold lotions. Sedative astringent lotions may be most comforting; such as ℞ Subacetate of lead, gr. vijss.; dilute hydrocyanic acid, ℥ij.; alcohol, ℥iij$\frac{1}{4}$; water to ℥j., or the well-known calamine lotion. Acid lotions may be applied, such as vinegar (1 part to 3 of water dabbed on with a sponge), or nitric acid (2 or 3 drops of the strong acid to a quart of water), or lemon juice. The French use warm carbolised vinegar (40 grammes of aromatic vinegar and $\frac{1}{2}$–1 gramme of carbolic acid per litre). Evaporating lotions

also may give relief, and it is well after a lotion has dried to dust on an indifferent powder. Other lotions recommended are bichloride of mercury (1 in 1000), benzoic acid, atropine sulphate (gr. j.-ij. to ℥j. of water), over limited areas with compresses, and ichthyol. Chloroform water, dropped on the skin, was first used by Gull; Neligan combined chloroform with cold cream (℥ss. to the ℥j.), and Hardy suggested 10 parts to 30 of oil of sweet almonds. Sometimes the pruritus is allayed by carbolic acid (♏xx. to ℥j. of aqua camph. with spirits of wine and glycerine). Menthol is often ill borne. Kaposi gives the following prescriptions:—(i.) ℞ Spirits of wine, 200 grammes; petrolic ether, 5 grammes; glycerine, 2 grammes; and spirit of lavender, 100 grammes. (ii.) ℞ Rectified spirits of wine, 150 grammes; sulphuric ether, 2½ grammes; aconitine, 1 gramme: in either case followed by powdering.

In conclusion, it is desirable to protect the skin, as far as possible, from the air and any sources of irritation, whilst remembering to warn against heated rooms, violent changes of temperature, stewing in bed, and any possible irritation by vestments.

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ECZEMA

ECZEMA is by far the commonest disease of the skin. Cases of this disease form a very large proportion of cases of skin disease generally. The proportion differs in the experience of different observers, very variously stated. My own experience in hospital patients gives about 28 per cent of all cases. This proportion does not include cases of impetigo, which are sometimes counted under eczema; if impetigo be included, the proportion would be more than 30 per cent. In private practice the proportion of eczema is somewhat higher. In general practice, and especially as regards treatment, eczema is probably equal in importance to all other skin diseases put together.

Definition.—Though this disease has been known under various names as long as medicine has been a science, and though there is no affection of the skin on which so much has been written, it is not even now easy to give a precise definition of it.

All agree that eczema is a superficial dermatitis, or inflammation of the skin, especially of the epidermis; but opinions differ widely as to what kinds of inflammation should be included.

The one extreme view is that of Hebra (1), who regarded eczema as essentially identical with any superficial inflammation produced by external irritants. He describes the production of eczema in its various forms by the application of croton oil to healthy skin, and regards scabies as a variety of eczema produced by the Acarus scabiei.

The other extreme view is represented by those who exclude from their definition of eczema all inflammations produced by direct irritation, and include only those of which the cause is supposed to be internal, and the so-called "idiopathic" or spontaneous inflammations. In other words, a dermatitis of which the cause is known would not be eczema. It appears to me that some inflammations produced by direct irritation are to be called eczema, and others not. But the production of eczema by the direct action of irritants is not a perfectly simple matter, and requires a moment's consideration.

The action of mechanical friction, of heat, of sunburn, of chemical irritants such as ammonia or acetic acid, and of organic irritants like mustard, turpentine, croton oil, is, with differences of degree, nearly the same. First there is redness from hyperæmia or "erythema"; next, exudation of fluid in sufficient quantity to detach the epidermis, usually in a continuous sheet so as to form a "blister," and finally there is a

shedding off of dead epidermis, even if no blistering has occurred. Certain special irritants, such as croton oil, penetrating more deeply, may cause pustules. But these things are not precisely eczema, and to produce a typical eczema by external irritation is not always easy. For this purpose it is generally necessary that the action of the irritants should be not too severe, and should be somewhat prolonged. Friction of a truss or a ring, continual application of poultices, or prolonged maceration in wet bandages, occasionally sunburn acting for some days, special irritation caused by various occupations, any of these may produce an eruption indistinguishable from eczema. But a single application of an irritant rarely does so, except in persons of great susceptibility.

Even when this so-called "artificial" eczema is produced, predisposition and constitutional or structural peculiarities are not without importance. In some persons, especially in those who have suffered from eczema already, it is easy to set up an artificial eczema by various forms of irritation. In others it is extremely difficult, if not impossible, though the skin may be injured to the point of necrosis. This is shown by the experience of hydropathic establishments, where it is made a part of the cure to produce an artificial eczema, called by the name of a crisis, and thought to be salutary. In some persons this is easily produced by wet bandages or compresses; in others it is a matter of extreme difficulty, requiring a long time; or the attempt may fail altogether. Considering, then, that the production of eczema is not a necessary consequence of any irritation, but only follows under special circumstances, and more particularly in certain constitutions, it seems impossible to draw a sharp line between artificial and spontaneous eczema.

Again, it is to be remembered that in many cases artificial eczema persists after the irritant which produced it has ceased to act, and spreads beyond the part originally affected. It is impossible to draw any distinction between such cases and those in which the eczema appears to be spontaneous.

On the whole, the conclusion seems to be that transitory inflammation produced by the immediate action of irritation should be called artificial or traumatic dermatitis, but that when an eruption presents the clinical and anatomical characters of the supposed spontaneous eczema we cannot deny it that name on account of its traumatic causation.

In attempting to frame a definition of eczema it is necessary to take account both of anatomical and of clinical characters, and to define each separately.

Anatomical definition.—A superficial inflammation of the skin, chiefly confined to the deep layer of the epidermis and contiguous papillary layer of the corium; displayed in the epidermic portion by rapid necrosis of old epidermis and rapid production of new elements; in the papillary layer by swelling of the tissue and turgidity of the papillary vessels, which exude a fluid resembling plasma (with variable numbers of leucocytes), sometimes in sufficient quantity to be visible.

Clinical definition.—An inflammation which has no one specific

cause; which may be, though it is not usually, produced by external trauma (called irritation), generally by more obscure causes; which rarely occurs as an acute self-limited disease, but, however produced, tends to persist even when the cause which gave rise to it has ceased to act; which is accompanied by little, or sometimes by no fever or general disturbance, and which is not associated exclusively with any one diathetic, constitutional, or general state.

From the anatomical definition we conclude that its chief features are (i.) hyperæmia, (ii.) exudation, (iii.) necrosis and so-called exfoliation or desquamation of epidermis, with formation of new epidermis.

In the clinical definition the chief features are: (*a*) persistence as a morbid state, and (*b*) almost complete localisation or limitation of morbid conditions to the skin.

Usual though not essential features of eczema are: (*a*) Nervous disturbances, that is, almost universally, the sensation of itching, and very frequently that of heat or burning, rarely more definite sensations of pain; (*β*) bilateral symmetry, the lesions being in many cases found in corresponding situations on the two halves of the body; (*γ*) distribution in certain seats of election which will be afterwards pointed out; though this limitation is by no means constant.

As an illustration from catarrhal inflammation of mucous surfaces, it may be remarked that both the anatomical and clinical definition of eczema may be applied, *mutatis mutandis*, to catarrh of the mucous tracts; most clearly to those of the respiratory, less definitely to those of the digestive mucous membrane. In nasal catarrh or bronchitis we have hyperæmia with swelling, change of the normal transudate into a morbid exudate (though of course different chemically from the exudate of eczema), and also increased necrosis and new production of epithelial elements. In the digestive tract these conditions are less obvious, but are seen typically in severe inflammations, such as cholera. Moreover, etiological relations are alike in the cases of skin and mucous membranes. Mucous catarrhs may be produced by traumatic irritation, and are thus produced, for example, by dust in the case of miners, by ipecacuanha, and so forth. But they are usually due to more remote causes, such as cold and the like, which need not be mentioned here. The nervous symptoms are from their situation different. Itching is never felt in deep mucous surfaces, but this symptom of eczema is there replaced by reflex phenomena—by coughing and sneezing in the respiratory tract, by vomiting and diarrhœa in the digestive. Moreover, even the general or clinical symptoms are analogous. Fever and general disturbance are variable and intermittent features in inflammations of mucous surfaces, though, for reasons almost obvious, more severe than in inflammations of the skin; but they contrast in a marked degree with the grave and abrupt disturbances produced by inflammations of solid organs—the lung, the liver, or the kidney. The analogy will appear more clearly when the clinical characters of acute eczema are described.

Eczema has often been called a catarrhal inflammation of the skin,

referring either to the continuous exudation of fluid or to the shedding off of epidermis; but as the term is somewhat ambiguous, it does not seem necessary to make it a part of the definition.

Causes.—We must conclude that there is no one cause of eczema, but that it results from several factors which may be roughly summarised as follows:—

(i.) A particular liability to injury, or *vulnerability of the skin.* Persons liable to eczema apparently spontaneous are also especially affected by external irritants.

(ii.) Disturbance of the nutrition of the skin by *derangements of the nervous system.* The nervous origin both of acute and chronic eczema in certain cases is unquestionable. So is the effect of the nervous system in producing secondary eruptions. Instances will be quoted later.

(iii.) A sort of *poisoning* or *auto-intoxication* from the circulation in the blood of products of imperfect digestion, or of incomplete metabolism in the alimentary canal. Deficient elimination of such products by the kidneys and bowels forms an obvious aggravation of this condition, and is often clinically recognisable. The cases where eczema is set up or maintained by dyspepsia or gouty conditions are probably of this kind.

(iv.) *Traumatism.*—As already explained, even if we do not call the immediate result of injury eczema, the secondary and remote results often deserve that name. If, for instance, artificial dermatitis of one hand or arm is followed not only by local extension, but also by appearance of the same lesion in the corresponding region on the other limb (as I can aver from personal experience), or in other parts untouched by the original irritant, no one could refuse to call the secondary eruption eczema whatever hypothesis might be framed to account for its appearance. So chronic friction or irritation, as in certain trades or occupations, may ultimately so lower the nutrition of the part, that a true eczema results which is independent of the original irritation. Recognition of the primary trauma does not exclude or deny the operation of the other factors classed under heads (i.), (ii.), and (iii.), but rather explains their mode of action, as also that of the factor next to be spoken of.

(v.) *Action of bacteria in the skin.*—Some dermatologists, especially Unna, attribute an exclusive importance to bacteria in the production of eczema. Without admitting this, it is easy to see that changes in the nutrition of the skin may arouse the activity of saprophytic organisms already in the skin, and give them a pathogenetic virulence which they had not before. So that though the case of organisms casually alighting on the skin and setting up eczema is probably, to say the least, rare, it is probable that these organisms may explain two remarkable properties of eczema, namely, its chronic persistence and its local infectiveness. Moreover, some local forms of eczema seem to be definitely parasitic; that is, bacterial.

Analysis of the chief characters of eczema.—1. *Hyperæmia.*—This character is most clearly seen in acute eczema, where it precedes the

other changes, and for some hours, perhaps, may be the only visible alteration. It is, however, never quite absent, even in chronic forms. The external signs are redness and objective sense of heat to the touch. When considerable, it may also give rise to subjective sensations of burning. As the universal accompaniment of inflammation in vascular parts hyperæmia requires no special consideration. Generally, no doubt, it is secondary to the injury of the tissues which constitutes inflammation; some have thought, however, that a neuro-paralytic hyperæmia (direct or reflex) is sometimes the starting-point of eczema, and is, therefore, prior to inflammation properly so-called.

2. *Exudation.*—This is the most characteristic feature of eczema, though not always in sufficient abundance to be visible. As in other inflammations, a fluid is exuded from the vessels and in the skin; this oozing takes place from the vascular loops which accompany the papillæ. Hence it is poured out at a number of separate points; and if the amount of fluid be sufficient, and the horny epidermis not too thick or resistant, the latter is raised up over each papilla into a little elevation, which at first is hard, and looks solid, so that it is called a papule; but as the fluid collects it becomes translucent, obviously contains fluid, and is called a vesicle. The production of vesicles is so far general in eczema that it was formerly regarded as a constant feature of the disease, and eczema was classified by Willan (2) as a "vesicular disease." Even later writers, differing totally from Willan, such as Hardy, made the occurrence of vesicles a part of their definition of eczema; and some do so still. But, as a matter of fact, vesicles are sometimes absent in chronic eczema, from first to last; and, even in cases where vesicles occur, they are often present at one stage only of the attack, and that stage may be of short duration. Hence the vesicular character of the eruption may be established only by a doubtful history. The actual production of a distinct vesicle by the exuded fluid is limited by mechanical conditions, but even if from these causes no vesicles be seen, the fact of exudation may often be established.

For instance, in eczema of the palm of the hand no vesicles may be seen, owing to the thickness of the epidermis; but if the latter be rendered transparent, by water or glycerine, minute drops of exudation may be seen under the skin, forming virtual vesicles. In chronic scaly patches of eczema no exudation may be visible, but if the scales be rubbed off with soft soap, or liquor potassæ, a red, moist surface presents itself; and on this may be seen (especially with a lens) minute drops of exuded fluid poured out by the papillary vessels. A clean piece of white blotting-paper applied to the surface becomes dotted with little drops. This simple experiment, if successful as it generally is, affords convincing proof that eczema, even the dry form, is an exudative disease. Sometimes it may even establish the diagnosis, and is, moreover, in some cases a good therapeutic method.

Characters of the eczematous exudate.—The clear fluid exuded in eczema is often called serous, but really, like other inflammatory

exudates, resembles blood-plasma more than serum. It coagulates spontaneously, drying up into a horny crust; whence its well-known property of stiffening linen. Whether it contains the factors of fibrin I do not know, as the small quantity furnished makes analysis difficult; but it does not apparently exhibit fibrinous threads under the microscope. It appears precisely to resemble the exudate which cements the edges of a wound of the skin when hæmorrhage has ceased. Like this, it seems to be the natural defence against cutaneous lesions. Doubtless it contains a large quantity of albumin besides the special substance, not yet isolated, which gives it its horny character on drying. It has an acrid, irritating property, due probably to the large quantity of salts contained in it. Lymph corpuscles in variable number are also present in the fluid, and when in excessive number cause it to be purulent. The difference between eczematous fluid and serum or lymph may be clearly seen in eczema of the lower leg if anasarca be present at the same time. Acupuncture of the anasarcous tissue will liberate the bland, non-coagulating, dropsical fluid, which forms a striking contrast with the acrid, sticky fluid of eczema.

Blood does not naturally escape from the vessels in eczema unless they are actually wounded, by scratching or otherwise. This has an important bearing on the colour of eczematous eruptions.

Further changes in the exudate.—When the vesicles of eczema reach their full size they usually burst spontaneously; but sometimes they dry up and become abortive. When broken spontaneously, or by scratching and friction, the fluid becomes diffused over the surface; and, if considerable in quantity, carries away the dead and loosened horny epidermis, so that a general raw, red, weeping surface is produced. This is the characteristic feature of the form called *eczema rubrum*—moist or weeping eczema. This usually corresponds to acute eczema, or to an acute phase in chronic eczema, but it may be permanent for a considerable time. The exudation is not always continuous, but may occur in spontaneous bursts, sometimes at a particular time of the day, followed by intervals of comparative quiescence. It is aggravated, of course, by scratching or friction. In this condition no vesicles proper are produced. The exuded fluid, however, coagulates, and then are found the crusts so characteristic of eczema. In these are entangled the epidermic scales which are constantly being thrown off, with blood set free by scratching; and hence the eczematous crust is often of very mixed composition. Some amount of incrustation is often seen even when the surface is chiefly covered with scales, and thus the presence of crusts of dried exudation, even in minute quantity, often establishes the diagnosis of eczema.

3. *Desquamation* or epidermic proliferation and shedding of dead epithelium form the third characteristic feature of eczema. In favourable cases of acute eczema this marks the termination of the process, and, sound epidermis being formed beneath, the healing is completed; though, while exudation continues, the new epidermis is thrown off in the same way as

the original, either in sheets or in scales, till a sound layer is produced. But in persistent or chronic eczema—that is, in the majority of cases—the process is somewhat different; the dead upper layers of epidermis are not immediately thrown off, but remain attached to the new epidermis formed beneath them, and thus masses consisting of several layers of horny scales are formed. Generally speaking, there is a continual shedding of scales from the top, in the form of branny desquamation, constituting dry or scaly eczema; but when the epidermis is naturally thick and hard, as on the palms and soles, they remain more firmly attached, so that the parts are greatly thickened, and the form called *hypertrophic eczema* results. In either of these cases there may be a total absence of visible exudation or crusts, and some mild forms of eczema, being scaly from the beginning, may at no time exhibit any visible exudation.

The remarkably multiform appearances of eczema, which make it so difficult to give a precise description of the disease, depend mainly upon the intermingling of the two processes—namely, of exudation and excessive production of imperfectly formed epidermis; as one or the other predominates, the exudative and crusted or the scaly form results.

But they are further complicated by inflammation of the hairs and glands of the skin, and by two processes which remain to be described, namely, suppuration and induration.

The process by which thick scaly masses are produced, as in chronic scaly eczema, is not well understood, but may perhaps be something of this kind. In the normal formation of epidermis the soft cells of the deep Malpighian layer are changed into the horny cells of the outer layer by the deposition in them of an imperfectly known substance called keratohyalin. In the morbid changes here spoken of this process is excessive or perverted. There is a deposition of a probably abnormal substance, which causes the scales to adhere closely. This process has been called "hyperkeratosis," and is seen not in eczema only, but in other scaly diseases, such as psoriasis, also. For some reason hyperkeratosis seems to hinder healing as much as deficient keratosis, which is seen when on a moist surface the epidermis is imperfectly formed. The term "parakeratosis" is used by Unna, but with a different meaning.

Suppuration and Induration.—In some cases of eczema the exudation is purulent instead of being clear; the vesicles becoming pustules. This constitutes suppurative or impetiginous eczema. This must not be regarded as the same thing as impetigo proper, which will be described separately. Suppuration in eczema occurs especially in those whose tissues are liable to suppuration, as is often though not always the case with children, and in cachectic persons. It may also depend upon a direct infection of the inflamed parts with pyogenetic cocci, as is made probable by the fact that the suppuration may often be checked by appropriate treatment, while the eczema is far from being cured. Perhaps the two causes may in reality be one; that is, that the tissues of those who are prone to suppuration merely afford a suitable soil for the

pyogenetic organisms, which can generally be found in the suppurative form.

Besides this, the pustules seen in eczema are often not altered vesicles, but are due to suppuration in the hair-sacs or sebaceous glands. Pustules of this kind often complicate a healing eczema, especially if it has been vigorously treated.

Induration in eczema is due to the extension of inflammation into the deeper part of the corium, and even into the subcutaneous tissues. It is especially seen in parts where the skin is naturally thick, or where there is venous congestion, as in eczema of the lower leg; and only when the process is of long duration. Induration seldom or never occurs when the skin is soft and moist, as in the flexures.

A still more marked consequence of the deep extension of inflammation is *hypertrophy of the papillæ*. This occurs in the foot or lower leg in some cases of very chronic eczema. Papillomatous patches are produced which would hardly be regarded as eczema, except by tracing their connection with the previous or simultaneous occurrence of the more ordinary forms. An extreme degree of hypertrophy, affecting the subcutaneous tissue also, and resembling elephantiasis, is sometimes seen.

Negative characters.—Two negative characters of eczema should also be mentioned since they are often important in diagnosis.

1. The inflammation causes no destruction of tissue and consequently there is no scarring. If scars occur they are the result of excessive scratching or other injuries.

2. Eczema is, broadly speaking, not contagious, except when complicated with impetigo. Occasionally we see an eruption on the arm or hand of a nurse from attending to an eczematous infant. We must except also the contagious dermatitis observed especially in infirmaries, which has, at least, a close relation to eczema.

The pathological states, which have now been described, make up the anatomical picture of eczema, and fall under the anatomical definition given above. They may, for the most part, be more or less perfectly reproduced by the effects of severe external irritants, or by the long-continued action of milder agencies such as pressure and friction, forming different kinds of traumatic dermatitis.

We have now to speak of eczema as a disease—of its clinical features as well as its external appearances. In doing so it is necessary to speak of the different forms separately, since no single description would suffice for the protean manifestations of this malady.

Clinical History of Eczema

The varieties of eczema are so numerous that some writers (Brocq, for example) speak of "the eczemas" in the plural; and an enormous number of epithets, chiefly Latin adjectives, have been applied to denote the different kinds. Erasmus Wilson (5) enumerated thirty-five;

and Dr. L. D. Bulkley has collected a hundred and twenty-five such Latin names. Most of these are quite useless, and there is no magic in translating an adjective into Latin; but in some cases a distinctive epithet is very valuable, because it denotes a variety distinguished by other characters than that connoted by the single name. For instance, *eczema rubrum* implies not merely that the eruption is red, but that it is excoriated, moist, and exuding.

The names given to varieties of eczema are derived from different aspects of the disease, and may be considered under the following heads (slightly modified from Dr. Bulkley):—

1. According to the stage or duration: as acute, chronic, recurrent.
2. According to the predominant lesion: as vesicular, papular, pustular, etc.
3. According to the condition: as dry, scaly, moist, crusted, fissured, etc.
4. According to locality or distribution: as of the hands, feet, flexures of the limbs, etc.
5. According to the supposed cause: as artificial, gouty, scrofulous, etc.

Beside these there are a number of trivial or miscellaneous names, not coming under any of the above heads, but of no importance.

It is, of course, obvious that the above distinctions (as Dr. Bulkley remarks) are not logically exclusive; they are rather cross divisions, so that a chronic eczema, for instance, may be described as dry, papular, and limited to the hands; and may be ascribed to some constitutional cause.

It appears to me that the divisions 2 and 3 merge into one, and that the inquiry into causes is of little moment; so that the only important distinctions are—first, into the acute and chronic forms; and, secondly, according to the parts of the body affected; for the character of the skin in different regions greatly modifies the affection, and causes it to assume a different form.

Acute and Chronic Eczema.—The term "acute," as applied to disease, is understood in the old sense of rapid or transient. It is often now used in the sense merely of "severe," which, whether correct or not, is not what is here intended. An acute disease is one which begins abruptly, reaches its height, and then declines; either going away altogether or passing into a chronic form. A chronic disease lasts for an indefinite time, preserving a somewhat uniform level of severity; which may, however, be interrupted by acute attacks or by exacerbations. Both these forms of eczema occur, and another form is found, not precisely acute or chronic, but recurrent; in this case the disease returns at irregular intervals, like ague or gout.

Acute eczema is often the starting-point of the chronic; but the converse may occur: the chronic disease gives rise to acute attacks,

which may be limited to the original seat, or, as often happens, may be more widely distributed.

Acute eczema.—In severe cases there may be some prodromal symptoms; for instance, the patient has complained of general feeling of illness, want of appetite, or nausea for two or three days before the eruption appears. Sometimes there is a sensation of coldness or repeated slight shivers—not a sharp rigor. The temperature may rise to 100° or 101° F. I have not known it above 102°. The general affection closely resembles that of a "cold," or mucous catarrhal inflammation. In many cases there are no prodromal symptoms whatever.

The local changes usually begin at one spot. There is a sensation of burning, with visible redness of the skin, and more or less swelling. The amount of swelling is variable, and chiefly depends upon the greater or less laxity of the tissues in particular parts. It is most marked in the upper part of the face, and especially under the eyes, where, as is well known, any local inflammation gives rise to considerable swelling. Hence acute eczema of these parts sometimes gives occasion to the erroneous diagnosis of erysipelas. Independently of the character of the eruption, however, the greater severity and abruptness of the fever and general symptoms in the latter disease will generally mark the distinction. The distinction from erythema is sometimes extremely difficult, and perhaps, in the first stage, not always possible.

This first or *erythematous* stage of the affection is soon succeeded by the *vesicular*. The inflamed surface becomes covered with papular elevations which are rapidly filled with fluid. The time occupied in the production of the vesicular stage varies greatly: sometimes the vesicles are complete in two or three hours; sometimes their eruption is delayed for a day or more. It is possible for the vesicles to dry up and become abortive at this stage; but generally the vesicles break, and the surface becomes covered with exudation, as before described. At the same time the eruption is pretty sure to extend to contiguous parts, and often attacks corresponding situations on the other side of the body, so as to become symmetrical, if it were not so at first. It may invade a large part or even the whole of the surface.

During these changes the patient's general condition does not improve, but usually becomes worse. The eruption brings no relief. Burning and itching are usually intense; there is restlessness and insomnia, and sometimes the slight degree of fever mentioned above. It may seem strange that even when there is a large amount of inflamed tissue the fever is not higher. But it should be remembered that the heat of the inflamed tissues is mostly radiated from the surface, and that the toxic products, instead of being absorbed, are also largely thrown off. There is usually constipation. I have not observed any notable changes in the urine.

Course and event of the attack.—It is important to remember that an

attack of acute eczema, like other acute diseases, may subside spontaneously, and this is not less likely to happen because the eruption is extensive. The eruption may become abortive in the first stage,—when it resembles a papular erythema,—and end with desquamation, or after exudation has taken place. This may gradually become less, and dry up; when after a few exfoliations the skin becomes sound. The possibility of spontaneous subsidence should always be kept in mind, and be a warning against too energetic treatment. But, unfortunately, in accordance with the observed proclivities of eczema, it more often happens that the acute passes into a chronic inflammation which requires the treatment appropriate to that form.

Causes of the acute attack.—An attack of acute eczema may occur for the first time in a healthy person; or it may be one of a series of recurrences with intervals of health; or it may be a recrudescence of a chronic local eczema. In all these forms the immediate cause of an attack is sometimes quite inscrutable, but often it may be traced. These occasional causes are in the main of three kinds: (i.) external irritation or trauma; (ii.) disturbances of digestion; (iii.) disturbances of the nervous system. But the causes of a first attack of eczema are usually obscure, and one would hesitate to frame any generalisation on the subject.

In patients subject to recurrent acute eczema (a class not necessarily the same as that of sufferers from chronic eczema) similar determining causes may often be traced. (i.) It may be due to some irritating application, to cold and dry winds, to the salt spray of the seaside, to sunburn, or even, in very sensitive persons, to sitting in a draught which in other persons would produce a common cold. (ii.) It may again be due to an attack of acute indigestion or some irritant article of food—causes which in another class of patients might set up urticaria or erythema, but in a healthy person would produce no cutaneous affection. (iii.) Nervous disturbances frequently determine attacks in certain persons. I have known so many cases in eczematous patients where a sudden shock or alarm, such as bad news, accident, the alarm of fire, excessive anxiety or annoyance, has been followed by an attack, that I cannot doubt the reality of this cause. Excitement and flushing from social entertainments, hot rooms, or wine, are with good reason dreaded by some patients of this class. I will venture to relate one case of eczema from nervous causes:—

A gentleman of nervous temperament in a public office was suffering from over-work, and indeed ordered away for his health. The last afternoon in his office he tried to get through a mass of work which he found it impossible to finish, and went home in a state of extreme annoyance. In the course of the night acute eczema of both hands came out, which I saw the next morning. It was his first attack and subsided with improved health.

The causes which make a chronic eczema take on an acute character are not always clear, but often such as those above mentioned. Fre-

quently in addition to the heightened intensity of the local process there is extension in an acute form to other parts. These acute secondary eczemas, however severe, are generally either transient or easily cured.

Chronic eczema.—This may be the sequel of acute eczema, or may be, as it were, chronic from the beginning, coming on gradually.

Chronic eczema presents an immense variety of appearances, but there are three main forms: (*a*) chronic exudative; (*b*) dry and scaly; (*c*) dry and papular.

(*a*) The exudative comes nearest to the acute form, and is also especially prone to exacerbations. We see a surface imperfectly covered with epidermis, and either coated with crusts composed of dried exudation and scales, or excoriated, red, and moist—the form called *eczema rubrum*. These appearances may alternate. (*b*) The dry scaly form is more definitely chronic, remaining unchanged in appearance for long periods. It is often a later stage of the exudative form, but some forms are scaly from the beginning. It is mostly seen in dry regions of skin, but sometimes even in moist parts like the flexures. Limited scaly patches sometimes closely resemble psoriasis. (*c*) The dry papular form is less common. It is hardly seen except in certain situations, especially the outer or extensor sides of the limbs, in limited patches which are generally extremely irritable. Some of these forms are by the modern French school regarded as lichen. In true eczema the papules can be generally shown to be papulo-vesicles by the exudation which occurs on scratching or rubbing.

The difference between these forms consists chiefly in the greater or less abundance of exudation; and this depends partly, at least, on the idiosyncrasy of the individual skin. In some persons exudation is easily produced, and the moist forms predominate. In others exudation is poured out more scantily, and the papular or scaly forms predominate.

Two minor forms may be mentioned: *rimous* or *fissured eczema* is that in which the inflamed skin forms deep cracks. It is especially seen at the tips of the fingers and palms of the hands, or corresponding parts of the feet, and behind the ears; in *hypertrophic eczema* the epidermis is thickened so as to form hard callous masses. This is seen on the palms and soles, and is often complicated with cracks, so that it also is a rimous eczema.

Local varieties of eczema.—Since eczema may affect almost every region of the body, I propose here to enumerate those local varieties only which specially affect certain regions, and at the same time have other characters in common.

The chief local varieties may be distinguished as follows:—

Of the head.—This is often complicated with seborrhœa. In children it is frequently purulent or impetiginous. But both seborrhœa and impetigo may exist in a severe form without eczema.

Of the face.—Here two forms at least may be recognised:—(*a*) Seborrhœic—complicated with seborrhœa or seborrhœic eczema of the

scalp. It affects especially the forehead, the eyebrows, the sides of the nostrils, and the parts which in men are covered with hair. (β) Erythematous—accompanied or preceded by flushing of the face, often due to internal causes. This is the prevailing type of acute recurrent eczema of the face. (γ) Nervous—Unna distinguishes in children a nervous form, due to reflex irritation from dentition, and associated with a similar affection of the backs of the hands and wrists. This was the "strophulus" of Willan (7), who in two of his plates represents the simultaneous affection of the cheeks and forearms.

Of the ears.—A common form, generally moist or easily becoming so; sometimes associated with inflammation of the auditory meatus. Defective circulation contributes to its obstinacy. It is much aggravated by cold.

Of the limbs.—Here two types may be recognised:—(α) Of the flexures, that is, the fold of the elbow, the axilla (though here complicated with features due to the presence of hairs), the popliteal hollow, the groins, the scroto-femoral flexures. Frequently associated with these are eczema of the front of the throat and of the skin behind the ears, also sometimes of the umbilicus. The character of the skin in these situations being thin, moist, and free from hairs, determines the character of this *flexural eczema*, which is mostly moist, often showing vesicles or papulo-vesicles, or a red exuding surface. When dry the epidermis is likely to exfoliate in large flakes, but does not become heaped up in thick, hard, scaly masses. (β) Of the outer or extensor sides of the limbs. It is in this situation almost exclusively that the dry, papular, chronic form is found, sometimes in remarkable circumscribed patches (E. circumscriptum), but it may be diffuse. However, in these situations the eruption is often moist, or even vesicular. On the arms it is chiefly below the elbow; on the legs the calf or the peroneal region are most affected. Dr. Pye-Smith notes a symmetrical "weeping eczema occurring in adults, and affecting the outer side of both forearms from an inch or more below the point of the elbow down to the wrist." I have often observed this form, and even seen several cases in succession in robust labouring men. It corresponds, as Dr. Pye-Smith remarks, to the similar affection of the calf and peroneal regions of the lower limb. I believe that the irritation of coarse and dirty clothing is a contributory cause. (γ) A perfectly distinct chronic type, sometimes called varicose eczema of the lower leg or ankle. It is difficult to see why this should not be called traumatic dermatitis. It is clearly due in the main to external irritation acting on tissues imperfectly nourished from venous congestion. Varicose veins are generally but not invariably present. Deficient arterial supply from arteriosclerosis is another cause of imperfect nutrition of the skin in old people.[1]

Another contributory cause I believe to be the spread of saprophytic

[1] I once made a post-mortem examination of an old person who suffered from this form of eczema in one leg only. The external iliac artery on that side was found almost completely blocked by calcareous atheroma. The veins were normal.

bacteria from the foot, where these microbes are always abundant. This is shown, among other things, by the beneficial results of absolute cleanliness and of pure parasiticide applications. In chronic cases there is induration and thickening from connective tissue hyperplasia, such as we see in internal organs when the circulation is disturbed in like manner. In the acute form it presents the classical type of eczema rubrum.

The local character of this affection is shown by the fact that it may remain for many years quite confined to this part, with no sign of eczema elsewhere. But in rare cases, when in the acute stage, it seems to become locally infective, and may spread, sometimes rapidly, over the rest of the limb, or even over nearly the whole surface of the body.

This form of eczema, as is well known, is frequently associated with ulcers of the leg, caused by the same disturbance of circulation.

Of the hands.—The hands are so often affected by various traumatic causes, such as those proceeding from certain occupations—washing, friction of tools, irritating substances, and so forth—that it is difficult to draw the line between traumatic dermatitis and eczema. But when an inflammation with the characters of eczema spreads beyond the part injured, continues when the irritation has ceased, and tends to become distributed in a typical manner, unrelated to the original seat of injury, and especially if it affect both hands when only one was subject to the trauma, it seems right to call the affection eczema.

It may affect (α) the fingers, (β) the palm, (γ) the back of the hand.

Eczema of the fingers is favoured by cold, wet, and external irritation, so it is difficult to draw the line between obstinate chaps, cracked fingers, and the like, and true eczema. It may also start from the irritation of a ring or a thimble, probably not through friction, but from the formation of bacterial colonies; and thence may spread widely over both hands. It may be dry or moist, and is very frequently rimous.

Eczema of the palms very frequently leads, especially in the horny-handed workman, to great thickening of epidermis, which may be accompanied by very deep and painful cracks. It should be observed that in ladies, and other persons with delicate skins, this thickening does not take place, but, instead of it, great tenderness and vulnerability. Palmar eczema generally affects both hands, but may be confined to those parts. It is often extremely obstinate.

Eczema of the back of the hand does not often occur alone, without affection of the corresponding surface of the fingers. It is not uncommonly associated with eczema of the face, and in such cases I have found an almost constant association with dyspepsia from chronic gastric catarrh. It is probably due to a nervous reflex.

Of the feet.—Here eczema is much less common than on the hands. When affecting the soles it usually presents the same characters as that of the palms. Eczema of the dorsum mostly follows the same course as that of the lower leg.

Of the region of the anus and the perineum.—This eczema is an extremely obstinate and distressing form; sometimes it is associated with

piles or prolapsus, and may follow the irritation of thread worms. The visible phenomena are sometimes so slight that the case may be hastily set down as one of mere pruritus; but on examination patches of raised skin may be seen which, from being in a moist situation, look white and sodden, not dry and scaly. Similar patches may be seen on the mucous surface.

This affection may probably be set down in great part to the action of bacteria migrating from the rectum.

Of the genitals.—This, in both sexes, is an extremely obstinate form, resembling that of the anus. It also gives rise to intense irritation. It may extend to the neighbouring mucous surfaces in women, in whom it is often associated with leucorrhœa or mucous discharges. It is frequent in diabetes.

Of the nipple and areola.—Here it is equally obstinate, and often forms very deep and painful cracks. It must be distinguished from Paget's disease of the nipple, though in early stages the distinction is often difficult.

Seborrhœic eczema.—In 1887 this name was used by Unna to indicate the connection between what is generally called seborrhœa of the scalp and a certain form of eczema. He pointed out the extension of the scaly condition of the scalp to the forehead, eyebrows, and other parts of the face; to the neck and ears; then to special regions of the body, as the axilla and groins, the chest, the back, and so on; but with a preference for the flexures and moist situations. Most of the secondary lesions are what have been generally described as eczema; but Unna included also certain forms of psoriasis, and the so-called lichen circinatus or seborrhœa corporis (see "Seborrhœa," p. 759), and others. He also extended the name eczema to the original dry seborrhœa or pityriasis of the scalp; and included the whole process, including lesions varying much in form, under the above name. But at the same time he denied the participation of the sebaceous glands in the process, and attributed it to a perverted action of the sweat-glands, a statement which makes the term "seborrhœic" unmeaning.

It is admitted that there are no objective characters common to all the manifestations of the disease except the presence, in some scaly patches, but not universally, of a yellow colour due to the admixture of fat. The diagnosis of the separate lesions will then rest generally on their history, and on tracing their connection with seborrhœa of the head.

Some dermatologists refuse to accept this generalisation; others have accepted it fully; others, again, recognise the existence of such an eruption, and its origin from the head, but deny it the name of eczema (Dermatitis seborrhœica (G. T. Elliott)). The hypothesis of the implication of the sweat-glands has had little support.

Briefly, my own opinion is that the general fact of transference of inflammation from the scalp downwards to other parts of the skin is a very important pathological law, and one fruitful in clinical deductions.

Hence I recognise the great value of Unna's discovery, but doubt whether the name eczema be appropriate to the whole of the process. It seems to me the condition, or stage, of seborrhœa can generally be distinguished from eczema, though one passes into the other; that the disease may be transferred from the scalp to adjacent parts in the form of seborrhœa or, at a later stage, in the form of eczema. When the original eruption is eczematous there is more tendency to spread; but the secondary lesions may be eczematous, even if the primary be merely seborrhœic.

The origin and extension of seborrhœa are treated of elsewhere (p. 759). With regard to the extension of eczema from the scalp, it may be traced in many cases with certainty. A head, which has been scurfy for many years, becomes sore and eczematous. After this, eczema appears on adjacent parts, such as the ears or neck, and then on lower regions of the body. This might be called *descending eczema*, without deciding whether the sebaceous or the sudoriparous glands have anything to do with the process. And a similar extension of eczema from a primary focus may be seen in other parts of the body. Chronic eczema of the anus, perineum, or adjacent parts may give rise to a secondary eczema extending over the trunk and limbs, or *centrifugal eczema;* this also is described by Unna as one form of seborrhœic eczema. Finally, we have the not uncommon case of chronic eczema, which may have been confined for years to the lower leg or foot, beginning to extend and to spread up the leg, or even over the whole body; this might be called *ascending eczema.* It is possible there may be other points of departure; but these three situations have a special importance, because the scalp, the perineal region, and the foot are just those parts where saprophytic bacteria are most abundant. They constitute, in fact, bacterial nurseries, where certainly many more than one species vegetate, and from which they may spread to neighbouring parts, giving rise to local inflammations or eczemas.

The only one of these forms which can be called seborrhœic is the descending. Three chief forms of this are recognised: (i.) moist exuding surfaces, especially in the flexures; (ii.) discoid or ringed scaly patches, especially on dry situations and outer surfaces of limbs; (iii.) a form with thick scales resembling psoriasis, but not typical in distribution, and yellowish in colour.

It is important, if possible, to recognise the seborrhœic origin of eczema, for special treatment is indicated by this connection.

Neurotic eczema.—In some cases, as mentioned above, a nervous disturbance may be recognised as the cause of an outbreak of eczema; but the eruption, once established, has no special characters by which we can detect its nervous origin. Hence I find it impossible to distinguish any variety of eczema as neurotic.

Gouty eczema. — Although gout and eczema are sometimes connected, the skin eruption in such cases has no definite or constant character.

TREATMENT OF ECZEMA.—The treatment may be divided into (i.) internal or general; and (ii.) local. Formerly great importance was attached to constitutional treatment, intended to improve the general condition of the patient, or to remove any supposed diathetic cause; latterly, greater weight has been laid upon local treatment. From my own experience, I regard local treatment as by far the more important, though in some cases constitutional treatment is a valuable adjuvant.

General treatment.—Since eczema often passes away with altered conditions of life, change of climate, change of diet, or the relief of some internal affections, especially constipation and dyspepsia, there are strong theoretical grounds for believing that general or internal medication may prove effective; yet in practice it is found extremely difficult to discriminate the fault of nutrition or assimilation to which the affection of the skin may be attributed, and still more difficult to find the appropriate remedy apart from local medication.

The first rule, especially in chronic cases, is to improve the general nutrition, if it be defective. In this respect the treatment of chronic eczema does not differ from that of other inflammations, being guided by the rule that chronic inflammation means essentially defective repair.

Cod-liver oil, as a nutrient tonic, is very useful with cachectic children; nor need we inquire whether they are scrofulous or not, which is largely a matter of words. In adults this drug is less suitable; and we naturally have recourse to iron in order to combat anæmia or cachexia; but I must confess that, after twenty years' experience, I am not very certain of the good effect of iron in eczema. Other so-called tonics are of little importance. Nor must it be supposed that the removal of anæmia or cachexia necessarily implies a corresponding improvement in the eczema; striking instances to the contrary sometimes occur.

One drug, however, arsenic, seems to have a special action in improving the nutrition of the skin. That this is its chief mode of action is shown by its effect on healthy people, in whom it improves the complexion and quality of the skin. In chronic inflammations it assists the tissues to throw off the effects of injury, and is more useful in some other skin diseases, as psoriasis and lichen, than in eczema. Formerly this drug was used without discrimination; but it is now recognised that it is beneficial in chronic forms of eczema only, and, among these, in the dry and scaly rather than the moist, and in diffuse or general rather than circumscribed and local forms. Seborrhœic eczema is also favourably influenced by arsenic.

Of all general methods of internal treatment in eczema none is more important than purgation. Almost all varieties of chronic eczema are benefited by purgatives, but more especially where there is much inflammation and exudation. These conditions are relieved, and irritation seems to be allayed. Flushing of the face is also often relieved by purgatives. The best drugs are salines, especially magnesia. A draught containing magnesium sulphate, or some natural purgative water, should be given every morning in a dose sufficient to produce a

moderate action of the bowels. Mild vegetable purgatives are recommended by some. The old combination of sulphate of iron and magnesia sometimes appears to be very useful.

The digestion of eczematous patients often requires attention. Whether dyspepsia actually causes eczema or not, there can be little doubt that it often makes an existing eczema worse, and especially increases the irritation. The dyspepsia of eczema patients is due to chronic gastric catarrh for the most part, and is best treated with bismuth and alkalies, for which it is not necessary to give precise prescriptions.

Intestinal digestion and the functions of the liver may sometimes require attention. Occasional doses of calomel, blue pill, iridin, or euonymin are useful.

Great importance is attached by some writers to the use of diuretics in eczema; but, though such treatment may seem theoretically desirable, I cannot say that I have observed any striking benefit from it.

Alkaline citrates and similar salts are often called for by the general state of health in patients with eczema. I am in the habit of prescribing potassium citrate, in doses of thirty grains or more three times daily; it is best in an effervescent form, but I am not prepared to say that it has any direct influence on the skin. When patients with eczema suffer, as they often do, from some form of rheumatic affection, salicylate of sodium is indicated; but it is not clear that the salt has any specific action on the eczema.

External or local treatment of eczema.—A very large number of medicaments have been used in the external treatment of eczema, and as some kind of classification is necessary, we arrange them as follows :—(i.) Astringents. (ii.) Tars, aromatics, and deoxidising agents. (iii.) Caustics.

(i.) *Astringents.*—The effect of astringents is to reduce hyperæmia, check exudation, and contract the tissue elements; thus restraining inflammation. There are metallic and vegetable astringents. The metallic are salts of zinc, bismuth, lead, mercury (mercurous and mercuric), and silver; the above list gives them in order of their efficacy —from the weakest to the strongest. Zinc and bismuth compounds, being unabsorbed, are probably inert on unbroken skin, but on moist surfaces they are mildly astringent, and also of service as protecting the inflamed surface. The compounds generally used are zinc oxide, calamine, and bismuth subnitrate. Soluble zinc salts may be employed in lotions. Zinc oleate is a bland non-irritating compound.

Lead salts are incomparably more powerful in subduing inflammation than those of zinc. Nothing has so much effect in acute eczema as ordinary lead lotion; and sometimes no other application is required. Insoluble compounds of lead—carbonate and acetate—are used in ointments, but are not so efficacious as the old "diachylon," made from olive oil and litharge—a very ancient pharmaceutical preparation. As an ointment its use was revived by Hebra (11). Unguentum diachyli is

made in the same manner as emplastrum plumbi of the Pharmacopœia, except that double the proportion of olive oil is used. As it is not easily made in small quantities, the following formula may be used:— ℞ Emplastri plumbi (B.P.), olei olivæ, āā ℥j. Mix with gentle heat, adding a little more oil in cold weather, to make an ointment. Another ointment is made by mixing emplastrum plumbi and soft paraffin in equal parts. Chemically, diachylon is merely crude oleate of lead with excess of olive oil. A few drops of some aromatic oil (lavender or bergamot) are added, not only as a scent, but also to prevent decomposition. This is used as a dressing ointment, especially in chronic moist eczema. Lead compounds should be used with caution to the face as they may discolour the skin.

Mercurial compounds have the advantage of penetrating much more deeply than other metallic salts, even when the epidermis is unbroken. Hence their remarkable efficacy in chronic eczemas. In the case of mercurial applications the risk of absorption should be remembered. The mercurous salts have a milder action than the mercuric, partly on account of their insolubility. In ointments, ammoniated mercury (white precipitate) is chiefly employed; but subchloride (calomel) has a very similar action, and native mercurous sulphate (turpeth mineral) is much used in France. Lotio nigra, containing mercurous oxide in suspension, is much recommended by some dermatologists as an application in acute eczema. Mercuric compounds are more powerful, but mercuric oxide, red or yellow (the latter preferable), is non-irritating, and much used in ointments for chronic eczema. The acid nitrate is a very potent application, and the ointment, diluted to one-fourth or one-eighth of its strength, is one of the best applications in chronic eczema, especially of the scalp. The perchloride (corrosive sublimate) possesses the properties of mercuric salts in the highest degree, but it is irritating. Though more used to destroy microbes than to check inflammation, perchloride solutions (1:1000 or 1:500) are very useful as occasional applications in chronic moist eczema.

Vegetable astringents, such as tannin and catechu, are not without effect in chronic inflammation of the skin; but, being less powerful than metallic compounds, are not much used. Glycerine of tannic acid is, however, of great value in certain forms of eczema, especially for moist eruptions in the neighbourhood of mucous surfaces—as round the lips and nostrils of children, and eczema of the external ear, when connected with otorrhœa; also for moist seborrhœic eczema of the face and neck. It is sometimes better diluted.

(ii.) *Tars, aromatics, and similar substances.*—Astringent or metallic preparations, though they act favourably on eczema, and control more especially its inflammatory element, often fail to effect a permanent cure; and relapse follows apparent recovery. In order to cure chronic eczema permanently, recourse must generally be had to some of the numerous substances included under the above heading. They may be classified as:—(*a*) Wood tars, including pix liquida or pine tar, oleum

cadinum or juniper tar, oleum fagi or beech tar, and birch tar (often sold as oleum rusci, but not made from the ruscus). With these must be classed their derivative creasote. (*b*) Coal tar, always used in compounds such as liquor carbonis picis (B.P.), or alkaline or alcoholic solutions, which form an emulsion with water, and are known by various names. With these must be classed carbolic acid and resorcin. (*c*) Thymol, β-naphthol, and similar products. (*d*) Chemically quite different from the above, but similar in action, and having an accidental similarity of name, are the acids of the aromatic series, benzoic and salicylic. (*e*) Sulphur has a peculiar action of its own, but allied to it are ichthyol, and perhaps resorcin. They have been described as reducing or deoxidising agents, since they are oxidisable. This property belongs in a still higher degree to pyrogallic and chrysophanic acids, and chrysarobin.

Though the above-named substances vary in many respects, their therapeutical effect in eczema is broadly the same, but it is difficult to explain their mode of action. Some authors speak of the group as one of stimulants, which only expresses the fact that in a concentrated form they produce irritation. Others call them alteratives, a name to which it is still more difficult to attach a precise meaning. Others, again, attribute their efficacy to the antiseptic and parasiticide properties which many of them undoubtedly possess, and speak of the whole class as antiseptics. Others, from the fact that all tarry and resinous substances absorb oxygen rapidly or slowly, attribute their action to the "reducing" power most conspicuously shown in pyrogallic acid and the like. Whatever the precise nature of the action may be, it seems that all these substances exert a similar and special physiological effect on living cells. It may be compared to the action of such substances as benzoin, turpentine, creasote, and the like on the respiratory mucous membrane when eliminated by the breath; and of an analogous group of aromatic oils and resins on inflammations of the urinary tract when eliminated by the kidneys.

The different groups of these substances are useful in different ways. (*a*) Wood tars and their derivative creasote are very powerful in their action, but irritating, and sometimes objectionable from their odour. The old method of Hebra was to apply cautiously a tar, such as oil of cade, to a small portion of the eczematous surface previously treated with metallic applications, and to discontinue the application if irritation were produced. But it is better to use a dilute preparation such as an alcoholic solution of oleum fagi, which forms an emulsion with water. To begin with, the strength may be ʒj. of the tar solution to a pint of water—to be gradually increased. This may be used even to moist eczemas, but is most suitable for the dry forms. Soaps containing wood tar are useful in dry chronic eczema. Creasote possesses the properties of wood tars in a very high degree.

(*b*) Coal tar preparations are much more generally used in this country, such as liquor carbonis picis (B.P.), and patent preparations

of similar composition. They are perhaps less powerful than the wood tars, but much blander in their action, and in the end not less efficacious; their odour, also, is less penetrating. Lotions made with coal tar solution are recommended by Mr. Hutchinson as the best application in almost every form of eczema. The strength may be from one to ten per cent or more; and in certain cases the coal tar solution may even be applied undiluted. Ointments should be made with soft paraffin in various degrees of strength. About 1 in 16 (℥ss. ad ℥j.) is an ordinary strength. Baths with coal tar solution are useful in dry papular eczema, to allay irritation. The strength must be determined by experience, but generally a drachm or half a drachm to each gallon of water is sufficient. Coal tar soaps are valuable in dry eczema.

Carbolic acid, besides its antiseptic properties, has the therapeutic virtues of the coal tar series, and is excellent as a local sedative. But it is more often employed in combination with other remedies.

Salicylic acid has a definite and powerful action on scaly affections of the skin, especially when accompanied by epidermic hypertrophy. In such cases it gradually produces exfoliation of the horny epidermis—an action which has been called "keratolytic." In appropriate cases it is most valuable, and may supersede all other local remedies. It is applied in ointments with soft paraffin,—30 grains or more to the ounce.

Benzoic acid appears to me to have a similar action to that of its homologue salicylic, but much weaker. It is, however, rarely used, except in the familiar zinc ointment.

Chrysarobin and pyrogallic acid exhibit the properties of the tar group of remedies in the highest degree; but both, especially the former, are very irritating. Hence their use in eczema is confined to chronic dry forms in skins which are not sensitive. They are applied in the form of paraffin ointments,—30 or 40 grains to the ounce.

Combination of astringent and aromatic remedies.—Long experience in the use of the two classes of local remedies, above distinguished, has shown that each class has its special merits—one in the earlier, the other in the later stages of the disease; but that the best results are generally obtained by a combination of the two. That is to say, the addition of a certain proportion of antiseptic or aromatic substance increases the efficacy of the metallic remedies; while the combination of metallic astringents with antiseptic or tarry applications restrains the possibly irritating effect of these remedies, and sometimes appears to aid their absorption into the skin.

Hence, in all but the most acute or sensitive forms of eczema, the custom has arisen of employing ointments or lotions containing both a metallic astringent and some tarry or aromatic substance.

Examples of these combined remedies are the following:—1. Benzoated zinc ointment.—This, the zinc ointment of our Pharmacopœia, contains an uncertain proportion—something less than 2 per cent—of benzoin, an aromatic. Hence it is not a pure metallic ointment, and

the benzoin is probably by no means inert. The efficacy ascribed to it in chronic dry eczemas by Sir Erasmus Wilson (12), its introducer, is probably due to the benzoin (or benzoic acid). On this account it is not, as sometimes supposed, the mildest of all applications to the skin; in some cases it produces irritating effects which are not caused by oxide of zinc alone.

2. Compound petroleum ointment.—The preparation largely used under this name at the Hospital for Diseases of the Skin consists of Liq. carbonis picis, ℥ss.; hydrargyri ammoniati, gr. x.; paraffini mollis, ℥j. These proportions, however, may be varied. This suits dry eczema, and even moist forms when the exudation is not excessive; it is perhaps the most generally useful as a routine application.

3. Carbolic zinc ointment.—Zinc ointment, with the addition of 20 to 30 minims of liquefied carbolic acid. This is more efficacious than simple zinc ointment, and also allays the itching; but it must be used cautiously to sensitive skins.

4. Mercury and creasote ointment. — Unguent. hydrarg. nitratis, ℥j.-℥ij.; creasoti, ♏x.; paraffin. moll. ℥j. Carbolic acid may be substituted for the creasote. This is very useful in eczema of the scalp, especially when impetiginous; and in impetiginous eczema of other parts, especially in children.

It is needless to prolong the list. Any metallic ointment is improved by the addition of some carbolic acid, creasote or coal tar solution; the proportion being determined by the stage or chronicity of the eczema. Moreover, these mixed ointments may be used when ointments containing only tarry or antiseptic substances would be inadmissible, the proportion being gradually increased till the full effect of these remedies is obtained.

Similarly remedies such as salicylic acid and sulphur may in the first instance be mixed with zinc or other metallic ointments; and the skin thus prepared to bear their application alone. It should be remembered that lead ointments gradually turn black with sulphur. The same principles apply to the composition of lotions.

3. Caustics.—These agents are sometimes used in chronic eczema for the removal of old epidermis, and the setting up of a more healthy form of inflammation; in short, for converting a chronic into an acute eczema. The best agent for this purpose is liquor potassæ, diluted with an equal part of water, or soft soap. This must be rubbed in till a raw exuding surface is produced, then washed off, and the surface immediately covered with some metallic ointment.

The occasional use of a solution of nitrate of silver is recommended by some dermatologists, and produces an effect similar to that of nitrate of silver in sluggish ulcers.

Special methods of applying local remedies. — In addition to ointments and lotions, some other valuable forms of local applications have been introduced. The gelatine paste with oxide of zinc, introduced by Pick of Prague, and modified by Unna (13), is very useful as a protection

for delicate skins, and may have other remedies combined with it. Starch jelly is used for similar purposes, and answers best with a little boric acid, to render it antiseptic, as recommended by Professor Jamieson.

The plaister muslins (mulls), introduced by Unna, are intermediate between ointments and surgical plasters; they are impregnated with various medicaments, such as zinc oxide, diachylon, salicylic acid, and so forth. Those containing salicylic acid are especially useful in chronic infiltrated eczema.

General scheme of treatment in eczema.—A. Acute eczema.—The treatment of an acute attack of eczema must be conducted on the general principles of treatment in a sharp catarrh, or a slight febrile attack. If the eruption is extensive, if there is much shivering or discomfort, or if the temperature is raised, the patient should be confined to bed, but not too warmly covered.

The internal remedies indicated are a mixture containing liquor ammoniæ acetatis, 1 to 4 drachms, with spir. ætheris nitrosi, 15 to 30 minims. In febrile cases the addition of vinum antimoniale, 5 to 15 minims, first advocated, I believe, by Mr. Nayler, is very useful. The effect of these drugs is to lower arterial blood-pressure, and to add to the patient's comfort. A thorough action of the bowels must be procured, and for this purpose saline aperients, sulphate of magnesia, and the like, are best. No internal remedies have so direct an action on the eczematous inflammation as aperients. It is generally thought advisable to stimulate the action of the kidneys. For this purpose potassium citrate, bitartrate, or acetate may be added to the mixture, in doses of 20 to 30 grains. This recommendation seems, however, to find no great support in experience.

The diet, being an ordinary fever diet, should consist chiefly of milk and other light liquid foods. Stimulants should be prohibited.

The external applications must be in the form of lotions, as ointments are rarely tolerated in the acute stage. The ordinary surgical lead lotion is generally by far the best application; but, should it cause smarting, it should be diluted with an equal part of distilled water. A very small quantity of glycerine, not more than 15 minims to the ounce, may be added to delay evaporation; but larger proportions will cause irritation. If there be much exudation, zinc oxide (30 grains to the ounce) may be suspended in the lotion; but powders sometimes irritate. The lotion should be applied on linen dressings kept as constantly moist as possible. It is sometimes difficult to prevent the dressings sticking to the surface and causing pain on removal. In such cases a thick emulsion is better than a watery lotion. Such an application is linimentum calcis (B.P.) with 40 grains of zinc oxide or calamine in suspension. Some physicians would add to it 30 or 40 grains of calcium carbonate, and Dr. R. Liveing recommends almond oil in place of the olive oil. Such an emulsion can be painted on with a brush, and allowed to remain uncovered. Sometimes rags soaked in olive oil are the best dressing. When lotions have been used for a

few days, till the hyperæmia is reduced and the exudation diminished, ointments may be used cautiously. Those made with cold cream as a vehicle are least heating. But very often lotions are quite sufficient in really acute eczema.

B. Chronic exudative eczema is generally best treated, after removal of the old crusts, with ointments applied as a dressing, and gentle pressure exerted by a well-arranged bandage. These need not as a rule be changed more than once in the twenty-four hours, on which occasion the patches and surrounding skin may be washed with a dilute coal-tar lotion. For certain parts, especially the face, the gelatine and zinc oxide is a good application, and may be mixed with various other medicaments according to the case.

For moist eczema generally picric acid in saturated solution is a most valuable application.

In this form the occasional use of liquor potassæ (diluted), or soft soap, to rub off the superficial epidermis and convert the chronic into an acute eczema before the dressings are applied, is sometimes of great service, but must be tested experimentally.

C. Chronic dry eczema is also very generally treated by ointments containing appropriate remedies rubbed on and covered by a bandage. But if the use of ointments be objectionable, and the skin will bear more vigorous applications, the use of tar soaps, followed by tar lotions, is sometimes more efficacious.

Treatment of local varieties of eczema.—Eczema of scalp.—If, as is often the case, there is much sebaceous incrustation, the crusts are best removed by soaking in oil for some hours and afterwards washing with yolk of egg and warm water, or cautiously with a bland soap. But the oil may be combined with a remedial agent as follows:—Ol. olivæ, adip. recent, āā ℥ss.; hydrarg. oxid. rubr. (vel flav.) gr. xv. Ft. linimentum. Five drops of carbolic acid and a few drops of oil of bitter almonds or other scent may be added. This should soak for twelve hours, the head being covered up; then wipe with a soft towel, comb out the loose crusts, and apply more liniment. A few days of this treatment will suffice, and a soft mercurial may then be used, such as dilute citrine ointment with a little carbolic acid or tar. Thick ointments should be avoided. If the seborrhœic condition predominate, sulphur, with carbolic acid or resorcin, in paraffin ointment, is useful. Some cases do well with glycerine of tannic acid. If there are no thick crusts the latter applications may be used from the first. When the condition becomes dry and scaly, or is so at the beginning of treatment, more decidedly tarry preparations are indicated, such as the compound petroleum ointment mentioned above; and we may cautiously proceed to the use of tar soaps, which complete the cure.

Eczema of the ears.—This is mostly connected with seborrhœic eczema of the scalp. The important point in treatment is that ointments should always, if possible, be applied on strips of lint or thick linen, carefully fitted to the part and kept in contact, especially behind

the ear, where there are probably cracks. Where such dressings cannot be tolerated in the daytime they may still be used at night. Heavy metallic ointments of zinc or lead, or combinations of these with ammoniated mercury, are best. When the eruption is limited to the inside of the auricle round the meatus, glycerine of tannic acid may be useful for a time, and a gradual transition made to tarry preparations. In very chronic cases previous removal of the epidermis by soft soap or alkali accelerates the cure.

Eczema of the face.—There is no affection to which the golden rule of the old physicians, "Cure, if possible; at all events do no harm," is more applicable; for it is easy to aggravate this condition by injudicious treatment. There are two main forms—the seborrhœic, often connected with similar conditions of the scalp and ears; and the hyperæmic, which comes in acute attacks with flushing and swelling. For the first, the general principles of the treatment of this form apply; but it is very desirable, especially in children, to keep the surface covered with ointment spread on linen, carefully fitted to the surface; a complete mask, with holes for eyes, mouth, and nose is sometimes necessary, and to some extent protects the parts from scratching. If this be impossible, a thick creamy liniment of linimentum calcis, with forty grains of calamine to the ounce, may be applied with a brush; or Pick's gelatine of oxide of zinc, liquefied by gentle heat, may be applied and protected by a covering of soft linen. A thick emulsion of bismuth subnitrate is preferred by some. As the cure advances ordinary mild ointments may be substituted.

The eyelids, if sore, should be separately treated with ointment of vaseline and yellow oxide of mercury (five grains to the ounce).

If the affection is chronic the patients are often anæmic and cachectic, and require iron or other tonics. For children cod-liver oil is very useful.

In the hyperæmic form lotions are generally borne best. Lead is the most efficacious, but if used too long it makes the skin look dirty. Zinc lotions (twenty to thirty grains in the ounce of oxide or calamine, with two grains of sulphate) are free from this objection. Sometimes a very dilute lotion of liquor carbonis picis (two to ten drops in one ounce of distilled water) is better tolerated than either, and is very efficacious. As to the use of water and soap the general rules for the treatment of acute eczema apply. If ointments can be used, the best basis is cold cream, with yellow oxide of mercury or oxide of zinc. Purgatives are very useful in this form. The face must be protected as far as possible from the sun or cold winds.

Eczema of the moist surface of the lips is an obstinate form. In treating it we must remember that a portion of anything applied to the lips is likely to be swallowed. Glycerine of tannic acid is harmless and a good application, and, especially in children, is often sufficient. As an ointment the following is useful:—Unguent. zinci, ℥j.; acid. carbol. ♏xv.; glycerin, ℥ss. Or, Unguent. zinci, ℥j.; sulph. pp. gr. xv.;

glycerin, ʒss. Glycerine alone has a healing effect on the fissures which are often present, though it causes smarting at first. Deep cracks should be touched with nitrate of silver. Mercurial preparations should be used with caution, but weak ointments of yellow or red oxide often do well.

It should be remembered that inherited syphilis may give rise to an inflammation of the lips, with fissures much resembling eczema, and requires specific constitutional treatment.

Eczema of the upper lip, below the nose, is often accompanied by inflammation of the inner surface of the nostrils, and appears to be kept up by the nasal discharge. Besides ordinary treatment of the skin, the nose should be brushed internally with glycerine of tannic acid, or a lotion of carbolic acid; or the same ointments used for the skin may be introduced on little pledgets of cotton wool, one being treated at a time. The condition is sometimes called sycosis, but it is really distinct from this follicular inflammation.

The same confusion arises with respect to eczema of the beard, which is often confounded with true sycosis; the more as it may be complicated with some inflammation of the hair follicles. The beard should be cut short with scissors rather than shaved, and mixed metallic and antiseptic ointments perseveringly used. The ointment should be applied on strips of linen kept in close contact with the surface—at all events by night, and, if possible, by day also.

Eczema of flexures and opposed surfaces of skin. In the natural flexures, such as axillæ, groins, folds of the elbows, perineum, and the like, eczema assumes a special character, which is also seen in the additional folds produced in fat children or adults, by obvious causes; and on the lower surface of the mammæ in fat women. The exudation is generally copious, and is complicated by an accumulation of sweat, which undergoes fatty decomposition. A simple local inflammation thus produced, unaccompanied by eczema elsewhere, is called *Intertrigo;* but it is often difficult to draw the line between this and eczema.

In the simple intertrigo, so common in children, dusting powders are generally used, and often serve the purpose. The best are fullers' earth; oxide of zinc, alone, or with an equal weight of starch powder; or starch powder with small quantities of salicylic or boric acid. But, even in these cases, a speedier cure is effected by greasy applications, such as common zinc ointment, or vaseline zinc ointment (40 grains to the ounce) applied on linen. The surface should not be washed more than is necessary, and should be carefully dried before the dressings are applied.

But when the condition is a part of true eczema powders cannot be relied upon, and sometimes cause inconvenience. The opposing surfaces should be kept apart by dressings of linen covered with whatever ointment is judged most appropriate to the case. The use of narrow muslin bags filled with starch, powdered boric acid, or some antiseptic drying powder, to keep the sore surfaces apart, is recommended by Mr. Malcolm Morris (16).

Eczema of mamma.—The form which affects the nipple and areola is especially obstinate; it may accompany or follow lactation, and must be distinguished from malignant papillary dermatitis (Paget's disease). In simple eczema, liquor potassæ, diluted with an equal part of water, should be painted on as before directed, and diachylon or white precipitated ointment, with or without a little coal tar, applied on lint. The treatment is slow. If not successful, salicylic acid should be tried, and is best applied in the form of a plaister, such as Unna's muslin plaister which is made in various degrees of strength.

Eczema of the genital organs, in both sexes, is often very obstinate. In men it affects the scrotum, where, though no special application is indicated, success in treatment will largely depend on keeping the applications in close contact with the parts by appropriate bandages. In women, eczema of the external genitals often causes the most intense itching, and is the most frequent though not the single cause of so-called pruritus vulvæ. It is well to begin with a mild antiseptic lotion, such as mercury perchloride 1:2000. If the condition be very chronic, dilute liquor potassæ may be applied occasionally, as directed above. After this a mixed metallic and tarry ointment should be kept constantly applied, the strength being proportioned to the sensitiveness of the spot.

When the dressings are removed each day, an application of a dilute lotion of liquor carbonis picis, creolin, or carbolic acid alleviates the itching. In case of much swelling and redness lead lotion is the most useful. Cocain hydrochlorate in ointments (1 to 4 per cent) is sometimes the best remedy for irritation, and may be combined with other remedies. No internal remedies, except aperients, seem to be of any use.

The use of washing and baths.—As a general rule, the cure of eczema requires that bathing and washing of the parts should be used as little as possible. The healing of a chronic moist eczema may be indefinitely delayed by washing, which carries off the delicate newly-formed epidermis, and prevents it from becoming firm. Water is still more harmful in some acute cases; but as, in chronic cases, the usual bath cannot be altogether forbidden, the patches of eczema should be protected as far as possible. Soft water, if attainable, should always be used; if this cannot be had, the water should be boiled to deprive it of a portion of its hardness.

Soap should never be used to acute nor, generally speaking, to any moist eczema. In its place thin, carefully strained gruel should be used. For the scalp, yolk of egg is the best substitute for soap. In chronic dry eczema, on the other hand, soaps containing tar or sulphur are often valuable therapeutic agents. If the skin be sensitive "superfatted" soaps should be prescribed. Many useful medicated soaps of the kind are now made.

Natural baths and mineral waters, though much favoured by some patients, are of little service. The benefit of a visit to a German or English bath is due partly to the general improvement of health, and partly to the fact that patients give themselves up to their cure with a

thoroughness which they do not practise at home. An exception must, however, be made in favour of certain sulphur springs, such as those of Harrogate, Strathpeffer, Aachen, and several others on the Continent; these I have known to be very beneficial in chronic, dry, irritable eczema of the kind sometimes called "gouty." But the cases must be carefully selected; for moist eczema, and cases in which the skin is tender, often get much worse under such treatment. Sea-bathing is nearly always injurious.

Clothing.—The chief requisite is that woollen garments, as a rule, should not be worn next the affected skin, but rather soft linen, cotton, or silk. Any desirable woollen garments can be worn over these.

Climate has not, as a rule, much influence on eczema; but a soft, mild, moist air is preferable. Nothing is more trying to an eczematous patient than the cold dry winds of an English spring. Sea-air is not generally beneficial; often, indeed, it is injurious.

Diet.—The influence of this factor in eczema has been greatly exaggerated. In infantile eczema, however, the diet has sometimes to be carefully regulated. Sweets of all kinds should be restricted, though ordinary cane sugar in beverages is certainly the least harmful of them. Vegetables which are imperfectly digested, even potatoes, increase the irritability of the skin, probably by irritating the alimentary canal. Coarse oatmeal, on similar grounds, is sometimes injurious; indeed, in some persons it is said to cause pruriginous eruptions.

Adults are less influenced by diet; but patients with chronic eczema often find that certain articles of diet cause an aggravation of their symptoms, probably by disturbing the digestion. No general rules on this subject can be laid down; each case must be studied individually.

The question of stimulants is one on which patients are sure to ask for advice. Nothing is more certain than that actual excess in alcoholics aggravates eczema, and seriously interferes with its cure; so that in cases of habitual, even slight excess, it is better to stop such beverages altogether while the cure is in progress. Any stimulant which, by its quantity or quality, disturbs the cutaneous circulation and causes flushing is injurious. But in a large number of cases of limited local eczema there is no occasion to interfere with the patient's ordinary habits. Speaking generally, regard should be had to the condition of the patient himself rather than to that of his skin.

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J. F. P.

IMPETIGO

Syn.—*Impetigo contagiosa; Porrigo contagiosa.*

This name is given to a pustular affection formerly confounded with eczema. It was first recognised as a distinct disease, under the name "Contagious porrigo," by the late Mr. James Startin, at the Hospital for Diseases of the Skin, before the year 1855, but regarded by him as not identical with impetigo as then understood. It was noticed by Mr Hutchinson (referring to Startin's observations) in the *Transactions of the Pathological Society* for 1855; and its probably parasitic nature was discussed. Under the name "Impetigo contagiosa" it was more fully described by Dr. Tilbury Fox in 1863-64; and has been recognised by most English dermatologists, though only somewhat recently on the Continent. It has been found impossible to draw a distinction between simple impetigo and I. contagiosa. Duhring, however, still distinguishes a simple impetigo. The eruption appears in the form of single vesicles, at first solitary, which rapidly become pustules; or they may appear to be pustular from the beginning. The single pustules collect together into groups, and, when ruptured, become covered with a crust which is usually of a distinctly yellow colour, and was formerly compared to honey; hence the old name Melitagra. Large crusted patches may be thus produced, but, as a rule, there is no continuous exudation as there is in moist eczema. Sometimes a bulla or bleb is produced which may reach the size of a sixpence or a shilling. This bullous form is common in adults, but occurs, though more rarely, in children, and was described as typical by Tilbury Fox. The distribution of the disease is quite irregular, not generally showing any bilateral symmetry, as eczema does. It almost always begins on an exposed part of the body, especially the head, face, and hands; but in little children with bare legs it may begin on the lower limbs. A diffuse form is seen on the scalp usually associated with pediculi. The patches of eruption easily give rise to others by local contagion, and thus may spread widely over the body. The duration of each individual lesion is often not more than a week or two; but, by local extension, the disease may become

chronic. A very notable fact is that the lymphatic glands connected with the inflamed skin rapidly become enlarged, often within twenty-four hours. On healing, the crusts dry up and fall off without leaving any scars, except in very cachectic patients. There is usually very little itching, and, except in rare cases, the disease is not accompanied by any constitutional disturbance.

Impetigo occurs chiefly in children, but may be conveyed from them to adults. No doubt badly fed, dirty, and cachectic children are more liable to the complaint than others; but it may be conveyed to those who are perfectly robust and well nourished; and even flourish among them. The cause of this complaint is nearly always contagion from a previous case of impetigo; but it may occur through auto-infection, that is, from a focus of infection—not impetigo—in the patient himself. The original source of infection is always some kind of suppuration, but not necessarily of the skin. I have traced the connection of impetigo with such inflammations as conjunctivitis, otorrhœa, purulent rhinitis, ulcerative stomatitis, and even purulent vaginitis; as well as very frequently with whitlow, and with superficial wounds or scratches which have festered. Conversely I have traced the origin of those forms of suppuration from impetigo. It is obvious that if this be correct, impetigo is not only contagious, but is itself the result of local contagion. It might be defined as "inoculated suppuration of the skin."

Bacteriology.—The organisms present in impetigo were first systematically studied by Bockhart, who found Staphylococcus aureus and albus to be the predominant forms.[1] This has been confirmed by subsequent observers, and we often find these organisms present in a pure cultivation. But considering that they are common saprophytes of the skin, and that they occur in other affections, such as boils and carbuncles, it has been doubted whether they are the agents of suppuration, and whether some other organism be not the cause. I have made, and had made for me, many cultivations from pustules of impetigo, and my experience is that in the most pronounced cases of impetigo staphylococci are present exclusively; and therefore they must be regarded as the pyogenetic organisms. If we give the name of staphylococcia to the inflammations produced by these bacteria, then impetigo means *Staphylococcia purulenta cutanea* (of Darier), or inoculated cutaneous staphylococcia. Since we know that these organisms may live in the skin without producing inflammation the fact of their causing suppuration has to be explained. It appears as if these organisms, in the first place, cause inflammation if the tissues in which they live are injured in any way; then growing as a pure cultivation in the inflamed tissue they acquire increased pathogenetic properties, and, by passing through one focus of inflammation after another, ultimately acquire sufficient viru-

[1] Bockhart denies that these organisms are present in the vesicles of Impetigo faciei contagiosa, which he regards as a different disease from the simple or "Wilson's Impetigo." I can only suppose that this discrepancy arises from applying the name I. contagiosa to a disease different from ours.

lence to cause suppuration in healthy skin. There is thus a development of pathogenetic virulence, a development which may take place in one individual, or more strikingly when contagion has passed rapidly from one patient to another. As an instance of the first method, suppose a child to have a small wound on the foot, a part where pathogenetic microbes are rife; the wound festers, as it is said; that is, it becomes a focus of pathogenetic cocci. From this part pustules extend up the leg, and pus removed from it by scratching may be conveyed by the nails, and inoculated upon the face, where it produces a typical impetigo. If unchecked this contagion may be conveyed to other children, and thus a little epidemic is the result. An instance of intensification of virulence by passing through several individuals is shown by the epidemics of what is called *Football impetigo*. Perfectly healthy and robust boys, or young men, may become affected with a contagious pustular disease transmitted from one to another. Evidently the beginning is in some superficial hurt which becomes inflamed and develops a virus of gradually increasing virulence, till at length it has decidedly contagious properties. From the natural history of the disease we conclude that superficial suppuration is far more contagious than deeper suppuration; and that suppuration of the skin itself is far more likely to set up impetigo than is that of any other part. The pus from deep abscesses does not appear to produce impetigo; and acne when a suppurative disease seems rarely if ever to give rise to it. It should be stated that several observers have found other organisms such as streptococci and bacilli. It is quite possible that in some cases these are the infective microbes.

Epidemics of impetigo.—This disease is particularly prone to occur in epidemics, sometimes limited to one building, or to the pupils of large day schools, or spreading from one school to another. When in the epidemic form it appears to be more actively contagious than in sporadic cases.

Impetigo in adults.—The disease occurring in adults sometimes differs to a certain extent in its characters. Instead of producing simple pustules, sometimes a larger vesicle more like an imperfect bleb or bulla, resembling an abortive pemphigus, or what has been called ecthyma, results. This is most commonly seen on the face, and I have known undoubted instances of contagion from one man to another employed in the same office. I have also seen it in a father whose children suffered from ordinary impetigo. It is therefore apparently due to the same virus, the difference being explained by the greater thickness of the epidermis in adults. This fact seems to throw some light on the disputed question whether there is such a disease as "*Ecthyma.*" I believe it to be produced by the same microbes as impetigo, but under special circumstances. The severe form of ecthyma is never seen except in badly-nourished patients, and is therefore called *E. cachecticorum*. In such subjects the tissues may become necrotic, whereby a deep sore is produced which leaves a distinct scar; but this result appears to be due to the state of nutrition of the patient, not to the nature of the virus.

Connection of impetigo with eczema.—Impetigo may no doubt complicate eczema ; that is to say, eczema, especially in children, may become infected with the impetiginous virus, so that it becomes suppurative ; but the latter condition may be removed by treatment while the eczema remains. Conversely it is possible, though rare, for inoculated impetigo to set up a true eczema in predisposed subjects. Impetigo is commonly attributed to the irritation of pediculi in the scalp, but with doubtful propriety ; lice may live on the scalp for months or years without producing any result, excepting irritation, till suddenly in a few days the whole scalp becomes covered with acute impetigo, and the occipital glands swell. It seems clear that this must be due to infection with fresh microbes, which by the bites of the lice are inoculated all over the scalp. The disease is therefore produced by the combined efforts of pediculi and staphylococci.

Treatment.—As a prophylactic, in schools and other places where infection is possible, the skin should be kept washed with antiseptic soap, or sponged daily with some antiseptic solution. For the eruption it is generally best to remove the crusts, if considerable, by soaking with oil followed by a light poultice. The best application is a mild mercurial and antiseptic ointment. I prefer diluted citrine ointment as not containing any heavy metallic powders. It alone is sufficient in many cases to soften the crusts. The following formula may be used :— ℞ Ung. hydrarg. nitrat. ʒj.-ʒij., creasote ℥v., paraffini mollis ʒj. M. Ft. ung.

Other forms of mercurials are used, and carbolised oil is preferred by some. The surrounding skin should be carefully disinfected. It is generally recommended that the clothing should be disinfected, and to this there can be no objection, although I believe the contagion essentially resides in the skin.

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IMPETIGO HERPETIFORMIS

This very rare disease was first described by Hebra, and most of the few recorded cases have been observed in Austria and Germany. Fifteen cases have been recorded at Vienna. It nearly always occurs in pregnant women, two exceptions only being mentioned by Kaposi where

young men were the patients. Never having seen this disease I take the following account chiefly from Kaposi :—

The eruption begins at several parts of the body, especially the groins, the navel, the breasts, and the armpits, with the formation of groups of small pustules on a red swollen base from half-an-inch to one inch in diameter. The pustules dry up in one or two days, forming a brownish crust, while immediately round them, sometimes in a double or triple circle, fresh pustules arise and in their turn dry up and form crusts. The process thus extends, in the manner of a circinate eruption, till it covers a large surface, and becomes continuous with adjacent patches.

When the crusts fall off, the skin underneath appears red, and either covered with new epidermis, or moist like eczema, or infiltrated; but never ulcerated. At length, after three or four months, nearly the whole surface becomes affected by the eruption, being hot, swollen, and covered with crusts, and showing here and there some excoriated patches surrounded by rings and pustules. The mucous membrane of the tongue and the palate, uvula, and posterior wall of the pharynx, show in some cases circumscribed gray mucous patches depressed in the centre.

The accompanying **symptoms** are continuous fever of the remittent type, with occasional rigors and high temperature, which are the precursors of new eruptions; also dry tongue, vomiting, and delirium. In a few cases erythema or urticarial wheals have been observed, preceding or accompanying the pustular eruption.

Prognosis.—The disease is nearly always fatal in a few months, only two cases of recovery being on record. Even when the patient has recovered from one attack a recurrence in a subsequent pregnancy has been known to be fatal. Parturition does not interrupt the progress of the disease, or prevent a fatal termination.

Diagnosis.—A febrile disease with an eruption consisting of groups of very small pustules on an inflamed base, with tendency to peripheral extension, limited in duration to weeks or months, and presenting the severe symptoms mentioned above, can hardly be confounded with any other form of impetigo, or of vesicular herpetic disease.

Pathology.—The cause of the disease and its relation to the pregnant state are at present insoluble problems.

One hypothesis is that it is a sort of pyæmic or septicæmic infection; but the accompanying morbid conditions found on necropsies have rarely been indicative of such an infection, or indeed of any severe inflammation. The lesions have been carefully examined for specific micro-organisms, but nothing has been found, beyond the saprophytic and pyæmic forms which occur in many affections of the skin.

According to another view, the disease is analogous to hydroa gestationis or dermatitis herpetiformis, and it was first included under the latter by Duhring. Although symptoms of nervous irritation are less marked in this disease, its analogies would seem to be on the whole with the group of diseases just mentioned.

Treatment.—Antiphlogistic remedies, such as quinine in full doses,

have been recommended, but appear to be of little service. For local application only soothing remedies are indicated, such as alkaline baths; or, in severe cases, the continuous bath, and simple ointments containing carbolic acid or other antiseptics or sedatives.

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GENERAL EXFOLIATIVE DERMATITIS

SYN.—*Pityriasis rubra.*

History and Nomenclature.—The name Pityriasis rubra was apparently first employed by Willan. In the edition of his works dated 1808 he stated: "It affects in some cases only the face and neck, in others it extends, though not continuously, to every part of the body." The condition described by Willan was, however, of a mild and easily curable character, wherein it differs from that now to be described. Devergie gave the first account of the disease, as now understood, under the title of P. rubra in 1857. Hebra in 1866, under the same title, described the disease from three cases which all ended fatally. Erasmus Wilson described three cases in 1867, and in 1870 a fourth and very characteristic case, most admirably depicted. He compared these with those portrayed by Devergie and Hebra, admitting their similarity; and, after discussing various names for the malady, came to the conclusion that Dermatitis exfoliativa seu Ekzema exfoliativum was the most appropriate. Further, the names of D. desquamativum and Erythrodermie exfoliante (Besnier) have also been employed.

It is now generally agreed that the names Exfoliative dermatitis and Pityriasis rubra apply to a group of cases which, whilst presenting minor differences, have so much in common that they are linked together clinically, and require a common and inclusive designation. In this country the names General exfoliative dermatitis and P. rubra have about an equal number of supporters, and either name is applicable to the disease. Exfoliative dermatitis is the more expressive, as in the majority of cases the epidermic scales thrown off are in large flakes or laminæ, and have not the branny character of pityriasis (τὰ πίτυρα, bran). It has been urged that the usual practice in biological literature of adhering to the original name, even although a somewhat better one be subsequently suggested, should be followed; nevertheless exfoliative dermatitis seems the more likely to prevail. As Dr. Walter Smith has recently

pointed out, our knowledge on the subject has passed through successive stages: (i.) That of the Devergie-Hebra period (and I would add that of Erasmus Wilson), when it was regarded as a peculiar and primary disease of the skin. (ii.) The Buchanan Baxter period. Buchanan Baxter, in 1879, recognised cases of secondary origin, as well as primary cases; and gave an exceedingly valuable account of the disease. (iii.) The present stage of revision of our knowledge and search for the etiological factors, which, however, have not yet been discovered, though we have learnt during this last period the connecting links between the principal types.

It is a matter of importance and of no little difficulty to know what to include under the name General exfoliative dermatitis. M. Brocq, who has devoted much attention to the subject, and contributed a good deal to our knowledge, distinguishes the following varieties: (i.) Erythema scarlatiniforme desquamativum; (ii.) Typical or subacute exfoliative dermatitis; (iii.) Chronic general exfoliative dermatitis; (iv.) Pityriasis rubra chronica of Hebra; (v.) Benign subacute pityriasis rubra; (vi.) Benign chronic pityriasis rubra; (vii.) Exfoliative dermatitis of the newly born. By most dermatologists such multiform subdivision is regarded as superfluous. All admit the type of Devergie and Hebra, and that of Erasmus Wilson; but we have learned by the study of many more cases that there are various degrees of acuteness or chronicity in cases which are evidently to be ranged under these types. Relapsing scarlatiniform erythema and the "epidemic dermatitis" stand nearly related; but it is convenient to keep them apart, at any rate for the present; in their course and circumstances they offer important differences, but they may be valuable in helping us to understand the nature of general exfoliative dermatitis. Pemphigus foliaceus is by some included in the group, though rejected by the majority of dermatologists; nor would I include epidermolysis bullosa. Moreover, I would not include under general exfoliative dermatitis cases of congenital or acquired ichthyosis, but would limit the name to the group of cases in which inflammation is present persistently. The cases which should be included under the name general exfoliative dermatitis have the following characters: (*a*) they are nearly or quite universal in extent; (*b*) there is persistent hyperæmia of the skin; (*c*) they are attended with a more or less abundant and continuous desquamation; (*d*) they are rebellious to treatment, retaining their characters for months or years; and (*e*) the nails and hair are affected.

Causation.—Under this head but little can be stated, beyond the circumstances under which exfoliative dermatitis occurs, yet which but partially explain it. We now fully recognise that cases of general exfoliative dermatitis must be divided into two categories, namely, (A) those in which the disease is primary, and (B) those in which the generalised condition is secondary to some antecedent chronic affection of the skin. First, as to *remoter antecedents*. *Age* and *sex* have a decided influence on the incidence of the disease. My own experience agrees with that of

others, that the disease is more common in the male than in the female sex. Of twenty-one cases which I had previously placed on record, and twenty-three I have since had under my care (making in all forty-four cases), there were twenty-eight men to sixteen women; or nearly two of the male to one of the female sex. With regard to age, there is a general concurrence of testimony that the middle and later periods of life supply the greatest number of patients. This is borne out by my cases, which, distributed into the decennia in which they occurred, appear as follows :—

Ten years and under	1
Between the ages of 1 and 20 . .	3
„ „ 21 „ 30 . .	3
„ „ 31 „ 40 . .	6
„ „ 41 „ 51 . .	12
„ „ 51 „ 60 . .	10
„ „ 61 „ 70 . .	7
„ „ 71 „ 80 .	1
„ „ 81 „ 90 . .	1
	44

Of these 44 : cases were primary, . .	M. 12.	F. 9.
„ „ „ secondary, . .	M. 16.	F. 7.

So that the numbers in the two classes are nearly equal, namely, 21 of primary and 23 of secondary origin.

The average age of the primary cases was 47 :	M. 45.	F. 49.
„ „ secondary „ 46 :	M. 50.	F. 44.

From the above figures it will be seen that the greatest number occur in the 4th, 5th, 6th, and 7th decennia, and that no age is exempt. The youngest patient was a child aged ten months; the disease, which was primary, had existed three weeks, and was universal; Dr. Crocker has recorded a primary case in a patient two months old. These early cases are to be distinguished from the disease described by Ritter under the name of D. exfoliativa neonatorum, which will be mentioned later. The oldest patient in my series was eighty-four years of age; but the disease has been seen in people over ninety. The diminished number of cases afforded by the decades after seventy is due to the few living beyond this period; but the figures suggest that the liability to the disease is relatively high in old age.

It is doubtful whether *social position* and *circumstances* have much influence in determining the disease. It is held by several writers that the nervous temperament, or nervous instability, is a powerful influence in its causation. Dr. Pringle has expressed a very strong opinion that the part played by alcohol has been greatly underestimated. My own experience does not lead me to attach the same importance to alcohol in the causation of the disease. In my last twenty-three cases this ante-

cedent is only mentioned in three; and two in the same series were total and life-long abstainers. Dr. Radcliffe Crocker has been impressed with the frequency of the association of the disease with rheumatism; but in my cases I have not found this connection to be a close one. In my last twenty-three, only three cases of undoubted rheumatism occurred; nor has gout been frequent in the history of patients suffering from the disease.

Family history of skin diseases.—In only one case under my observation was the disease said to be hereditary. A man of sixty, who had suffered from the disease for forty-eight years, stated that his father had suffered from the same disease for years, and that it disappeared three years before his death. Whether the father's disease was general exfoliative dermatitis or psoriasis must remain doubtful. Psoriasis is the only family disease of the skin that appears to be of any importance numerically. I have found a history of psoriasis in parents and other relatives in a certain number of cases, and this may be of some significance. Ichthyosis—another universal skin disease—is sometimes found in psoriatic families, and Mr. Hutchinson has suggested it may be the result of transmutation of hereditary transmission. Though it be a conjecture with but a slender basis of support, we may suggest that the inheritors of psoriasis, or those with a proclivity thereto, may have a vulnerability of skin disposing them to the disease. Pulmonary and arthritic diseases are tolerably frequent in the families of those subject to exfoliative dermatitis. Both, however, are common diseases, and there is not sufficient evidence to show whether they are more common than the general incidence of such diseases would lead us to expect.

Proximate causes.—Exposure to wet and cold seems to have excited the attack in some cases, notably in that described by Wilson; in other cases it has been wanting. Nervous causes appear occasionally to have induced it. Dr. Pringle mentions a case in which "the condition showed itself immediately after an extremely prolonged cross-examination in the witness-box at the hands of an eminent but notoriously harassing counsel." One of my cases followed shortly after shipwreck, in which immersion, exposure, privation, and anxiety were combined. In many cases no reasonable explanation is afforded for the occurrence of the primary form of the disease, or for its supervention on eczema or psoriasis; the attack occurring in persons often of fair general health and nutrition. Some cases of eczema and psoriasis have passed into general exfoliative dermatitis after the local application of chrysarobin, pyrogallol, arnica, and the like; and after both the external and internal employment of mercury.

Symptoms.—Mode of onset. In this respect cases of general exfoliative dermatitis must, as regards their mode of involution, be separated into (i.) those of primary origin; (ii.) those in which the disease is secondary to some other affection of the skin.

(i.) *Primary general exfoliative dermatitis* in some cases begins as a patch of erythematous inflammation in one or in several situations. The

eruption may resemble erysipelatous inflammation; indeed true erysipelas has occasionally been the starting-point of the disease. In other cases the eruption has been papular, whilst in a few it has been vesicular or bullous. The skin inflammation, once started, spreads with varying rapidity, acquiring as it does so its characteristic qualities of redness and dryness, succeeded by desquamation. In the more acute cases it extends over the whole of the integument in a period varying from a few days to two or three weeks; in others it spreads more slowly, and may take months or a year or even years to become universal.

(ii.) *Secondary general exfoliative dermatitis.*—In these cases the condition supervenes upon some already existing chronic affection of the skin; of these eczema is the more common in my experience. It occurs in connection with both ordinary eczema and seborrhœic eczema.

Next to eczema, as an antecedent, stands psoriasis; the disease may also supervene on lichen ruber planus, pityriasis rubra pilaris, erythema multiforme, and, as already stated, erysipelas. What is characteristic of these cases of secondary origin is that, as the disease becomes generalised, the primary disease changes, and the original seats of the disease, whether of eczema or psoriasis, lose their distinctive features, and, like the newly-invaded parts, become red, dry, harsh, and covered by a more or less abundant exfoliation of large dry, papery scales. During the period of involution there may be some constitutional disturbance—a sense of chilliness, loss of appetite, slight fever with acceleration of pulse and respiration, and diminution of the quantity of urine, with increase of colour and acidity, and a deposit of amorphous urates. On the other hand, the constitutional disturbance is sometimes so slight as to be unnoticed by the patient.

The established disease.—There are three cardinal symptoms: redness of the skin, exfoliation, and the more or less universality of the disease. The redness is a very conspicuous feature; it is usually a bright red colour, becoming dull on exposure to cold. It disappears on pressure, leaving the skin of a yellowish tint as long as the pressure is maintained, revealing hyperæmia and diapedesis of blood corpuscles. The skin is dry and more or less tense, as a rule; and sometimes there are rhagades or fissures at the natural folds of the skin. It has been much disputed whether the skin is thickened in general exfoliative dermatitis or pityriasis rubra, and this is equivalent to saying that in some cases it is so and in others not. Thus Devergie stated that in P. rubra the skin is always thickened; Hebra, on the other hand, remarked that thickening of the skin is always wanting. On the whole, thickening of the skin is not common, but it does undoubtedly occur; when present, it is due to inflammatory exudation into the skin. In a few cases œdema is present, especially in dependent positions. Desquamation is also a prominent feature of the disease. The skin is covered with large scales which are shed abundantly, so that in the course of a night handfuls, or as much as will fill a pint measure, may be collected from the bed of a patient not under local treatment. The scales are usually large, and have been

compared to hop-bracts, flaky pie crust, or paper. The size and character of the scales vary according to their source; they are usually largest on the back and extremities; they are usually detached at their free edges, and are arranged in rows according to the movements of the skin, presenting, as Erasmus Wilson described them, "frills" of semi-detached epidermis, or armour-plate arrangement. On the face and abdomen the scales are usually smaller, but have the same general characters. On the palms and soles the hyperæmia is not so marked, papules appear beneath the cuticle, which becomes hard, stiff, thickened, and glazed, and subsequently is exfoliated in large laminæ, or is thrown off in one sheet. On the scalp crusts form, the exfoliated epidermis being mixed with sebaceous secretion, of a dirty grayish colour. In some cases the exfoliation is not in such large scales, but has more of a branny character though it may be abundant. The more furfuraceous scaliness is characteristic of the type described by Hebra.

Distribution.—D. exfoliativa is one of the few diseases in which the whole of the skin, from the crown of the head to the soles of the feet, is affected. In the majority of the cases it is universal, and affects not only the whole of the skin, but the dermal appendages also. In some cases it stops short of being universal; the palms and soles, occasionally the face, and more rarely, the abdomen, escaping. How large an area of the skin is necessary to constitute the disease is disputable; but the use of the term *general* exfoliative dermatitis excludes separate patches of a similar character, with great clinical advantage even if with some violence to nature.

When the disease is fully established the clinical picture is very striking and characteristic. The universal invasion of the skin, the redness, dryness and scaliness impress themselves very forcibly on the observer. It makes no difference, when it has become general, whether the disease be of primary or of secondary origin; and it is impossible to say from the appearance to which category it belongs. The disease when not treated, or relapsing after treatment, may last many years, twenty or even forty, and at the end of this time present just the same characters of redness and continual exfoliation universally affecting the skin.

The amount of irritation of the skin varies considerably. In some a constant burning of distressing character is complained of; in others itching is severe, and may lead to excoriations from scratching, producing secondary lesions, pustules, and boils; in others, again, but little complaint is made, which is the more remarkable when the extent and character of the disease is considered: this clearly points to personal differences in the irritability of the patient. Whilst dryness of the skin is one of the most characteristic features of the disease there are exceptions to the rule; and sometimes patients perspire to a moderate degree, especially in the armpits and groins. In one of Devergie's cases the sweatings were so profuse that the patient required a change of clothes three times in the course of the night, as they were soaked in perspiration. This is quite exceptional; indeed it is often difficult or impossible to induce sweating,

even with powerful sudorifics, including pilocarpin and hot-air baths. When any exudation does take place it is watery, and does not, as a rule, stiffen linen like that of eczema. Occasionally a few bullæ may appear in the course of the disease, but this is very exceptional. Devergie stated that in two of his cases "le pityriasis rubra se transforme en pemphigus," and spoke of them as "P. pemphigoïde." Pustules and boils may occur; in my experience, especially in the stage of recovery.

The dermal appendages share in the changes in the skin. In the majority of cases the nails of both hands and feet are affected. The changes are of various kinds: sometimes the nails are dry, rough, brittle, and discoloured, with longitudinal or transverse ridges, or are pitted. Sometimes they are pushed up by inflammatory exudations or exfoliations from the nail-bed, which attach themselves to the under surface of the nails, which grow out like large talons or claws. It is very common for the whole of the nails to be shed in the attack; and I have known this to occur more than once in the course of the attack. The newly-grown nail may be deformed. The hair, not only of the scalp but also of the face and elsewhere, becomes detached and falls out; and in some cases, especially the most acute ones, the patient becomes almost or entirely bald. The hair follicles are not destroyed, however, except in very severe and protracted cases; so that, when recovery takes place, the hair grows again. The lymphatic glands may be moderately enlarged, but this is by no means universally the case. They occasionally suppurate.

Constitutional symptoms.—A variable amount of constitutional disturbance accompanies the disease of the skin. Pyrexia, which was mentioned as sometimes attending the advent of the disease, may persist; the temperature rarely exceeds 102° F., but has been known to be as high as 104°. Occasional rises may occur in the course of the disease with exacerbations of the inflammation of the skin. The majority of cases are, however, practically apyrexial throughout. At the outset of the disease the general health and nutrition may be good, and in many cases are maintained throughout the illness. In very protracted cases, however, especially in those of the Hebra type, there is slowly progressive emaciation, with great failure of the bodily powers. In some cases there is marked disturbance of the nervous centres; delirium may occur, and insanity has declared itself, especially in drunkards. Sleeplessness may be a troublesome symptom, but in the majority of cases the sleep is not interfered with; much depends on the amount of pruritus, and this, as already stated, is of variable severity. Patients suffering from exfoliative dermatitis show a marked susceptibility to changes of temperature. The urinary system presents less disturbance of function than would be expected in the universal implication of so closely correlated a structure as the skin; speaking generally, a lowered specific gravity, with a diminished output of urea due to the lessened amount of nitrogenous food taken by patients long confined to bed, is all that is observed. Albumin

may appear in the urine, sometimes as a mere temporary event, at other times persistent, due to nephritis of a progressive nature; and it should always be watched for. Its presence always indicates a greater gravity in the case. In a case under Dr. Galloway's care a body reducing Fehling's solution was present, so-called "alkaptonuria"; but this must probably be regarded as a mere coincidence. The digestive system suffers little as a rule; but anorexia may be troublesome, and the bowels require regulation. Bronchitis is a dreaded complication, and broncho-pneumonia may supervene; they are amongst the dangers of the disease.

Progress and event.—In the majority of cases the progress of the disease, in whatever direction, is extremely slow. In favourable cases, suitably treated, the exfoliation is apparently quickly removed; as the epidermic scales, being sodden by local applications, become less apparent. But the local applications have but to be discontinued for a day or two for the abundant desquamation of papery scales to be reproduced. The degree of hyperæmia is the criterion of the progress of the case; gradually in the course of weeks or months, in cases that do well, the skin becomes less red. The improvement is generally more or less contemporaneous in all parts of the skin, but relapses and recrudescences are extremely common. Eventually the vivid redness disappears, the exfoliation ceases, and the skin is left of a dull red or brown colour, dry and somewhat shiny or glazed. Frequently at this stage a number of small red, shiny, smooth, and flat-topped papules may be detected on careful inspection. I believe this appearance to be due to the papillæ of the skin, which, as Dr. Crocker has shown, are transversely enlarged. The horny layer has been stripped off, and the rete so thinned as to expose the hyperæmic papillæ. This "lichenification" might deceive the inexperienced observer who had not watched the progress of the case, and be mistaken for L. ruber planus. During the disappearance of the disease pustules and boils sometimes arise. The skin may remain red or brownly pigmented for some months after the subsidence of the disease, and is often unnaturally dry. Patients apparently cured are very liable to relapse, or to have a recurrence of the disease; but I have had several cases under my care in which the cure was complete and the patient kept under observation for years afterwards.

In cases which take a downward course the redness and desquamation continue until near the fatal event, when the skin ceases to be red, but is discoloured, dry, and scaly. In such cases the digestion fails and emaciation results; in fact the patients sink into a state of marasmus; death is usually determined indeed by marasmus, renal disease, or pulmonary disease, such as bronchitis, pneumonia, or tuberculosis.

It will be convenient next to describe the *General exfoliative dermatitis of the newly born*, *Epidemic exfoliative dermatitis*, and *Relapsing desquamative scarlatiniform erythema;* all of which have points in common with general exfoliative dermatitis, and are by some writers included under this name.

DERMATITIS EXFOLIATIVA NEONATORUM.—Ritter von Rittershain and others have described a disease of a non-contagious nature occurring in foundling institutions on the Continent; but none has been recorded in this country. In the Foundling Asylum at Prague nearly 300 cases occurred in ten years. It usually occurs between the first and the third weeks of life, but may be delayed until the fifth. It is characterised by redness and desquamation, which at first are local, but later become general, or universal. The eruption is completely dry, or presents a slight moisture on the under surface of the scales; sometimes there are flaccid bullæ, like pemphigus foliaceus. It may present various aspects, and may be complicated by vesicles and bullæ. There is neither fever nor marked constitutional symptoms. The desquamation may be branny, or in large flakes; over the hands and feet large pieces of epidermis may peel off. It is a very fatal disease, the mortality being about 50 per cent. The fatal event is caused by marasmus and failure of the body heat, with or without diarrhœa. It has been variously regarded as a pemphigus foliaceus, and as an exaggeration of the natural exfoliation of the newly born (Kaposi). In the light of Copeman's investigations on the "Epidemic skin disease," it is not improbable that some condition of the milk which is of course the main or sole nutriment of infants, may be a factor in the production of this disease.

"EPIDEMIC SKIN DISEASE," "EPIDEMIC EXFOLIATIVE DERMATITIS," "EPIDEMIC ECZEMA."—In 1890, outbreaks of an acute disease of the skin occurred in the Poor Law Infirmaries of Paddington, Marylebone, and Lambeth, in a manner quite unfamiliar to the medical officers, and new indeed to the dermatologists of London. The outbreak at Paddington was studied with great completeness and ability by Dr. Thomas Savill. These Infirmaries contain the derelicts of humanity broken down by age, misfortune, and disease; the majority of the inmates are in the middle and later periods of life, and always contain amongst their number some cases of chronic eczema. Between 1st July and 31st October 163 cases, or 19·2 per cent, of the inmates of Paddington Infirmary were attacked by the disease in question. It began as a papulo-erythematous, erythematous, or vesicular eruption in patches; these soon became confluent, the skin was of a crimson redness, thickened and infiltrated, and covered with desquamated scales or flakes. In about two-thirds of the cases there were vesicles and moist exudation, whilst in the remaining one-third the eruption was dry throughout. The skin remained in a crimson inflamed condition for several days or several weeks, continually shedding its epidermis many times; the size of the epidermic exfoliation varied from an impalpable powder to an entire cast of the hand. In exactly half of the cases the body was covered with the eruption, sooner or later; but in some cases it was in patches. It was accompanied by a variable amount of constitutional disturbance, anorexia and prostration being the most marked features. Fever was moderate or absent, except in cases complicated with boils or some other local

inflammation. Recrudescences or relapses were a common feature of the disease. The average duration of the attack was 7½ weeks. Eighteen of the cases ended fatally by marasmus, coma, or pulmonary œdema. Falling of the hair and shedding of the nails occurred in the majority of the severe cases. Burning and itching of the skin were present in most of the cases, and in some pigmentation remained after the attack. Most of the patients were in advanced life, but this was not merely due to the greater number exposed to the disease being past middle life, for the percentage proportion increased in nearly each decade after the fourth. Men suffered more than women, the average being 23·67 men to 15·74 women.

Dr. Savill and Dr. Risien Russell, independently, found a diplococcus in the epidermic scales, the exudation from the skin, and in the blood, which grew readily in artificial media of cultivation, which grew better in the presence of oxygen than without it, which did not liquefy gelatine, or but slowly, and which inoculated into animals produced no effect, except in one instance in which Dr. Savill succeeded in communicating the disease to a rabbit, from whose blood typical cultures of the same organism were made, and verified by microscopical examination. No explanation of a satisfactory kind was found for the epidemic outbreak of the disease. Subsequent outbreaks have appeared in the same and other Poor Law Infirmaries. Dr. Monckton Copeman, from the investigations of outbreaks in the Bethnal Green and Shoreditch Infirmaries, is of opinion that, whilst from the evidence he has collected milk is a most important factor in this form of epidemic skin disease, the evidence falls short of proof; but the presumption is that milk is in some way connected with the causation of the malady. Dr. F. W. Andrewes, who undertook bacteriological examinations of the outbreaks investigated by Copeman, found no organisms either in the blood or in the affected skin; in most cases where micro-organisms have been found they have been of no constant species, but have included various sorts of staphylococci—some of which at least are normal inhabitants of the human skin; while others which he had tested had no pathogenetic powers on rodents. Dr. Andrewes is of opinion that the organism found by Drs. Savill and Russell is derived solely from the skin, and that it is probably the staphylococcus epidermidis albus which is found in the skin of healthy persons. Clark and Knox also, in investigations upon Savill's later cases, obtained no conclusive results concerning this diplococcus.

By the kindness of Dr. Savill and Mr. Lunn, I had the opportunity of seeing many of these patients in the Paddington and Marylebone Infirmaries. In the generalised cases the condition conformed in all essential respects to the type of more persistent D. exfoliativa, but the patches were indistinguishable from eczema. These outbreaks are of great interest and importance, and the reader will do well to refer to Dr. Savill's full account, and to the reports of the medical officer to the Local Government Board for 1893-94. In their epidemicity, contagiousness, and rapid course in congregations of the sick poor, they differ from

the ordinary types of general exfoliative dermatitis. During the last twenty-three years I have rarely been without a case or cases of the latter in the general wards of the London Hospital; but there has never been any extension of the disease to the other patients in the hospital; nor have any of the nurses in attendance on the cases contracted the disease. Moreover, in three cases under the care of Dr. Pringle, investigated by Dr. Risien Russell, the diplococcus of Savill's cases was not found.

RELAPSING DESQUAMATIVE SCARLATINIFORM ERYTHEMA.—This is an affection described by Besnier and Féréol, of which I have seen several examples. Its onset is abrupt, with shivering, malaise, headache, and sometimes sore throat. Fever is present for a part of its course (100° to 104° F.) The redness begins locally, but soon becomes general, and the throat is often congested. When the eruption is at its height the fever usually abates. It is followed by desquamation, which may be branny or in large flakes; but the redness does not disappear when the desquamation takes place, which distinguishes it from scarlet fever. It may run its course in a week or ten days, or last for several weeks. A transverse marking of the nails sometimes follows its occurrence; but the nails are not shed, as in exfoliative dermatitis. Relapses are of such frequent occurrence as to be indicated in the name.

It is not contagious nor epidemic. It may occur in the course of enteric fever and acute rheumatism; and may be caused by external and internal toxic agencies, among which may be mentioned belladonna, opium, quinine, arsenic, mercury (which may also cause it when applied externally), chloral, chloralamide, carbolic acid, salicylates, and antipyrin. It is most apt to be mistaken for scarlet fever, and may give rise to undesirable differences of opinion between medical men. Protracted cases may so far resemble slight cases of general exfoliative dermatitis as to be indistinguishable from it; usually, however, it differs in two particulars—in its rapid course, and in that a single shedding of the skin takes place with each attack of erythema; whereas in exfoliative dermatitis the process is continuous, and, unless treated, will go on for months or years.

The narration of a case will give a good notion of scarlatiniform erythema:—

The patient was a man aged twenty-seven. There had been scarlet fever in his house five weeks before his tenancy of it began. None of his family contracted scarlet fever. Six weeks before he came under my care his illness began with sore throat, preventing him from swallowing solids. Two days later he was sick and had itching of the hands and chest. His medical attendant said he had scarlet fever, and notified the case at once. The eruption, which was red and slightly papular, began on the fingers and spread up the arms to the chest, and then became universal. He was feverish. A week after taking to bed peeling began and became general. When first seen, six weeks after the beginning of his illness, the skin over the greater part of his body was red, the colour disappearing on pressure, but not infiltrated. The skin generally

was covered by fine branny scales, but on the hands and feet there were large pieces of exfoliating epidermis. His temperature was from 99° to 100°. He was put to bed. At first a lotion of glycerine of subacetate of lead was applied, and when the hyperæmia was reduced, the ointment of glycerine of lead. At the end of four weeks, when he was discharged, the skin was rough, but not exfoliating; there was still a good deal of hyperæmia, and the papillæ were prominent.

In this case no relapse took place. Often several relapses occur following the same course; they may have a seasonal relationship. Eventually the tendency is lost and dies out.

Pathology of general exfoliative dermatitis.—Our knowledge in this direction is far from complete. Its *histo-pathology* reveals the changes occurring in the skin, but supplies no explanation of their nature.

The horny layer has been found of variable thickness, the cells, retaining their nuclei and imperfectly keratinised, are raised up into lamellæ which desquamate. The stratum granulosum is usually thinned and the kerato-hyalin diminished. The rete, which is thinned over the papillæ, sends down long, narrow processes between the papillæ, and this produces a great apparent enlargement of them. The prickle layer is thinned or absent, and the prickle cells flattened horizontally. Jadassohn, however, has found extreme proliferation of the cells of the rete, and invasion of immigrant cells. In the early stages the changes in the cutis are mainly confined to the part of the skin above the longitudinal vessels of the superficial plexus, with comparatively little change in the lower half of this part. The papillæ are enlarged transversely as well as longitudinally, and the immediately subjacent corium is infiltrated with cells (Crocker). Later, the infiltration, which still has its maximum in the apices of the papillæ and upper part of corium, becomes more general; but in the lower parts it is confined chiefly to the neighbourhood of the vessels and sweat-glands. The collagenous bundles are thickened and closely surrounded by embryonal (mesoblastic) cells (Gironde); but, according to Vidal and Leloir, the collagenous bundles are normal. At first increase of nuclei of connective tissue cells may be noticed; later, the bundles are thickened and sclerotic. A great accumulation of yellow and brown pigment is found in the lower part of the cutis (Jadassohn and H. Hebra). The blood-vessels have been found dilated and their walls thickened (Petrini and Babes); and thrombi have been found in the vessels. The lymphatic spaces have also been found dilated in some instances. In cases of prolonged duration the papillæ, sweat-glands, and hair follicles have been found atrophied, and the sebaceous glands replaced by lobules of fat. Hans Hebra sums up the changes in a case of long standing, by saying the general appearance is that of a scar with epidermis over it. The peripheral cutaneous nerves revealed no morbid change in one case in which they were examined.

The changes described thus display evidences of inflammation of the

skin and parakeratosis, and the atrophic results of the inflammation on nearly all the tissues of the skin when it has been of an enduring character. The masses of yellow and brown blood pigment explain the pigmentation left behind by the attack; but, as Unna remarks, two clinical symptoms especially require explanation: the striking persistence of the hyperæmia, and the subsequent atrophy and tension of the skin.

As regards the *general pathology* of the disease we are in still greater ignorance. Whether scarlatiniform erythema and epidemic dermatitis should be included in the group of cases to which the name General exfoliative dermatitis is given is open to doubt. Clinical convenience inclines us to keep them apart, for a while at least. Nevertheless they are closely allied conditions, and they may serve to guide us to the true nature of exfoliative dermatitis. The fact that not only scarlatiniform erythema but exfoliative dermatitis (Galloway) have been known to follow, and apparently to be caused by the internal administration of mercury, is significant. A more acute form of exfoliative dermatitis occasionally occurs at the terminal stage of Bright's disease (uræmia); in the epidemic exfoliative dermatitis suspicion points to milk poisoning as the cause; scarlatiniform erythema has been met with in connection with enteric fever and acute rheumatism, as well as after the administration of various drugs (see "Drug Eruptions," p. 920). Other forms of erythema (roseola) occur in enteric fever, diphtheria (especially after injections of antitoxin), cholera, and so forth. These facts all suggest some blood intoxication, and, in accordance with the present predominant views of pathology, may lead us to ascribe the unknown factor in exfoliative dermatitis to bacteria or to their toxin products. We must be careful, however, not to carry our analogical inferences too far, and must remember that whilst in some diseases there is proof (enteric fever and diphtheria) or presumption (small-pox, rheumatism) of bacterial agency in causing the exanthem associated with certain diseases, on the other hand, under other conditions the probabilities are against microbic influences being the cause, as in the eruptions induced by mercury or chloralamide. I must content myself with pointing out that the tendency of the evidence is in favour of exfoliative dermatitis being caused by some blood alteration, which may be due to microbic, mineral, or vegetable poisons introduced from without; or it may be autochthonously engendered within the body. The histological evidence points to an action from within; but whilst we can readily understand simple or polymorphic or scarlatiniform desquamative erythema, which are comparatively transitory affections, being caused by some poison admitted into the system or generated within it, as in Dr. Pye-Smith's case of dermatitis from chloralamide, it is more difficult to admit such an agency for a disease which may persist for years. Nevertheless it must be remembered we were in such a position as regards the lifelong disease of leprosy before the discovery of the B. lepræ; and that we are still in that position as regards syphilis, where there is surely a contagium vivum, yet one which hitherto has eluded detection.

Diagnosis.—If we restrict the name General exfoliative dermatitis or P. rubra to cases in which the hyperæmia and continuous exfoliation are nearly or quite universal, and the condition not a merely transitory one, no difficulty or little difficulty in diagnosis exists. It only remains to try to discover the path by which this condition has been reached; that is, to determine whether it is primary in origin or secondary to some other chronic disease of the skin; for, as already stated, there is nothing to distinguish between these two classes of cases when once the disease is fully manifested. To discriminate between them we have to depend on the history of the involution; but cases of eczema and of psoriasis may be so widely diffused as to create some difficulty. In eczema the presence of a discharge that stains and stiffens linen will generally reveal its nature. It is, however, in very extensively distributed squamous or "dry" eczema that the difficulty occurs; yet even in such cases there is usually a history of a "running" at some period of its existence; and, though extensive, it lacks the universality of distribution of exfoliative dermatitis, and the nails are not so generally affected. In eczema the skin is thickened, whilst in most cases of exfoliative dermatitis this is not the case. Psoriasis is recognised by its predilection for certain sites, by the raised and thickened skin covered with heaped up silvery scales, and by outlying foci or spots with psoriatic characters, which are not present in exfoliative dermatitis. It must be remembered that both eczema and psoriasis may pass into exfoliative dermatitis, when the initial characters will be lost. The rapid extension of primary exfoliative dermatitis distinguishes it from eczema or psoriasis, which lasts for months or years, as a rule, before they become generalised. Epidemic exfoliative dermatitis, or Epidemic eczema, is distinguished by its occurrence in epidemics (so far confined to Poor Law Infirmaries) in being contagious, and in running a shorter course. The diagnosis from relapsing scarlatiniform erythema has been given in connection with the description of the latter: it runs a much shorter course, and the desquamation is a single, not a continuous act. Pemphigus foliaceus shares with exfoliative dermatitis universality, chronicity, and exfoliation; but with care, except perhaps in the terminal stage, flaccid bullæ and moist offensive discharge will be recognised. Pityriasis rubra pilaris (Devergie) rarely gives rise to difficulty in diagnosis; but when it becomes general, or practically universal, some difficulty may arise. The history of its early stages, when it is largely confined to the hairy parts, where acuminated papules are seen, is usually sufficient to allow of discrimination. The tumour stage of mycosis fungoides may be preceded by a chronic foliaceous dermatitis, but in the cases I have seen it was not universal, and was not diagnosed as general exfoliative dermatitis.

Prognosis.—General exfoliative dermatitis must be regarded as a serious disease. Under the most favourable circumstances it means a total disablement for the time, and will involve confinement to bed, probably for months. In a certain number of cases it ends in death. Its exact mortality cannot be accurately calculated from the number of

recorded instances. Though the cases described by Hebra, three in number, all ended fatally, a greater experience has given us a larger hope. A favourable issue cannot, however, be absolutely predicted in any given case. It is difficult to say whether the acute or the more chronic cases are the less favourable, or if the issue be determined by whether the disease be primary or secondary. Individual experiences differ on these points. Similar differences of opinion exist as to whether the disease is more grave in the young or in the old; my own experience is that it is less hopeful in older than in younger subjects. All experienced observers are agreed, however, that the disease is most fatal in persons broken down by intemperance or organic disease. Especially grave is the existence or supervention of renal disease in its course, as was emphasized by Mr. Malcolm Morris in a recent discussion on the subject at the Dermatological Society of London. The general state of nutrition, the integrity of the viscera, and the observed course of the disease under treatment are the only guides in forming a prognosis in any individual case.

In my experience the prognosis is best in the acute cases.

Treatment.—In every case the patient must be confined to bed; no measure short of this will be successful, as local treatment, which is the all-important element in cure, can only be carried out effectively by such means. The mattress should be a fairly firm one, and the patient should lie between the blankets. The diet should be of a simple character; and alcohol should not be given unless the patient be dependent on such stimulants by habit, or the bodily powers be failing.

Local treatment.—Opinions are divided whether, in the first instance, watery or oily applications are the best. My experience is entirely in favour of the former; and the plan I adopt in carrying it out is the following:—Two garments are made of lint—a jacket and trousers, with socks (also of lint) attached. A mask of lint should be used for the face and head. A roughly-made suit of this kind generally lasts about a week, when it should be burnt. This suit of lint is to be kept constantly soaked with the following lotion:—Glycerine of subacetate of lead, and pure glycerine, of each one ounce; water to one pint. A basin of the lotion, which in cold weather may be warmed, should stand at the patient's bedside, so that the lotion can be squeezed over the lint suit, without removal, by the nurse or patient, as often as necessary, and the lint kept moist day and night, and never allowed to become dry. A daily bath is a comfort to the patient, but is not a necessity; the continuity of the applications is more important, and the avoidance of chill, which is of all things to be most dreaded. The object of the glycerine in the lotion is to lessen its volatility. No fear of absorption of lead need be entertained, not even if the lotion be kept continuously applied for weeks or months. It promptly relieves the burning and itching, softens the epidermic scales, and gradually reduces the hyperæmia in a way no other local remedy can rival. When the hyperæmia diminishes a change should be made to a greasy application; and

lanoline and vaseline in equal parts, simple vaseline, spermaceti ointment, or the ointment of the glycerine of subacetate of lead are amongst the best for this purpose. Ointments containing mineral powders, such as the oxide or carbonate of zinc, are better avoided, as they are apt to block the mouths of the follicles and to favour pustulation. A few days determines whether the change from a wet to a greasy application be an improvement. If not, and the hyperæmia return, it is necessary to go back to the lead lotion; and this may happen again and again. If, on the contrary, the ointment is well borne, it is to be continued until the skin resumes a nearly natural condition, and local treatment can be discarded. Of other watery applications a lotion of liquor carbonis detergens (℥iv. or more to the pint), which relieves itching, or the lactate of lead lotion, may be tried. If oily preparations are preferred in the first instance, Dr. Crocker's calamine liniment is an excellent one (Calaminæ ppt. gr. xl., zinci oxidi gr. xxx., aq. calcis, ol. olivæ, āā ℥ss.); Liq. carbonis detergens may be added to it, and the liniment should be applied by bandages or the lint suit. Lassar's paste is also a suitable application. The subsequent local treatment is the same as when watery applications are employed in the first instance. Baths suitable for patients suffering from exfoliative dermatitis are the following: ℞ Starch 1 lb., bran 2 to 6 lbs., linseed 1 lb., gelatine 3 lbs., gluten (size) 6 lbs., to 30 gallons of water; or alkaline baths, such as ℞ Borax 3 oz., bicarbonate of soda 2 to 10 oz., carbonate of soda 2 to 6 oz., to 30 gallons of water; or a compound alkaline bath, as ℞ Bicarbonate of soda 6 oz., borax 1½ oz., water to 30 gallons. The temperature of the bath should be from 98° to 100° F. The continuous bath is sometimes employed, and affords relief.

Internal treatment.—There is a unanimity of opinion that, in comparison with local treatment, internal treatment is of very little importance and most observers go so far as to say that internal treatment is unnecessary. Arsenic has been tried by all physicians, and is now regarded as useless, if not harmful. Antimony (vinum) in 5 to 7½ minim doses has been advocated by Hutchinson and Jamieson; but patients appear to do just as well without it, provided suitable local treatment be employed. Thyroid extract has been fairly tried, but proved of no avail; indeed on account of its depressing effects it should not be given. Diaphoretics, including pilocarpin subcutaneously, and diuretics, may occasionally be of service; but I use them less frequently than formerly. Dr. Crocker is of opinion that quinine in an effervescing potash mixture is of more service than any other internal remedy. Mr. Malcolm Morris has advocated opium in cases where the kidneys are healthy, and sleeplessness and restlessness are troublesome. Cod-liver oil may be given with advantage in some cases. The possibility of relapse and recurrence must be borne in mind, and the patient should therefore be kept under observation.

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S. M.

PITYRIASIS ROSEA

SYN.—*Pityriasis rosé* (Gibert), *P. circiné* (Horand), *P. circiné et marginé* (Vidal), *P. rubra aigu disséminé* (Bazin), *P. disséminé* (Hardy), *Pseudo-exanthème érythémato-desquamatif* (Besnier).

THE number of names, the list of which is not exhaustive, given to this not very common or important disease illustrates the multiform nomenclature of dermatology. The majority of English and American dermatologists now use the name P. rosea for the disease, of which Gibert was the first to give a good description in 1860; but M. Brocq discriminates between the P. rosé of Gibert and the P. circiné et marginé of Vidal. Duhring and Colcott Fox, the latter of whom was the first to call attention to the disease in this country, have given good descriptions of it.

The disease may occur in adults and in children; but it is probably more common in the latter. It usually begins as a solitary patch situated in the neck, trunk, abdomen, or arms—the "primitive patch" of Brocq. This patch is oval or circular, its borders are slightly raised, of a rosy tint, and covered by fine scales; whilst its centre has a faded appearance. It closely resembles a patch of P. circinata or L. circumscriptus. After growing and lasting four or five days it is followed by what has been called the "secondary" eruption. Gibert described this as "little furfuraceous, very slightly coloured, itchy, irregular macules, scarcely exceeding a finger-nail in size, numerous and thickly set, although always separated by some intervals of healthy skin, distributed upon the upper part of the body, and in preference upon the neck and the upper part of the chest, but possibly invading regions beyond, even to the thighs, in such a manner that the total duration of the eruption, which dies out gradually in the regions first attacked *pari passu* with its

further extensions, is prolonged for six weeks or two months." Bazin, Hardy, and Vidal have described ringed forms of the disease, which some regard as distinct; though most writers at the present time, following Duhring, look upon these as only varying phases of the same affection. The two forms usually coexist. Manifested as described above, and generally extending in a downward direction, on the neck, trunk, upper parts of arms, sometimes on the thighs, rarely below the knees, the skin is occupied by pale, slightly scaly macules and rings, separate and coalescing into gyrate patches with wavy borders which are often most marked on the lateral aspects of the trunk. The face and hands are rarely affected. The scales are very fine, and it often requires a good light to detect the delicate and faint macules and rings. Usually the oval and rounded rosy patches, with the fairly well defined extending borders and fading centres, are seen in all stages; and thus the various phases may be studied. After lasting a month or six weeks, or, more rarely, three or even six months, the eruption gradually subsides, leaving a slight pigmentation where the lesions have been.

The eruption is attended with a variable amount of itching, sometimes worse at night, and often absent. It is stated to be more common in the warm season. As a rule little or no constitutional symptoms are present; there may be slight fever preceding or during the eruption. According to Unna, microscopical examination reveals an amount of inflammation quite out of proportion to the apparent triviality of the disease, clinically speaking. Of its nature nothing is really known. Its appearance and course suggest a parasitic cause, and Vidal has described a minute organism, the *Microsporon anomœon;* but this observation has not been confirmed by others. Other observers have found micrococci, but there is no reason to believe they are specific, but rather saprophytic cocci usually found in the skin. The disease is not contagious.

Diagnosis.—The identification of the affection is the most important point, and presents some difficulties. The slightly scaly patches resemble very closely some very slight cases of psoriasis, such as are seen in children and young adults. The mode of involution is, however, different, and P. rosea shows no preference for the seats of election of psoriasis. This alone is perhaps not a point to depend upon, because, in the very slight cases of psoriasis for which it may be mistaken, the knees and elbows often escape. The scales in P. rosea, however, lack the silvery and heaped-up character of psoriasis, and on their removal no hyperæmic papillæ are visible beneath. The eruption, too, is more extensive than in such mild cases of psoriasis; and the maculæ and ringed patches are unlike ordinary psoriasis. It may be mistaken for lichen circinatus or seborrhœa corporis; but the range of the latter is more limited, and chiefly confined to the centre of the chest, front, and back; and the ascertained fact of rarely changed body-flannel, which has led to the name of the "flannel eruption," is usually wanting. The eruption of P. rosea presents some resemblance to T. versicolor; but the M. furfur is absent. From eczema P. rosea is distinguished by its symmetry. P. rosea presents some resemblance to the

early syphilides—in the macular and circinate forms; it is distinguished from these by the absence of constitutional symptoms and of lesions in the throat and mouth, which in syphilis are usually present at this stage.

No internal treatment is needed; a boric acid ointment externally is sufficient.

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S. M.

ROSEOLA

ROSEOLA is a name but little employed at the present time, though formerly it was in much greater use. Willan describes the following varieties:—R. æstiva, R. autumnalis, R. annulata, R. infantilis, R. variolosa, R. vaccinia, R. miliaria.

Roseola is now classified as a variety of congestive erythema (E. roseola), and is regarded as idiopathic or symptomatic, according to the circumstances in which it occurs.

Idiopathic roseola is an eruption especially met with in infancy and childhood. It may begin with mild constitutional disturbance and slight fever (rarely above 100° F.), in connection with gastric or intestinal derangement or teething. After a day or two an erythematous or faintly papular eruption appears, limited to some one part, such as the face and neck, or one limb; or it may be diffused over the body. The eruption may be the first sign of the malady. It is of a rose colour, and may be scarlatiniform or morbiliform in character. It may be accompanied by slight redness of the palate and fauces. After lasting for a few days it fades, leaving either no trace of its existence or very fine branny desquamation.

Symptomatic roseola occurs in connection with small-pox, vaccinia, and more rarely with varicella, cholera, and diphtheria; and as a "drug eruption" after many medicinal substances; it is perhaps the most common of the drug eruptions (see article, p. 920).

R. variolosa deserves brief description. It is more common in some epidemics than others. It usually appears on the third day, but sometimes follows the initial rigor. Several varieties occur. The most common is situated on the extensor aspects of the elbows and knees, on the backs of the hands and fingers as far as the first phalangeal joints, and on the back of each foot in a line corresponding with the extensor tendon of the great toe. "Its distribution is so characteristic that it enabled the writer several years ago to diagnose a case in which there was no other

reason to suspect small-pox" (Hilton Fagge). It may closely resemble rötheln, and I have known it to be mistaken for this disease. It generally lasts a day or two, and is followed by the characteristic eruption of small-pox, which, however, may spare the parts where the roseolar eruption was previously situated.

R. cholerica is an erythematous or papular (E. papulatum) eruption that appears about the seventh or tenth day of the disease during the stage of reaction. It generally lasts about three days or longer, sometimes even for a fortnight, and may be followed by slight desquamation over prominent parts (Mr. F. M. Mackenzie). It occurs chiefly on the back of the hands and feet, and also on the forearms and legs, and has a bluish red or livid colour. It is a rare accompaniment of cholera, and Hilton Fagge noted that it chiefly occurred in cases that ended favourably.

Diphtheritic eruption.—Chiefly after injections of antitoxin serum, but occasionally independently of these, an eruption, which was formerly described as roseolar or scarlatiniform but which is now regarded as erythematous or urticarial, occasionally makes its appearance. In the report of the Clinical Society's committee on the antitoxin of diphtheria, 1898, it is shown that eruptions were present in 34·7 per cent of cases treated by antitoxin; and, as eruptions are rare in cases not so treated, they are regarded as directly attributable to the use of antitoxic serum. Of the 220 cases of rash, 161 were described as erythema,—simple, papular, gyrate, or punctate, 117 being cases of simple erythema; 37 as urticaria; urticaria and erythema were associated in 17, and in 3 cases of erythema and in 2 of urticaria the rash became petechial (*vide* p. 935).

Diagnosis.—Roseola has to be distinguished especially from scarlet fever and measles. This is done by attention to the date of the first appearance of the eruption in relation to the onset of constitutional symptoms, the initial seat of the eruption, and the severity and character of the concomitant symptoms. Care on these points will usually prevent a mistake. The possibility of the eruption being due to variola, and of its being caused by medicines, must also be borne in mind.

Treatment.—A simple aperient, and a stomachic or febrifuge mixture, with tepid sponging, are all that is necessary for idiopathic roseola.

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S. M.

PSORIASIS

Definition.—A well-marked disease of the skin of common occurrence. The lesions begin as minute scaly points in the epidermis, on a more or less reddened base, which increase or extend so as to form circumscribed scaly patches, or gyrate lines about areas of all sizes. It is chronic in course, and almost invariably tends to relapse.

History.—It is always difficult to recognise the diseases of the skin, as we now know them, from the descriptions given by ancient writers; but it seems highly probable that the leprosy "whiter than snow" from which Naaman and Gehazi suffered was psoriasis. For our leprosy, even the whitened anæsthetic patches, could never merit so poetical a comparison; indeed, psoriasis is the only disease known to us now which could be so regarded. And Naaman at the time of his cure was strong and in active service, which again would tally better with psoriasis than with leprosy. However this may be, it is certain that there has been a long lasting confusion between these two affections.

Celsus distinctly describes our psoriasis as one of his four classes of impetigo; and a few lines farther on we can recognise the guttate variety of the disease under the name of ἀλφός, one of his three classes of vitiligo. From his time down to that of Willan we find the names Psora and Lepra applied loosely to all kinds of squamous diseases. Willan and Bateman in their Atlas (plate vii.) give a representation and a clear description of psoriasis, which they speak of as "Lepra vulgaris, the common leprosy"; whilst under the heading Psoriasis, the second division of scaly diseases, we find easily recognisable pictures of P. vulgaris, Acute and chronic eczema, Seborrhœic dermatitis, and P. gyrata. Willan restricted the name Lepra (Græcorum) to those eruptions which assumed circular forms, and applied to the rest the name Psora leprosa, or Psoriasis, to prevent a confusion with scabies, the psora (*nosos* understood, the itchy or scaly disease) of many earlier writers. Although the inutility of this division was pointed out by Alibert, Fuchs, Hebra, and others, and the danger therein of confusion with true leprosy (L. Arabum), the use of the two names was upheld by most of the prominent French and English writers during the first half of this century, and even later. Erasmus Wilson revived the name Alphos; but, with this exception, all the more modern writers have used the name Psoriasis or P. vulgaris for all forms of the disease, and have reserved the word Lepra exclusively to denote the leprosy of the present day.

Frequency.—Dr. Crocker states that the proportion of psoriasis to other skin diseases in this country is 7 per cent; Nielsen, taking the mean of the combined statistics of several of the largest towns in Europe, found that the percentage was 6·5 per cent. In North America, J. C. White, by

means of similar combined statistics from several large towns, estimated it at 3·28 per cent; and Bulkley, from his own large statistics, at 3·69 per cent. It would seem, therefore, that the malady is much more common in Europe than in America (North); it is also more often met with in France and England than in Germany and Austria.

Causes.—*Age.*—Psoriasis may begin at almost any age. I have myself seen a first attack in a woman over sixty, and have found the lesions well established in children between two and three years old. Twice I have been assured by mothers, who knew the disease, that their children had it directly after birth. Kaposi refers to one case in a child of eighteen months, whose father was psoriatic; Bulkley has met with five cases reported to have started during infancy. It may begin at any age up to seventy, but it is rare for it to appear even at sixty.

Sex.—The statistics of different observers vary too much in detail to allow us to compare accurately the susceptibility of the two sexes, but they certainly show definitely that men are affected more frequently than women,—in the ratio of about 3 : 2; and that the relative proportion of men is much larger after twenty years of age than before. Nielsen's (Copenhagen) and Bulkley's (New York) figures both coincide in this respect.

Social rank and *occupation* seem to have no effect on the liability to the disease. It is widely spread, but the influence of race upon its development has not been studied with care. It is common in northern latitudes (in Iceland 8 per cent of all skin diseases, including 50 per cent of scabies), and is rare in negroes (Morison); but, bearing in mind the action of vapour baths in accelerating the disappearance of the eruption, it is possible that climate may have more to do with the distribution than race.

Symptoms.—The eruption begins in the form of a minute point or papule of about the size of a pin's head, from which, in its earliest stage, a scale can easily be removed. Kaposi states that the red spot is not covered with scales until after a lapse of several days, but a scale can be readily obtained by scratching slightly as soon as the redness is discernible; if not visible to the naked eye, it can be detected by using a lens (Besnier). The redness is not ordinarily so bright as that of an acutely inflammatory disease, such as scarlatina or papular eczema, but is of a dullish or even reddish brown tinge. The scale when detached is bright and dry, and from the first is generally white and even silvery in colour, or looks like mother-of-pearl.

The removal of the scale discloses a fine membrane covering the whole of the underlying patch. It is bright, but never oozes, and is so transparent that the colour of the blood-vessels is well transmitted through it. Bulkley, who first described this feature, rightly considered it as peculiar to psoriasis.

If this membrane be gently scratched away the surface will be covered by minute bleeding points. The bleeding soon stops, and in a day or two, or even in a few hours, the scale is reproduced. The production of

these bleeding points, which are caused by the abrasion of the tops of the enlarged and elongated vascular loops in the papillæ, was pointed out by Devergie, and by Hebra also, as being a useful differential sign. Although it cannot be considered as pathognomonic, for it occurs also in warts, it is certainly quite conclusive with regard to syphilis, the disease which most nearly resembles psoriasis, and with which there is the greatest danger of confusion.

As the spot enlarges by spreading outward at its edge, it often becomes very slightly raised above the surface, and the scaling is more marked. The borders are then seen to be sharply separated from the surrounding skin, marking the patch out with a decisive contour; but they are never raised above the level of the rest of the patch, as is the case in the circinate erythemas.

Various adjectives have been used to denote the size and manner of growth of the individual lesions; and, so long as they are used clearly for convenience of description, and not to indicate any differences in the character of the disease, they have a certain utility. Thus the earliest stage, when the disease appears as a dot, is spoken of as *P. punctata;* the second, when it resembles a drop of fluid, or rather of mortar, upon the skin, as *P. guttata.* As the lesions extend and form round patches of the size of small coins the term *P. nummularis* is used; and if the patches, whilst extending actively at the periphery, are clear in the centre, it is called *P. circinata.* If several such circles meet they form a large irregular circle, or a curved figure, having a polycyclic outline, and we then have *P. gyrata* or *figurata.* If the patches do not clear in the centre, as is usually the case, but coalesce to form larger plaques, the condition has been spoken of as *P. discoides;* and when this condition affects large areas, as *P. diffusa* or *scutata.* M'Call Anderson has described as *P. rupioides* a form of the eruption in which, on spots intermediate in size between the guttate and nummular, the scales accumulate in the shape of limpet shells, like those of the rupia of syphilis.

Course.—After having reached a certain size, usually between that of a florin and that of the palm, the patches cease to extend, and sooner or later begin to fade. Either they fade gradually over their whole area at one time, or white patches appear at different parts and coalesce, or the restoration begins at the centre and spreads outwards until the disease is entirely replaced by normal skin. If this restoration occurs as the disease extends a circinate figure is formed; or, if the progress is one-sided, an arc of a circle. The ground over which these lines of disease have passed is, as it were, exhausted; and when two circles meet, the arcs between the points of contact disappear, and a single waving or cyclical line results, which continues the progress onward over the normal skin.

The return to the normal is complete so far as regards the infiltration and desquamation, but occasionally pigmentation remains when the patches have disappeared. It is usually slight and transitory, though Crocker and Neumann report cases of deep and permanent brown discoloration (*P. nigricans*). Staining of the sites of the lesions is not

uncommon after the administration of arsenic, but it then usually occurs elsewhere at the same time. Achromia (Hallopeau) must be very rare, except as a result of the use of chrysarobin.

Distribution.—Though no part of the outer skin is exempt, the sites of predilection are the extensor surfaces of the limbs and the scalp; after these the lumbar and gluteal regions.

The primary lesion may occur anywhere, though I have never happened to meet with a case where the face was attacked first. Ordinarily the earliest manifestation is found on the extensor surface of one of the limbs, and generally on the forearm or lower leg. In most cases before long the rough corrugated skin over the elbows and knees is attacked. In old-standing cases patches may be found on all four joints, but in those which are less extensive this symmetrical distribution is not so common. Far too much reliance has been placed upon the implication of these regions as a diagnostic symptom, for not only, when the disease is spread over the rest of the body, may they be entirely free, but they are liable to be the seat of other diseases, such as lichen planus, chronic eczema, and syphilis, which to an inexperienced eye may be indistinguishable from psoriasis. In some chronic cases the patches on the elbows and knees constitute the only remaining signs of the disease; and there they may remain, seemingly unchanged, for years.

On the scalp the patches are usually small (nummular), and not so clearly marked out as on the body; they scale more freely than other affections, and the intervening skin is healthy. They may unite to form a cap of dense scales held together by the hairs, and yet the growth of the hair is for the most part wonderfully little interfered with by the disease. These patches must not be confused with the similar, often sharply circumscribed, masses of thick white scales, (apparently) of seborrhœic origin. They can be distinguished by breaking up the mass with forceps, when it will be found that the scales in psoriasis are horizontal, but those in the seborrhœic affection vertical, forming long sheaths round each hair. The patches of psoriasis on the scalp are often pale, but they assume the red colour as soon as they pass out on the open skin. When combined with seborrhœa the scaling is more diffuse, and the eruption, if it extend to the skin of the face or neck, may appear as a bright red band with a festooned edge.

On the face the lesions are rarely pronounced, and are at times difficult to distinguish from other scaly affections. They are mostly guttate and nummular, and sometimes gyrate. Behind the ears the patches are often well marked; they tend to crack and to become excoriated, and may be then easily mistaken for eczema. The concha and external meatus are frequently affected.

In the axillary and cruro-genital folds, and anal fissure, the lesions are very prone to macerate and to lose all their scales; it is then sometimes impossible to distinguish them from syphilitic condyloma, or from seborrhœic eczema; so likewise on the scrotum, where the skin easily cracks, and becomes acutely inflamed. A dry gyrate psoriasis of the

scrotum is practically indistinguishable from a gyrate syphilide. I have seen two cases where psoriasis existed for months on the scrotum alone before the appearance of any lesions elsewhere; in this case the diagnosis could only be inferred from the healing effects of tarry applications.

The disease may occur on the palms and soles alone, but this is exceedingly rare; indeed, even in widespread attacks, these are infrequent sites. The patches are irregular, and the scaling is replaced by rough exfoliation of hard dry skin, leaving a red base exposed beneath. Dr. Crocker has seen one case of slight scaling of the ordinary kind. If the skin be abnormally thick, especially about the sole and heel, small plugs of horny epidermis can be picked out, leaving pits behind.

Affections of the nails are by no means infrequent in psoriasis, and observers who have given special attention to this point find that they are present, in some degree, in about 20 per cent of all cases.

The mildest and also the most frequent of the lesions are the punctiform pittings on the surface of the nail-plate; these may be perfectly smooth and the rest of the nail may retain its polish intact. Schütz describes this as *Tüpfelpsoriasis*, Besnier as *état pointillé*. The former observer has noticed in these cases a number of minute red spots on the lunula, under the covering fold of skin, which disappear momentarily under pressure. Unna attributes the pits to a transitory psoriatic affection of certain of the papillæ of the nail-matrix, leading to a corresponding stoppage in the proliferation of the nail-substance. To such a passing attack the red spots may correspond, for they too are but of brief duration, and therefore not often seen. At times the papillæ would seem to bleed, for small ecchymoses embedded in the substance of the nail may be found side by side with the little pits. The pits may be scattered irregularly; but they often lie in a band transversely across the nail. If the whole matrix be attacked, and for a longer time, this band of pits is replaced by a transverse furrow. The number of the pits varies considerably; there may be only one or two of them, or the whole nail may be covered. If, instead of being smooth, they are eroded, as is often the case, the nail then looks like the outside of a thimble. The erosions appear as if they had been bored out from the surface with a drill, and, when filled with dirt, look like so many black dots on the nail. When a furrow is thus eroded a deep rough section of the nail-substance is exposed, showing a coarse, longitudinally fibrous base of a dirty gray or fawn colour. Owing, probably, to the action of the foot-gear these changes are not often seen on the toe-nails, except on those of the great toes. Any depression or erosion once formed in the lunula remains of course until it grows out at the peripheral edge of the nail-plate; which means a period of four to five months for the small nails, and twelve months for the great toe-nail (Samuel).

It is easily seen on many nails that the smooth depressions are the forerunners of the deep erosions; and a rapid transition from the one to the other may be well observed during a very acute and general attack.

If the primary affection of the matrix spread to the nail-bed, the process of destruction of the nail is continuous from the lunula forward; but the nail-bed may itself be primarily affected, and the process then usually begins at the edge of the nail. The nail-substance grows thicker, more translucent and horny, and is raised up by the growth of a firm mass of scales beneath. These scales become brittle and crumble away, leaving the nail separated from the bed; or the nail-substance itself becomes dull and friable, and frays away at the edge. Such disorganised nails are easily thrown off, or, if still held by some part of their base, become twisted and distorted. In one or other of these ways the whole of the nail may be eroded and destroyed, and replaced by a few brittle, irregular, and lumpy crusts which lie like moulds in grooves in the dried-up nail-bed. It is extraordinary how conditions even such as these may improve, and perfect nails be reproduced, even when the process of destruction has been many times repeated.

Either one or all of the nails may be attacked, and occasionally the lesions are symmetrical on the two hands or feet; this is specially noticed in the general cases which are associated with acute erythrodermia or arthropathic symptoms, when all the nails are commonly involved. Onychogryphosis (*vide* art. "Diseases of Nails," p. 787) is often associated with the chronic cases of this kind, but it must be regarded as a trophoneurosis rather than as a manifestation of psoriasis.

There is a general consensus of opinion that no one of these changes in the nail-tissue in psoriasis is characteristic of the disease. The pitting is frequently seen in cases of chronic eczema, and may be met with also in syphilis (H. v. Hebra) and P. r. pilaris (Unna); and the other lesions, furrows, erosions, discolorations, and subungual hyperkeratoses are found to be identically reproduced, not only by these same diseases but also by lichen planus and the fungi of "ringworm" and favus, so that in the absence of characteristic lesions in other parts of the body it is impossible even for an experienced eye to discriminate the one from the other. But psoriasis may occur primarily on the nails (Hardy, Schiff, Bruck, and Meneau) some time before its appearance elsewhere; and, although the lesions are not pathognomonic, the pitting of the surface is so much more frequent in psoriasis than in any of the other affections (Max Radt), that their presence should suggest a careful search for other symptoms of the disease elsewhere.

General symptoms.—In the great majority of cases no general symptoms accompany an ordinary outbreak of psoriasis. Indeed, the general condition of the patients is usually so good that it seems to bear out Hebra's saying that psoriasis is a disease of the healthy. This, however, like most epigrammatic generalisations, is but partially true. Still, the constitutional symptoms which can be connected definitely with psoriasis are remarkably few: there is no fever, or in very acute and general eruptions in very sensitive patients sometimes some slight febrile disturbance may occur; and there are some associated rheumatoid affections to which reference will be made later. But commonly no

alteration in the general health, directly due to the attack, is to be detected, although a previous lowering of vitality (exhaustion, nervous shock) may usher it in. Itching is often present, especially when the disease is extending, and it may last until the extension stops; but individual patients vary greatly in this respect, some are quite free from irritation, in others it is maddening. The worst instances are found in the overfed, especially in large meat-eaters, and topers. In gouty people the eruptions are prone to become inflamed and irritable, hence gout has been regarded as a factor in the causation of the disease.

Pain occurs only when there is cracking or excoriation of the skin; and sometimes during acute outbreaks in the joints when arthropathies supervene. The internal organs are not affected, except reflexly, as in asthma.

Variations.—The form, intensity, and distribution of the eruption may vary remarkably, not only in different patients but even in the same patient at different times. A single small patch may be noticed on almost any part of the body, and in a few days, or weeks it may be, the skin may be widely covered with guttate or nummular lesions. Or the original patch may remain almost of the same size for months, and then be tardily followed by other scattered lesions. In many cases these remain as the only manifestations, even when neglected, as they generally are; and occasionally, but rarely, they disappear, either spontaneously or under treatment, and the patient remains free from further outbreaks. More frequently the disease, after a longer or shorter period of quiescence, begins again to extend with more or less rapidity. In some patients these relapses have a certain seasonal periodicity, most of them taking place in the spring or autumn, some during the summer, and a smaller number in the winter; but too much stress has been laid on this supposed periodicity, for the great majority of cases relapse quite independently of seasonal changes. There are some persons, and by no means those in whom the disease is most severely manifested, in whom a fresh outbreak is always coming on whilst the last is disappearing, so that the skin is never free. Usually there is nothing to account for these fresh extensions, either in the health of the patients or in their manner of life; and so far we have no indication of their immediate cause. Unlike angio-neurotic erythema, the form of eruption varies not only in different patients, but even in the same patient at different times and on different parts of the body; this may presumably be due to latent variations in the physiological condition of the skin, and in the phases of its nutrition.

The amount of hyperæmia varies greatly; it is generally more marked in rapidly extending eruptions, and much slighter in more chronic lesions; but the reverse may often be seen. In some the lesions are always livid and angry, in others always pale.

The scales also vary greatly in quantity and character. The silvery scales generally disappear as the eruption passes beyond the guttate or nummular stage, and they become yellower and more sparse, except perhaps on the elbows and knees. The change is probably

due to the impregnation of the lamellæ with the sweat and sebum which accumulate beneath; for in less fatty skins, when the scales form dry layers between which the air can penetrate, the nacreous aspect is preserved, and the affected area may look brilliantly white. Where the hyperæmia is more intense the scales are less persistent than on those patches which are paler and more chronic.

At times the patches, especially behind the ears and on the hands, may be irritated and take on a quasi-eczematous action; the surface then becomes cracked or excoriated, and exudes; the whole skin is inclined to be thickened and infiltrated, and the scanty scales are mixed with serous scabs. Cracks are not infrequent in old patches on account of their excessive dryness and want of elasticity. And the aspect of the lesions may be much altered by the tearing off of the scales in the efforts to relieve itching, and by the consequent inoculation of pus cocci with formation of scratch pustules.

Psoriasis and Seborrhœa.—Some of the lesions found in the still vaguely defined and very multiform affection seborrhœa so closely resemble those of psoriasis as to be at times exceedingly difficult of discrimination. Unna regards seborrhœa, or, as he names it, eczema seborrhœicum, as very closely allied to, if not actually merging into psoriasis; and there are psoriatiform, gyrate, and papular forms of seborrhœa which undoubtedly resemble psoriasis very closely; so much so indeed at times as to render a differential diagnosis impossible. When psoriasis is confined to the regions chiefly affected by seborrhœa—namely, the head, ears, face, chest, upper back, and flexures—the doubt may be always there, for in both affections we have the same red scaly lines and patches. When the firm white scales are present the doubt is removed; these are found in psoriasis, but not in seborrhœa. Yet on the face, which scales but slightly, and in the axillary, anal, and scrotal region, where the scales are often macerated away and a raw surface left exposed, the two diseases may to the eye be inseparable. The difficulty is increased by their not infrequent symbiosis; and the psoriasis may remain masked until the removal, by treatment, of the seborrhœa and greasiness of the skin reveals its characteristic patches and scales. It has been supposed that psoriasis may originate in such seborrhœic dermatoses, either directly through transition, or indirectly, as do tertiary syphilides, by finding there a place of least resistance. The reverse, however, is certainly true, that psoriatic lesions become contaminated with seborrhœa; and, if the seborrhœa become eczematous, the psoriatic patches may take on an exuding eczematous aspect. (This is not the psoriasis eczémateux of Devergie; he designated by this name the acutely inflamed, irritable, diffuse condition, with ragged scales and easily exuding, which is found in psoriasis patches which are passing into a state of exfoliative dermatitis.) More commonly the effect of the seborrhœic condition of skin is to render the scales in certain regions yellow and greasy. The patches in such parts may then assume a salmon tinge like that of the psoriatiform seborrhœa, and it may appear as if that affection were present on the head and trunk, and a psoriasis

vulgaris on the limbs. On the scalp the ordinary discrete patches of psoriasis are often lost in the diffuse scaling of the seborrhœa.

But the most striking combination of the two affections is one not very unusual, but which I have never seen specially described. A psoriasis patient with a seborrhœic skin (oily, yellow-brown pigmentations and desquamations, seborrhœa capitis, and perhaps some "lichen circinatus") may manifest lesions over the sternum, or between the shoulders, which will spread, often with great rapidity, to form large patches with sharply defined geographical edges. In some cases this condition has spread over the trunk and extended to the limbs. The colour is a dark or even livid red, and it is covered, not by scales, but by a glazed minutely nodular layer, as if a solution of gum tragacanth had dried unevenly over the surface. There may be no real desquamation, and it never weeps. It is very obstinate, it is little influenced by tars, but it will give way gradually to pyrogallol and chrysarobin. On the limbs similar patches may occur discretely, but the eruptions there are usually those of simple psoriasis.

Psoriasis and Exfoliative dermatitis.—At times the course of a psoriasis undergoes a sudden change. The patient has a feeling of malaise and chilliness, with rheumatoid pains and pruritus, and sometimes feverishness; a scarlatiniform dermatitis then sets in, and raised erythematous-looking blotches and even urticarial-like rashes may appear. These spread, and more or less quickly (in a few days or weeks) cover the whole body, from scalp to toes. The previously existing patches of psoriasis are lost in the general invasion. The colour turns from a bright to a livid or deep red, the thick skin of the hands and feet is thrown off in large flakes, and that of the limbs becomes either rough and furfuraceous or is covered with large papery lamellæ. Beneath these lamellæ the skin is moist; but after they have fallen it is left in a thin, soft, shining, tender condition, and of a deep dark-red colour. The face is drawn and tight, and there may be some ectropion. If this state continue, as it may do for months, the nails and hair are liable to fall, and various disorders of the internal organs supervene.

These symptoms may arise spontaneously, as it seems, in untreated cases, and even during the first outbreak of the disease; or they may follow an irritation set up by strong medicaments, such as tar or chrysarobin, or even (Besnier) under too extensive indiarubber dressings. This excessive irritability generally comes on suddenly; but in some cases it may be constantly present. It is certainly more common in those who are affected with chronic rheumatic joint affections and rheumatoid arthritis, and in drunkards; but in the majority of cases there is no apparent cause. It occurs more often in connection with psoriasis than any other skin disease, but as it also occurs in persons suffering from eczema, lichen planus, erythema papulatum, and other affections, it must be looked upon rather as an accident than as an essential part of the disease. It is usually regarded as a milder form of pityriasis rubra, though Devergie and Besnier distinguish between this form of psoriasis rubra

acuta and the slow, malignant, cachectic type—the *herpétide exfoliatrice* of Bazin—and the pityriasis rubra of Hebra. Certainly the prognosis is different, for whereas the former is amenable to treatment, often readily so, and may recur more than once and disappear, the other is always fatal. But clinically it would be difficult to draw a sharp line between well-marked cases of the two conditions before the fatal marasmus had set in.

In rare instances the extension of the pityriasis is only partial; Bulkley has recorded such a case in which it was confined to the limbs; and I have seen an instance in an old man in which the change slowly affected the psoriatic lesions on the limbs and head only, leaving the body free.

Pathology.—The discrepancies in the statements of different investigators of the pathological anatomy of psoriasis are doubtless due to the differences in the lesions from which their specimens were obtained. It is, for example, rarely mentioned whether the sections were taken from a fresh eruption or from one of long standing; or whether the disease were at the time stationary or spreading; nor is it recorded from which part of the body they were taken, a most important point considering the normal differences in the structure and growth of the skin in different regions. The want of care in eliminating accidental details, or such as are common to other diseases, has also helped to increase the confusion; and the mental bias towards one or other etiological hypothesis has, in some instances, obviously led to the exaggeration of certain features and to the neglect of others.

Three changes are, however, recognised by all the more recent writers as constantly present—(i.) an increased production of epithelium; (ii.) a change in the character of the epithelium; (iii.) a dilatation of the vessels. It has long been recognised clinically that the most minute lesions of psoriasis are indicated by hyperæmic spots which give characteristic scales when their surface is slightly scratched. Whether the scales may appear before the redness is difficult to say, for they are not always recognisable by the eye alone, even with the guidance of the vascular redness beneath; and whenever examined microscopically the vascular changes are always found to accompany the scaling.

Thus Polotebnoff, by denying the existence of any cell-exudation, and by ignoring the qualitative changes in the horning process, is enabled to interpret the incipient redness, and the underlying dilatation of the papillary vessels which causes it, as a proof of the angio-neurotic nature of the disease. Hebra and his school also regard the redness as primary, but construe it as an early symptom of an inflammation of the cutis to which the epidermic changes are consequent. On the other hand, those who hold that the first sign of the lesion may be a papule without redness,—that is, that the scaling may precede the redness,—naturally look upon the epidermis as the primary seat of the disease. Thus Wertheim (1862) attributed the redness to a secondary hyperæmia, whether a congestive hyperæmia or a stasis, due to some persistent though

unknown form of irritation. Unna holds that the scaling is always immediately antecedent to the redness, as indeed it would have to be (whether clinically demonstrable or not) to accord with the view that the disease originates in the epidermis. Squamous affections of the epidermis, similar to psoriasis, do exist without apparent vascular dilatation ; but, when we consider the very close interdependence of the epidermis and the vessels of the upper layer of the corium, it is not surprising that in a disease in which the changes are so rapid and extensive as those in psoriasis the two should be affected almost synchronously. It suggests rather that one cause is producing changes in vessels and epidermis alike, than that the changes in either area are a by-product of the other. It will be better, however, to consider the alterations of the two layers separately.

Changes in the epidermis.—The clinical character of the scales has been sufficiently described above, and we have now to consider the pathological characters of the change in the horning process which leads to their production, since these have an important bearing on the question of the causation of the disease.

Tilbury Fox, Robinson, Jamieson, Auspitz, Thin, and Hans v. Hebra have all contended that the primary seat of psoriasis is in the epidermis. Auspitz classified it as a parakeratosis, that is, an abnormal form of cornification. The normal epidermic cell consists of a cell-membrane connected on its inner side with a dense mass of fibrillæ which fill the interior of the cell like a scaffolding ; in a clear space in the middle lies the nucleus, and the cell-protoplasm fills up the meshes between the fibrillæ. On the outer side of the membrane these fibrillæ project like spines and unite with similar processes from neighbouring cells to bridge over the intracellular spaces, and hold the whole layer together. As the cells pass upward their outer surface becomes by degrees more cornified, the intracellular network breaks up, forming keratohyalin granules, the nucleus disintegrates, the protoplasm shrivels, the intercellular processes rupture and disappear, the whole structure is flattened down horizontally, and finally nothing of the original cell is left but the hardened horny outer membrane.

In a parakeratosis, such as psoriasis, this process is imperfectly carried out. The keratohyalin is not formed (Suchard), and the stratum granulosum is therefore absent. During periods of diminished activity of the morbid action, the granular layer may appear in its normal thickness (Vidal and Leloir), or during attempts at healing may be greatly increased (Neumann). It is the absence of the refracting granules of keratohyalin which allows the red colour of the plaques to be seen so clearly when the scales are removed (Leloir). The nucleus and protoplasm do not disappear so completely as they do in the normal skin ; and the horning process being imperfect, and the cell-mantle thus still permeable, they soak up fluid and keep the cell soft and pliable. The intercellular bridges do not become hard and break apart ; thus the horny cells, instead of being cast off singly, as in the normal skin, are held together

in large flakes. The moisture prevents the absorption of the skin fat; thus, when these flakes are lifted up so that the air can penetrate under them and dry them, they become highly refractile, and take on their characteristic white glistening appearance. The abundance of mitoses in the cells of the lower layers of the epidermis (palisade cells, but chiefly in the prickle cells immediately overlying them) is evidence of their unusually rapid proliferation.

The papillæ, in well-developed lesions, are often enormously elongated, and this elongation Neumann attributed to a new growth of the papillæ themselves. Auspitz pointed out that it is not the papillæ which grow, but the epidermis; and that the new growth of epidermic cells, taking the line of least resistance, stretches downward between the papillæ into the corium, so forcibly elongating the papillæ and producing the effect illustrated in Neumann's figures. This explanation is borne out by Kromayer, who found that the increase in the size of the papillæ was most marked in lesions taken from the back and neck, where normally they are very slightly developed. And the elongation is by no means peculiar to psoriasis, but may be seen in any keratosis (such as callosities or corns) where there is an increased growth of the epithelial layer on a circumscribed area; and also in lupus, syphilis, pityriasis rosea, seborrhœa, and other chronic inflammatory diseases of the skin. An increase in the size of the papillæ may take place owing to the pressure of dilated vessels and œdema, and to the increase of their cellular contents; but this is a simple deformity, and not an active enlargement (Unna). Kromayer insists that both papillæ and epidermis must necessarily take part in the growth, for, as in his opinion the epidermis and papillary body form respectively the parenchyma and stroma of one organ, it is impossible for one element to grow without the participation of the other.

Changes in the blood-vessels.—Examination of one of the earliest diagnosable lesions of psoriasis shows that the vessels of the superficial layer, and those forming the papillary loops, are already slightly enlarged and elongated, and are surrounded by an infiltration of cells. This infiltration varies in amount, according to the acuteness, intensity, and duration of the eruption. The younger and more active it is, the greater the infiltration and the more do the polynuclear round cells preponderate; the older and less active it is, the less the amount of infiltration, and the greater the number of mononuclear cells. The origin of these cells is uncertain. Kromayer regards the polynuclear cells as identical with Ehrlich's neutrophile blood-cells; yet Unna says that leucocytic immigration is not a part of the pure process of the psoriatic papule, but is indicative of the psoriatic form of eczema. He looks upon them as connective tissue cells; but the possibility of determining whether inflammatory infiltration cells have been derived from leucocytes, endothelium, or connective tissue cells, is at present too doubtful to allow of any definite decision being made in this particular instance. But that the connective tissue does take some active part is shown by the swelling

and increase of its cells around the vessel. The loop of vessels in the papillæ is not only increased in calibre but is also lengthened and contorted. Kromayer thinks that this alteration is merely artificially produced by the shrinkage following excision, and says that it is found more or less in sections of normal skin; but although the loops are certainly often contorted, they are undoubtedly increased at the same time, both in length and breadth, in comparison with the neighbouring vessels in the normal skin close by. Wertheim, who first described the hypertrophy of these loops, attributed it to a stasis caused by some unknown impediment to the circulation. Unna agrees with him as to the existence of a stasis, for he finds, from the examination of carefully injected specimens, that the venous legs of the loop, and indeed the venous capillaries of the whole of the superficial vascular network, are distended and lengthened; but he attributes this not to any direct impediment to the circulation but to a chemotactic action from the side of the epidermis which, by its continuous attraction, first lengthens the blood-vessels and then passively dilates them.

The amount of cell infiltration is usually slight, and confined to the immediate neighbourhood of the uppermost layer of vessels. It may, however, affect these lying beneath the papillary layer, and especially those which supply the sweat-glands and their ducts; so that the lumen of the glands may be blocked up. Dr. Crocker found a free infiltration around the hair follicles, which extended even down to the roots in the deeper layers of the corium; and, combined with this, a proliferation of the epithelium of the follicular walls with the formation of finger-like elongations. So deep an infiltration must be unusual, especially in early lesions such as he described; for almost all the other writers are unanimous in stating that the infiltration is ordinarily confined to the upper vascular layers, and that the deeper parts of the corium are but slightly affected in some lesions of old standing.

No one has as yet discovered any changes in the sebaceous glands or their vascular supply; and Rindfleisch alone has described a perineuritis as occurring in one case. Others (Vidal, Leloir, Neumann, Kromayer, and even Polotebnoff) have failed to find any alteration in the nerves supplying the affected regions.

The evidence of the presence of œdema is conflicting. Auspitz denies it, and it is difficult to recognise when present in very slight degree. On the other hand, Crocker and Unna have found it among the very earliest changes in incipient lesions.

The question whether psoriasis be an inflammatory disease depends of course on the definition of inflammation. There is no heat nor pain, it never suppurates, nor does it form granulations or scars; yet we have, though only in small degree it is true, dilatation of vessels with œdema, and the presence of leucocytes around them betokening the response of the tissues to an irritation. Even some of the opponents of its inflammatory nature recognised this; for the elder Hebra said that the tissue changes are "comparable to inflammation," and Kromayer admitted that, although

the clinical characters, in his estimation, are not those of inflammation, the histological characters might well be "likened to inflammation."

The hypothesis of *chemotaxis*, propounded by Pfeffer and Leber (1888), first suggested how irritants situated at a distance could excite these reactions by attractive force; and Unna (27), applying the principle to the skin, showed that it is capable of explaining how microbes, situated in the outer layers of the moist epidermic cells, may attract leucocytes, impede the blood by so doing, and thus cause the vessels to dilate. It is quite obvious that a presumptive parasite may be situated in the epidermis in psoriasis, and cause at once an inflammatory hyperæmia of the nearest blood-vessels, even before it had had time to injure the cells immediately around it. In psoriasis this explanation is still but a speculation, for the micrococci, to which Unna attributes the irritant action, have too much the characters of saprophytes to allow us to consider them as specific agents.

Relation of psoriasis to other diseases.—Beyond the gouty state (including the results of overfeeding with meat and alcohol) and certain arthropathies to be referred to later, there seems to be no form of disease, debility, or dyscrasia which necessarily exerts any influence on the course of psoriasis. Wasting diseases, such as cancer, diabetes, and phthisis, have caused it to disappear, but more frequently they leave it unaffected. It is not dependent on chlorosis, indeed many aver that it increases as chlorosis disappears. Its coexistence with the most various forms of nerve lesions Polotebnoff has, unwittingly but conclusively, proved to be mere coincidence.

It may be present in combination with other forms of skin affections, such as seborrhœa, eczema, syphilis, ichthyosis, and prurigo; and I have seen it in conjunction with lichen planus. Several cases are known in which epithelioma had developed on old psoriasis patches; and de Amicis and Pick have found mycosis fungoides starting in a like way.

That psoriasis has first appeared after attacks of scarlatina has been several times recorded, and has happened at least twice in my own experience; it has also been found as a sequel of the eruptions of other infectious fevers, such as erysipelas and variola. The initiation is presumably one of the remarkable changes in the nutrition of the tissues which follow these diseases, and is not due to the eruptions themselves; for several writers have noted its supervention after typhoid.

Still more curious and suggestive is the origin of psoriasis on the site of vaccination, which has been recorded by several writers (Rohé, Hyde, Piffard, Chambard, Gaskoin, Morris, Fox); for it has occurred not only when the relatives were psoriatic, but also when there was no psoriasis in the patient's family, and no apparent source of contagion. Most of the cases were inoculated with animal lymph; and although it has generally arisen after the fall of the crust, it has done so where bovine lymph had been inoculated and had not taken (Rohé, Piffard, Hyde). From the time of Jenner downwards, eczematous outbreaks have been described as following vaccine inoculation, and it has also been often

noted that the inoculation had removed existing eczematous eruptions; Wood had a case in which vaccination with bovine lymph removed an extensive psoriasis from a young man; whilst two of his young sisters, for whom the same stock of lymph was used, both acquired the disease at the site of inoculation. The latter cases recall the origin of impetigo and tinea from the vesicles formed by animal lymph; but the former is difficult to explain, unless by a systemic influence upon the nature of the whole integument. A similar reaction is found in regard to pregnancy; for whereas some patients lose their psoriasis during their period of gestation in others it is uninfluenced or even increased in amount.

Etiology.—Notwithstanding researches in every direction—social, statistical, chemical, microscopical, and bacteriological—the cause of psoriasis is still unknown. The disease may begin at almost any age; it attacks both sexes; and those in all conditions of life, the well-to-do and the poor, the fat and the thin, the dark and the fair. Extensive analytical schedules (Bulkley, Schütz, Nielsen, and others) give no clue to the mode of selection of the victims; the results of bacteriological investigations are discredited, and minute histological examinations have not determined with certainty the site in which the work is begun. We are therefore reduced, if we wish to take up some working hypotheses, to make a kind of eclectic review of the various opinions on the causation of the disease. These may be placed under three headings, namely, (i.) the humoral, (ii.) the neuropathic, and (iii.) the microbic.

(i.) The *humoral hypothesis*, as upheld by the older writers, explained psoriasis either as a manifestation or hanger-on of gout; or of what the French school called "herpetism" or "arthritism." Bulkley (5) quotes the opinions of Holland, Watson, Prout, and Garrod as to the concurrence and alternation of this disease with gouty and rheumatic states; and says that "the evidence increases that it is more or less allied to the blood states which are known as gouty or rheumatic." The evidence, however, seems in many of the patients to consist in "an acid state of the blood" with deposits of uric acid, urates, oxalates of lime and stellar phosphates; and in the beneficial action of copious water-drinking, with abstension from alcohol and meat. Gout may undoubtedly irritate a psoriatic eruption, as it may a parasitic eczema, or a rhinitis, or an erythema; but the attempt to establish a causal connection between the gouty or rheumatic state and psoriasis has now been almost universally abandoned, yet not without the most careful consideration. And indeed any one who sees a large number of patients suffering from psoriasis, and looks at them with an unbiassed mind, would have to confess that any such explanation, even on the most liberal interpretation, could apply but to a very small minority of them.

The diathetic views of the older French writers, although still partially adhered to by some modern clinicians—even by Brocq, have been so thoroughly denounced by Besnier in the name of the St. Louis school as to render any further criticism unnecessary. Erasmus Wilson's notion,

since revived by R. W. Taylor, that psoriasis is an attenuated form of hereditary syphilis, may be dismissed at once as untenable. Some years ago Wolff suggested that psoriasis is due to the action of a parasite which is probably ingested with the food, and thus entering the blood-stream finds its way to the skin and gives rise to the eruption. Tommasoli proposed that some bio-chemical ferment, generated in the body, produces the lesions on the skin; but both he and Wolff seem to have since abandoned their notions, which indeed had nothing in the shape of facts to support them.

(ii.) *The neuropathic hypothesis* appears to have been originated definitely by Barduzzi and Weyl, although Tilbury Fox had already (1873) said that the trophic nerves seem to play a large part in psoriasis. Eulenburg stated that it is closely associated with a general neuropathic condition, and especially with such symptoms as hysteria, neurasthenia, and psychical over-strain. Weyl thought it most probable that psoriasis depends upon a congenital functional weakness of the nerve centre regulating the nutrition of the skin, and that the eruption is the peripheral expression of the central disturbance excited by irritations acting on certain hereditary lines.

At the present time the neuropathic hypothesis has a large body of adherents, who support it mainly in opposition to the parasitic; averring that the disease presents certain features incompatible with those of other dermatoses of known parasitic origin. The chief of these objections are that the disease is hereditary; that it is not contagious; that it cannot be inoculated; that it is seasonal; that, like urticaria, its appearance may be incited by local irritations or injuries; that it is symmetrical; that it may be induced by shock, grief, or anxiety; that it has sometimes a distinct connection with asthma, and that it is incurable. But the argument on which most reliance has been placed to prove its nervous origin is the alleged frequency of its coexistence with other nervous symptoms, especially in very neurotic patients; and with various forms of arthropathies which are presumed to be of nervous origin.

The concurrence of psoriasis and certain forms of joint affections is not a new topic among French dermatologists. It was noticed by Alibert and Rayer, and described by Gibert and Cazenave; later still Devergie seriously discussed the nature of their connection. The writers who in recent years have treated the subject most fully are Bourdillon, Polotebneff, and Kuznitzky.

Bourdillon records 33 cases, of which 27 were men and 6 women. He found that the arthropathies generally affect the small articulations of the limbs, especially those of the hand and wrist; they are slow in their course, are preceded by pain of a dull aching or lancinating character, are accompanied by little effusion, and soon tend to form contractures and anchylosis, but not tophi. They resemble most closely fibrous or nodular rheumatism, to which, however, they do not exactly correspond. Attacks, always painful, keep recurring and lasting for months. The absence of morbid history, family or personal, and the negative results of anti-

rheumatic treatment, forbid us to regard them as of rheumatic origin. They rarely precede the eruption of psoriasis, but follow it (29 times) at varying periods. They are also associated with very various nervous symptoms, such as neuralgias, melalgias, and myalgias; and they occur especially in persons of neurotic inheritances, and in those who have suffered from neuroses in their youth. In the absence of any other possible explanation Bourdillon therefore felt justified in regarding them as trophic in origin, and belonging to the group of nervous arthropathies.

Polotebnoff supports Bourdillon as to the characteristics of the joint lesions in psoriasis and their nervous origin, but dwells more especially upon the neurotic element in his psoriatic patients. He cites instances of members of neurotic families in which the appearance or exacerbation of psoriasis ran parallel with various nervous symptoms, such as headaches, migraine, hysterical attacks, cramps, insomnia, epilepsy, various palsies and paræsthesias, and lunacy; in others the nerve symptoms and psoriasis were due to injuries received even six or eight years previously. On these discoveries he bases the opinion that psoriasis is one of the multiple symptoms of a vaso-motor neurosis, in which the disturbances in the blood circulation, as they occur in the different organs of the body, sometimes extend to the skin. The result of his histological investigations satisfied him that the local lesions of psoriasis depend simply on a dilatation of the blood-vessels—an angioneurosis, on which the abnormal increase in the formation of epithelial scales is, either directly or indirectly, dependent. The scaling he regards as a simple exaggeration of the normal desquamatory process.

Kuznitzky has gone much farther than his predecessors in the advocacy of the neurotic supposition, for he has not been content to speak merely of supposititious nerve centres and simple hyperæmia, but has also attempted to define precisely the site and function of the centres concerned. He repudiates the dictum of Hebra that the subjects of psoriasis are generally healthy people; they are on the contrary persons who have inherited or acquired an irritable nervous system. Psoriasis itself is not inherited, but the disposition to it; and this proclivity consists in an abnormally irritable central nervous system. The rapid changes in the cutaneous phenomena and the occurrence of the eruption on one side of the body (one case of which he illustrates), show that it is not a peripheral but a central neurosis; and, as it may concern all the vaso-motor centres, it must be the whole cord which is affected and not the medulla oblongata only (Goltz). The arthropathies are apparently neither gouty nor rheumatic, but in all probability co-ordinate with the psoriasis and due to the same cause; this supposition is supported by the supervention of changes in the peripheral skin, muscles, and bones after artificially produced chronic irritation of nerves; especially when the areas supplied by these nerves have been subjected to injury or even to simple pressure (as in walking). He quotes the case of Pel's patient, who at the end of every summer for the last thirty years presented the most perfect symptoms of advanced lateral sclerosis combined with

a general eruption of psoriasis; in the spring both always disappeared synchronously, and the man remained perfectly well until the next summer, when both affections returned again. It is well established that psoriasis may appear directly after some psychical shock or strain, as it has been proved anatomically that shock may cause myelitis; moreover, psoriasis may disappear spontaneously in a very short time. In the pathology the chief factor is the hyperæmia, which is neither inflammatory nor paretic, but angio-erethic, due to an irritation of the vaso-dilators. The chronically irritated state of the spinal vaso-motor ganglia is probably only functional, and may be quite possibly caused by injuries, even of the slightest kind, acting on the vascular areas supplied by the excited ganglia; but it is also probable that more permanent material lesions of the gray matter of the cord exist, which have not been described as yet; perhaps because search has not been made for them in autopsies on patients who have suffered from psoriasis.

(iii.) *The parasitic hypothesis* owes its origin to Professor Lang of Vienna. He drew attention to the close resemblance of the rings and gyrate figures of the psoriatic eruptions to those produced by the dermato-mycoses, and of the discoid plaques to the diffuse spread of pityriasis versicolor. In both cases the alternation of quiescence of the eruption with exacerbations and extension could, he thought, be explained by alterations in the nutrient base and consequent slower or quicker vegetation of the fungus. The gyrate figures, formed when the centres of the rings meet, would be due to the exhaustion of the food on the surface already covered. The preference for the extensor surfaces, and especially for the elbows and knees, is possibly due to the greater friction exercised by the clothing on those parts; but more probably to some anatomical or physiological difference which makes them more accessible or more suitable to the parasite. Favus, like psoriasis, affects the extensor surfaces, whilst tinea prefers the finer flexor surfaces. He also instances the similarity of the affections of the nails in the two classes of disease, and the absence of any manifestations on the mucous membranes; and he urges that the absence of any proof of a connection between psoriasis and a pathological change of any internal organ shows it to be a local and not a constitutional disease.

The heredity which occurs, in different estimates, in from three to twenty per cent of all cases, Lang explains as an hereditary disposition of the skin to allow of the growth of the supposed parasite; and with our present knowledge of the fastidiousness of certain organisms as to the nature of their nutrient media, the explanation is quite feasible. For different individuals have been found to vary greatly, both clinically and experimentally, in their susceptibility to parasitic diseases. But until a parasite has been definitely detected it is, of course, manifestly impossible to say whether the heredity be merely one of disposition, as in tuberculosis or eczema, or of the very disease itself, as may occur in bullous dermatolysis and certain neuro-vascular affections.

That the disease is not inoculable is in the main true. Many trials

have been made by different experimenters (Lassar, Tommasoli, de Amicis, Ducrey, Campana, and others) both on men and animals ; and, although on some of the animals a squamous condition of the skin was produced, none of them succeeded in producing in man any results whatever, not even when the tender subscalar membrane was rubbed or inserted into the living epidermic cells, or blood injected, or pieces of psoriatic skin directly transplanted. Of all the numerous experiments which, from the time of Alibert, have been made on human beings one only seems to have been successful, that of Destaut, who established a typical psoriasis patch on the elbow fourteen days after inoculating psoriasis scales on the fore-arm ; yet even here the eruption did not appear at the site of inoculation. These repeatedly negative experiences look decisive enough ; but, as Lang points out, repeated attempts have been made to inoculate pityriasis versicolor, of the fungous nature of which there is not the slightest doubt, yet so far not more than two successful cases have been recorded.

Notwithstanding the failure of these artificial attempts, it is open to doubt whether a good deal of the apparent heredity may not be a direct transmission from one member of a predisposed family to another, for which the intimacy of the common life would give endless opportunities. Nielsen quotes a case in which a mother acquired the disease a long time after her daughter; and I have a case in which a mother manifested psoriasis for the first time not long after she had begun to sleep by night in the bed which her son, who had long suffered from psoriasis, occupied during the day. Campbell also met with two cases in which mothers acquired the disease four years and one year respectively after their sons. It has been objected that the disease is not communicable between persons who are not related but live in close contact. Usually this is so, but it is not invariable. Unna has recorded a case in which a nurse-girl suffering from psoriasis communicated the disease to three children who were perfectly free from any hereditary taint; and Nielsen has seen a similar transmission. Augagneur had a patient, suffering from a trade eczema, in whom the eczematous surfaces became the starting-point of a general psoriasis after he had occupied a bed between psoriatic neighbours. Poor mentions five cases, and Nielsen one case, in which both husband and wife were psoriatic ; and Hammar, M'Call Anderson, and Aubert have met with cases in which the husband manifested psoriasis after living with a psoriatic wife.

Another reason which has been advanced against the parasitic hypothesis is the possibility of a patch arising on the site of an injury to the skin, such as a scratch or prick or wound ; or even after the use of poultices or compresses on parts which have been irritated by chemicals or caustics : for it has been argued that such a mode of invasion likens it to urticaria, or to other angioneuroses or trophoneuroses of reflex origin. But when patches have been intentionally produced in psoriatic patients, by scratching through the most superficial layers of epidermis with a needle (Koebner's experiment), it is found that the experiment only succeeds when the disease is in the progressive stage ; that it never

appears until after a lapse of about a week, and then in the form of minute discrete punctæ, which suggest much more strongly the growth of a microbe which has fallen on a nutrient base than a reflex neurosis. The casual outbreak of a primary psoriasis on the site of some local injury is quite as easily explicable by the supposition of a local parasitic infection as by that of a constitutional bias.

The symmetry of psoriasis is not well marked in the great majority of cases; indeed, it is not usual, unless the disease is very extensive or is spreading quickly. Too much stress has been laid upon this point as an argument in favour of the neurotic origin, for, as Lang has pointed out, psoriasis is not by any means so symmetrical in its arrangements as scabies or pityriasis versicolor; nor even as P. rosea. Its symmetrical extension may be preceded by an erythematous or even an urticarial outbreak; but lupus vulgaris may spread rapidly and symmetrically on the face in the wake of an erythematous rash, and disseminated lupus is at times symmetrical in a well-marked degree. The most that a symmetrical distribution could prove would be that (putting aside the mere symmetry of favourite anatomical localisations) nerve influence can condition the site of an eruption of psoriasis as it may of an eczema.

It is true that psoriasis has sometimes a definite association with asthma, the attacks being either concurrent or alternate (Bateman, Bulkley, Hölscher, and others). But this proves nothing as to the neurotic nature of psoriasis, it only shows that, like patches of eczema or rhinitis, it may serve at times either as an excitant of the asthmatic neurosis or as a counter-irritant.

Dr. Crocker has brought forward an argument against the parasitic hypothesis, that the disease is apt to recur in predisposed subjects whensoever they come under depressing or debilitating influences, and decreases rapidly when such influences are withdrawn. Apart from the well-known fact that psoriasis may seem to disappear, even for long periods, after exhausting fevers, the same influences are found to act in the same way in various affections of the skin undoubtedly parasitic; for example, sycosis, seborrhœic dermatitis, or parasitic eczemas, which may vary greatly with the general state of the health. The supposition that the skin varies in its susceptibility to the action of a parasite at different times would explain the liability to fresh outbreaks, and the periodicity of certain cases, just as easily as that of a neuro-vascular influence; and there is no reason for supposing that such variations in susceptibility occur less frequently in the skin than in other organs, as, for example, the lungs and intestines. We need only allow that if psoriasis be due to the action of a parasite, this parasite is a fastidious feeder, and that the skin must be in a specially prepared state to allow of its growth.

After this brief statement of the arguments which have been used for and against the parasitic and nervous hypotheses, it is not difficult to see defects in both. Those in favour of the neurotic origin of the disease have received but little attention as yet in this country; and the novelty of a view which would convert our psoriatics, whom we have for so long

regarded as among the healthiest of our patients, into a class of neurotics and cripples, is certain to be received by us with great caution, if not with opposition.

Let us take first the case of the arthropathies. Their connection with psoriasis is not a common one. Schütz found one case in a hundred, Besnier estimates the proportion roughly at 5 per cent, and Nielsen, from careful statistics of his 616 cases, at about the same. In this country it is certainly very uncommon. In some hundreds of cases of psoriasis I have hardly met with a single case of a marked joint affection, although I have been on the look-out for them; and I have certainly never had one among those worst cases which have had to be taken into the wards. The authors of the English text-books make no mention of the relationship, except Mr. Malcolm Morris, who says that he has never observed it. Dr. Crocker merely says that gout, rheumatism, and rheumatoid arthritis exercise an influence over psoriasis. Dr. Dyce Duckworth has reported a case of psoriasis with rheumatism which passed over into pityriasis rubra; and Dr. Stephen Mackenzie has shown two cases of psoriasis of the nails associated with "end-joint rheumatism." Following on the psoriasis the terminal joints of the fingers and some of the toes became red and swollen. In one case the only fingers affected on each hand were those on which the nails were psoriatic. The affection was an osteo-arthritis. Nielsen notes that most of the cases are chronic forms of joint disease (rheumatism and arthritis deformans), which show no relation to the psoriasis in their date of origin or their extent, and generally none in their exacerbations. He finds that psoriasis occurring in persons suffering from such lesions runs with unusual frequency up to a very high degree of intensity, and often takes on the character of D. exfoliativa or P. inveterata, but denies any community of cause between the two affections. Whilst granting that many of the cases are merely simple coincidences, he is wrong in ignoring the opinion of other good observers that the connection may be an intimate one. Kaposi speaks of rheumatoid articular pains as habitually accompanying the acute eruptions; and Besnier insists that the cases are not merely instances of psoriasis in the rheumatic subject, or of rheumatism in the psoriatic, but of a pathological unity—"psoriasis arthropathique."

Whether it be due or not to a difference of temperament of the people in this country it is hard to say, but we certainly have not noted any marked connection between psoriasis and psychical excitability. Such facts as its connection with functional lateral sclerosis, its sequence on attacks of neuralgia and sciatica (Besnier and others), and the limitation of the eruption to areas supplied by the nerves involved in these neuralgic affections (Thibierge), prove that some morbid nervous influence may be in action. But a less intense form of nervous excitability is required for the majority of our psoriatic patients, and a more refined and special kind of spinal irritability, before an opinion like that of Kuznitzky can find a general acceptance, for most of them neither show any nervous symptoms in themselves, nor in their families; nor can they connect their outbreaks with any appreciable alteration of their usual good health.

Neither of the hypotheses alone seems as yet to be capable of explaining all the phenomena of the disease. The parasitic view fails to explain, even as satisfactorily as the other, why eruptions should be produced by shock or physical depression, and heal either spontaneously, or merely by the help of invigorating external conditions (such as sea-bathing); and it is powerless to account for the relationship between the skin lesions and the arthropathies and general nervous symptoms. On the other hand, the neurotic hypothesis has nothing on which to base its assumption that the lesions in the skin are simply the result of a chronic hyperæmia; and there is no analogy among the nerve dermatoses to support the opinion that the peculiar form of parakeratosis found in psoriasis is due to nerve action alone.

Besnier no doubt felt this difficulty when he suggested that the trophic disturbance depends "on that part of the medulla which is the centre of the function of keratinisation," a centre not as yet discovered. The clinical character and pathological anatomy of the lesions are more readily explained by the supposition of a parasite located in the epidermis. And the neuro-vascular view, although it may allow us to understand the cause of the relapses and spontaneous disappearances of the eruption, fails to account for the success of an antiparasitic treatment. There is no analogy among the erythematous diseases of the skin to explain why eruptions which have been present in varying degree, but continuously, for long periods of time may be cleared away by local antiparasitic treatment alone in a few weeks, and may remain clear for months or even years afterwards, though the nerve symptoms continue; nor why a continued after-treatment may have so well marked an action in restraining or even preventing relapses.

There is nothing improbable in the supposition that both the internal and external causes are at work at the same time, as Dr. Crocker (though on different grounds) has already suggested; the neuro-vascular factor being primary, and the parasitic being secondary, but essential to the full manifestations of the lesions. Such a combination has already been supposed to occur in sebaceous rosacea, in lupus erythematosus, and in certain forms of eczema, such as the chronic centrifugal circinate or discoid patches and the acute eczema of dentition in seborrhœic children—all of which may require a local antiparasitic treatment to remove what was primarily an angio-neurotic condition. This view is a compromise, it is true, and will probably be replaced, after further investigations, by some more accurate and satisfactory explanation; but at the present it seems to be the only working hypothesis of which our knowledge will admit.

Prognosis.—Patients suffering from psoriasis vary so greatly in their susceptibility, or capability of resistance to the disease, that it is beyond our power to give a prognosis in any individual case. That, however, which general experience suggests is not of a very cheerful kind: some may be cleared of it by a more or less laborious treatment, and others, but only a very small percentage, heal spontaneously. In the great majority it recurs sooner or later. Some pass rapidly from one attack to another,

others have an annual outbreak, and others again may remain apparently free for years and then suffer from a fresh outbreak. If the proximate causes can be discovered and rectified, or avoided, the outlook is improved, but in the bulk of the cases this cannot be done ; and, unless favourable changes set in spontaneously, the prognosis must chiefly depend on the results of treatment. As we possess no internal specific this treatment consists mainly in the application of local remedies ; and to be of avail it must be pursued until the skin is absolutely clear, and continued, in some modified form at any rate, for a long time. It is rare to find patients who are sufficiently intelligent and persevering to carry out a troublesome and disagreeable course of treatment after all the symptoms seem to have disappeared, especially when their hopes are dashed by the repeated outbreak of fresh patches. If the underlying cause of these relapses, be it spinal irritability or any other form of internal or reflex irritation, can be detected and controlled, the outlook may improve ; but at present the prognosis cannot be good beyond the existing attack.

Differential diagnosis.—The great majority of cases of psoriasis are easily recognised, even by those who have the least acquaintance with skin diseases ; but when the lesions are scanty, or slightly marked, or restricted to small and unusual areas, mistakes may readily arise. It is always advisable to look at the disease from all points of view : its course, duration, symptoms, liability to relapse, and its connection with the general health of the patient ; but the examination of the lesions on the skin has to be the final arbitrament. And, as it is chiefly in the older lesions that the danger of confusion lies, it is well (as in all cases of skin disease) to seek out the earliest initial lesion, when such can be found, since in these the distinctive characters are much more clearly marked. The minute, scattered, often solitary red points with the profuse white scaly caps are readily recognisable ; but as these pass into various shapes, become inflamed, scratched, or modified by treatment, or by the supervention of other affections such as impetigo or seborrhœa, the task of recognition may be difficult.

The following diseases may all appear in the form of red scaly patches, and bear at times a sufficiently close resemblance to psoriasis to demand a careful discrimination.

Seborrhœa.—When acutely eczematous the distinction is easy ; but the scaly papular forms are at times very like the corresponding lesions of psoriasis. Yet the patches are more superficial and irregular, and the scales smaller, thinner, softer, less profuse, and often more greasy ; the colour of the base has more of a salmon hue when fresh, and a dirty yellow or fawn colour when older. When gyrate the lines are thinner and more polycyclic. Other evidences of seborrhœic infection are usually to be found on the chest and upper part of the back, especially over the sternum and between the shoulders, as slight papules at the mouths of the sebaceous glands, which are blocked with greasy scales in the form of a minute plug. These papules have a great tendency to communicate

with neighbours to form small polygonal figures, the centres of which are of a dirty dull yellowish tinge. Further evidences are almost always to be found about the middle third of the face, on the forehead, and on the scalp. Psoriatic eruptions on the scalp are in patches with intervening healthy skin, whereas seborrhœa tends to be more diffuse and to involve the whole scalp without forming distinct patches. One uncommon form of sharply circumscribed eruption, which builds up a thick scab like psoriasis, has been referred to before as presumably seborrhœic; its scales, unlike those of psoriasis, surround the hairs like collars. Seborrhœic dermatitis of the palms and soles again is more diffuse than that of psoriasis, and retains its scales better; the thickened skin over the psoriatic lesions peels off more readily, leaving a red dry base.

Eczema.—The patches are not by any means so clearly defined as in psoriasis, the scaling is much less in quantity, and the scales are smaller, softer, and never silvery white when removed. Both may itch, be scratched, denuded of scales, inoculated with pus cocci, and cracked with fissures; but there are usually some characteristic signs of punctate oozing on an eczematous patch, or some papular or vesicular satellites in its immediate neighbourhood.

Pityriasis rosea.—The resemblance of this affection to a slight eruption of psoriasis is sufficiently close at times to confuse those who are not well acquainted with it. The patches and gyri are, however, much slighter and paler than those of psoriasis, and not so clearly defined; the scaling is much less marked and more branny, and the course of the disease is much more brief and rapid. The bleeding points are also absent.

Lichen planus.—Patches of this disease which have become scaly may bear a certain resemblance to those of psoriasis; but if the scales be scratched away it will be found that the base, instead of being red and tender, is firm and more horny, and that the under scales are granular, like mortar, and more adherent. A lilac shade of colour, too, may usually be detected, and some deep brown pigmentation where the eruption is fading. The smaller papules, when present, are easily distinguished from those of psoriasis by their smooth, flat, waxy tops. The later corneous stage has a gray, raised, irregular, horny surface, which is pitted like a fine honeycomb; and the pruritus is more intense and persistent.

Lupus erythematosus.—The patches are covered with very adherent scales, and the mouths of the sebaceous glands are dilated and filled with horny plugs. The red erythematous border and the evidences of superficial atrophy offer further points of distinction.

Lupus vulgaris.—Old patches of non-ulcerative lupus may sometimes closely resemble patches of psoriasis from which the scales have been removed; but in case of doubt they may be easily identified by pressing upon them with a piece of glass until they become bloodless, when the characteristic yellow nodules may be seen embedded in the corium.

Syphilis.—It is well recognised that some of the squamous syphilides may at times so closely resemble the lesions of psoriasis as to be clinically

indistinguishable from them, even to a well-trained eye. Both are red, both punctate, papular, circinate, or gyrate; and both are covered with white scales. The syphilides are, however, as a rule more uniform in size, and much less scaly; they have a more translucent-looking base, of a red colour which tends to a yellowish brown, and are much more prone to take on a figured arrangement, the small papules being arranged in corymbose groups, the larger papules in circles, arcs, or gyri. When the eruption is extensive, or when it occurs on the flexures, there will be little danger of confusion. It is with the isolated groups that the difficulty arises. The method of scratching the surface (not with the finger-nail) may be resorted to as a help; for the punctate bleeding is never present in syphilis. In the later squamous syphilides the base is generally much more elevated than in psoriasis, especially at the borders; but in the gyrate form the resemblance is often exceedingly close. The position is as likely to deceive as to help; but the presence of ulceration or scars, deep pigmentation, or constitutional symptoms, may clear up the mystery at once; or an appeal may be made to treatment. For obvious reasons this means of diagnosis should be regarded as the last resource.

Treatment.—The treatment of each practitioner, if other than empirical, will depend to some extent on the view which he takes of the causes of the disease. But all are agreed as to the supreme value of the local treatment. Brocq says: "For the older authors the internal treatment of psoriasis was everything, for the modern authors it is, so to speak, nothing." Even those who look upon psoriasis as a neurosis lay stress on local remedies for the purpose at least of clearing the skin; but those who hold to the view of its microbic origin lay equal stress on their continuance, as an after-treatment, in the hope of finally extirpating the germs.

General treatment.—The health of those who suffer from psoriasis, I repeat, is usually good; still the first task in beginning their treatment is to correct any deficiencies in this respect, if such can be detected; for lowered states of vitality may not only precede and aid the spread of the eruption, but may render it also more resistant to local treatment. Gouty conditions, for instance, may make the lesions irritable and inflamed; and it is advisable at once to take measures to counteract them, not only by administering drugs, but also by ordering copious draughts of water (at suitable spas if possible), and by limiting the supplies of meat and alcohol. Dr. Bulkley says that a number of his patients have been kept free from the eruption for long periods of time simply by taking no meat, or no more than a very little fish and the white meat of poultry. Neisser finds that butchers are specially liable to suffer from the disease. If the eruption is irritable, alcohol ought to be prohibited altogether; if, on the other hand, the patient is in low condition, an improvement in the diet may be of service. Exposure to cold and chills may induce fresh outbreaks, and I have patients who were especially liable to attacks when living in wet and cold localities, but improved in a warmer climate. Sailors and travellers sometimes lose their eruptions in the tropics. In these cases the body should always be protected by woollen underclothing.

In the case of a distinctly neurotic element it is advisable to have recourse to bromides, valerianates, or hydropathy, as an accessory treatment; since nervous excitability has at times a deleterious influence on psoriatic eruptions. Rest is of great value in extensive or acute cases, and confinement to bed alone will often reduce the vigour of an attack considerably. If the patients are ordinarily strong healthy people none of these preliminaries is required, and we may proceed to administer drugs to act directly on the disease itself.

Internal remedies.—The only medicine which is universally acknowledged to have anything like a specific action on psoriasis is *arsenic:* but it is by no means a specific, for it does not act under all conditions; in some patients it does not act at all, and if the eruption be acute, and tend to spread, it will probably do more harm than good. Its method of action is uncertain. Schulz tried to explain it by supposing that it increased the movement of the oxygen in the affected cells by taking it up from one substance and giving it to another as it passes from arsenious to arsenic acid and back again, a property for which it is extensively made use of in dyeing. It has also been supposed to act directly as an oxidising agent on the blood; but Zelenew and Quinquaud found that the amount of hæmoglobin is diminished in psoriasis, and that this diminution is not prevented by the administration of arsenic. Zelenew thought that the improvement which it produces in the disease must therefore be due to its action on the nervous system; but, as Unna succeeded in removing an eruption of psoriasis completely by means of a mild ointment of arseniate of potash (which has no caustic action), it would appear as if the action were rather local than general; a view which is supported by the after-pigmentation of the patches. Kuznitzky attributes its beneficial influence to its power of dilating blood-vessels, and thus relieving the hyperæmia of the lesions, or of the irritated spinal ganglia; as a mustard foot-bath relieves internal inflammations by "derivation." Arsenic may be given either as the potash or acid solution of the Pharmacopœia, or as a soda solution of like strength. The dose at first should be (for adults) 3 minims, gradually increased up to 10 minims, given in water, after meals, three times daily; if well tolerated it may be increased still further; but it should be stopped if smarting of the eyes, gastric pain, vomiting, or diarrhœa supervene, which in some patients they do very quickly. Dr. Crocker finds that 30 minims of Tr. lupuli added to each dose favour toleration. It may also be given in pill form, each containing $\frac{1}{20}$th to $\frac{1}{15}$th of a grain; one to three pills being given daily, gradually increased within the limits of toleration; but the solution freely diluted is less apt to cause trouble, and can be more accurately graduated. Administered in this way it may certainly effect the complete removal of all the lesions from the skin in some cases, and in most it will render some help. It has no influence in preventing relapses; and at the best it works very slowly, requiring some months to complete its task; often, indeed, five or six weeks elapse before its influence is visible. Subcutaneous injections (Lipp) act more quickly and have given good results. Two drops of

Fowler's solution may be given each day in a syringe full of water, and the dose gradually increased ; if the injection be boiled immediately before use there is no danger of accidents. I have never used the injections in psoriasis, for in other diseases I have not found them well tolerated.

Vidal, from his experience of a large number of cases of psoriasis, found that arsenic, given in small doses, is useless ; yet in doses large enough to be efficacious there is the danger of inducing intoxication, with gastro-intestinal irritation and peripheral neuritis. And, even though the danger of causing serious symptoms be not great, many patients will object to the drug on account of the minor discomforts. Furthermore, the possibility of a hyperkeratosis of the palms and soles, due to its action (Hutchinson), is by no means very distant. The skin thickens and grows rough, sometimes with the accompaniment of a burning sensation ; and small warty elevations rise above the surface, which seem to be peculiar to the action of arsenic. In some patients this condition is soon induced, in others it is more insidious ; but, once acquired, it is very difficult to remove, and soon begins to increase if any more arsenical preparations are administered.

Danlos has recently recommended the employment of cacodylic acid in place of the arseniate salts : this is a combination of arsenic with methyl radicals, it contains 54 per cent of arsenic, and is best given as a mixture in which the acid is neutralised with soda, and flavoured with rum, syrup and peppermint. The dose is 0·10 grm. repeated three to six times daily. Danlos and others have found it to possess remarkable curative powers in cases which had resisted all other treatment ; and, although Balzer and Griffon record two cases of exfoliating dermatitis which followed its use, it is said to be remarkably free from the other poisonous properties of arsenic. The greatest drawbacks to its employment seem to be the alliaceous odour which it imparts to the breath, and the fetidity of the fæces.

Iodide of potassium also, like arsenic, may claim a quasi-specific power against psoriasis, but, unless given in the large doses recommended by Haslund, from 10 grm. up to 50 grm. daily, it usually fails to exercise any influence whatever. The large doses seem to be well tolerated in most instances, perhaps owing to their diuretic action and the consequently quicker elimination ; but they are apt to cause acceleration of pulse and some feverishness (iodine fever). The action on the disease can hardly be a local one ; for Gerhardt found iodine in the ashes of the scales from a patient in which the iodide had failed to influence the eruption to any great extent after being given for some weeks. Many complete successes in the removals of the eruption are now recorded, though the proportion to the failures is not large. Seifert had only four recoveries out of thirteen cases, even after seven weeks of treatment, during which the patients had taken from 334 to 850 grm. of the salt. Large doses may cure arthropathies, even though they fail to relieve the accompanying eruption on the skin (Besnier). In much smaller doses I have found it to improve rebellious

outbreaks of deep colour in full-bodied men where local treatment was not well borne; but I have never ventured to use it in Haslund's heroic doses, partly on account of the expense. Nor do I know that the method has been tried in this country.

Turpentine is recommended by Dr. Crocker in doses from 10 ♏ up to 20 ♏ three times daily, administered in capsules or in a gummy solution. Although tincture and syrup of lemons help to mask the taste I have found patients very intolerant of it. Plenty of barley-water should be given, and a sharp look-out kept on the action of the kidneys.

Carbolic acid has been employed with much benefit by Kaposi, who gives three to six pills daily, each containing one grain. He considers it to be quite as efficacious as arsenic.

Balsam of copaiba was found accidentally, by Hardy, to have cleared away an eruption of psoriasis, and it has since been employed for that purpose, with good results, by McCall Anderson and others. The dose must be gradually raised until the eruption disappears, or until a copaiba rash is produced, when the psoriasis often rapidly vanishes.

Tartarated antimony has been praised by Mr. Malcolm Morris in the acute stages of the disease, and I have used it extensively with great advantage. The wine is the best means of administration, and 15 ♏ three times daily is not too large a dose. It is often well to combine it with the acetate or citrate of potash on account of their diuretic action.

Thyroid gland, which was introduced as a remedy for psoriasis by Dr. Byrom Bramwell, has failed to establish for itself the position which he anticipated. It has cleared away the eruption, even in obstinate cases; but it works slowly, and it does not prevent relapses. Dr. Abraham, who tried it extensively, had not very encouraging results; my own have been entirely negative, but they were all made on out-patients. It may give some help, as it undoubtedly does in certain other skin diseases; but we do not know its special indications, and for general purposes it cannot compare with other internal and external remedies. The editor of this work, on the other hand, suggested thyroid extract in a severe and inveterate case of psoriasis in a male adult with little hope of success, as previous prolonged and skilful treatment had failed. To his surprise the patient some months afterwards reminded him gratefully of the advice, for the extract had cured him rapidly and completely. There must be some difference of genesis in cases which behave thus differently under treatment.

Mercury has been strongly recommended, by Mapother and others, in the form of pills. Brault has effected the complete removal of eruptions of psoriasis, in non-syphilitic patients, by injections of 5 cgm. of yellow oxide of mercury. The cure was said to be completed in each case in three months after six or seven injections had been made.

Mineral waters seem to have no direct influence on psoriasis, except such as contain arsenic (La Bourboule, Roncegno, Levico); these may be of service in removing the irritation of gouty and rheumatic conditions. Sea-bathing, however, although denounced by Dr. McCall

Anderson, is often beneficial. I have found it useful in some cases, and Nielsen and Morris have seen rapid disappearance of the eruption in obstinate cases in patients who bathed freely in the sea. In these bath cures it is uncertain whether the tonic action of the bathing and the recuperating effect of the change and relaxation assist the patient rather than the direct action of the waters on the disease. In the case of indifferent thermal or weakly alkaline waters it must be this, in conjunction with the maceration of the scales, which does the good.

Local treatment.—There is nothing more specific among the external remedies for psoriasis than among the internal; and it would be useless to try to enumerate all the consequently numerous drugs, and recipes for their application, which have been tried and recommended by different writers. It is better to indicate a method of selection in the remedies we employ rather than to catalogue a bewildering mass of formulæ; for more of the failures to attain results are due to the inefficient and indiscriminate use of remedies than to the inefficiency of the remedies themselves.

The treatment in ordinary cases may be divided into three stages:—(i.) the removal of scales and the lessening of hyperæmia; (ii.) the application of stronger remedies to effect the removal of the lesions; (iii.) after-treatment.

(i.) The method to be adopted to get rid of the scales must depend on the state of the disease at the time. This principle, indeed, applies to the treatment of the disease in every stage, and cannot be too strongly insisted upon, for when an eruption is acute and spreading only harm is likely to ensue from any but the mildest measures; whereas in chronic and indolent patches vigorous "stimulation" may be not only tolerated but necessary.

Thus in acute cases any rough mode of clearing away the scales must be avoided. Soaking for half an hour in a warm bath (95° to 100° F.), to which water boiled with bran or starch ($\frac{1}{2}$ lb.) and soda and borax (each $\frac{1}{4}$ lb.) have been added, is very soothing and emollient; and a few ounces of liq. picis carbonis may be added to relieve itching. For more restricted eruptions water compresses can be employed; or, better, compresses of very weak creolin lotion. India-rubber or mackintosh coverings are certainly effectual, but are apt at times to cause irritation. Vapour baths help not only to remove the scales, but also to clear away the underlying patches. Baths of natural sulphur water, such as those of Harrogate and Strathpeffer, and those made artificially by the addition of calcium sulphide, probably owe their value to the desquamating action of the sulphur on the skin.

One of the most effective agents for getting rid of the scales is salicylic acid: it may be used as a 5 to 10 per cent ointment, and either rubbed in after the bath or applied alone; or it may be used locally as a plaster, by preference the salicylic soap plaster (Pick), which Neisser rightly says is less caustic than the ordinary kind (Unna). But if the eruption is very acute and inflamed, a simple zinc plaster will be as much as the skin

will tolerate, and it macerates and loosens the scales very effectually; or it may be better at first to keep the parts soaked with a lead and calamine lotion until the angry stage has subsided. In all but very chronic cases I use an ointment composed of kaolin 1, amylum 1, paraff. molle 2, to which about 2 per cent each of glycerol. plumbi subacet., liq. picis carb., and acid. salicyl. are added at first, and the quantities gradually increased; this base has the advantage that it does not dry and rub off as do the thinner ointments. The glycerine d'amidon is a favourite medium among French physicians in applications for psoriasis, probably for the same reason.

For removing the scales from the scalp, and as a first treatment for the disease, a weak sulphur ointment with some liq. picis carbonis is very effectual; or the skin may be soaked with a solution of the liquor in water, beginning with a proportion of 1 : 8, and macerated under a waterproof dressing. The salicylic ointment is also effectual. Shampooing with soft soap, spirit and water is the best means of cleansing the scalp when the scales are softened. The action of ointments is much intensified if, after they have been freely rubbed in, the skin is covered closely with flannel or flannelette; on the limbs these coverings are made most conveniently in the form of bandages, and on the trunk with large pieces fitting like a "chest preserver." For the scalp an oil-skin bathing-cap may be used, or a tightly-fitting india-rubber bathing-cap.

(ii.) When the scales have been removed and the acuteness of the eruption has subsided, and not until then, stronger remedies may be applied. In fixing the strength of the applications it is most important to bear in mind the very varying degrees of toleration of different skins, and to begin tentatively with weak doses of each fresh preparation until the amount of reaction of the individual skin has been ascertained.

The remedies which have been found most generally useful are tar, chrysarobin, and pyrogallol.

The varieties of wood tar which are most in favour are juniper tar (oleum cadini), beech tar (oleum fagi), and birch tar (oleum rusci). Leistikow, after a long series of experiments, found that their therapeutic effect is practically equal, but that oleum cadinum is the least irritating. Brocq says that this oil is sure in action, easily tolerated even in hairy regions, and, in spite of its colour and smell, is still the best medicament for psoriasis. In my experience, however, none of the wood tars can compare in utility to coal tar, which is quicker and more penetrating in its action, and relieves irritation and itching better. An alcoholic extract (liq. carbonis detergens), and the one made with the addition of quillaia, now officinal as liq. picis carbonis, have practically ousted all other forms of tar in this country for many years past. Leistikow recommends an alcoholic and ethereal extract (coal tar 3, alcohol (95°) 2, ether 1), which he calls tinct. lithanthracis; this I have found distinctly more active than the simple alcoholic extract. With the addition of a little glycerine or castor oil it makes a good varnish, to which salicylic acid can be added with advantage. Beiersdorf makes a useful plaster

containing the two substances, but the tincture painted on and covered with zinc plaster answers almost better.

In extensive eruptions it is better to apply the tar freely over the whole skin. The patient should be well rubbed either with oil of cade or prepared coal tar mixed with soft soap, and then soaked thoroughly in a warm bath. On coming out he should be dried and again well rubbed with a tar ointment.

On the Continent oil of cade is often applied in the undiluted form; but it is safer, in dealing with patients in this country, to dilute it considerably, at any rate at first; for I have found that few will stand the pure tar. An ointment containing ʒss.-ʒij. to the ounce is usually quite strong enough; and, in order to increase its keratolytic action, caustic potash in the form of soft soap or salicylic acid may be added, the latter being the more active agent. For this purpose Hebra's well-known modification of Wilkinson's ointment (℞. Sulph. prec., ol. fagi, āā 5, saponis mollis, adipis, āā 10, cretæ pulv. 1) may be used. In Vienna it is rubbed in twice a day, for a week or ten days; and a bath given as soon as the epidermis is falling. For more restricted application the ung. picis B.P. with acid. salicyl. (gr. 15 to the ounce) is very serviceable. After the inunction the flannel coverings should be carefully adjusted. The urine ought always to be kept under observation, so that the moment any discoloration is detected the ointment may be stopped. Furthermore, if the skin show any signs of irritation, or of tar acne, it must be cleansed at once from the tar, with oil and soap, and dressed with a sedative ointment or lotion until it is safe to begin again with a weaker preparation.

It is not advisable to use tar ointments of such strength and consistency to the scalp and face, here they should be replaced by milder and less offensive measures. For this purpose ung. hydrarg. ammon. with the addition of liq. picis carb. ʒss.-ʒj., and acid. salicyl. gr. 15 to 1 oz., is very useful; and naphthol and resorcin ointment (20 gr. to 30 gr. of each or both to the ounce of ointment) is cleanly, inodorous and effectual. For the scalp, where the desquamation is apt to be troublesome, a soft ointment containing sulphur prec. 20 gr., acid. salicyl. 20 gr., and liq. picis carb. 20 to 60 ♏ answers well.

By these means alone a very large number of cases of psoriasis can be thoroughly and often quickly cleared; but none of them can at all compare in brilliancy of action to chrysarobin. The ease and safety with which in some cases this drug causes the lesions to disappear from the skin unfortunately leads to its routine employment in cases of every degree; whereas it ought never to be used whilst the disease is at all acute, and at first always somewhat experimentally. The patient should be warned beforehand about its staining properties, and the danger of setting up conjunctivitis if it should touch the eyes; the staining of the clothing is indelible, and too many patients are allowed to gain their experience of it exhaustively by the loss of much fine linen and the gain of much unwished-for purple raiment. That the patient must be confined to his room does not matter, for no one can be properly treated for extensive

psoriasis whilst going about and wearing ordinary clothing; he must give himself up absolutely for three or four weeks to the exigencies of the treatment, or be content to drift on for months uncured.

If the patches are small the staining can be limited by applying the chrysarobin in the form of plasters, or in solution in liq. guttaperchæ or collodion; or by painting it on as a chloroform solution and covering it with plaster or guttapercha: but, unfortunately, no other vehicle brings out its exceptional properties in anything like so marked a degree as an ointment. A tar plaster is better than one of chrysarobin, and both tar and pyrogallol work better as paints and varnishes than the chrysarobin. As patients differ greatly in their tolerance of this drug, it is always well to begin with a small dose—10 gr. or even less to the ounce. The addition of salicylic acid increases its penetrative power, and ichthyol diminishes the likelihood of the rapid, angry-looking dermatitis which an overdose so quickly sets up. Thus Unna's Ung. chrysarobini co. contains: ℞ Chrysarobini, ichthyolis, āā 5·0, acid. salicyl. 3·0, paraff. mollis 100·0. Hutchinson's ointment—℞ Chrysarobini, hydrarg. amm. chlor., āā gr. x., liq. picis carb. ℥x., paraff. mollis ℥j. — is very efficacious; creasote (10 ℥) is added in some formulæ, and although it increases the general effect it is hardly admissible except in an hospital. Great care must be exercised in the use of any ointment containing mercurials when spread over large surfaces of the body, especially when the patients are kept in bed or even covered with bandages; for under such circumstances quantities so small as 5 gr. of the white precipitate to the ounce of ointment may in sensitive subjects rapidly bring on a stomatitis and gastric symptoms.

If the chrysarobin is well borne the amount should be increased gradually, but the action of the stronger ointments should always be limited carefully to the affected areas. Very soon the lesions begin to fade away until they look like white patches among the surrounding dull red staining of the normal skin. The whiteness is not indicative of the obliteration of the disease as is so often supposed, on the contrary, it is the continued presence of the disease which prevents the staining; and not until the complete staining of the previously white patches has taken place can the patch be considered as properly cured. Occasionally, however, but rarely, the achromia is permanent, and then it must be regarded as a direct result of the action of the chrysarobin. If any dermatitis should be produced, the drug should be removed at once and replaced by a soothing lotion of lead, zinc and calamine. It is always well to avoid any application of chrysarobin to the scalp and face, not only on account of the very great discoloration of the hair and skin, but because by its action the face is particularly liable to be easily irritated, and to become acutely inflamed and swollen. An ointment of sulphur and resorcin accelerates the removal of the stained skin, and the nails may be cleared by scraping; but nothing but time will get rid of the dirty greenish discoloration of the hair.

Pyrogallol is certainly next in order of merit to chrysarobin in its

power of removing the outbreaks of psoriasis; but, besides having an almost equal power of staining the skin and nails, it may set up a very painful local inflammation with the formation of vesicles or bullæ; and, if too large a surface be exposed to its action, it may give rise to hæmoglobinæmia and hæmoglobinuria from which fatal results have been recorded. It is best confined to the scalp, where its action is exceedingly good; an ointment containing 2 per cent to 5 per cent is usually quite sufficiently strong, and its effect may be still further increased by associating with it some salicylic acid. Ichthyol may be added with advantage, either to an ointment such as Unna's ung. pyrogallol co., in which pyrogallol takes the place of the chrysarobin in the former prescription, or the two may be combined in the form of a lotion which I apply with safety over large surfaces:—℞ Pyrogallol gr. xv., liq. pic. carb. ℥xv., ichthyol ʒj., aq. ad ℥j. A fresh solution of pyrogallol and salicylic acid (āā gr. xxx. in collodion ℥j.) is a cleanly and efficacious remedy for small isolated spots and patches. Unna advises, on rather speculative grounds, that hydrochloric acid should be taken internally as a prophylactic whilst pyrogallol is being used externally; but it is important to keep a good watch for sickness and discoloration of the urine, and then at once to suspend its further application. With due care, the danger of poisoning is very slight.

Antharobin, though milder than chrysarobin, is yet a useful drug, and I have had cases in which it worked well when chrysarobin was not tolerated; but it is not altogether free from inflammatory capabilities, and the deep, dirty, madder-lake colour with which it stains the patient and his bed-linen and clothes is beyond all apology.

Endeavours are continually made to discover agents as quick and trustworthy as those we have just mentioned without their by no means inconsiderable drawbacks. Dr. Crocker has tried turpentine with good results, one part dissolved in eight of oil; but the odour is too strong even for perfumes to mask. Pine oil and thymol, though useful mild remedies, have the same defect. The milder mercurials, the oxides, and ammonia-chloride are useful, especially about the face and scalp; and they work well with a little tar tincture and salicylic acid. Gallanol is unobjectionable, and may be used as a 2 per cent to 10 per cent salve, or as an alcohol varnish to the exposed parts; but it works slowly. Hydroxylamin and hydracetin are irritating, dangerous substances, to be carefully avoided. Gallacetophenon is a yellow powder allied to pyrogallol in chemical formation, and, although cleanly and not poisonous, it is very much less active, and works but slowly in a 10 per cent salve.

(iii.) *After-treatment.*—The tendency of psoriatic eruptions to reappear on sites from which they have seemingly been removed completely shows that some remnants of the disease may persist which are inappreciable to the eye. Whatever explanation may be offered of this fact by the supporters of different views of the causation of the disease, experience shows that these recurrences are much less prone to take place if the skin

is subjected to a long-continued after-treatment. Those who incline to the parasitic view look upon this as a means of inhibiting and destroying the germs, with the hope of finally getting rid of them completely. With this purpose the patients are ordered to take frequent baths with tar soap, and to sponge over the body with solutions of liq. picis in spirit or water, with frequent inunctions of ointments containing salicylic acid and naphthol, or other cleanly and inodorous drugs, and the application of tars or the other stronger remedies to any definite signs of eruption at the moment of their birth. Few patients have any conception of the thoroughness which is essential to a bacteriological disinfection in a structure so full of harbours as the skin; and even those who have persevered for a time are finally lulled into a feeling of false security, and, very naturally, want to "give themselves a holiday," during which the disease regains its hold. But in a few patients who have had the intelligence and the perseverance to continue in spite of the seeming completeness of their recovery the results have been most gratifying; and instead of being tormented by continual and extensive outbreaks, they have long periods of complete freedom, broken only by the occasional appearance of a papule which can be quickly removed. The process is, in fact, the logical sequence of the previous employment of a series of anti-parasitic remedies, and is analogous to that of weeding a garden; we have no means of learning, by any microscopic or other test, when our work is finished; and we have to go on until we find that no more weeds appear. Even then there is always the possibility of a fresh infection; and Neisser suggests that this may be brought about by articles of clothing, as is the case with seborrhœa and pityriasis versicolor.

Thus, although we are not justified in saying definitely that psoriasis is incurable, for cases have been cured, it is obviously impossible to promise to the patient anything more than a longer or shorter period of freedom from his eruption. Practically in every case, however bad, the skin may be cleared if the medical attendant have sufficient skill and experience, and the patient sufficient confidence and determination, and can give the necessary time and attention. But even the serious patient, "qui veut se traiter," as Brocq says, may well be sympathised with if at times he loses heart and neglects his never-ending treatment and precautions; although without them there is little hope of cure.

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LICHEN

DEFINITION.—Although evidently meant originally to denote those diseases which spread on the skin, as the cryptogamic lichens spread on trees and stones, the name Lichen has at the present time no generally recognised or definite signification. It is supposed to designate eruptions of the skin, the elements of which are exclusively and permanently papular; but it is loosely applied to some forms in which the papules become vesicular, or suppurative. Since Hebra's time its use has been generally restricted to those conditions in which the papules are inflammatory. But the employment of the word is now purely conventional, and, when used alone, conveys no special indication, either morphological or etiological, of the nature of the disease to which it is applied.

HISTORY.—In the Hippocratic writings the word "lichen" is used exclusively to signify papular eruptions; yet by many later Greek writers and their translators it was employed to designate not only papular eruptions, but also some which contained pustular lesions. Although Celsus pointed out that the papula agria was changed into impetigo by neglect or improper treatment, the confusion between the papular lichen eruptions and pustular diseases was continued by writers in every country, even down to the days of Plenck; and such varied and distinct diseases as scabies, sycosis, and even herpes, were included in the lichen group. This association was probably the result of an unconscious attempt to include them all under one etiological heading, the Hippocratic school having attributed to the lichens the power of purging the body from vicious

humours, a function for which the pustular eruptions were also supposed to be designed.

Willan, in order to obviate this confusion, returned to the original sense of the word as used in the school of Hippocrates, and defined lichen as an extensive eruption of papules affecting adults; connected with internal disorder; usually terminating in scurf; recurrent; not contagious. He divided the lichens into six varieties: *L. simplex*, *L. pilaris*, *L. circumscriptus*, *L. agrius*, *L. lividus*, and *L. tropicus*. To this very Linnæan classification many additions have been made by subsequent writers. Hebra first tried to introduce some order by restricting the term to those maladies which are characterised by papules which complete their evolution as papules—without changing into other lesions, such as vesicles or pustules. Unfortunately he did not adhere strictly to his own definition, for he included in his group not only lichen ruber (acuminatus and planus), where the eruptions in their typical form are purely papular, but also L. scrofulosorum, the elementary lesions of which may become vesicular or pustular.

Since his time the process of elimination has gone continuously forward, and furnishes a somewhat humiliating exposition of the periods of painstaking and laborious blundering through which clinical observation may have to pass before it rectifies the errors implied in the traditional use of an old name.

It will clear the air if I indicate at once those of the so-called lichens which by general consent have now been relegated to other groups of disease, to which they more rightly belong. Such are:—

L. hæmorrhagicus, small papules formed by hæmorrhage taking place at the mouths of hair follicles. *L. lividus*, vibices of purpura affecting the hair follicles. *L. urticatus*, papular urticaria. *L. tropicus*, "prickly heat," in which the papules are formed by the blocking of the mouths of the sweat pores, with consequent cystic degeneration of the ducts and inflammatory swelling. *L. strophulosus* or *strophulus*, "red gum," "teething rash," usually regarded as a sweat rash; it is more probably urticarial, or a weak form of prurigo: Vidal and Brocq include it in their Lichen (prurigo) simplex aigu group. Bohn insists that there is a true papular non-pruritic strophulus in infants. *L. circumscriptus* is referred to by Vidal and Brocq as the equivalent of the L. simplex chronicus. The representation of it in Willan and Bateman's Atlas is undoubtedly taken from seborrhœa papulosa corporis. Jamieson still regards it as a true lichen. *L. circinatus*, *annulatus*, *serpiginosus* are likewise seborrhœa. *L. gyratus* is included by Dr. Crocker as a form of seborrhœa; but Biett's description of it reads more like that of a neurotic papilloma, or nævus. *L. simplex*, the papular stage of various eruptions, eczema papulatum, prurigo, and urticaria. *L. agrius*, in its original meaning a severe papular eczema, later becoming vesicular. According to Vidal it was used to indicate what Hebra afterwards described as prurigo. *L. syphiliticus*, the small papular or miliary syphilide.

The various forms of eruption described by Vidal, and his pupil Brocq,

as *L. simplex*, *acute* and *chronic*, *L. polymorphe*, *mitis*, and *ferox*, need not be dealt with here, as the application of the word to such diverse papular lesions has been rejected by the leading French dermatologists. Brocq has since placed them in the group of prurigos, but classifies them, in order to prevent confusion, as forms of neurodermatitis.

There are two other conditions to which the term is still applied, and its use defended; but the designation can hardly survive the consensus of opinion against their continuance in the lichen group. They are:—

1. *L. pilaris.*—According to Willan, this was a form of lichen simplex affecting the hair follicles, accompanied by troublesome itching or tingling lasting about ten days, and then fading and leaving a slight desquamation. Bazin and all other later writers have uniformly used the name to signify the rough, scaly plugs which often project from the hair follicles, especially on the extensor surfaces of the upper arms and thighs. It is certainly not a lichen, but a form of keratosis of the upper part of the follicle, causing retention of the hair. Dr. Crocker, who has recognised this, unfortunately applied the name to the L. spinulosus of Devergie, because the eruption is inflammatory. But, as Unna has shown, keratosis pilaris is also inflammatory, and, on the external view, it is often more inflammatory than Devergie's disease; so that the justification for the name fails. *L. spinulosus* is a peculiar keratosis of the hair follicles, leading to the formation of thin rod-like horny plugs which project even as much as an eighth of an inch from the surface. This is distinctly a follicular keratosis, and not a lichen.

2. *L. scrofulosorum* or *L. scrofulosus* certainly begins in the form of typical "lichen" papules. They are yellowish, brownish, or even dull white in colour, or of the colour of the surrounding skin, are slightly scaly, painless, and do not itch. They occur in circular or circinate groups, sometimes on the neck and limbs, but usually on the sides of the trunk, in children and young adults, who for the most part (90 per cent) are obviously scrofulous. They may last a long time, and disappear spontaneously. Kaposi's investigations show that this disease is an inflammation confined to the immediate neighbourhood of the follicles, the sebaceous glands, and the perifollicular papules. This may go on to suppuration and the formation of an acne cachecticorum. Sack, Jacobi, and Darier have all found a tuberculous-looking granuloma with caseation, and Jacobi one doubtful tubercle bacillus; but inoculation experiments were all unsuccessful. If not itself a tuberculous process, it is either a pilo-sebaceous folliculitis, of probable microbic or toxidermic character, which only arises in a scrofulous skin (Besnier), or a mixed infection of tuberculosis with some other dermatosis (Unna). Though its not infrequent coexistence with a pustular eczematous condition of the ano-genital region supports these views, its nature is still unknown. In any case it is certainly not a lichen in Hebra's sense, but a folliculitis; Neisser proposes for it the name *Scrofuloderma miliare.* With a view to treatment general antiscrofulous measures—such as fresh air, sea-bathing, iodine, cod-liver oil, etc.—are important; but the inunctions with cod-

liver oil, recommended by Hebra, though effectual, may be quite successfully replaced by the use of ointments containing chrysarobin (Wolff, Jacobi), or even weak doses of thymol, tar, or subacetate of lead (Crocker).

Lichen ruber.—The exact nature of the disease to which Hebra originally gave this name is at the present time unknown; for, although his account of it is clear, it is impossible to identify it with any similar condition known to dermatologists in these days; and in his later years he himself seems to have had no further cases to record. According to his original description (1860) it is essentially a lichen; that is, it consists of papules which remain unchanged throughout their whole course, and do not become converted into vesicles or pustules. These papules are red, minute, not excoriated, and covered with a few minute red scales. They are not collected into groups, nor scattered over the whole surface of the body, but they are generally confined to certain parts, especially on the limbs. The papules remain of the same size throughout the whole course of their existence, but become so closely packed together that they finally come into actual contact, and form continuous patches of variable size and shape, which are red, infiltrated, and covered with thin, paper-like, not very adherent scales. These patches may so extend as to cover the whole surface of the body, and the integument is then universally reddened, covered with numerous thin scales, and so infiltrated that when a fold of the skin is taken up it is found to have more than twice the normal thickness. When the scales are picked off the apertures of the hair-sacs are seen to be dilated. There is no oozing, and the patches do not bleed when gently scratched. When the disease is extensive the itching may be very disagreeable, but is by no means proportionate to the severity of the complaint; and the excoriations are never well marked. The movements of the parts affected are much interfered with, particularly of the hands and feet; and deep bleeding rhagades form over the articulations. In extensive cases the nutrition of the nails is greatly interfered with, either by an increased growth from the bed of the nail, and discoloration and brittleness of its substance, or by cessation of the growth over the nail-bed, and formation of a brittle horny plate projecting upward from the matrix. The hair of the scalp, pubes, and armpits remains unaffected, but that on the other parts of the trunk is not well developed. The state of the general health depends upon the extent of the cutaneous affection; at first, when the patches are scanty, the functions go on normally, but as the eruption increases in quantity the nutrition of the body begins to decline. The patient may eat and sleep well, but loses his subcutaneous fat by degrees; and, later, after the whole surface has become involved, marasmus sets in, and the case generally ends fatally; though it may be years before the end comes. Of Hebra's first fourteen cases, on which he based his description, twelve ended in death, one patient disappeared, and one only recovered completely; all were treated with arsenic.

This preliminary conception of the disease was modified subsequently;

for during Hebra's lifetime (1877), and with his consent, Kaposi divided L. ruber into two classes: *L. ruber acuminatus*, which was to correspond with Hebra's original L. ruber, and *L. ruber planus*, which was the L. planus of Wilson. Speaking of L. ruber acuminatus as the equivalent of the old L. ruber, Hans Hebra says that the patient complains of great and general uneasiness, twitching of the extremities, and a burning and tormenting itching which disturbs his night's rest, renders his existence unbearable, and causes continuous scratching, so that it is not unusual to meet with blood-stained spots. A characteristic feature of the affection is its speedy action in reducing even strong people. They quickly become prostrate and lose weight, due chiefly to sleeplessness and want of appetite; œdema appears, especially in the lower limbs, with fever and albuminuria; and the prognosis is necessarily of a serious character.

Such cases are of great rarity, and Kaposi, who had not seen Hebra's original patients, or indeed any other case of the same fatal character, considerably modified his teacher's description of the lesions. According to him, the papules range from the size of a millet seed to that of a pin's head, and are very hard, red, and conical, bearing at their summit a thick little hillock of epidermis, so that when closely packed together they feel like the prickles of a rasp. On account of Hebra's acceptance of this description it found its way into all the text-books, but it remained a mystery why the disease with these well-marked horny papules had ceased to be fatal. Taylor of New York recognised the condition from the skin lesions, and, regarding it from Kaposi's description as Hebra's disease, denied that it had any connection whatever with Wilson's L. planus. Besnier, who with his pupil Richaud (1877) had been restudying Devergie's pityriasis rubra pilaris, asserted (1889) that this affection is identical with Kaposi's L. ruber acuminatus, and to this identification Kaposi assented. But as P. rubra pilaris differs in many ways from L. ruber,—for example, in its anatomical structure, in its freedom from itching and from serious constitutional symptoms, and in not being improved but sometimes injuriously affected by arsenic,—how were the deaths of Hebra's patients to be explained? Either the type of the disease had changed, which was hardly possible in the time, or, as Hans Hebra, Neumann, and Unna assert, Kaposi was wrong in identifying L. ruber with Devergie's disease. Most probably, in the lapse of years since the last of the fatal cases, he had mistaken the P. pilaris for a slight non-fatal form of the original L. ruber type.

As v. During suggests, it is most likely that Hebra himself in his original description (1860) confused three different diseases together: (i.) the true L. ruber with intense neurotic symptoms tending to a fatal issue; (ii.) P. rubra pilaris (L. ruber acuminatus of Kaposi); and (iii.) universal cases of L. planus. Erasmus Wilson agreed with Hebra that L. planus was part of L. ruber; and Tilbury Fox (1873) had also identified them as modifications of the same affection; hence the change of name from L. planus to L. ruber planus, which was generally adopted both in this country and in Germany.

As P. rubra pilaris, although first recognised in London, is practically unknown in this country, and as L. planus certainly does not correspond to Hebra's description of L. ruber, it is obvious that both Wilson and Tilbury Fox must both have seen cases which resembled the latter affection sufficiently to allow of the identification. For Wilson was so convinced of the identity that he gave Hebra the priority of description; and Fox regarded L. ruber as a part of L. planus. Yet all the writers of the last twenty years, in their unwillingness to doubt the word of such experienced observers, have had to accept the identification on trust. Only the French writers doubted it; they said they knew Wilson's disease well, but of Hebra's disease they knew nothing, and in all their vast material they could find no trace of it. Unna (1884), who had an opportunity of studying an epidemic of lichen in Hamburg, in 1881-82, was able to confirm Richaud's opinion (1884) that L. ruber acuminatus is not the same affection as P. rubra pilaris; and he met with several cases in which, as in Hebra's original cases, the pointed scaling little papules were present, accompanied with red desquamating infiltrated surfaces: the onset was acute, and preceded by general symptoms of itching, shivering, and aching. If treated at once it was readily arrested; but if untreated it spread gradually over the body, the skin became thick, hard, dry, and scaly, and after a few weeks the nails became affected, the hair fell out, and the patient became marasmic. In these he recognised clearly Hebra's original L. ruber, and the reason of his later acceptance of Kaposi's term *acuminatus* as applicable to the form of the lesions. Either Kaposi had never seen this form of lichen, or he had confused it with P. rubra pilaris. But as Unna had found the acuminate lesions in conjunction with those of L. planus and obtusus (an observation since borne out by H. Hebra, Boeck, J. C. White, Hallopeau, and others), he had no hesitation in recognising in it an acute and exaggerated form of the L. planus of Wilson. This recognition, indeed, was foreshadowed by Hebra and Kaposi in the later edition of the text-book (1874), for they state there, in distinction from the earlier account, that the papules may be either discrete or grouped, and rounded, umbilicated, brownish red in colour, and having a wax-like shimmer; and Neumann, in upholding the distinction between Kaposi's and Hebra's L. r. acuminatus, speaks of the latter as L. r. acuminatus planus. It was probably the recognition of these slighter mixed cases which led Wilson and Tilbury Fox to pronounce for the unity of the acuminate and the planus forms.

We have thus come, by a laborious process of elimination, which it has taken a century to accomplish, to see that it is better to cease to apply the name "lichen" to an anomalous crowd of more or less papular affections, and to restrict it to one specific form of disease—that described by Erasmus Wilson in 1869 as lichen planus, of which Hebra's L. ruber is a rare and aberrant acute manifestation. This affection, in the words of Besnier, is, "*le seul vrai lichen de l'heure present, ou au moins le type de ce lichen.*"

Although the word is already being used in this limited sense in

France, and by some German writers, yet it is safer for descriptive purposes to divide the disease into two sections, the plane and the acuminate, as is the custom in the text-books.

Lichen planus is characterised by the eruption on the skin of small papules, which are polygonal or circular in shape, covered with smooth, hard epidermis, red or bluish red in colour, and burnished on the surface. They may remain discrete or become confluent, and either disappear with the formation of a brown pigmentation, or become covered with rough, hard masses of horny epithelium.

The elementary lesions, although they all have the same fundamental microscopic characters, present various modifications according as the alterations of the cutis or that of the epidermis are more or less highly developed; or as the sweat-ducts or hair follicles are more or less implicated. By the different methods of evolution, again, very different phases of these elemental lesions are produced (annular, discoid, atrophic, corneous); yet in the end all tend to reabsorption, with a more or less complete restitution of the normal epithelium. In pronounced lesions there is always some slight permanent atrophy after their disappearance, and there is always a tendency to an enduring pigmentation.

At first the colour of the eruption is red, though some papules may be pale; but as the epidermis thickens it casts a white shade over the underlying hyperæmic redness, giving rise to a bluish or lilac hue. The burnished surface of the papules, which brightly reflects the light, with this lilac overcast, the red areola, and admixture of brown pigmentation, together form a most striking and characteristic picture. A little punctate depression is found in many papules, but not in all; it is in no way characteristic of the disease. A much more significant sign is the presence in the papules of a white, milky-looking network which shows through the horny layer when tightly stretched. As the papules agglomerate to form patches their individuality is lost, and they become covered with scales; but the edges of the patch still show sufficient of this network to allow of a differential diagnosis. The pigmentation which accompanies the departing lesions may be of any shade of brown, occasionally deepening into black; it is usually darker than that left by any other lesion of the skin, even by the syphilides.

Almost every part of the integument may be attacked, indeed, almost the whole surface may be involved at the same time (*L. universalis*). The commonest positions are the flexor surfaces of the wrists and forearms, the shins, and the inner surfaces of the thigh; then come the trunk (particularly the portions pressed upon by the corsets), the neck, the outside of the thigh, the hands and feet, and especially the palms and soles: the face is rarely affected; the scalp hardly ever; the nails never. The symmetry, in the early stages at any rate, is generally well marked; though lichen, like psoriasis, may be unilateral. But odd patches or streaks may form, and remain without any attempt to spread symmetrically.

In one case of mine, a woman, the lesions, which were well marked, were confined to the flush patch of the face; after almost complete removal, the patient returned five years later with the lesions on the face in their former condition, and a fresh patch on each wrist. Several cases have been recorded in which the eruption was confined to the area of distribution of a single nerve. The mucous membranes are by no means infrequently attacked, more especially in the mouth, where the lesions appear in the form of white dots and patches, and of the white milky network, which is usually clearly manifest. They are most frequent opposite to the junction of the upper and lower teeth, but may cover the whole of the cheeks, palate, and fauces. On the tongue they closely resemble leukoplakia; and the red of the lips, when they are affected, looks as if tattooed with some white substance. The extent of the changes in the mouth bears no proportion to the general intensity of the disease on the skin, nor to its period of development; for it may precede all cutaneous symptoms (Crocker, Audry), or follow when the lesions on the body have already disappeared; or again it may constitute the only symptom of the disease (Frèche). Inside the labia the patches are milky white; but on the glans penis the colour depends on the extent to which it is covered by the prepuce, and on the degree of cornification of the epithelium. In my experience the mucous membranes of the genitals are not often attacked.

The attacks may be either acute or chronic, the latter being the more common; but in either form the course and development depend largely on the character of papular elements.

Unna has divided the various lichen papules into four varieties, of which three were included in Wilson's original description of lichen planus: they are—(i.) The *polygonal papule*, which derives its shape from the pre-existing skin furrows which form its boundaries; it is miliary to pepper-corn sized, and usually widely distributed, especially on the wrist-joints, backs of the hands, forearms, legs, abdomen, neck, and genitals. (ii.) The *obtuse papule* is larger (5-7 mm.), smooth, shining, free from scales, having a wax-like translucence, and showing a small depression or white horny plug corresponding to the mouth of a sweat-gland in its centre. As these papules grow they tend to become flattened, and to leave behind deep brown, somewhat sunken spots. It is almost the only form which is found in infants and young children. (iii.) The flat or really *plane papule* is not nearly so common as the polygonal or obtuse; it is hardly raised above the level of the skin, and its centre, which may be even slightly depressed, is hard and burnished. Its colour is bluish or brownish red, variegated with white mother-of-pearl points which shine through the horny epidermis, and may be dug out like milium. These papules occur on any part of the body, even the scalp, and on the palms and soles; though they are more usually found on the lower leg, where they tend to form large patches, which either disappear, leaving much pigmentation, or become chronic and corneous. (iv.) The *follicular or acuminate papule*, which is formed about the hair follicles. It is the

small papule of Hebra's original L. ruber, and will be referred to later.

All these different varieties may occur separately or in conjunction. The first three, the "planus" papules, are those usually met with, the acuminate kind being rare.

In the chronic and more common form of attack we find the papules appearing either discretely or (in the polygonal form even from the first) in patches. In any case they tend, sooner or later, to agglomerate and form patches of very varying size, from that of a pea to that of the hand; on certain areas, such as the abdomen, a large surface may be completely covered. They then lose the red colour in the centre and become lilac, or even whitish, if the epidermis grow very thick and dense. The smaller papules may keep their waxy gloss, but in the larger the surface gets wrinkled and irregular, and covered with partially detached, thin, hard, horny plates. Or the thickening of the epidermis may be exaggerated, and the red colour disappear as the patch is converted into a raised, lumpy, intensely hard, dirty gray or brownish horny mass, the surface of which is rough and stands up abruptly from the surrounding normal skin—*L. corneus*. These patches may persist for indefinitely long periods; in rare cases they ulcerate (Pringle).

Another and less frequent variation in the patches is brought about by the resolution of the central portion, which sinks and becomes pigmented, whilst the papules on the peripheral rim remain unaltered, or continue to spread outward. This change may occur accidentally, in odd patches, leading to the formation of circular figures (Hebra's "brooch set round with pearls"), or of gyri, when only a portion of the peripheral edge remains. But occasionally the whole of the patches take on this character from the first, merely as a thin rim of papules surrounding the brown depressed centre (*Lichen annularis*). In the last stage of such a general eruption I have seen the papules replaced by rough follicular plugs, looking like a staked-out boundary between the contiguous brown patches.

The acute attack may begin when chronic lesions are already present, but more frequently it is primary. It often spreads with great rapidity at first, but after a sudden start the later process may be more gradual. The eruption consists of a closely packed mass of small, red, shining papules, which sometimes remain distinct throughout, but generally run together to form large patches. Later these patches usually scale, and then often present a close resemblance to similar patches of chronic eczema or psoriasis,—with the latter more especially when the scales are white and more lamellar in character. Usually they are small and scanty in amount. The scaling, however, is not confined to the conglomerate patches, but is found occasionally on the smaller and discrete lesions.

Although the acute general forms of the disease, if treated at once, may sometimes be removed very quickly (in one of my cases in three weeks), it is usual for some of the lesions, and most frequently those on the legs, to persist and take on a chronic form. When these remnants

have been got rid of, the patient, in a great majority of cases, remains free from other outbreaks. Others are not so fortunate, and, before the first attack has disappeared, a fresh relapse occurs, either round the old patches or in entirely fresh areas; thus the course of the disease is protracted for long periods. More rarely the recurrences take place after the complete disappearance of former attacks; and in very exceptional cases they take place with some degree of regularity, as in the case recorded by Crocker, in which the patient, a lady, had suffered from the disease for fifteen years, and for five years had had a fresh attack every July.

The *general symptoms* vary most remarkably in different patients. They are not usually well marked, even in acute cases; and they seem to depend largely on the amount of itching present, and on the loss of rest and consequent depression which this entails. The itching is generally well marked and troublesome, but occasionally it is only slight, and may be entirely absent; sometimes it is replaced by pricking and burning. I have met with two extensive acute cases in which the patients were able, with the help of the usual antipruritic treatment, to pursue their avocations and to make quick recoveries. On the other hand, the pruritus may drive the patient to frenzy, and leave him no rest night or day. In two extreme instances which I have seen, in the effort to procure relief the patches had been actually gouged out of the flesh by the finger-nails. In acute cases the irritation generally ceases when resolution sets in, but in old chronic patches is apt to continue indefinitely; finally it may disappear, though the patch may seem unaltered. The horny hypertrophic lesions, especially on the lower leg, cause far more trouble in this respect than the large, flat, rather atrophic patches. Eruptions in the mouth evidently give rise to little alteration of sensation, for in the early stage the patients are generally unaware of their existence; but, if extensive, the contact with hot food or drink, or with condiments or tobacco smoke, is painful. No internal symptoms are definitely known to be connected with L. planus, but Pospelow suggests that the diarrhœa, which Crocker, he himself, and others have noticed in patients suffering from the disease, may possibly be due to an eruption of papules in the alimentary canal, since he has noticed that it disappeared, step by step with the skin trouble, under the influence of arsenic.

Prognosis.—It is quite impossible to foretell even the probable duration of a particular attack. Part of the eruption, at least, is likely to become chronic; but a good deal depends upon the stage at which the treatment is begun, those cases being usually most quickly controlled in which the treatment is undertaken at the beginning. But the cases of general eruption are never prolonged indefinitely, like those of psoriasis; and even the most obstinate remnants may exist for years, without ever giving rise to a fresh attack, and disappear, either spontaneously or under the influence of treatment, never to return.

Lichen neuroticus is the name given by Unna to the acute general

form of lichen, characterised by the presence of acuminate follicular papules and of well-marked constitutional symptoms. It begins with acute general symptoms,—headache, nervousness, hebetude, shivering, aching, and signs of fever. The first signs on the skin are patches of erythema, of about the size of the palm, which appear rather on the extremities or on the thorax. These patches, which have a shagreened aspect, spread quickly until they cover large surfaces of the body, but rarely reach the head or face. Upon the erythematous area, and in its immediate neighbourhood, arise small papules produced by the spasm of the arrectors. They follow an outbreak of nervous excitement, and in the first stages both these and the erythematous patches may disappear when the excitement has passed away, or been calmed by sedatives. Next, often after a few days, comes a formation of more permanent papules, which at first are confined to the hair follicles, but later occur independently of them. They are deep red, raised, conical, shining, penetrated by a hair, and may or may not be covered with a small, thin, fine scale. Like "planus papules" they remain in this condition until their resolution, and never become pustular or vesicular. As they increase in number they run together, the skin about becomes swollen and inflamed, and the several patches are lost in areas of a reddish and bluish gray colour, indistinguishable, in the later stages, from those found in universal lichen planus.

In the slighter cases the manifestations may recede before these patches form, and the patient then passes into a severe general lichen after the ordinary type, with the formation of planus patches and pigmentation. In the more severe cases, however, fresh attacks of fever, unrest, and intense itching occur, fresh crops of papules are formed, the skin generally is deeply pigmented, and the colour of the patches themselves may become almost black. The amount of desquamation is variable; it may be considerable, and removed freely by the finger-nail when scratching (Unna), or it may be very slight (v. During). In the most severe cases the attacks of itching are incessant; the nervous irritation, sleeplessness, feverishness, and loss of appetite all combine to bring on emaciation, and the weakness of the patient, his hollow eyes and sunken cheeks, all speak of a serious illness. The formation of the patches and the infiltration are so well marked that the skin consolidates into plates which it is hardly possible to raise into a fold; the pigmentation becomes a very dark, almost black sepia-brown, and the scales are small, thin and shining. On the head and face papules rarely arise, but there are often red scaly streaks on the face, and the scalp is red and scurfy. Sometimes the hair falls, though the nails are never affected. In this form the condition may last for months, to end, as in Hebra's first cases, in marasmus and death, or in complete recovery.

It is thus obvious that L. neuroticus, which corresponds so closely to Hebra's original L. ruber, is a primary disease, not a mere L. planus. It begins, not with discrete papular lesions, but with an acute erythrodermia, on which the small acuminate papules arise, and which leaves

behind it a mass of dark pigment cells in the corium. Even in universal L. planus this acute erythrodermia is never found.

The possibility of a confusion between these conical papules and those of pityriasis rubra pilaris, when the existence of the latter disease was, in Vienna at any rate, unknown, is easily seen; hence the transition of the L. ruber of Hebra into the L. ruber acuminatus of Kaposi. But, as v. During points out, Hebra and Wilson must have seen some points common to their lichen ruber and lichen planus, or they could not have agreed to regard them as forms of one disease. Probably they were impressed by the formation of plates common to both, for Hebra in his original account of the disease described such plates as Wilson did for lichen planus. The acuminate form of the papule is the expression of the acuteness of the disease, and such papules may be found now and again in universal L. planus, and possibly had been noted by Wilson.

The prolonged uncertainty among dermatologists as to the identity of Hebra's L. ruber may be due in part to his having included other conditions in his description, but in part also to the fact that the acuminate form of lichen with severe nervous symptoms is a rare form of disease which indeed seems to disappear completely for years together. Yet after the careful descriptions of Unna and v. During there seems to be little doubt but that L. neuroticus represents actually the original L. ruber of Hebra, and that the latter is really a member of the same group as the L. planus of Wilson.

One very remarkable form of the disease has been described by Kaposi under the name of *L. moniliformis*. It was a very chronic affection, having lasted fifteen years; and the lesions consisted of large stringy scars, like those of a burn, or of keloid, which were covered with planus papules. The scars were coral-like in colour, and situated chiefly on the neck and flexures, though some were present on the trunk. They ran in the long axis of the limb, but on the body and neck they were crossed in various directions. Histologically they presented the appearance not of keloid but of chronic inflammatory new growth. Rona met with a similar case, as did also Dubreuilh; and v. During observed one in which the strings of papules appeared on the marks produced by scratching. The nature of the keloid-like growths is uncertain, and needs further investigation.

A bullous-like eruption has supervened in a few cases. Morrant Baker, Unna, Kaposi, Leredde, and Neuberger have described cases of this kind, and I have met with one, in a patient who was suffering from a by no means extensive attack of L. planus. The eruption started suddenly, and, though it began chiefly about the neighbourhood of the patches, was not confined to them, but appeared on other parts also. In Unna's cases it was confined to the lichen patches, and disappeared again under the local treatment, showing that it was not due to an irritative action of the drugs employed. He attributes it to some idiosyncrasy of the skin of the individual patients, for were it part of the lichen process it is improbable that it would be so extremely rare.

Lichen planus in infants is of rare occurrence. I have never met with a case, but it is said not to differ in character from similar cases in adults. The papules, according to Unna, are almost exclusively of the obtuse variety. There is, however, another form, described by Crocker and Colcott Fox, which they regard as lichen planus; though the course and distribution of the lesions is different from those found in ordinary cases. The eruption comes out suddenly in the form of red miliary papules which, discrete at first, tend to run together to form scaly patches. They are from the size of a pin's point to a pin's head, flat-topped, abruptly raised, smooth, shining, follicular, and often well umbilicated. Sometimes they are acuminate, and either have a central plug or form a scale which, on falling, leaves a smooth, shining, angular papule. The colour of the eruption is red, but may vary from that of the skin to a bright red, and subsequently become of a purplish tint. In most of the cases there is considerable itching. Their resemblance to the lesions of L. planus is exceedingly close. They are not so abruptly raised up as in the adult, and have the appearance of being acutely evolved. They may disappear rapidly, but once established they are for the most part indolent. They do not extend peripherally, nor do they become corneous. Their distribution, as is the case in many other eruptions in children, differs from that of L. planus in the adult, for they are found anywhere about the trunk and limbs, and also on the cheeks. No microscopic examination of them has been made, but Crocker and Fox do not doubt the accuracy of the diagnosis. The affection is found mostly, though not exclusively, in weakly children suffering from syphilis, rickets, or tuberculous symptoms; and Dr. Crocker thinks that profuse perspiration is the determining factor in such cases. The affection resists anti-syphilitic treatment, but disappears in a few weeks under an iron tonic and a soothing application, such as calamine lotion.

PATHOLOGY.—The main elements of the pathological process take place in the upper layer of the corium and papillary body, and in the epithelium; the difference of the forms assumed by the primary lesions of the eruption depends on the degree in which either the one or the other predominates, and on the structures (epidermis, sweat-glands, hair follicles) more particularly concerned.

Although the first signs of the disease which can be detected clinically —namely, the flattening and burnishing of a very small area of skin— may appear before the slightest sign of hyperæmia can be detected, yet microscopic examination reveals changes in the vessels and connective tissue underlying the epidermis before any alteration of the epidermic cells is perceptible (Török). The first signs in the cutis are found in that portion of it which lies between the superficial network of blood-vessels and the epidermis—that is, the region of the papillæ. The whole of this area becomes œdematous and closely packed with minute cells, whilst the larger part of the cutis underlying the vessels remains unaltered. This close restriction of the field of operation seems to be quite characteristic of the

disease. The effect of this œdematous swelling is to dilate the papillæ into various forms; they lose their irregularities and become pear-shaped or almost cylindrical, and as their sides are gradually pushed together, and the intervening portions of the papillary body are pushed up, the interpapillary ridges of epithelium are compressed and diminished by degrees into mere wedge-like streaks. This upward and lateral compression may go so far that the ridges are pushed out altogether, and the tightly packed papillæ then form a solid cushion over which the epidermic layer lies stretched, but into which it does not enter. Owing to the absence of microscopic alterations in the character of the epidermic cells, it has been supposed that the smoothness and glossiness of the horny layers are due to the stretching of the epidermis over this underlying pad (Török), as is the case in rodent ulcer, and in molluscum contagiosum. Doubtless this is an important factor in the process, but it can hardly be the only one, for, although the horny layer in the very early stage shows no signs of obvious alteration, yet likewise it shows no signs of very abnormal tension; moreover, a modification of the horning process soon sets in, which is sufficient to explain the burnish of the fully developed papule; and the flat, shining surface is often the last sign to disappear from young papules which have been quickly arrested by treatment, and from which all signs of hyperæmia have vanished. Nor is the flat, glazed surface peculiar to L. planus; it is found in other morbid conditions of the skin, more especially in the chronic circumscript neurodermatitis, and in the state to which the name "lichenification" has been given by modern French writers. Probably digestion experiments might disclose changes in the early stage of the young lichen papule which are too slight for the microscope to detect.

The cellular infiltration takes place first round the walls of the blood-vessels, which are dilated, though often very slightly; and it is accompanied by œdema, and widening of the lymph spaces. The number of cells increases until the whole of the papillæ and papillary body—the whole area between the epidermis and the plane of the superficial layer of blood-vessels—is choked with them. Pigment cells appear early on the walls of the vessels. The great mass of the cells are of about the size of white blood corpuscles, having a large single nucleus and very little protoplasm. Unna regards them as originating from the proliferation of the stationary connective tissue cells, and not as leucocytes, since there are but few leucocytes in the dilated lymph spaces. Nor are there any plasma cells nor multinuclear spindle cells among them. The infiltration spreads horizontally, and has little tendency at first to pass downwards; though in the more advanced stages it may pass downward in the immediate neighbourhood of the vessels towards the hypoderm.

While these changes are taking place in the corium the epidermis has begun to undergo very evident changes. The lymph spaces in its lower layers are dilated, and a large number of wandering cells pass in. The palisade cells are compressed horizontally, and are distorted by the pressure from below and the tension of the horny layer above. The

prickle layer becomes hyperplasic (acanthosis), and the granular layer, and also the horny layer in its lower strata, are increased and thickened (hyperkeratosis). This increase of the upper epithelium persists, and the horny layer being of a peculiarly firm character, the softer prickle layer is crushed between the tense and swollen papillæ below and the hard and granular and horny layers above, until it is reduced to a mere plate; with its disappearance a corresponding depression of the surface is brought about. But where there is space left between the swollen papillæ the epidermis takes the line of least resistance, and, growing down between them, produces, as it cornifies, the irregular horny plugs and wedges which can be picked out from the surface of the papules.

In like manner the abnormal horning process affects the epithelial lining of the sweat pore, which proliferates right down to the papillary body, and cornifies with the same characteristic hardness as the surface epithelium. The condensed white plugs of keratosed epidermic cells, which are thus formed in the upper portion of the pore, have been spoken of as "horny pearls"; and the falling out of these plugs is supposed by Crocker and Robinson to account for the minute pit so often found in the centre of the smooth surface of the papule. Török thinks that although the falling out of the plugs does undoubtedly leave a corresponding hole, the little central pit is really caused by the holding down of the epidermis by the sweat-duct, so that the papillæ are unable to swell and lift that portion of the epidermis up to the general level. Several of my own sections seem to support this view, for the pit, as there seen, is not merely a dilated tube, but a crateriform hollow lined with epithelial cells, which are flattened out, as if stretched from the lowest point where the pore debouches.

Not merely the sweat-pore but also the duct and even the gland itself are often involved in the disease. The epithelial cells of both degenerate, the lumen is dilated, and is often filled with a granular or glassy mass (Unna). The connective tissue cells around undergo proliferation, which is all the more remarkable since the rest of the cutis is unaffected, and the hair follicles in their deeper portions are very rarely implicated.

At this stage, then, we have two counteracting processes at work. Below there is the papillary body enlarged by the dilatation of its vessels and the intense infiltration of cells, and tightly swollen by the œdematous effusion; the overlying epidermis, which at first gives way and is stretched, passively, as it would seem, over the engorged papillary base, soon begins also to react; its layers become hyperplasic, and the cornification of the upper cells becomes so firm that it is enabled to resist any further pressure from the uprising papillæ below. To this peculiar stretching, and the dense and firm character of the horny layer, is due the remarkable waxy gloss of the papules. In some forms in which the cornification is not sufficiently dense to prevent desquamation this burnished look is not produced, and it is always lost in the more chronic and extensive lesions.

In the early stage, when the dilatation of the vessels is the most prominent symptom, the colour of the papules is red; but as they become covered with infiltration cells the tint becomes more livid, and this again is changed, as the white epithelial layers thicken over it, to a bluish or even distinctly lilac hue. The papule may now be likened to a more or less lens-shaped cushion of swollen papillæ, covered with a layer of thickened epithelium tapering off at the sides. The pressure tends to abate the vascular activity in the centre, but it continues actively all round the edge where the redness is still visible; so that the papule appears of a bluish red in the centre and of a brighter red at the periphery. As both the horny and granular layers push downwards, wherever they can, around and between the groups of agglomerated papillæ, to find room for their hyperplasic growths, the epithelial covering is thicker in these places than elsewhere; and the white granular layer, being more freely developed in these downward prolongations than elsewhere, gives rise to the peculiar milky-looking network so distinctive of the disease.

From this time degenerative changes begin to appear. The hyperplasia of the prickle cells ceases, and the cells, separated by the œdema, lose their distinctive characters and are converted into colloid clumps. The cellular infiltration of the papillæ diminishes by degrees, and long, spindle-formed, partially pigmented cells appear round the vessels. The lymph spaces are dilated to such an extent that the epidermis is loosened from the corium (Caspary). The colloid degeneration now attacks the papillary body, and the vessels become swollen, hyaline, and impervious. The thickened, hard, horny layer, no longer having a firm base beneath, drops down, and the centre of the papule tends to become hollow. The collagenous tissue of the uppermost stratum of the cutis may now undergo a distinct sclerotic change, and, if the sclerotic shrivelling be well marked, the further progress of the lesion is prevented. The epithelium becomes atrophic, the hyperkeratosis disappears, pigment is deposited, and the affected area is depressed and scar-like.

The elemental eruptions are formed by the combination of these various processes in varying extent and degree. Thus the polygonal papule is characterised in its early stages by the great preponderance of the papillary changes over the epithelial, and their restriction to a small group of papillæ surrounded by the normal minute furrows of the skin. In the plane papule the reverse is the case; the epithelial changes markedly preponderate, and the papules spread at the edge. In the obtuse papule, which grows in a circular form round a sweat-pore, the changes of epithelium are more equally balanced, and the whole of the sweat-duct is involved in the inflammatory process. The follicular papule grows in the same way round the mouth of a lanugo hair follicle, and—like the obtuse papule—leads to the formation of a central horny plug. The erythematous patches of L. neuroticus associated with the follicular papules, as examined by Unna, show increase of the connective tissue cells as far down as the papillary layer of vessels, dilatation of the

vessels, slight perivascular cellular infiltration, and thickening of the horny layer with a tendency to scaling.

Hypertrophic forms.—In the older and larger papules the original relation of the epidermis to the cutis is altered. The epithelium, which at first was pushed upwards and stretched, begins to proliferate and to push downward, wherever it can, between the papillæ. The prickle layer is again increased, although its cells are still flattened by the pressure; and the granular and horny layers are markedly thickened, producing a number of downward prolongations of very various size. In the centre of the papule this downward growth flattens the papillæ, and pushes them down below their usual level, so that the cutis looks almost crateriform; whilst at the periphery they are still swollen and prominent. In L. corneus (verrucosus) the process goes to still greater length: the papillæ, though flattened, are infiltrated, the prickle and granular layers are thickened, and the horny layer is converted into a dense, non-desquamating plate. In the corium beneath a sharply defined tumour-like mass of round and spindle cells is formed (Gebert).

Atrophic forms.—In contrast to these hypertrophic varieties of lichen are those in which the process is so slightly developed and transitory that an early reabsorption takes the place of the central horny thickening, and the patches, instead of being discoid, are annular; the edges only being raised, and showing the typical appearance of the disease. Unna, who has examined this variety very carefully, found that there are the usual progressive changes slightly but characteristically developed in the narrow margin, but that the regressive changes are entirely absent. There is another atrophic form—described by Hallopeau as *L. atrophique*—in which, in addition to the ordinary changes, the acanthosis and hyperkeratosis penetrated right down into the sweat-ducts; and Darier found that the cutis was sclerosed through its entire thickness, which so interfered with the epithelial growth as to prevent the formation of anything further than horny pearls and pigmentation.

ETIOLOGY.—*Age.*—Lichen may occur at any period of life, from infancy to old age. It is comparatively rare in infancy, very rare in childhood and youth, most common between 20 and 50, and after 60 it is again rare. Most of my own cases have been between 30 and 50.

Sex.—My own experience agrees with that of Crocker, that in this country nearly half the cases are met with in women; but Kaposi's figures show that in Austria it is rather more frequent in men. The constitutional forms of the disease (L. ruber and L. neuroticus) are found almost exclusively in men.

There is as yet no precise indication of the direct cause of the outbreaks of the disease. It is evidently a neurotic disease, at any rate in so far as the nervous system is interested in determining the course and distribution of the local lesions and the general symptoms; and yet, in very many of the cases, beyond a local itching there is no sign of any nerve symptoms whatever. No signs indicate the implication of any internal organ, even in the fatal cases; and no sequels result from an

attack, however long or serious it may be. It does not seem to be in any way contagious or infectious, nor is there any evidence of microbic action. Although some patients are attacked when worried or in low condition, in the majority of cases, in my experience, the first signs come on when they are in good health, or without deviation from their ordinary standard. Hebra notes this fact about his fatal cases.

Possibly there is some virus acting on the nerve-centres. This hypothesis would at any rate explain the suddenness of the attacks, the irritation and liability to relapse, and possibly the tendency to recur in waves of greater frequency at intervals. Unna strongly believes in a parasitic origin, but, as is the case with psoriasis, we can hardly grant this supposition until we know more of the capacities and limitations of the trophic influence of the nerves in the production of morbid alterations in the tissues. A review of the successful methods of treatment gives us but little help, though it certainly tends rather towards the support of the parasitic view.

Diagnosis.—In the great majority of cases there can be no difficulty in distingushing L. planus from other diseases, for the small, red, or bluish papules, with the flat, smooth, shining tops and underlying white points or reticulations, together with their tendency to agglomerate into patches, are sufficiently characteristic. Furthermore, in the scaling stage the patches are associated with the peculiar dark brown staining which denotes the period of retrogression, or marks the site of former lesions. The hypertrophic corneous variety is distinguished by its horny hardness and the minute honey-combed, thimble-like appearance of its surface. Chronic patches might be confused with psoriasis, chronic eczema, and lupus erythematosus. But in *psoriasis* even the smallest lesions are covered with scales, and in the larger chronic patches the scales are not so horny and adherent; moreover when they are removed the underlying surface bleeds readily from the papillary vessels. In *eczema* there are always some signs of previous punctate oozing to be found, and generally some distinctive papules in the neighbourhood. In *lupus erythematosus* there is the atrophic centre with its red border as a guide; and the epithelial plugs, though they may closely resemble those of lichen, always lie in the mouths of the follicles, and are not embedded in a horny epidermis.

Pityriasis rubra pilaris resembles L. ruber acuminatus (Hebra) in the general redness of the skin and the extent of sheets of rasp-like acuminate papules. The redness, however, in the former is primary, in the latter secondary; the lichen papules are like cutis anserina, but glisten, and never scale very freely, while those of the P. r. pilaris are more rounded and composed entirely of hard epithelial accumulations which, when removed, expose the opening of a hair follicle or sweat-pore. The skin in pityriasis desquamates from the first, the redness and desquamation (particularly of the scalp and face) often being one of the first symptoms; and, although the red desquamating patches may look at times like those of L. r. acuminatus, the removal of the scales (which is easily

effected by rubbing them over with grease) at once reveals a mass of red or bluish red little horny elevations beneath. These patches resemble psoriasis, or chronic eczema, more than those of L. ruber, and they are not accompanied by the marked thickening of the skin which is found in the latter disease. Itching is always present in L. r. acuminatus; in P. r. pilaris it may be very pronounced, but it is more usually absent. The former disease tends to emaciation and the incidence of serious constitutional symptoms; the latter is perfectly free from danger.

In lichen the sites of predilection are the flexor surfaces, the extensor surfaces being less affected; in P. r. pilaris the reverse is the case, the appearance of the papules on the backs of the hands and fingers, and the "état granité" of the elbows and knees, being specially characteristic; but P. r. pilaris is very commonly found in the axillæ, lichen hardly ever. In P. r. pilaris the hair may fall out, but more commonly it grows with abnormal vigour all over the body; in L. r. acuminatus it always tends to fall out. The nails in P. r. pilaris, when affected, become dull in their peripheral half with yellow-coloured streaks, and are curiously deformed by a hyperkeratosis in the middle of the bed which causes them to be arched up as if laterally compressed; in L. r. acuminatus they are either raised up by a general subungual hyperkeratosis, or they tend to become disorganised throughout, and to fall off, leaving only a stunted growth at the matrix.

As P. r. pilaris is unknown in this country, and L. r. acuminatus of the greatest rarity, the diagnostic points of difference between them have been taken from the articles by Neumann, Unna, and v. During.

Dr. Colcott Fox has pointed out, as a difficulty in the diagnosis of L. planus in children, the well-known fact that most miliary papules on the child's skin, when disappearing, tend to become flat-topped and shining. This is often seen in papular eczema, in small papular syphilides, in milaria, and particularly in "L. urticatus," or papular urticaria. In the last affection the resemblance is often so marked as to render a distinction between individual papules almost impossible. The presence of other more characteristic lesions will usually remove at once any further doubt as to their real nature.

Certain *seborrhœic papules* take on this form in adults as well as in children, not only in the stage of retrogression, but during their growth. They are firm, red, raised, with flat, shining tops; and, when occurring in large numbers closely packed together, may resemble the miliary form of lichen planus. They are not, however, so hard, they have not the bluish tinge, and, if irritated, they may become acutely eczematous.

Incessant scratching on the skins of persons who have a certain predisposition (pruriginous diathesis, Besnier) is apt to produce a form of lesion ("lichenification," Brocq; "lichenisation," Besnier), on which arise flat papules of a dull red or even bluish red colour, and a flat, shining surface not unlike those of lichen planus. They may also occur in patches of various sizes, from two to ten inches across (*Neurodermatitis*

chronica circumscripta), in which the papules are packed closely together, so as to intensify the normal furrowing of the skin, and to give the same "cross hatching" effect ("quadrillage," Felderung) which is seen in agglomerations of polygonal lichen papules. The papules are not the cause, but the result, of an intense local pruritus, and are formed by an hypertrophy of the papillæ and epidermis; although they may sufficiently resemble those in a patch of L. planus to deceive an untrained eye, a careful examination will show that the typical characters of the true lichen papule are wanting.

TREATMENT.—The only internal remedy which exercises anything like a specific effect is arsenic, and, as in psoriasis, it not infrequently fails. Before it is administered any defect which can be found in the patient's general health must be remedied by attention to indigestion, constipation, neurasthenia, nervous excitability, gout, scrofula, and so forth. Special care must be given to the state of the nervous system by ordering rest and change; sedatives such as bromides and valerian (Brocq) must be administered if there be much irritability; and iron, strychnine, and quinine (hydrobromates), or mineral acid and nux vomica (T. Fox), if the case be atonic. As in all inflammatory diseases of the skin rest is invaluable; and, though not absolutely essential in the milder cases, it materially shortens the duration of the disease. Jacquet's plan of douching the patient for three minutes with water at 95° F., followed by a splash of colder water, has been found very beneficial in irritable cases (Frage, Dubois-Havenith); and he claims to have cured several cases by these means alone when all other remedies had failed. Generally, however, in acute inflammatory cases it is better to assist the external measures by internal medication. I have found tartarated antimony (15 min. of the wine, three times daily) very helpful. Brocq gives quinine, with belladonna and ergot, as in urticaria, a combination which Leistikow also strongly recommends; Dr. Radcliffe Crocker administers large doses of quinine in an effervescing mixture. In general eruptions, which are not so acute, Mr. Malcolm Morris recommends biniodide of mercury; either in the form of pills, or in the usual solution with iodide of potassium and sarsaparilla. As soon, however, as the very acute stage has passed, and the patient is able to tolerate it, arsenic should be tried, either in solution or in pills. The hypodermic method of Lipp and Köbner is more rapid, and relieves the itching more quickly; two drops of Fowler's solution, freely diluted and sterilised, are injected two or three times daily, the dose being gradually increased. Some patients, however, cannot tolerate arsenic, and few in this country would tolerate it in the form of frequent injections. On old-standing corneous patches it has little or no appreciable influence; and in no case should it be long continued without a careful watch being kept for deleterious by-effects (gastro-intestinal trouble, pigmentation, keratosis of the palms and soles, herpes, neuritis). Bulkley has had very good results by giving chlorate of potash (15 gr.) before meals, and 10 drops of dilute nitric acid after meals, three times daily.

The external treatment is always an important factor, both in relieving the irritation and in promoting the disappearance of the nodules. In the slighter cases it is often sufficient alone. As in eczema and psoriasis, the intensity of the action of the remedies must be regulated by the amount of inflammation. In very acute cases lead-lotion, thickened with zinc and starch powder or calamine, with the addition of a few drops of carbolic acid or liq. picis carbonis, has a very sedative effect. Vidal recommends a litre of vinegar in a starch bath; and inunctions, three times daily, with tartaric acid 1 part, glycerine of starch 20 parts. A tar bath, with 15 gr. of sublimate added, has not only an antipruritic but also a curative action. In ordinary cases an ointment or paste containing liq. plumbi subacet. 15 m., liq. picis carb. 15 m., to one ounce works well; and, if the surface be not too extensive, ammoniated mercury (5 to 10 gr.) can be added with advantage. Unna's well-known ointment is composed of ung. zinci 1 oz., acid carbolic 20 gr., hydrarg. perchlor. $2\frac{1}{2}$ to 5 to 20 gr.; the smallest quantity of the perchloride being used in extensive cases, the larger doses being reserved for local caustic effects in stubborn patches. It gives excellent results, and Unna himself asserts that, if used early and efficiently, it alone will remove the threatening general symptoms of L. neuroticus. Herxheimer and Neisser advise the employment of chrysarobin ointments; M. Morris advises pyrogallol ointment: and when the eruption is no longer acute they work quickly and satisfactorily. Their action is increased by the addition of salicylic acid, which softens the hard epithelium, a softening which may be effected, as a preliminary measure, by means of salicylic acid plasters; but the macerating action of a plaster containing other remedies (tar, sublimate, carbolic acid) will suffice in all but chronic cases. I find that it answers as well to paint the skin with a strong tar tincture containing salicylic acid and sublimate, and to cover with a plaster; yet some of the horny accumulations of lichen corneus resist all these measures, and have to be removed either by excision or by the cautery. Even the superficial application of a cautery is said, by Broes van Dort, to remove the itching permanently; this affliction is sometimes so intense and persistent that some such radical means of treatment may be necessary.

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PRURIGO

Introduction.—Willan defined prurigo (*prurio*, itch) as an association of the symptom of itching, occurring as the leading event, with a special eruption and other peculiar appearances; and he included the group, with strophulus and lichen, amongst the papulous diseases of the skin. Besnier considers this group to be a natural one. Willan divided the prurigos into two categories—those in which a large portion of the surface is involved, including a P. mitis and a P. formicans (neither very clearly defined), and a P. senilis, which subsequent observation has shown to be largely due to the presence of lice; and the local prurigos, including P. of the podex, of the prepuce, of the pubes (pediculosis), of the scrotum, of the urethra, and of the pudendum in women. Later Hebra protested against the indiscriminate use of the names "prurigo" and "pruritus," or the insufficient distinction between them; and he applied the name "prurigo" to a distinctly characteristic form of disease (P. Hebræ), to the exclusion of other states. Although the existence of Hebra's prurigo is now everywhere acknowledged, many authors do not accept his views in their entirety. Thus Erasmus Wilson writes: "Prurigo is a pruritus associated with an organic change in the tissues of the skin. It is a neurosis and liable to paroxysms, and is very much aggravated in character by the advance of age. Hence a distinction into prurigo *mitis* and prurigo *senilis*. P. mitis may occur at any period of life, but the eruption which is present is due to secondary irritation of the skin caused by scratching, rather than to the force of the neurotic affection." He adds that P. senilis is accompanied by a papular eruption also. And again: "The pathognomonic characteristic of prurigo is, however, pruritus." "The student of dermatology would form a very inaccurate idea of prurigo if he were to seek for it solely in the presence of papulæ. A more practical picture of the disease is to be found in the itching or pruritus without obvious or

apparent cause; the neurotic character of the itching; the altered appearance of the skin, arising from defective nutrition; its readiness to bleed when scratched; and, last of all, the papulation, which is as frequently the consequence of the scratching as its cause." Mr. Hutchinson also writes: "For me 'pruritus' is the symptom common to all forms of 'prurigo,' and the latter term is applicable to any malady of which itching is the paramount symptom and cause of aggravation." He disputes Hebra's claim to the restriction of the name "prurigo" to one life-long and incurable malady; and he groups cases affecting the cutaneous surface generally, as distinguished from the localised P. podicis and pudendi, under five headings. "*Varicella prurigo*" and "*Lichen prurigo*" have been described under L. urticatus. His *Prurigo of adolescents and adults* is most common about the age of puberty; but it may begin in childhood or adult age. It does not itch excessively, but more or less scratching is induced, and scar formation. It may extend over the whole surface of the limbs and trunk, but it is always most severe on the face, arms, and shoulders. Papules are but slightly developed, and erythematous congestion of the skin is always conspicuous. Though occasionally approaching Hebra's type, it differs in the aggravation or relapse in summer, the age of origin, the severity with which the face is attacked, and the absence of a tendency to thickening and "eczematisation" of the skin (see plate xxxviii., New Sydenham Society's *Atlas of Diseases of the Skin*).

His *winter prurigo* comprises cases in which the skin is made "pruriginous" by cold (see *P. hiemalis*). Besnier, whilst accepting Hebra's prurigo, will not consent to drop the name "prurigo" for other states, such as louse prurigo, senile prurigo, and that of the vulva, scrotum, and anus.

It will be gathered that the question is not simply one of want of discrimination in the use of the names "prurigo" and "pruritus," but whether the characteristic papules are primary, or are secondary to scratching; and, further, whether Hebra's description requires some modification so as to embrace some other and milder forms. It has long been taught that scratching and rubbing, especially if persistent, excite certain characteristic lesions in the skin; but the subject has undergone a considerable development in recent years, and has led to much controversy. In France, Vidal, Brocq, Jacquet, Besnier, and others have insisted that certain special eruptive manifestations, which they term "*lichenisation*" and "*eczematisation*," are the outcome of persistent scratching in certain cases; and they assert that the scratching is secondary to a pruritus, and the latter to a special neuropathic state, perhaps produced by a toxic agent. Clinically the objective forms described by these authors are admitted; but the existence of a primary pruritus, or state of itching, and a neuropathic state is disputed, and is difficult of proof. This supposition has been applied to explain the origin of certain diseases, such as Hebra's prurigo and L. urticatus (strophulus, or P. infantum); and it is sought to group various clinical forms together on the basis that, whereas itching predominates and precedes all, the form of eruption varies with the skin reaction.

Definition of Hebra's prurigo.—An independent malady, not contagious and not hereditary, characteristic in its eruption, in the peculiarities of its course, and in its secondary phenomena. It appears from the eighth to the twelfth month of life, and lasts ordinarily throughout life; it is characterised for some months at the outset by urticaria, and later by the chronic appearance of little hard papules, varying in size from a millet-seed to a hemp-seed, pale or pale red, and often perceptible only to the touch; disseminated upon all the body, but especially seated upon the extensor aspect of the limbs and of the legs more than of the arms, leaving the flexures of the joints free; itching violently, and under the influence of rubbing and scratching becoming tumescent, excoriated, and capped with a brown crust, and secondarily complicated with striated excoriations and more profound losses of substance, with pustules, with diffuse or rayed brown pigmentation, rooting out of the hairs, œdema and thickening of the skin of the legs, engorgement of the inguinal glands, and the phenomena of eczema in all degrees.

Description.—There is but little to add to the points set forth in the above definition. The beginning in urticaria (Kaposi), and the gradual change of form to a characteristic pale papule the size of a hemp-seed, associated, or, according to some, preceded by intense itching, are characteristic. Kaposi says the pathological physiognomy is completed by the end of the second year, or at the beginning of the third. Afterwards the papules may be reddened, or made tumescent, by external irritation; and in severe outbreaks wheals may be seen occasionally. The site is also characteristic in the special implication of the extensor aspect of the limbs, and especially of the legs; and in the freedom of the large joint flexures, and, according to Riehl, of the palms and soles, genitals and scalp. The quantity of eruption and the extent of distribution are apt to vary with the season; and the eruption is otherwise liable to mitigation and exacerbation. According to Vienna authorities, it is mitigated in the warm summer months, which is in striking contrast to L. urticatus; Besnier says, however, that exceptions are met with. Another important feature is the secondary complications, which may completely mask the primary eruption. The intense itching leads to the excoriation of the papules and their incrustation with a brown scab, and to the subsequent pigmentation of the skin, which may vary widely in degree. So also pus inoculation may be more or less prominent. But perhaps the feature of most interest is the gradual "*lichenification*," especially on the extremities. The skin thickens, becomes dry and rugose, exfoliates in a fine powder, and the natural lines are deepened. At other times "*eczematisation*" occurs, and squamous or weeping eczema; and this may extend to the large flexures unoccupied by prurigo papules. The enlarged lymphatic glands in the inguinal region, and occasionally elsewhere, are also noteworthy. In old-standing cases the panniculus adiposus wastes.

Kaposi so far falls into line with other observers that he admits a graver degree (*P. agria* or *ferox*, Hebra) and a *P. mitis*. The latter is similar in form, but the number of papules is less, the region involved less

extensive, and the itching and outbursts less intense; with a corresponding lessening of severity of the secondary complications.

The subjects of P. ferox are usually pallid and thin.

Causes.—The causes are unknown, but many observers regard the affection as a neurosis, especially those who regard the itching and disposition to nutritive disturbance as the essential features, and the papular eruption as secondary. Some suppose an "auto-intoxication." Little can be derived from an investigation of the family history. Besnier holds, and many will agree with him, that the affection does not invariably begin in early infancy, that it may arise even in youth. Its usual mitigation in summer has been referred to. It is certainly much intensified by neglect of hygiene and treatment. Though prone to occur in all classes of society, the poor especially are attacked. It is said to be more frequent in the male.

Pathology.—Kaposi says no particular explanation of the symptoms of prurigo is to be obtained by microscopical examination. The slight cellular infiltration of the papillæ and the serous exudation are those of papular eczema, and the changes in the thickened skin are those of chronic eczema. Riehl regarded the papules as of urticarial nature, and Caspary as epithelial papules due to acanthosis. Leloir and Tavernier, on the other hand, described a degeneration of the prickle cells with consequent cyst formation; and this has been confirmed by Kromayer, van Giesen, and others. Unna says that "if we maintain parakeratosis as an essential symptom of the various forms of chronic eczema, these pruriginous diseases, in spite of the vesicles, belong no more to eczema than to the herpetic diseases." The secondary thickening, however, is common to several itching diseases. He further reconciles, in a measure, the discordant views of investigators. Every prurigo papule has an urticaria-like basis, for there is a spastic œdema of the cutis, but in addition a proliferative inflammation of the vessel-sheaths, without, however, the formation of plasma cells. Further, as Leloir found, there is a special softening and necrosis of the prickle cells, independent of the immigration of leucocytes, forming a vesicle; or sometimes going on to form an impetigo pustule, but one not containing staphylococci. The modern French school contend that pruritus, and a certain disposition to nutritive disturbance, or even neuro-vascular tension, is primary, and that objective lesions only occur under the influence of scratching.

Prognosis.—Hebra pronounced the grave form described by him as incurable and of lifelong duration, but capable of mitigation by appropriate means. In any case, as Kaposi says, it exercises a baneful influence upon the physical and moral life of the unhappy subject in a thousand directions which will be obvious; not to speak of nervous depression and broken sleep. Observers are agreed, however, that there are many exceptions to this grave outlook, that some cases are less intense than Hebra described, and that the affection is not necessarily of lifelong duration. Kaposi says prurigo can be cured in the first infancy only.

Diagnosis.—In infancy, before the typical state is reached, it is obvious

that the diagnosis from urticaria or L. urticatus must be very difficult, if not impossible. When the disease is typically established the attentive observer can rarely be at fault, if he studies carefully the history and the character of the papules, and notes the itching, the distribution, the intractability, and the glandular implication. A real difficulty arises where the primary disease is marked by secondary complications; and it is often necessary to await the healing of the pustulation and eczema before a correct diagnosis can be made from chronic eczema or one of the chronic itching dermatoses, such as scabies, chronic urticaria, pruritus, which may be thus complicated. Further, ichthyosis has a very similar distribution, and may also be masked by eczema.

Treatment.—No known specific remedy will cure prurigo, but the affection can be kept well under control by appropriate treatment. Such treatment, however, demands persevering efforts and the devotion of much time, so that the best results follow in those who are in a position to carry it out most thoroughly. No effort should be spared, especially in the early stages. The details of treatment must depend on the intensity of the malady, the age, and position in life of the patient. In the first place, any eczematous and pustular complications must be dealt with by appropriate methods. The indications thereafter are to improve the nutrition of the patient in every possible way by good hygiene, liberal feeding, and cod-liver oil; to control the itching by certain internal and external measures; and to dissipate any coexistent eruption. It is remarkable how greatly cases improve for the time being by rest in bed with a liberal diet. The itching may be controlled by the use of alkaline, starch, sulphurated potash, or other baths medicated with creolin or izal. Indeed, baths are a very important factor in the treatment, and the local applications to be mentioned will greatly assist. Hatschek speaks well of massage with vaseline. Crocker recommends cannabis indica in full doses, and Blaschko antipyrin. Thyroidin also removes the eruption temporarily. Wolff recommends alternate injections of carbolic acid and pilocarpin. Carbolic acid (15 to 22 grains daily), in pill form, finds favour with Kaposi. Arsenic, he says, is useless. At Vienna the local remedies most in favour have been sulphur, tar, and soap, and, in recent years, naphthol. In the early stages, and in slight forms, the patient may be washed with sulphur soap, or with sulphur and tar soap, and then placed in a bath for an hour; after this, cod-liver oil, plain or medicated, or some simple fat, is rubbed in. In intense cases the impermeable caoutchouc dressing, or ten or twelve frictions with Wilkinson's ointment, gives relief. I have had capital results from the use of a carbolic acid ointment. In other severe cases the patient can be thoroughly soaped in a warm bath, when either a tar preparation, or Vleminckx's solution, can be applied, and the patient continue for a long time in the bath, or remain in bed with the application still on. Such strong measures, however, need watching, and must be carried out with caution in order to avoid their irritant effects. Lastly, naphthol is highly recommended by Kaposi and Ehlers. Each evening a slight friction is

made with a 5 per cent naphthol ointment (1-2 per cent for children under ten years), and the surface is afterwards powdered. A bath is not necessary, but every other evening a washing with naphthol and sulphur soap may be given in a bath. Besnier insists that the treatment should be persisted in for a long time after the eruption has disappeared. Modern occlusive dressings, such as the various varnishes or thick wadding, serve a useful purpose also, and, according to French observations, prevent eruptions, though not the pruritus. Monti's method consists in cleansing the skin, and thickly powdering it with zinc-salicylic powder; the parts are then covered in with "Mosetig batiste" dressings, and this application is repeated, and the macerated skin cleansed, every forty-eight hours.

T. Colcott Fox.

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T. C. F.

DEEP DIFFUSE INFLAMMATIONS

GUTTA ROSEA, OR ROSACEA (ACNE ROSACEA)

Definition.—A chronic erythematous inflammation complicated with disturbance of the sebaceous glands; limited to certain regions of the skin, especially the face.

This disease, though traditionally known by the name of acne, has little to do with acne properly so called. Its first stage is an erythema of the face, usually over a small area which includes the nose and those parts of the cheeks liable to flush from vaso-motor disturbances. This flushing, which may come from various causes, is at first transitory; but it becomes permanent, so that the patient has a red nose or red cheeks. The red patches are not clearly defined, and the blood-vessels are easily emptied by pressure. This erythematous condition may last for months, or possibly even for years, without further change. Many robust men have similar hyperæmia of the whole face, a condition which is hardly to be called rosacea. But sooner or later the peripheral blood-vessels become so dilated as to be conspicuous. The whole skin is swollen, and becomes covered with papular or nodular elevations which sometimes suppurate. This is the condition properly called rosacea. It often extends over the chin and the forehead as well as the typical areas of flushing. Erasmus Wilson compared the papules to the papules of eczema; but the histological researches of Bulkley have shown that the epidermis and rete mucosum are normal, while the papules are due to inflammation in and around the sebaceous glands and hair follicles. We must conclude that the sebaceous affection is part of the process, and that the pustules which often occur are similar to those of common acne.

Unna, on other grounds, describes it as a seborrhœic affection, and regards the vascular phenomena as secondary. It seems to me impossible to ignore the great mass of clinical evidence for a primary angio-neurotic erythema, and that the disease is to be regarded as a vascular erythema complicated with seborrhœic infection. It is often accompanied by seborrhœa of the scalp, which influences this as it does other affections of the face.

Causes.—The commonest cause is some reflex nervous hyperæmia

derived from the digestive or uterine organs. Excess of alcoholic drinks is a cause too well known to need discussion; but it should be remembered that in topers the sebaceous system is stimulated at the same time that the face is flushed. Certain articles of food cause redness of the nose and cheeks independently of dyspepsia; of such are mustard, pepper and the like, or strong cheese. Tea is perhaps too much blamed, except indirectly, as a cause of dyspepsia. Chronic derangements of digestion (gastric or intestinal) take an important part, and derangements of the uterine organs one hardly less so, in producing rosacea. Excessive self-consciousness has no doubt some influence, and unfortunately is increased by the complaint itself. The effect of extremes of temperature, such as nearness to a hot fire or gas light, or exposure to sun and wind, is well known. Finally, uncorrected defects of vision may produce congestion of the nose, and so may ill-fitting eye-glasses. When permanent hyperæmia is produced by such causes, and some infective agent,—perhaps the same as in seborrhœa,—co-operates, rosacea ensues.

Sex and Age.—Rosacea is commoner in women than in men: probably in the proportion of two to one, of those at anyrate who apply for treatment. The most usual time of life for its beginning is from thirty to forty; but may be a few years earlier or later. Broadly speaking, the liability to this disease begins when the liability to common acne ceases. In many cases I have found that patients suffering from rosacea in middle life had common acne in their youth.

Diagnosis.—The red swollen patches of skin with papules, nodules, or pustules, occupying typical situations on the face are generally unmistakable. Difficulty can only arise in distinguishing them from common acne, simple erythema, and lupus erythematosus. With regard to common acne, the presence of comedones, the time of life, and the absence of diffuse inflammation, generally make the distinction; but it should be remembered that the one affection may, so to speak, overlap the other, and the two coincide. From erythema it is distinct by the presence of actual tissue change and discrete inflammation. In lupus erythematosus the adherent crusts and morocco-like surface are a characteristic feature.

Course and prognosis.—Beginning in early adult life this disease may continue till old age or death, unless treated. Spontaneous involution, except as the result of a change in diet or habits, is rare. On the other hand, a judicious combination of general and local treatment will always bring alleviation, sometimes a complete cure.

GUTTA ROSEA HYPERTROPHICA.—It is better to speak separately of the hypertrophic variety of this affection, which has some peculiar features. In rosacea considerable thickening of the true skin occurs, producing lumps and nodules, or, in the case of the nose, a great general enlargement. The deformity thus produced, especially in heavy drinkers, is well known; but there is a special form of hypertrophy of

the nose which has received the name of *Rhinophyma*, and is regarded by Hans Hebra, with whom I entirely agree, as a distinct disease. It is confined to the nose, and begins with a vascular dilatation, but of the venous type, the surface being cold, and the colour bluish or cyanotic. In the earlier stage there is no trace of active hyperæmia; and I believe the causation of this remarkable affection to be at present quite unknown.

Treatment.—The first indication is to deal with the causes of vascular congestion. Diet must be carefully regulated, even in the absence of avowed indigestion. Condiments and spice of all kinds, cheese and rich foods generally, should be strictly prohibited—including, of course, any food whatever that is found by the patient to be difficult of digestion. Alcoholic liquors should be forbidden, or very strictly limited. The worst are champagne, port, burgundy, and other strong wines, and neat spirits; the least objectionable are light claret or German wines, especially if diluted with water or effervescent drinks. Malt liquors are generally injurious, but some patients can take them, if they do not produce flushing of the face. Tea and coffee are allowed only in strict moderation. Besides this any actual condition of dyspepsia is to be treated by the ordinary means.

No drug in my experience is so useful as bismuth in preventing the flushing of the face which arises from indigestion, as well as in correcting the morbid condition. Sometimes mercurials, and other drugs regarded as acting on the liver, are more efficacious, as, for instance, in the form of the following pill:—Hyd. subchlor., iridin, euonymin, āā gr. j. Ft. pil.

Constipation requires careful treatment, and salts of magnesia seem to be most effective in emptying the congested cutaneous vessels. Next to the digestive system the uterine organs are in the female sex the most frequent source of vascular derangement. I do not enter upon a special investigation of these morbid conditions, but functional changes appear to be strongly influenced by such drugs as bromide of potassium. As a routine practice in cases of rosacea in women I am in the habit of combining this with a bismuth mixture:—℞ Bismuth carb. gr. xv., sodæ bicarb. gr. v., pot. bromid. gr. x., pulv. tragacanth. co. gr. xv., aq. menth. pip. ℥j. t.d.s.

The erythematous condition is remarkably influenced by large doses of quinine. The local treatment of rosacea resolves itself into controlling vascular inflammation by astringents, and attacking the sebaceous complications with a specific remedy. Lead solutions, with which oxide of zinc may be combined, are most effective against vascular congestion—in such a formula as the following:—℞ Liq. plumb. acet. dil. ℥ij., zinci oxid. gr. xxx., glycerini ♏xv., aq. ros. ad ℥j. Ft. lotio.

For the sebaceous condition the same combinations of sulphur may be used as for common acne (pp. 757, 758), but the milder form of sulphur

lotion is preferable. When there are many dilated vessels and much cutaneous hypertrophy surgical treatment becomes necessary. Dilated vessels are laid open longitudinally with a cutting needle, and allowed to bleed freely. Linear scarification is also useful; in the hypertrophic form it may be necessary to remove portions of tissue. Information on these matters must be sought for in surgical works.

J. F. PAYNE.

PELLAGRA. See vol. ii. p. 800.

DISCRETE INFLAMMATIONS

HERPES ZOSTER, OR ZONA

(Including H. zoster ophthalmicus)

The name herpes was used by the older physicians for any creeping eruption; even lupus was once spoken of as "herpes exedens." But since the time of Willan the generic name of herpes has been confined to acute eruptions characterised by the presence of groups of vesicles on an erythematous base. Even so this group contains herpes iris, which bears no pathological or clinical relation to herpes zoster, herpes febrilis (seu labialis), or herpes præputialis. In the present day the generic name herpes and the adjective "herpetic" have become more and more confined to the eruptions of H. zoster, H. labialis, and H. præputialis.

Yet there has never been any confusion with regard to H. zoster, or Zona, since the disease was first described. For this name is confined solely to an acute vesicular eruption running round one-half of the body in the form of a girdle. After more or less prodromal neuralgia, affecting definite nerve territories, groups of painful papules on an erythematous base suddenly appear. These rapidly become vesicles filled with fluid, clear at first, but later usually purulent, or even blood-stained. The vesicles usually break, forming shallow ulcers that leave more or less scarring. Each eruption follows the distribution of nerve-fibres in connection with one, or more rarely two, posterior root ganglia.

So far the disease and its name are both absolutely distinctive. But eruptions of an exactly similar nature occur on the limbs. In such situations the characteristic appearance of the half-girdle is lost to the uneducated eye. But for the morphologist the eruption still runs from dorsum to venter, and the name "zoster" is therefore morphologically as correct for an eruption on the arm or leg as for one on the trunk. Again, on the scalp the eruption follows the distribution of various branches of the Gasserian ganglion, and it is only because of the peculiar structure of this ganglion that the eruption does not run from the

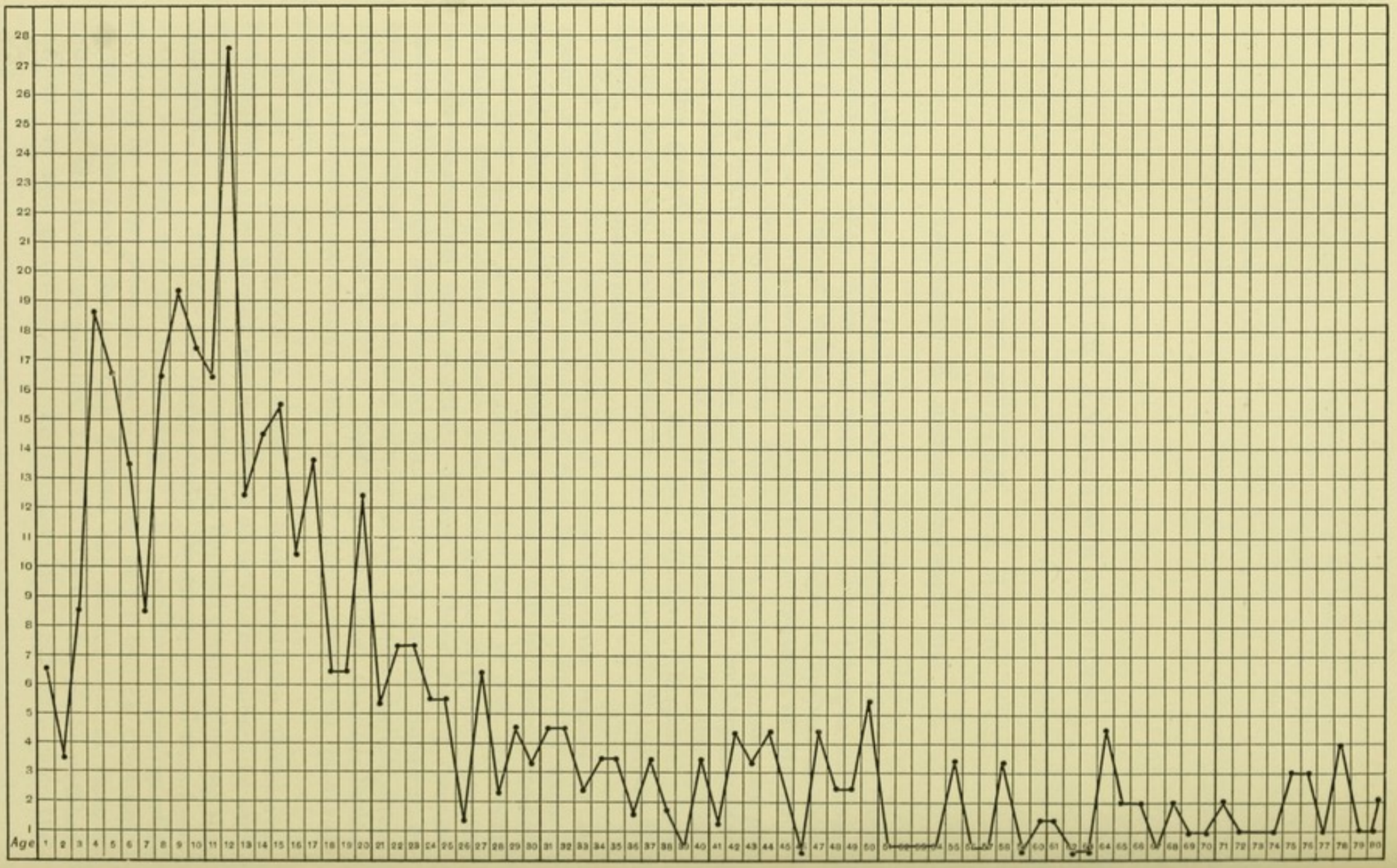


CHART.—To show the age incidence of Herpes Zoster from 378 personally collected cases.

[*Face p.* 617.

morphological dorsum to the morphological venter. Thus H. "brachialis," "sacralis," "collaris," and the like, are but useless and confusing names; and, wherever it be situated, it is better to speak of an eruption having the above well-defined course and characteristics as herpes zoster, or zona. "H. ophthalmicus" is a useful name for that peculiarly definite form that attacks the territory of the ophthalmic branch from the Gasserian ganglion; yet even here it is better to speak of H. zoster ophthalmicus.

Accuracy in nomenclature is necessary in order that there may be no confusion between herpes zoster and herpes febrilis (seu labialis). The latter disease bears no relation to herpes zoster, excepting only that it is a papular eruption which becomes pustular. For (i.) it is habitually recurrent, while herpes zoster extremely rarely occurs twice in the same individual; (ii.) it is usually bilateral, whereas bilateral herpes zoster is of extreme rarity; (iii.) it follows no central nerve area, and is associated with no changes in the central nervous system; (iv.) it may occur simultaneously with H. zoster in the same individual.

H. præputialis belongs to the same group of diseases as H. febrilis, and differs from zoster in the four characteristics just mentioned.

Thus this article will only treat of herpes zoster, or zona; and no eruption will be described that does not come directly within the limits of this disease.

Amongst 127,000 cases of all forms of diseases and injury that came to the receiving-room of the London Hospital in the last twelve months, 127 were cases of zoster (1 in 1000; or 1 in 418 of the medical cases).

Causes.—*Sex* is said to have no marked influence on the disease; but out of 378 cases, of which I have records, 240 were males and 138 females.

Age.—The most various statements are made in the text-books with regard to the age at which H. zoster is most prone to occur; the differences probably arise from the comparatively small number of cases that are likely to fall to the lot of a single observer. If, however, it be permissible to generalise from my own experience, I find that out of 378 cases 283 were under the age of twenty-five; 66 between twenty-five and fifty years, and 29 over fifty years. If these cases are arranged on a chart the maximum incidence between the ages of twelve and thirteen is beautifully seen. Broadly speaking, the age at which the disease is most apt to occur lies between three and twenty, with a more particular proneness to attack between four and thirteen. Children below one year of age are not commonly subjects of this disease; but I have seen four cases under one year, the youngest of which was six months old. A case has been recorded in an infant four days old (Lomer). It is usually stated that the aged are peculiarly susceptible to zoster, but in my 378 cases this does not appear. The notion has probably arisen from the extreme severity of zoster in old persons. Thus whilst a person of middle age may have an attack of zoster of benign course, zoster in the old is always accompanied by severe pain,

and necessitates medical treatment. In many cases of zoster occurring in the middle period of life the patient walks into the receiving-room of the hospital for a diagnosis; and on hearing that it is the "shingles," and that it is not catching, he does not think it necessary to attend again, and thus does not come under the notice of the dermatologist or consulting physician.

Symptoms.—Some malaise generally precedes the first appearance of the rash, particularly in children. The child is ill; it lies about by day and tosses restlessly at night. It vomits, or refuses food, and the mother suspects the onset of some acute specific disease. Adults may suffer from a slight rigor with shivering and chilliness, exactly similar to the rigor that accompanies the onset of acute lobar pneumonia, but of less intensity.

During this period the temperature generally rises somewhat; as a rule in adults it does not exceed 100·5° F., but in children it may occasionally reach 102° F.

Pain is usually present from the first; it is shooting in character and worse at night. Thus it is not uncommon for these cases presenting some fever, malaise, and pain in the side to be admitted to hospital for acute pneumonia or pleurisy; and the true nature of the disease may not be evident until the rash appears about the fifth day. The pain follows the lines of the nerve-roots, and occupies the territory not only of the anterior primary division (intercostal nerves), but also of the posterior primary division. On the trunk it thus runs more or less straight round the half of the body.

The pain may be associated with some hyperæsthesia; and on more than one occasion I have been fortunate enough, by means of the antecedent hyperæsthesia, to mark out the area of the coming herpetic eruption.

With the appearance of the rash the temperature may fall and the general malaise decrease; although the pain remains. But this is by no means always the case; for it would seem that the period in the disease at which the rash appears is extremely variable, and the best method of considering the course of a case of zoster is to date the beginning of the attack from the first onset of pain and malaise. Almost every patient suffers from considerable pain, and the majority from some fever and general discomfort.

The rise of temperature lasts from three to five days, and this may be considered as the duration of the acute disease. The rash may appear a few hours after the onset of the disease, or may be delayed until the period of the acute general symptoms is past. Thus, if the rash be taken to represent the physical signs, an attack of zoster bears a close resemblance to an attack of acute lobar pneumonia; for it is notorious that the signs in the lungs may be present very shortly after the initial rigor, or may not make their appearance until the crisis has been reached.

The rash most commonly makes its appearance on the third or fourth day of the disease, just as the physical signs of acute lobar pneumonia

usually present themselves on the third or fourth day after the initial rigor.

From the time when it first makes its appearance the rash spreads with very varying rapidity. In each area representing the distribution of a posterior root three spots usually exist at which the branches come to the surface (posterior primary, lateral branch of anterior primary, and anterior branch of anterior primary division). It is over these "maxima" that the eruption first makes its appearance. From these points it spreads along the whole area of the distribution of the main branches, and may invade the distribution of even the finest twigs, until, in a complete case, the whole area of one posterior root is occupied by vesicles or raised erythema. The most severe incidence of the eruption always falls on the skin in the neighbourhood of the maxima; and it is over these points that in the severest cases huge bullæ (sometimes containing blood-stained fluid) or small gangrenous patches may appear.

Sometimes the territory of the anterior primary division, sometimes that of the posterior primary division, is first affected: no definite rule can be laid down.

The large majority of cases do not run a severe course; and in some the whole eruption consists only of a few vesicles scattered around one or more of the maximum spots.

On the palm and sole of the foot vesicles are extremely rare. When present on the palm and sole they tend to be of small size, very little raised, and not surrounded by erythema. Vesicles on the fingers, the back of the hand, the toes, and the dorsum of the foot are not often, in my experience, severe.

The rash may come out fully in two days from the appearance of the first spot, or may continue to come out for a week. The latter is particularly apt to be the case if the outbreak of the rash occur synchronously with the onset of the fever and malaise. On the other hand, in those cases where the rash is delayed until the fall of temperature, the whole eruption may come out with extreme rapidity.

The rash may consist, from the first, of vesicles containing clear fluid, surrounded by more or less erythema; but more commonly it first shows itself as an erythema upon which vesicles rapidly arise. The whole of the distribution of the posterior nerve root is rarely, if ever, occupied by vesicles; and the whole distribution can only be obtained by taking in the borders of the profound erythema.

In very severe cases the vesicles may contain blood-stained black fluid. Sometimes these rapidly break down and give place to shallow ulcers, that may reach the size of a florin. In all such cases the subsequent scarring is profound, and much after-pain is likely to result.

In most cases the contents of the clear vesicles become turbid. Possibly it is in connection with this pus-formation that the lymphatic glands that drain the affected tract of skin are in the majority of cases enlarged. Thus H. zoster forms a useful means of determining the dis-

tribution of the lymph channels from skin areas. During this time the temperature may remain a little raised (99·2°-100°), possibly owing to the invasion of the vesicles by the organisms of suppuration.

About the fifth to the tenth day after their first appearance the vesicles begin to dry up and to form scabs. Under these scabs the eruption heals, and at the end of six weeks beyond some freshly-healed scars nothing is to be seen. Some leave scarcely any scarring, although the scars of the severer eruptions are large, irregular, and white; closely resembling those made by a superficial burn.

The pain which precedes the rash has already been described. During the period of the rash itself the pain becomes more local in distribution, and may be little more than a painful itching; or it may become of an agonising burning character. When severe it is worse at night, and in such cases the patient suffers from loss of sleep.

Usually the pain dies away when the rash begins to heal; but in elderly patients it may last for weeks, or even for months and years, after the scars are healed. Under such circumstances the pain is stabbing, darting, and aching, and is seated in the position of the heaviest scarring. I have not seen this pain follow herpes, except in elderly people or where there was considerable scarring. It is relatively more common after herpes of the ophthalmic division of the trigeminal, and in this situation severe cases may occur in young adults, especially if the rash have left deep scarring.

The pain, although subject to exacerbations, is usually continuous; and I have seen no case as yet in which the pain assumed the paroxysmal character common in neuralgia quinti major (vol. vi. p. 730) ("epileptiform neuralgia"). It tends to vary from day to day, and, like the lightning pains of tabes, is worse "when the weather changes." The exact nature of the meteorological change that increases these nerve-root pains is not yet determined.

After the rash has died away the sensibility of skin it has occupied cannot, as a rule, be discriminated from that of the surrounding parts. But where there is a deep and widespread scarring all forms of sensation, but particularly sensibility to heat and cold, are diminished. This loss of sensation does not extend over the whole area previously occupied by the rash, but seems to be limited to the part where the scarring is deepest. Thus it cannot be due to a complete degeneration of the nerve-fibre, but only to a loss of those fibres which supply the parts most deeply affected. Apart from coincident nervous disease, I have never seen a broad band of anæsthesia extending over the whole area previously occupied by the rash, as a consequence of an attack of zoster. Second attacks are very rare, apart from nervous disease. I have personally met with four cases in which a patient with zoster has shown scars of a previous attack. One of these cases is extremely well authenticated, as it occurred in the person of an eminent dermatologist. In none of these cases did the distribution of the second attack coincide with that of the first. Similarly it is rare for a patient to be the

subject of a bilateral eruption, apart from the coexistence of some gross disease of the central nervous system. Kaposi mentions a bilateral case; and I have also seen one in which the eighth dorsal was affected on the left side, the tenth dorsal on the right.

In no case of spontaneous zoster has the bilateral eruption been at exactly the same level.

Zoster of the Head and Neck.—Within the territory of the first or ophthalmic division of the fifth nerve herpes, exactly resembling in course that seen on the body, is a fairly common occurrence. It is preceded by considerable malaise and some rise of temperature, and is noteworthy for the extreme severity of the pain. The area occupied by the rash is either a part or the whole of the distribution of the ophthalmic division. It may extend as far back as the parietal eminence, and occupy the whole upper lid and side of the nose as far as the ala nasi. This implication of the side of the nose is an extremely important feature; for, as Mr. Hutchinson first pointed out, the patients in whom this area of the skin is affected are peculiarly liable to suffer from ulceration of the cornea.

The rule as originally laid down by Hutchinson is too absolute; for Hybord found that out of 53 cases in which the nose was implicated 35 showed eye changes, whilst in 18 the cornea and iris were normal.

Fig. 2 shows the invasion of the nose; in Fig. 3 the whole ophthalmic division is affected, excepting the branch to the side of the nose.

When the eye is affected the conjunctiva becomes red and injected, and ulcers may appear on the cornea; it is probable that the abrasions occasionally seen on the inflamed conjunctiva are the remains of similar shallow ulcers. But the cornea is not the only structure of the eye that is apt to suffer in herpes of the ophthalmic division of the fifth. Iritis also is apt to occur, and, unless care is exercised and the pupil kept under the influence of atropine, adhesions may form between the posterior surface of the iris and the anterior surface of the lens. Panophthalmitis has also been described in several cases.

Although I have carefully examined every case of H. z. ophthalmicus that has come under my notice, I have never seen changes in the retina or optic nerve, even in the most severe cases of this disease. Blindness has, however, been known to follow an attack (Bowman).

In rare instances paralysis of the ocular muscles and ptosis have accompanied the disease. In some of these cases the herpes was not of the true spontaneous type, but was secondary to some growth or disease about the base of the skull (Sattler). But there are several cases on record (*vide* p. 630) where ophthalmoplegia interna and externa accompanied the spontaneous zoster of this distribution. In one case that came under my notice (Silcock) a careful naked-eye necropsy failed to reveal any gross disease of the eyeball, nerves, or base of the brain. Removal of tissue for microscopic examination was unfortunately not permitted.

Herpetic eruptions about the lips and nose, or on the cheeks, are common in connection with febrile states, or with inflammation of the nose and pharynx. Such eruptions, however, bear no relation to zoster; for (*a*) they are usually bilateral, (*b*) they notoriously tend to recur frequently. Thus some patients are subject to this disease whenever they are attacked with a common nose cold. (*c*) Herpes labialis may occur concomitantly with zoster on the trunk. Now double zoster is one of the greatest of rarities; whereas on four or five occasions I have

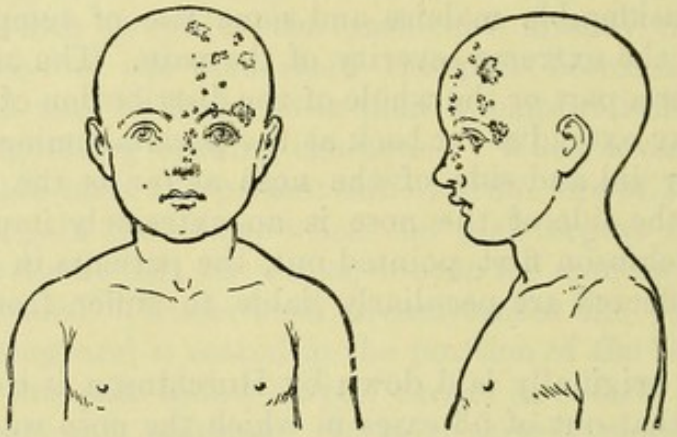


Fig. 2.

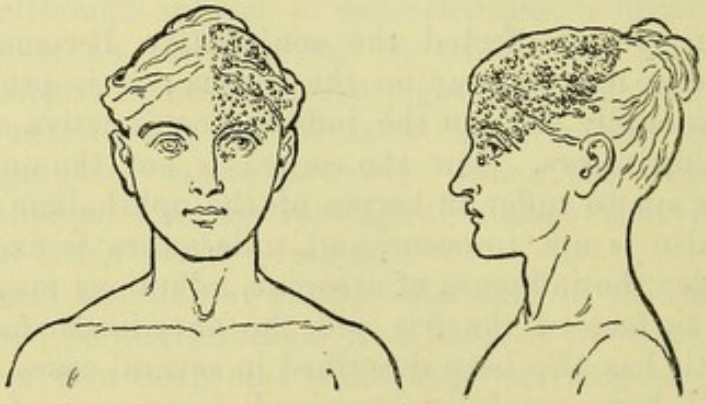


Fig. 3.

seen typical H. labialis present in a patient suffering from a well-marked attack of zoster on the trunk. (*d*) H. febrilis is not accompanied or preceded by the characteristic neuralgic pain of H. zoster.

Yet, in spite of this, true zoster of the face characterised by unilaterality and subsequent scarring does exist. In one such case Campbell and I found a hæmorrhagic focus in the Gasserian ganglion exactly analogous to the changes in the posterior root ganglion which we found in the other cases of zoster which we examined after death. Moreover, in one case I saw typical H. ophthalmicus associated with an equally well-marked eruption over the area of the second division (infraorbital) of the trigeminal.

I have also seen several cases of true zoster involving the third or maxillary division of the fifth nerve. However, true zoster over the area of the two lower branches of the fifth is rarer than H. ophthalmicus.

Thus it will be noticed that zoster on the face tends to follow the distribution of the three main peripheral branches of the ganglion rather than to be distributed over the supply of "root areas" or "segments." This, as I shall show more fully later, is probably due to the structure of the Gasserian ganglion; for this ganglion is the homologue of a large number of posterior root ganglia. Though an anatomical integer it is physiologically manifold. Thus to anatomical lesions it reacts on coarse anatomical lines; to physiological stimuli it reacts over much smaller areas corresponding to the ancient supply of its components.

Of the Tongue.—The tongue is occasionally the seat of a true herpetic eruption, but the vesicles are extremely rapidly broken, giving place to shallow ulcers. Occasionally the original vesicular nature of the affection can be seen in the ragged remains of the vesicle still adhering to the edge of the ulcer.

The ulcers are usually distributed on the upper surface of the tip of the tongue, but occasionally they occupy a strip along the dorsum, not reaching either the side or tip.

The tongue is apt to be affected in connection with the lips, and in such cases the eruption is frequently bilateral. Thus it breaks two of the canons of true zoster, and is undoubtedly, in most cases, of the same nature as H. labialis. I have, however, though rarely, seen cases where the eruption was unilateral, and was not associated with an eruption on the lips or palate. Such cases may be of the nature of true zoster; but the usual cases on the tongue are certainly manifestations of H. febrilis (seu labialis).

The hard palate may also be the seat of herpetic eruptions, but these are usually bilateral and tend to recur.

Of the Neck.—I pointed out above that the lateral and posterior regions of the neck, in fact, all that part of the neck situated posterior to a rough line along the anterior border of the sterno-mastoid, could be the seat of zoster as typical as any on the trunk. It is unilateral, occurs once only, and is accompanied by the typical neuralgic pain and more or less malaise.

The area in front of the sterno-mastoid can also be the seat of true zoster, but is extremely rarely attacked without the simultaneous invasion of the third cervical area. When attacked by true zoster the region of the great occipital nerve is usually also affected (second cervical).

On the other hand, herpetic eruptions of the type of H. labialis are not infrequent within this area. They are not infrequently associated with spots and vesicles about the lips, and are commonly bilateral.

Distribution of Zoster.—Mehlis, in 1818, was the first to suggest that the eruption of H. zoster follows the distribution of nerves, but von Bärensprung was the first to prove this hypothesis. He stated

definitely that the eruption of H. zoster followed the distribution of the fibres from a posterior root ganglion. But throughout his paper he names the various eruptions according to the peripheral nerves they implicated, as the distribution of the fibres of the posterior root was then unknown. Thus the erroneous doctrine grew up that herpetic eruptions follow the distribution of peripheral nerves. As each case arose the teacher pointed out how it followed this or that nerve in a more or less satisfactory manner. It was, however, obvious to any one who examined such cases carefully, especially when the disease happened to attack one of the limbs, that it certainly does not follow the course of any peripheral nerve. Dr. James Mackenzie of Burnley and I simultaneously saw the importance of a more careful study of the distribution of these eruptions. For, if v. Bärensprung's statement were correct, the distribution of these eruptions would be an admirable method of studying the supply of certain fibres from the posterior roots.

That v. Bärensprung was right in his statement of the pathology of the disease has been amply borne out by necropsy; and in describing the areas affected by H. zoster, I shall assume its correctness.

In a very large proportion of the cases the eruption does not occupy the whole area of a single nerve-root but a district consisting of the maxima, surrounded by lines or patches of vesicles of variable extent. Thus it is only by collecting a very large number of cases that it is possible, even approximately, to determine the extent of any one root area.

Figs. 4, 5, 6, and 7 show the distribution of the fibres from the posterior root ganglion based upon the 412 cases of zoster of which I have photographs or drawings. It makes no pretence to absolute accuracy, for such accuracy could only be obtained by reproducing the distribution of each area separately. But the area affected in each case is a band coiled round one-half of a rough cylinder, and it is obvious that the shape assumed by this band will vary greatly with the diameter of the cylinder. Thus a nerve-root area spread out on the round belly of a baby will have quite a different appearance from the same eruption around the waist of a woman who wears stays. The same eruption will differ considerably as it is extended on the long, narrow, sloping chest of the phthisical, or the barrel-shaped, high-shouldered trunk of the emphysematous patient. Bony points are thus almost useless as landmarks. Skin points only are trustworthy, and of such landmarks on the trunk we unfortunately possess only the nipples and the navel.

We are also confronted with a second difficulty which must make such combined Figs. as 4 and 5 untrustworthy; namely, that the supply from any one root may vary. Thus in two several patients a certain portion of the skin may be supplied by a higher or by a lower root. The nervous system may be "prefixed" or "postfixed." Such variation is best seen by studying those areas which just lap on to the limb,—the third dorsal on the arm and the first lumbar on the leg. Now an examination of 34 cases of zoster over the third dorsal, and of 27 cases

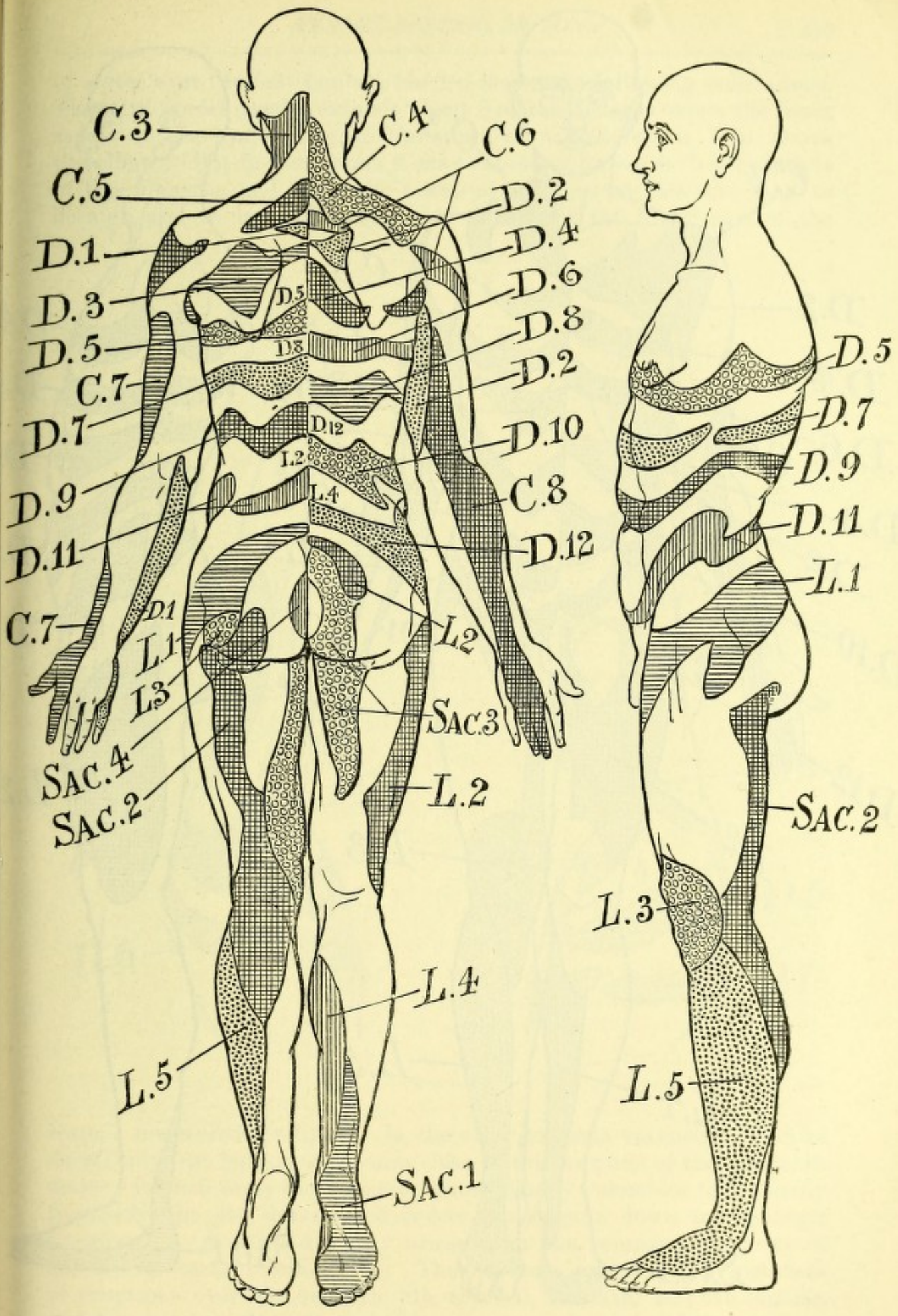

C.3
C.4
C.6
C.5
D.2
D.1
D.4
D.3
D.5
D.6
D.5
D.8
D.8
C.7
D.2
D.7
D.12
D.10
L.2
D.9
L.4
C.8
D.11
D.12
C.7
D.1
L.2
L.1
L.3
SAC.3
SAC.4
L.2
SAC.2
L.4
L.5
SAC.1
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D.9
D.11
L.1
SAC.2
L.3
L.5

FIG. 4.

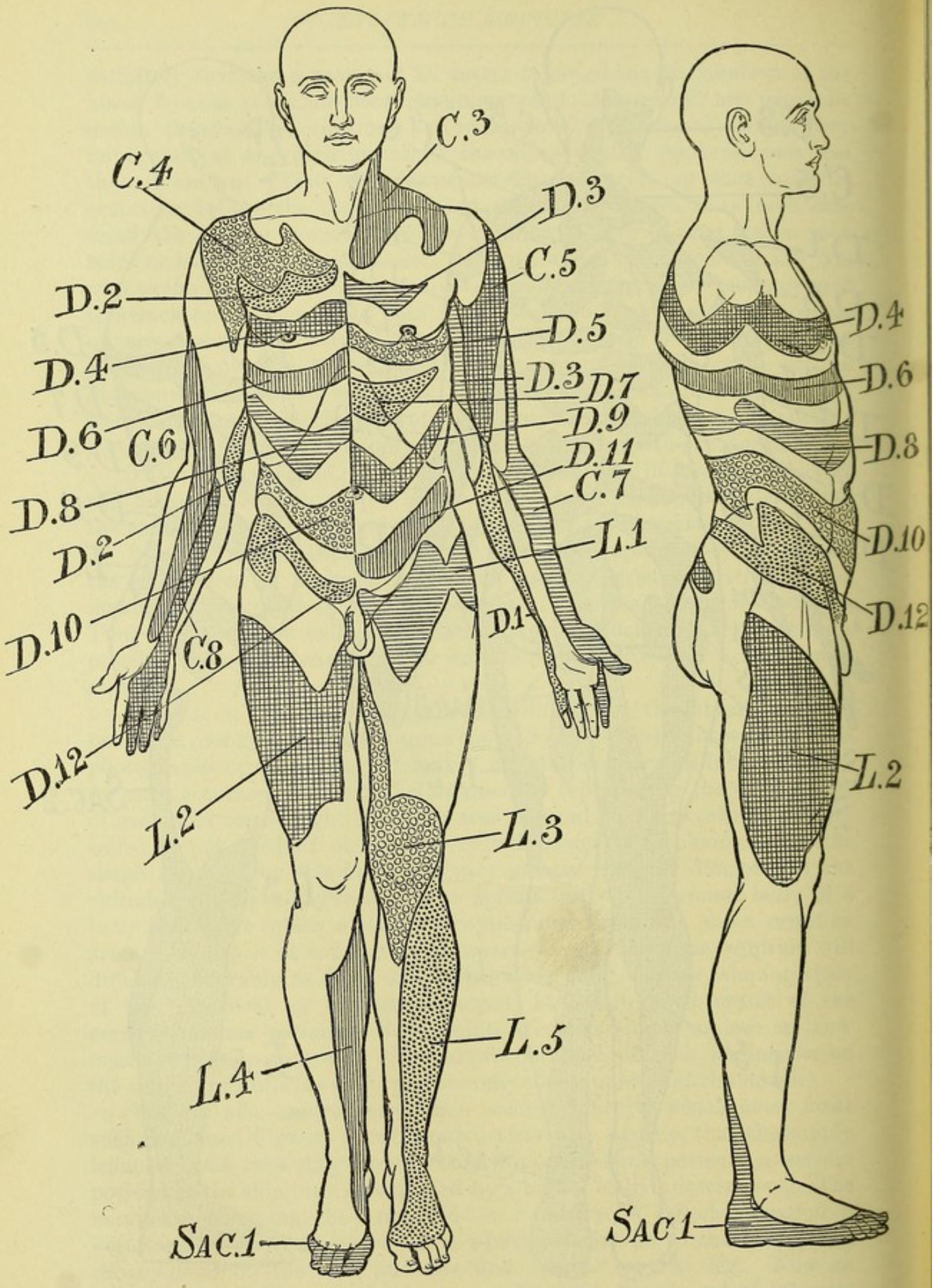

C.4
C.3
D.3
C.5
D.2
D.5
D.4
D.3
D.7
D.6
D.9
C.6
D.11
D.8
C.7
D.2
L.1
D.10
D1
C.8
D.12
L.2
L.3
L.5
L.4
SAC.1
D.4
D.6
D.8
D.10
D.12
L.2
SAC 1

FIG. 5.

of zoster over the first lumbar, has led me to the following conclusions. The third dorsal usually extends about $\frac{3}{4}$ of the distance down the inner aspect of the arm, ending, in the adult, at a point about 3 in. above the elbow. But in some cases it may extend as far as the inner condyle of the humerus, and if so the posterior portions of this area tend to lie high, and to leave a considerable portion of the lower part of the

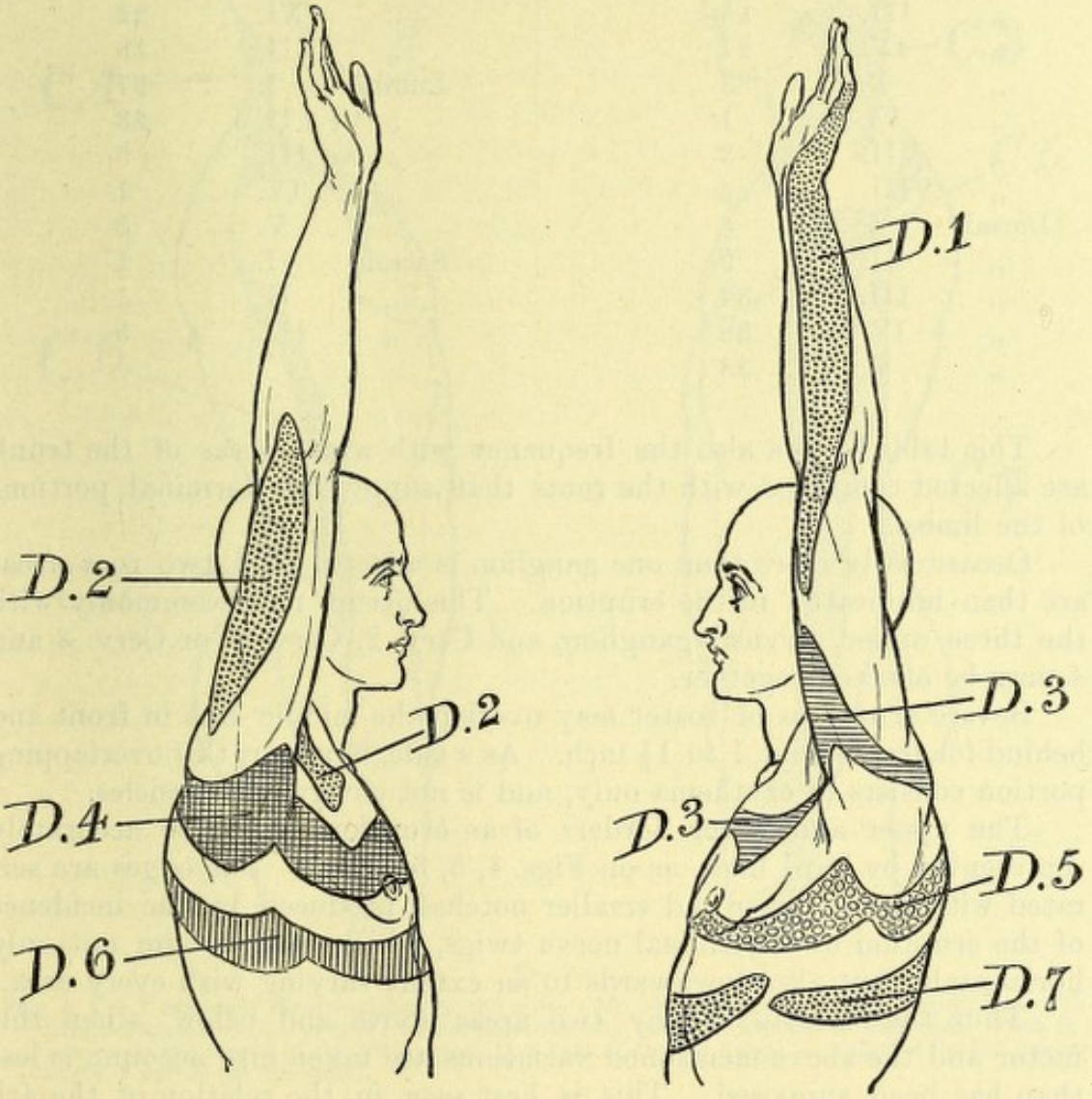


FIG. 6.

scapula uncovered (prefixed). In the other extreme variation the third dorsal only just laps on to the arm close to the insertion of the pectoralis major; in such cases the posterior patch closely resembles that usually formed by the 4th dorsal, and covers the scapula down to the angle (postfixed). A third difficulty arises from the comparative rarity of zoster over certain root areas. Thus I have seen too few instances of eruptions over the 6th, 7th, 8th cervical, 3rd, 4th, and 5th lumbar, and 1st sacral, to do more than guess at the real supply of these roots.

The following table shows the relative frequency in my experience of 412 cases with which each area is affected :—

Trigeminal—		
1st Division,		18
2nd	„	2
3rd	„	2
Cervical	II.	only in combination.
„	III.	15
„	IV.	21
„	V.	3
„	VI.	1
„	VII.	3
„	VIII.	4
Dorsal	I.	5
„	II.	9
„	III.	34
„	IV.	38
„	V.	38
Dorsal	VI.	20
„	VII.	19
„	VIII.	36
„	IX.	19
„	X.	26
„	XI.	22
„	XII.	18
Lumbar	I.	27
„	II.	23
„	III.	5
„	IV.	1
„	V.	3
Sacral	I.	1
„	II.	1
„	III.	5

This table shows also the frequency with which areas of the trunk are affected compared with the roots that supply the terminal portions of the limbs.

Occasionally more than one ganglion is affected, and two root areas are then implicated in the eruption. This occurs most commonly with the three upper cervical ganglion, and Cerv. 2, Cerv. 3, or Cerv. 3 and 4 may be affected together.

Severe eruptions of zoster may overlap the middle line in front and behind for from about 1 to 1½ inch. As a rule, however, this overlapping portion consists of erythema only, and is not covered by vesicles.

The upper and lower borders of an eruption cannot be accurately represented by hard lines, as on Figs. 4, 5, 6, and 7. The edges are serrated with many larger and smaller notches, produced by the incidence of the eruption over terminal nerve twigs, which tend to run not only horizontally but also downwards to an extent varying with every area.

Thus the overlap of any two areas above and below, when this factor and the above-mentioned variations are taken into account, is less than has been supposed. This is best seen in the relation of the 4th and 5th dorsal areas to the nipple: the 4th sends a limb downwards on the outer side, and another on the inner side of the nipple, it supplies the upper portion of this structure; the 5th, on the other hand, always has an upward projection to supply the lower part of the nipple. Thus when the breast is enlarged, as in women, the 4th dorsal covers roughly the outer, upper, and inner quadrants, while the 5th covers the lower quadrant. In the same way, however low the main portion of the 9th dorsal may lie, it always swings up to a point in the mid ventral line above the level of the umbilicus; but the 10th dorsal never reaches the mid venter above this line.

Overlap is, however, greater on the limbs, and over such parts as the upper three intercostal spaces, and the pubes, where developmental compression has taken place.

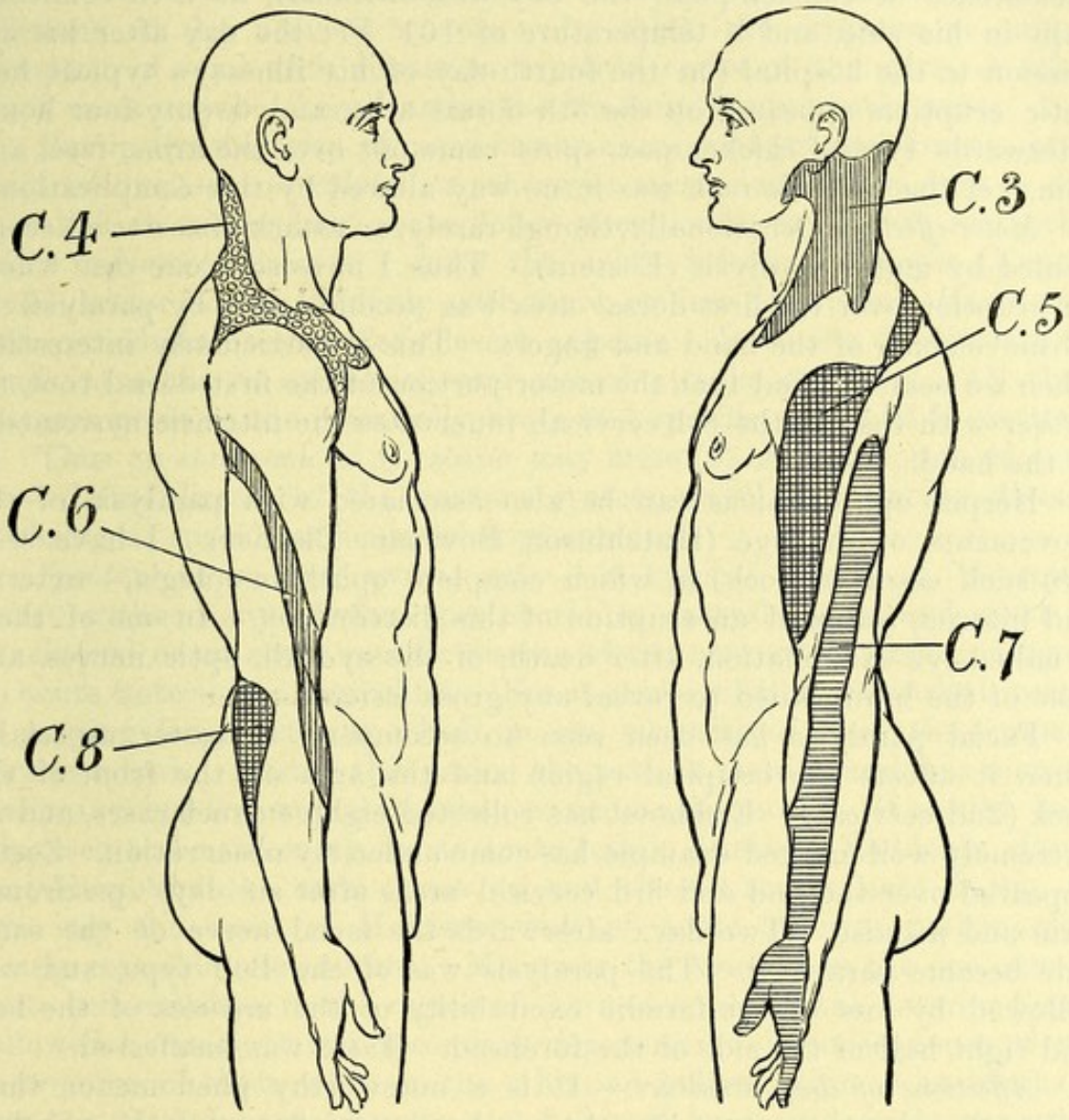


FIG. 7.

Figs. 4, 5, 6, 7 represent diagrammatically the areas over which zoster makes its appearance. The nomenclature of each area refers to the posterior root ganglion affected in each case. Thus C. 3 represents the supply of the 3rd cervical, D. 3 that of the 3rd dorsal, L. 3 that of the 3rd lumbar, and S. 3 that of the 3rd sacral.

Complications of zoster.—*Skin.*—The rash usually heals up and leaves scars within a few weeks; but occasionally gangrenous sores may appear, and may last for many weeks, or even months. In a lunatic patient I once saw these sores had lasted for over a year; but this probably was due to the irritation of his filthy habits.

The outbreak of zoster seems to be quite uninfluenced by the simultaneous existence of other skin conditions. Thus I have seen an attack of acute zoster in a patient who was covered with an extensive and well-marked macular syphilide. The zoster was unaltered in distribution or appearance, and died away in the usual time and manner. Zoster of the

typical appearance is not uncommon in patients suffering from psoriasis, possibly owing to the almost universal treatment of this disease with arsenic. One case that came under my notice was complicated by the coexistence of chicken-pox: the boy was obviously ill with vomiting, pain in his side, and a temperature of 101° F.; the day after his admission to the hospital (on the fourth day of his illness) a typical herpetic eruption appeared on the 5th dorsal area, and twenty-four hours afterwards typical chicken-pox spots came out over the arms, face, and chin, yet the herpetic rash was in no way altered by this complication.

Motor effects.—Occasionally, though rarely, an attack of zoster is accompanied by motor paralysis (Ebstein). Thus I have seen one case where an eruption over the first dorsal area was accompanied by paralysis of all movements of the hand and fingers. This is particularly interesting when we bear in mind that the motor portion of the first dorsal root, together with that of the 8th cervical, innervates the intrinsic movements of the hand.

Herpes ophthalmicus can be also associated with paralysis of the movements of the eye (Hutchinson, Bowman, Blachez). I have seen two such cases (Silcock) in which complete ophthalmoplegia,—externa and interna, followed an eruption of this distribution. In one of them a naked-eye examination, after death, of the eyeball, optic nerves, and base of the brain failed to reveal any gross lesion.

Facial paralysis has been seen to accompany H. zoster, especially when it affects the occipital region and the area on the front of the neck (2nd cervical). Eichhorst has collected eighteen such cases, and an extremely well-marked example has come under my observation. Zoster appeared over the 2nd and 3rd cervical areas after six days' prodromal pain and malaise. Two days afterwards the facial nerve on the same side became paralysed. The paralysis was of the Bell type, and was followed by loss of the faradic excitability of the muscles of the face and right half of the side of the forehead. Taste was unaffected.

Affections of deep structure.—It is a noteworthy phenomenon that, although a deep structure like the iris becomes inflamed in H. ophthalmicus, I have never been able to find any evidence of inflammation of the pleura or peritoneum in those cases where the eruption lay around the chest, or over the abdomen. In the former group of cases I have habitually listened for signs of pleurisy but have been unable to hear a friction sound; and in an autopsy on one such case I examined the parietal pleura carefully but could find no sign of inflammation. In an autopsy on a case where the rash, present at death, occupied the 11th dorsal area, I was likewise unable to discern any inflammation of the peritoneum.

Again, there is no evidence that deep organs, receiving their visceral supply from the affected roots, become affected during an outburst of zoster. Thus when the 10th dorsal is affected the testicle does not become tender in the same way that it does when in consequence of a renal calculus the 10th dorsal segmental area is hyperæsthetic.

With the exception of the iris, then, there is no evidence that any deep structure is affected during an attack of H. zoster.

Pathogeny.—A certain number of cases of zoster bear a definite relation to some pre-existing disease in either the central or peripheral portions of the nervous system. In them the eruption is only a symptom of some such disease as myelitis, caries of the spine, or tabes. Such cases may be classed under the heading Symptomatic zoster.

But in the majority of cases zoster arises without any known cause. Cold is invoked to explain its otherwise mysterious origin, just as cold is called in to explain acute lobar pneumonia, erysipelas, and other acute infective diseases. Like the acute infective diseases (Kaposi, Rohé) zoster begins suddenly with more or less fever, and after a variable period the characteristic lesion appears. It runs a definite course, tends to occur in epidemics, and second attacks are rare. All these features point to the essentially acute and specific nature of H. zoster.

Thus an outbreak of H. zoster may arise (*a*) as a symptom of some pre-existing disease of the nervous system, or (*b*) as an acute disease, probably as specific as acute lobar pneumonia.

Spontaneous or acute specific zoster.—A typical attack of H. zoster arises without any obvious peripheral or central cause, and must be considered as an acute specific disease of the nervous system analogous to acute anterior poliomyelitis. For it starts with a prodromal period of varying length, during which, in the majority of cases, the temperature is raised. During this period the patient feels ill and has more or less pain ; but it is impossible then to make a diagnosis. If a child, he is supposed to be sickening for an acute febrile disease. Suddenly after a variable period the rash comes on and the disease declares itself. In this way the onset of H. zoster and of acute anterior poliomyelitis closely resemble one another. Moreover the lesion is in the one case an acute inflammation in the region of the motor cells of the anterior horns, followed by more or less secondary degeneration in consequence of the destruction of these cells ; in the other, an inflammation or hæmorrhage into the posterior root ganglia, also followed by secondary degeneration due to the destruction of the ganglion cells of the posterior root. Now the cells of the posterior root ganglion are the morphological equivalents of the large cells of the anterior horn, and thus the parallel between the two diseases is complete. The reason that zoster is of commoner occurrence than anterior poliomyelitis probably lies in the fact that one who has suffered from zoster is not hampered in the struggle for existence, whilst anterior poliomyelitis materially diminishes the likelihood of the patient's survival in the struggle.

If zoster be an acute specific disease second attacks should be uncommon, and we find as a fact that second attacks of spontaneous zoster have been rarer than second attacks of measles. Again, it should tend to occur more at certain periods than at others, or even in actual epidemics. This is now recognised to be the case. My records of the last two and a half years at the London Hospital tend

also to bear out the statement; for although sporadic cases occur throughout the year, at certain seasons of the year there is a large increase in the number of cases. Throughout the years of which I have a complete record these seasons have varied; they seem to depend on atmospheric conditions of which we are as yet ignorant. Thus in 1896, 1897, and 1898 there was an epidemic in the middle of March. In 1897 and 1898 there was an outbreak from the middle to the end of May. In 1897 a large number of cases appeared during the long drought that lasted from the end of July on to the beginning of November; and during this period of 4 months I saw 58 cases, or one-half of the cases in the year. In 1898 several cases appeared in June, and a marked outbreak from the middle of July to the end of August, during which period I saw 22 cases in a little under 6 weeks. Another outbreak occurred in the middle of October. Thus there can be little doubt that the occurrence of large numbers of cases of spontaneous zoster are associated with some atmospheric influence or conjunction of which we are as yet ignorant.

When this influence is at its highest those persons are particularly liable to be attacked in whom the resistance is weakened by some intercurrent disease. Thus many of the children attacked had recently suffered from whooping-cough, measles, diarrhœa, or some other children's ailment. Pregnant women are also liable to attacks of zoster, and I have seen it immediately follow the operation of ovariotomy.

Phthisis is also an extremely well marked predisposing factor, and in times of epidemic I always see several cases where zoster has attacked patients with this disease. The distribution of the eruption bears no relation to the position of the pain produced by destruction of the lung; for in several such cases the area occupied by the eruption lay over parts of the body never affected by the pain of lung-disease.

Mr. Jonathan Hutchinson first suggested that arsenic is apt to produce zoster; for he stated that patients under the influence of this drug are prone to the disease. Neilson found 10 cases of zoster amongst 557 patients with psoriasis who were taking arsenic; but not one case amongst 220 that were not taking this drug. I have seen many cases in persons who were taking arsenic for chorea and other diseases during those periods when zoster was rife amongst those who were not taking arsenic. Thus it is probable that Hutchinson's impression is correct. Yet in such cases arsenic is not a proximate cause of the eruption, but only a remote cause, in so far as it renders the patient more liable to attack.

Attacks of zoster are frequently attributed to mental causes, such as fear or sorrow. Such attribution seems as little proven in the case of zoster as elsewhere in medicine where it has been invoked to explain organic disease. Mental disease, as such, does not seem to dispose to zoster; but a considerable number of the insane suffer also from some bodily ailment, so that zoster is a fairly common complaint in large asylums.

General paralysis of the insane (dementia paralytica) undoubtedly disposes to zoster; and the majority of cases that have come under the notice of Dr. Campbell and myself in two county asylums were in patients suffering from general paralysis. We are not yet able to decide whether in such cases the zoster is symptomatic, as in the allied disease tabes, or whether the debilitated condition of these patients renders them peculiarly prone to attack, as they are prone to attacks of acute lobar pneumonia, colitis epidemica, and other diseases.

Symptomatic zoster.—The occurrence of zoster in cerebral disease does not stand in any direct connection with the brain lesion, but is probably due to the decreased resistance of such patients, whereby liability to attack is increased. In one such case, where we obtained an autopsy, we could find no obvious connection between the brain lesion that had caused hemiplegia and the local ganglion-lesion that had produced the zoster. The lesion in the ganglion differed in no way from that seen in other cases, and the eruption occurred at a period marked by the occurrence, both outside and inside the hospital, of an increased number of cases. But I repeat that zoster is a common occurrence in general paralysis of the insane (dementia paralytica).

Of myelitis zoster may be a direct symptom, for the area occupied by the rash not infrequently coincides with the upper level of the anæsthesia. In some cases of myelitis the upper level of the anæsthesia is surmounted by a band of hyperæsthesia representing that area of the cord undergoing destruction; and I have twice seen zoster appear within this area of hyperæsthesia. In one of these cases, which I watched for nearly a year, the area that had been occupied by the zoster ultimately became the highest area involved in the anæsthesia when the disease in the cord quieted down and became stationary. It is probable that in some of the extremely few well-authenticated cases of zoster bilateral at the same level, the appearance of the eruption may have been due to the disease of the cord (Bramwell).

There are also several well-authenticated cases of the appearance of zoster in caries and necrosis of the ribs (Dubler). In one of our cases the ganglia were invaded by multiple growths of lymphatic sarcoma which had spread into the intervertebral canals from a mass of glands on the anterior surface of the vertebral column. Again, herpes is by no means an uncommon phenomenon in caries of the spine; and in such cases I have always found that the area occupied by the eruption corresponded to the distribution of that posterior root which must have been involved in the fresh outbreak of acute disease. Thus in two cases of old spinal caries the clinical symptoms of recrudescence of the vertebral disease were accompanied by zoster over that root which corresponded to the acme of the curve and the local spinal tenderness.

In tabes outbreaks of zoster are a classical symptom; but in my experience this phenomenon is rarer than the text-books would lead us to suppose. Thus in the last eight years, during which I have seen a large number of cases both of zoster and of tabes, I have seen two in-

stances only. Neither eruption was complete, and neither showed that virulent intensity so frequently seen in spontaneous zoster; moreover, the eruption came out over a longer period than usual in spontaneous zoster (during four weeks in one case), and tended to recur. In both cases the eruption was situated in the territory previously occupied by intense lightning pains. The occurrence of zoster in tabes is of great theoretical interest in connection with the changes in the posterior roots found in this disease.

Crops of bullous eruptions are described as occurring after injury to peripheral nerves (Weir Mitchell, Charcot). It is, however, doubtful if such eruptions should be classed with zoster, for they only occur over the territory of the wounded nerve, and do not follow a central course. In Weir Mitchell's cases they occurred, with other trophic changes, within the anæsthetic area.

Pathology.—1. *The structure of the vesicle.*—A vesicle of H. zoster at its height is a unilocular cavity, whose floor consists of naked papillæ. Incomplete partitions are formed by altered epithelial cells which retain their attachment to the roof of the vesicle. The cavity is filled with swollen epithelial cells of all ages, which have lost their prickles. Together with these loosened cells are leucocytes that have emigrated from the vessels. Certain protozoa-like bodies are also visible in the vesicle (Pfeiffer); but these have been shown to occur in vaccinia and varicella, and are probably altered epithelial cells (Unna, Hartzell).

The papillæ beneath the vesicle are engorged with blood, and contain many wandering leucocytes. Under a scab, which consists of the whole contents of the vesicles, restitution takes place by the ingrowth of young epithelial cells from the periphery to cover the base of the vesicles (Unna).

The fine nerve-twigs in the deep layers of the corium show marked swelling of the neurilemma, the medulla is degenerated, and the axis-cylinder shows moniliform swellings. The larger branches show marked degenerative changes (by Marchi's method), ten days after the first onset of the eruption (Campbell and Head).

2. *Lesions in the nervous system.*—Von Bärensprung first suggested that the lesion associated with zoster lies in the ganglion of the posterior root. He examined one case after death, and, so far as the primitive microscopic methods at his disposal permitted, proved that "three ganglia" were affected, but "one more than the others." A child of one year, suffering from tuberculosis, was affected with zoster on the area of the 7th dorsal root; at the autopsy, six weeks afterwards, the 6th, 7th, and 8th dorsal nerves and ganglia were found reddened or thickened, but the 7th more than any other. Microscopic examination showed that the ganglion contained a fine brown mass, apparently altered blood; and that the "neurilemma was inflamed."

Since 1862, the date of von Bärensprung's observation, several observers have examined the ganglia at different periods after an eruption of zoster. Charcot and Cotard (1865) found injection and inflammatory

exudation into the ganglion. Oscar Wyss (1871), Sattler (1875), and Kaposi in H. ophthalmicus found hæmorrhage and infiltration into the Gasserian ganglion. Lesser (1877) in two cases, and Kaposi (1876) in one, found hæmorrhages into a ganglion in ordinary cases of zoster. Dubler examined a case where the zoster was secondary to necrosis of the ribs, and found changes in three intercostal nerves. He also, in an ordinary case, found small hæmorrhages in one ganglion.

Dr. Campbell and I took up the question, not so much to determine the nature of the lesion in zoster as to define the central representation of those areas of the skin affected. We have examined 17 cases at all periods, from a few days to a year and a half after the eruption. In the acutest cases we found hæmorrhages into the ganglion destroying it in part. These hæmorrhages were not usually of large size, but were surrounded by a considerable amount of inflammatory exudation. The ganglion cells were destroyed to a varying extent, and in the later cases parts of the ganglion were markedly sclerosed.

Secondary to this destruction of the ganglion cells there was more or less marked degeneration of the peripheral sensory nerves, and considerable change in that posterior spinal root in connection with the affected ganglion. This was beautifully shown by the Marchi method (osmic acid and Müller's fluid), and could be followed for some distance upwards in the posterior columns of the spinal cord. Thus zoster enabled us to determine definitely the supply of the posterior root ganglia; for in the acute stage the area affected on the skin was mapped out, and after death we determined the posterior root to which this area belonged by the degeneration that it showed when stained by Marchi's osmic acid method. In this way Campbell and I have traced the following root areas (*vide* Figs. 4 and 5):—cervical 3, dorsal 2, dorsal 4, dorsal 6, dorsal 7, dorsal 8, dorsal 11, dorsal 12 (twice), and lumbar 1. Now if these areas are correctly named on Figs. 4 and 5, as seems to be the case, it is probable that the remainder of the areas on the figure are correctly shown, although they have not yet been verified on necropsy.

We also examined three cases of zoster within the territory of the trigeminal, in all of which we found changes in the Gasserian ganglion.

Thus it seems certain that herpes zoster is associated with hæmorrhage into the posterior root ganglion, or an acute inflammation of it followed by more or less secondary degeneration in the posterior root and peripheral nerves connected with that ganglion.

Treatment.—In spite of many statements to the contrary, no treatment is effectual in aborting the eruption. Such statements are insusceptible of proof, for in a large number of cases the eruptions are incomplete.

When the rash has appeared it is well to dust it thickly with a powder consisting of starch 2 oz., oxide of zinc 1 oz., camphor powder 15 to 45 grains; and if there be much pain powdered opium (15 grains) is to be added. Another satisfactory application is ung. boracis (softened with the admixture of vaseline) 5 oz., cocaine 22 grains.

Ichthyol, either mixed with equal parts of water, or in the form of an ointment, is an extremely satisfactory preparation.

For the after-pain no treatment but morphia is adequate. It is, however, always well to try antipyrin, in 10-grain doses three times a day. General tonics, such as arsenic and quinine, are indicated, for the patients who suffer from the after-pain are always debilitated.

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PEMPHIGUS

SYN.—*Pompholyx; Febris bullosa.*

Definition.—A disease characterised by an eruption consisting entirely of bullæ, originating as such and not produced by trauma; which may become purulent, but are not originally pustules. Less constant characters are fever, cerebral disturbance, and cachexia. Usually there is no itching. The disease is sometimes fatal.

Formerly the definition was wider than it is now, and included cases with a polymorphous eruption accompanied by itching, which are now generally known as dermatitis herpetiformis or hydroa (*q.v.*)

Frequency.—Pemphigus has always been regarded as a rare disease, and is now, in consequence of the limitation above mentioned, nominally rarer than it was. Erasmus Wilson reported 19 cases among 10,000; Kaposi, about 200 in 50,000; the American Association, 183 cases out of 123,746. Stelwagon in America has seen only 4 cases in 6000 cases of skin disease. The average may perhaps be regarded as about 1 in 500.

Varieties.—There are three well-marked varieties of this disease: (i.) P. vulgaris; (ii.) P. foliaceus; (iii.) P. vegetans—of which the last

two are very rare. Besides these we have to distinguish certain diseases which have been erroneously called pemphigus; namely, (*a*) the so-called *P. neonatorum*, which, strictly speaking, includes two diseases—a congenital bullous eruption due to syphilis, and a contagious pustular affection, forming a variety of impetigo contagiosa or ecthyma; (*b*) *P. contagiosus*, described as a tropical disease; (*c*) *P. syphiliticus*; (*d*) congenital traumatic pemphigoid or bullous disease, also called Epidermolysis hereditaria bullosa.

The lesion called a bulla or bleb is therefore by no means peculiar to pemphigus. It may occur not only in the diseases just mentioned, but in eczema, impetigo, scabies, lichen planus, and many other diseases also. The characteristic of pemphigus, as strictly defined, is that this is the sole cutaneous lesion present.

The restriction of the name pemphigus to a purely bullous disease is one of practical convenience, not of scientific precision. By a bulla or bleb is meant a circumscribed detachment or elevation of the epidermis by fluid; this corresponds precisely to the effect of a severe external irritant, or trauma, the action of which is intense, but of short duration—in other words, a blister. When occurring as a sign of disease this lesion is produced by some internal cause, not by external injury. Now, a blister is the highest degree of the lesion which in its mildest form is represented by hyperæmia or erythema (as seen in the action of heat or mustard); hence to say that an eruption is bullous only amounts to saying that the lesion is at once carried to its highest degree of intensity, not stopping short at the milder stage of erythema. An intermediate stage is presented when the epidermis is partially raised in the form of small blisters or vesicles over a limited area, forming a group of vesicles, of which the anatomical name is herpes. An erythematous patch, a patch of vesicular herpes, and a bulla are different degrees of the same anatomical lesion, and may be inferred to result from the same or a similar cause, internal or external, acting with varying degrees of intensity. The diseases corresponding to these degrees of severity in the lesion are known as erythema, herpes, and pemphigus respectively; and these diseases, though not identical, are doubtless closely allied.

The skins of certain persons have the idiosyncrasy of manifesting on slight friction wheals like those of urticaria, and severe friction is a well-known cause of a blister; so that the urticarial wheal may be also the mild or primary form of the lesion called a bulla. The disease urticaria, as is well known, may become bullous. Again, there are persons on whose skin slight friction causes a perfect bulla at once, constituting the affection known as *Epidermolysis bullosa* or traumatic pemphigoid disease. It seems open to discussion, therefore, whether the varying character of the lesion, appearing as an erythematous patch, a wheal, a herpetic group, or a bulla, may not depend as much upon the varying vulnerability of the skin as upon variations in the intensity of the cause, whether external or internal.

The diseases, properly so-called, are distinguished from the factitious eruptions by the fact that the eruption is apparently spontaneous—that is, depends upon some internal cause, probably acting through the nervous system.

If each case of disease presented only one of the degrees of the lesion, as above specified, there would be no difficulty in nomenclature. But in many cases several degrees of the lesion are present, either simultaneously or successively, at different parts of the surface, or at different times; that is, the eruption is polymorphous. Preserving the name pemphigus for those cases in which the eruption is always at its highest degree, and erythema or urticaria for those in which it is always at its lowest, the intermediate or polymorphous forms have been called herpes, hydroa, or dermatitis herpetiformis. On the other hand, some authorities, as Hebra, and, in the present day, Kaposi, include the polymorphous eruption (except the very mildest forms, such as E. iris) under the general name pemphigus. Others again, as Dr. Pye-Smith, basing their conclusion on the manifest analogy with erythema, regard them as modifications of the fundamental form of erythema, and call them E. bullosum or E. vesiculosum. Duhring, followed by most modern dermatologists, separates the polymorphous forms as a distinct disease—Dermatitis herpetiformis, formerly called Hydroa.

Since a purely anatomical classification of disease is rarely satisfactory, it is necessary to consider whether with these anatomical differences are associated any corresponding differences in constitutional or clinical characters. The conclusion seems to be that the monomorphous bullous eruption, or pemphigus, is generally associated with graver constitutional disturbance, and is more often dangerous to life. The nervous disturbance generally takes the form of severe pain, less frequently that of itching.

In the polymorphous eruption the constitutional disturbance, though extremely variable in degree, is for the most part less severe than in the purely bullous form. The sensory nervous disturbance usually takes the minor form of itching, characteristic of minor forms of cutaneous inflammation; but this may be absent.

In the monomorphous erythema, even if occasionally intensified into a bullous or vesicular form, the constitutional disturbance is slight or none, and itching is generally absent.

Duration.—The purely bullous disease, or pemphigus, may rarely be an acute malady, but more generally is chronic or recurrent; being prolonged through months or years by relapses, which, however, always conform to the same type of eruption.

The polymorphous eruption generally constitutes a chronic or relapsing disease, of long duration, though presenting at different periods, or simultaneously, different forms or degrees of the cutaneous lesion. Yet one form of disease—*Hydroa gestationis*—which has been included under this name, is distinctly transitory, though it may recur when its determining cause recurs.

The purely erythematous disease, on the other hand, is almost invariably acute or transitory; the persistent form, called E. perstans, being very rare, and presenting special characters which are described elsewhere.

It will be seen from the above summary that the differences between these forms of disease are mainly differences of degree rather than of type. The higher grade of cutaneous lesion is generally accompanied by more severe general symptoms, as might be inferred from its denoting a greater intensity in the proximate cause. It is very difficult to draw a definite line; the milder forms of pemphigus and the severer forms of polymorphous or so-called herpetiform dermatitis merge one into another: and cases of the latter may form a transition to erythema. I have read through accounts of hospital cases, recorded minutely and without prejudice, some of purely bullous pemphigus, others of polymorphous dermatitis, in which the general or constitutional symptoms and the nervous disturbances were virtually the same.

The only absolute criterion of identity or distinctness of diseases lies in their etiology; and till the causes of these puzzling maladies are thoroughly understood our classification must be provisional.

It is therefore only provisionally, and for practical convenience, that we classify these diseases as follows:—

(α) A monomorphous bullous disease—pemphigus, here described. (β) A polymorphous disease—hydroa, or dermatitis herpetiformis, which might perhaps as well be called polymorphous pemphigus. (γ) Erythema, in its various forms, which is considered on p. 461. I would only observe, in reference to Dr. Pye-Smith's proposal to call the polymorphous dermatitis a form of erythema, that this would involve the classification not only of herpes, but also of pemphigus under the head of erythema; an arrangement which, though not without some theoretical justification, would be practically inconvenient.

General characters of pemphigus vulgaris.—The disease strictly called pemphigus begins with the production of bullæ on the surface. These in the most typical cases start up suddenly on uninflamed skin, so that they are no more than pale blisters filled with clear fluid. In other cases, before the bulla is formed, the spots become red or erythematous. At first they may be not larger than a pea, or even less, but they increase in size till they have a diameter of half an inch or an inch; more rarely large blisters two or three inches across are produced. After a day, or even less, a red margin or areola is formed round the bulla, whilst its serous contents become turbid and often purulent. In these respects its evolution is not unlike that of a variolous or vaccine vesicle. The erythematous areola is a secondary change. When, on the other hand, a considerable erythematous area is formed, only part of which rises into a bulla, the eruption is not what we now call pemphigus, but is called "Erythema bullosum," "Hydroa," or "Dermatitis herpetiformis."

To return to the bullæ. Each bulla increases for a few days only,

when it bursts and becomes covered with a scab, under which is an excoriated but not an ulcerated surface. This may be long in healing. In mild cases the bullæ may dry up without excoriation, especially when the disease is being successfully treated. In all cases a deeply pigmented macula remains, which fades slowly. The bullæ appear in successive crops, sometimes with a few days' interval. They may begin on any part of the body. I have records of cases beginning on the face, on the extremities, and on the trunk; but they spread over the body till a considerable part or nearly the whole of the surface may be invaded. How this extension occurs is a matter of some uncertainty. Hebra asserts positively that he was never able to produce the eruption by inoculation of the secretion either into unaffected portions of the patient's own skin or into that of another person. When the bullæ occur, as often they do, simultaneously in different parts — as, for instance, on two limbs — it is evident that local inoculation is not the means by which fresh eruptions are produced. Nevertheless, I think that sometimes fresh lesions are produced by a sort of infection or inoculation from those already existing. One of my patients, a man of intelligence and an accurate observer, amused himself with watching the spread of the eruption over his body, and he was confident that the fluid from the bullæ, running on to healthy portions of the skin, produced new spots; but it is possible that this effect was rather traumatic than infective. In addition to the skin eruption there is sometimes a similar affection of the mucous surfaces. The nose, mouth, and pharynx I have seen covered with blebs, which may also occur on the mucous surface of the larynx, trachea, and, very rarely, even in the bronchial tubes. If they affect the glottis there may be danger of suffocation. Kaposi remarks that the eruption may appear first on the mucous surface only, and may be the forerunner of a general pemphigus of the skin. A fatal case is recorded by Dr. Cheadle, where ulcers, apparently originating in the same way, were found in the intestinal canal. They have also been observed in the vagina. The remarkable affection called "pemphigus of the conjunctiva," or "essential shrinking of the conjunctiva," appears to be anatomically the same. With this there are usually some bullæ on the face as well, and other cases are on record in which it was associated with more or less general pemphigus of the skin.[1]

The eruption of pemphigus constitutes in itself a painful and, when it is general, a most afflicting disorder; but the eruption is not the whole of the complaint, it is often accompanied by grave constitutional symptoms which may even be fatal. In describing the symptoms we are met by a difficulty. Are we to speak of an acute and a chronic pemphigus—of a febrile and a non-febrile form? In former times it was the custom to speak of an acute pemphigus as a febrile disorder, like the acute exanthems, accompanied by a bullous eruption as its special exanthem;

[1] The number of recorded cases is small; but a case was reported by Messrs. Malcolm Morris and Leslie Roberts, with reference to twenty-seven others, in the *British Journal of Dermatology*, vol. i. p. 175; 1889.

but this was not admitted by the founders of modern dermatology. Willan defined pemphigus as a non-febrile disorder, and Hebra absolutely denied the existence of a febrile pemphigus. Still, several well-marked cases of this kind have been recorded, and I myself have notes of at least eight cases with high fever. Indeed from my own experience I should conclude that the occurrence of considerable fever in severe cases of pemphigus is the rule rather than the exception. Kaposi speaks of acute outbreaks as generally accompanied by fever. To a certain extent Hebra's objections are borne out by the fact that most of these acute outbreaks were preceded—or if not preceded were followed—by chronic pemphigus (the P. diutinus of Willan) after the type; so that they were rather acute paroxysms of a chronic disease than attacks of an acute, self-limited disease like the exanthematous fevers. It is quite possible that the severe febrile symptoms in these cases may be due rather to septicæmic infection, which from the large surface of inflamed skin is very likely to occur, than to the original disease.

On the other hand, there are cases of acute febrile pemphigus, the duration of which is measured by days, and which are often fatal. Though it is difficult to draw the line between these and others which, lasting for some months, would be called chronic, it seems better to describe acute pemphigus separately.

ACUTE PEMPHIGUS.—The disease usually begins with a general feeling of illness, chills and rigors, and a rise of temperature. The eruption begins at one part of the body, but spreads rapidly and may cover nearly the whole surface. As the eruption spreads the general symptoms are aggravated. Cerebral excitement and delirium are often present, and may give place to profound coma. The temperature may rise above 104°, with all the symptoms of a severe febrile disease. But in some, even fatal cases, there has been no fever. The urine often contains albumin, and the disease has occurred in the course of Bright's disease. In severe cases the bullæ are often hæmorrhagic and sometimes become gangrenous; even when this is not the case, fœtid decomposition of the purulent contents of the bullæ is often observed. The attack is often fatal, death occurring usually in from one to four or five weeks, but sometimes in less than a week; even in twenty-four hours from the first acute onset.

The remoter causes are obscure, though among them acute rheumatism and Bright's disease have been mentioned. However, in a certain number of cases there is a distinct history of a poisoned wound; seventeen cases have been collected by Pernet, in most of which a wound was definitely traced. In nearly all those without a wound the patients were butchers or persons in some way connected with animals. The original lesion was usually a festering sore or whitlow which had existed some weeks, or even three months, before the acute attack. In a few cases animals from which the affection was derived had some cutaneous affection.

These cases establish the existence of a specific inoculable disease

after the type of pemphigus, and it is possible that this may explain some cases in which no inoculation or trauma had been observed.

In three of the cases a diplococcus was isolated from the bullæ (by Demme, Bleibtreu, and Bulloch) which appears to be specific; and the same was found by Wells in two subsequent cases of acute pemphigus.

The above (with several other cases recently reported) show the clinical features of a very definite form of an acute eruption called pemphigus, but whether this be really the same as the ordinary pemphigus of chronic course with febrile exacerbations, must for the present be regarded as uncertain. The disease has the appearance of a septicæmia, and if the bacteriological diagnosis be relied upon, it must be regarded as a specific infective disease. Contagion in the ordinary sense has not been observed.

Chronic pemphigus.—The onset of chronic pemphigus is generally gradual, the eruption coming out, as stated above, in successive crops; so that it is perhaps better described as a recurrent than as a strictly chronic disease. There are no regular or frequent complications, unless the presence of the same lesions on the mucous surfaces be regarded as such. Diarrhœa is not infrequently present, and may be plausibly regarded as an implication of the intestinal canal. The constitutional state seems to have little influence on the eruption; most of the patients are certainly in feeble health, but there is no special kind of cachexia. If any system of the body besides the skin be affected it would seem to be the nervous system. Obscure symptoms of nervous depression are sometimes recognised before the eruption begins; and, in the severer forms, the central nervous system—or at any rate the brain—is evidently affected profoundly, as is shown by delirium and nervous prostration. It is not proved, however, that these symptoms have anything to do with the causes of the disease. They may be consequences of the state of the skin, or concurrent symptoms.

The chronic state may be interrupted by acute febrile exacerbations, in which the temperature may rise to 104° or more. This is indeed the commonest form of acute febrile pemphigus. Death may occur in this stage. In one of my cases the temperature rose till the time of death, with symptoms of hyperpyrexia.

In one form, called *P. solitarius*, a single persistent bulla is found, but the relations of this condition to ordinary pemphigus are uncertain.

Morbid anatomy.—In necropsy no constant changes are found in the viscera. Special attention has been paid to the nervous system, and some observers have recorded anatomical changes as if of inflammation of the spinal cord and sympathetic nerves. But the results have generally been negative. Kaposi speaks of nine cases in which the spinal cord was examined most carefully; in only one of them, a case with many complications, was any change found; in this there was diffuse sclerosis. The occurrence of bullæ or vesicles in chronic myelitis, neuritis, and other nervous disorders has often been recorded, but these

cutaneous lesions have only a superficial resemblance to pemphigus. The dependence of pemphigus upon morbid conditions of the nervous system is therefore not proved. If there be any such factor, it is probably functional rather than organic in nature.

The only other significant morbid change which has been found, so far as I know, is severe ulceration of the intestines, which was observed in one fatal case where there was severe diarrhœa. In other cases with severe diarrhœa no intestinal lesions have been found.

The anatomy of the skin lesions has been well studied, but it cannot be said that much light has been thrown on the morbid process. The researches of Haight, Wedl, Neumann, and others have shown that there is a copious inflammatory effusion in the Malpighian layer, by which in the early stages of the affection the cells are greatly elongated, though remaining attached to the elevated corneous layer; at a later period the cavity is filled entirely with fluid. In fact, the appearances are those of a rapid but very distinctly limited exudative inflammation. The vesicle differs strikingly from that of small-pox in being simple and not loculated. The fluid contains at first very few formed elements of any kind, but in the later stages many pus corpuscles may be seen. In fourteen cases referred to by Kaposi many eosinophile corpuscles were found. The same corpuscles have also been found in abnormal proportion in the blood.

Chemical examination of the fluid contained in the bullæ shows that it has generally the characters of blood serum, being an albuminous, faintly alkaline fluid, rarely spontaneously coagulable. Sometimes the fluid has been described as acid. Various chemical substances, such as free acid, ammonia, urea, uric acid, leucin, tyrosin, have been detected; but, considering that the fluid undergoes decomposition after it is effused, these facts cannot be regarded as having any great significance.

The examination of the urine has led to no constant results. Albuminuria, especially in the febrile stage, is not uncommon, and hæmaturia has been recorded.

The search for micro-organisms has not led to any significant results, except in the acute pemphigus above described. The numerous micrococci found when suppuration has occurred, or in any case when the bullæ have existed some time, may reasonably be set down to secondary infection.

Causes.—The causes of pemphigus are as yet unknown, neither the nervous nor the bacterial hypothesis being proved.

Age and Sex.—The disease is commoner in children and young persons than in the middle-aged or old, but may begin at any age, even in advanced life. It is doubtful whether it is more common in one sex than the other. The Vienna statistics give three males to one female. Dr. Pye-Smith records ten cases of males to twenty-eight of females. I have found no marked discrepancy.

In one case only, reported by Hebra, was heredity inferred. True pemphigus is certainly not contagious.

The two rarer forms of the disease must now be briefly described.

Pemphigus foliaceus.—This remarkable affection differs so much from P. vulgaris that it may be regarded as a different disease. Cases are recorded, however, in which the common disease has passed into this very rare form. Its most striking character is the production of imperfect flaccid bullæ, containing a sticky fluid which is always turbid and generally distinctly purulent. The bullæ readily burst but do not heal, the detached epidermis remaining in connection with the skin while the exudation penetrates under the adjacent untouched epidermis, splitting it up into several layers. The result is that the affected area becomes covered, not with bullæ separated by healthy skin, but with continuous layers of half-detached epidermis mingled with collections of purulent fluid not enclosed by any distinct boundary. The whole appearance has been compared to that of loose flaky pastry. In this condition, therefore, no distinct bullæ will be seen; but on raising up or removing the scaly layers some purulent exudation will be found, which is usually of offensive odour and prone to decomposition. When the scales fall off, or are removed, a red exuding surface, like that of eczema rubrum, is exposed.

Some patches of new epidermis may be seen, but the healing process is always incomplete, and such patches relapse into their former state. This morbid condition spreads continuously, and in the course of months or years will occupy the whole surface of the body.

The same condition may affect the mucous membrane of the nose, mouth, pharynx, or larynx. With regard to the general symptoms fever is rarely observed; itching is slight, but great distress is caused by the stiffness and tenderness of the skin. The health may be good at first, but in the end great emaciation and cachexia result. The disease may last for years, but the patient never gets well; and death results either from exhaustion or from some intercurrent malady such as pneumonia. This disease is exceedingly rare. I myself have seen but two cases.

Pemphigus vegetans.—This very rare disease was first described by Neumann in 1886; though isolated cases had been observed before, and generally regarded as syphilitic. It is distinguished by the presence of papillary outgrowths proceeding from a base of ruptured bullæ.

The eruption usually begins within the mouth, or the soft palate or fauces, or in the neighbourhood of the lips and nostrils; according to Kaposi sometimes around the anus. Afterwards the lesions may appear on any part of the skin. Bullæ are formed which at first have the appearance of ordinary pemphigus, yet after bursting they do not dry up, but remain excoriated, or produce deep ulceration. They also extend at the margin in a serpiginous manner till large surfaces are invaded. From the excoriated patches arise papillary outgrowths which exude an offensive fluid. These outgrowths are especially seen in moist situations, such as the groins and armpits. Healing may take place in the centre of some of the patches, leaving a brown pigmented macula. But many

do not heal, and new bullæ arise which go through the same course. Exhaustion from the continued discharges, and sometimes hindrance to nutrition from the state of the mouth, generally cause death within a few months. Very few patients recover.

The disease is exceedingly rare; only one definite case has been described in this country, by Dr. Crocker. Mr. Hutchinson, however, has reported several cases under another name. Having never seen the disease myself I have taken the above description from Neumann, Kaposi, and Crocker.

The lesions sometimes closely resemble those of syphilis, with which the disease has in some cases been confounded. Treatment appears to be unavailing, but opium was found by Mr. Hutchinson to afford some relief.

Prognosis of pemphigus.—The prognosis of pemphigus is generally favourable for acute attacks, especially in the young; but it is unfavourable as regards ultimate recovery. The severe attacks of the disease are accompanied by considerable danger to life in elderly persons. In the young, recovery may be confidently anticipated under suitable treatment; yet even in these cases there is a great probability of recurrence. Patients sometimes suffer from repeated attacks, prolonging the disease over several years, or for the rest of life. I had an elderly woman under my care some years ago who was admitted into hospital several times with this complaint; each time she was freed from the eruption, but when the treatment was discontinued the disease recurred. She afterwards died from bronchitis; but I learned from her medical attendant that she was hardly free from the eruption till her death. Many patients, however, completely recover and have no relapse.

Diagnosis of pemphigus.—The diagnosis of a well-marked case of pemphigus, if it be kept under observation for a short time, is not difficult. There is no other disease in which the eruption consists of bullæ which are not produced by any traumatic cause, unless it be syphilis. But all cases do not conform to the type, or present the features in a well-marked form; thus it may be difficult to distinguish from true pemphigus cases belonging to (i.) bullous syphilide, sometimes called "P. syphiliticus"; (ii.) bullous erythema, or severe forms of "herpes iris"; (iii.) cases of mixed eruption, consisting of erythematous patches, papules, and groups of herpetic vesicles—the Dermatitis herpetiformis of Duhring; or (iv.) a congenital traumatic bullous disease, which may be called "traumatic pemphigus," and is the Dermatolysis hereditaria bullosa of some writers.

Treatment of pemphigus.—On this subject there is the most remarkable divergence in the statements of different writers. Hebra and some of the French dermatologists speak with something like despair, as if all treatment were futile, or at the best palliative. Mr. Hutchinson, on the other hand, speaks of arsenic as an almost unfailing remedy. The experience, I think, of most English dermatologists agrees in the main with that of Mr. Hutchinson. I certainly share it, but there are

some qualifications which ought to be borne in mind. In children or young persons, pemphigus, I think, rarely fails to disappear under the use of sufficient doses of liquor arsenicalis; the only exceptions I have seen have been in cases of doubtful diagnosis, and the only possible fallacy appears to be that in a relapsing or recurrent disease there are sometimes spontaneous recoveries. This would, however, explain only a portion of the cases. After middle life the remedy certainly loses some of its efficacy, and in aged people it seems to have very little effect. Perhaps it will be thought that this is true of other drugs and of other diseases, and that cures are generally easier in the young than in the old. The acute febrile stage at any time of life is also less influenced by arsenic than is the chronic stage. In ordinary cases the treatment begins with five minims of the arsenical solution (or less in children) three times a day; and this amount is increased to ten or fifteen minims if required. A rapid effect may be produced, or it may be necessary to administer the drug for two or three months. Unfortunately it sometimes happens that the eruption disappears while the patient is under the influence of arsenic, but recurs directly the drug is omitted. In senile or acute cases I should rely more on quinine, full doses of stimulants, careful dieting, and, in general, everything that tends to keep the patient alive. There is no other drug much used internally, but perchloride of iron has been strongly recommended in chronic cases, and opium in acute ones. The local treatment of pemphigus cannot be regarded as curative, because nothing will prevent the coming out of fresh bullæ. The first indication is to protect the excoriated surfaces and to relieve the painful tenderness, which is often the patient's chief trouble. This indication is met by such applications as zinc ointment, or, what is sometimes better, the zinc gelatine of Pick. In either case I always add a small quantity of carbolic acid (from five to ten minims to the ounce). Absorption may take place if more is used, though even that would probably do no harm. Any non-poisonous antiseptic may be used; and thus the second indication for treatment is met, namely, to prevent decomposition in the discharges, which, in neglected cases, may become very offensive. It is also a good plan to sponge the skin generally with a weak coal-tar lotion; say, one drachm of liquor carbonis and half an ounce of glycerine to one pint of water. Baths have not been found comforting in most of the cases I have seen, but I have no experience of cases so severe as to require the continuous bath recommended by Hebra. The patient must, if possible, lie upon a water-bed, and the proper dressing of a severe case will test the capabilities of the nurse. After recovery from an acute attack, not only is the conventional change of air desirable, but also and more especially rest and quiet; since, whatever the cause of pemphigus, there can be but little doubt that excitement, anxiety, and nervous strain tend to aggravate the condition.

It only remains to distinguish certain diseases which have been erroneously described as pemphigus:—

I. PEMPHIGUS NEONATORUM.—This name has been applied to a contagious bullous eruption of new-born infants, and also to a syphilitic affection.

The contagious bullous eruption consists of imperfectly formed bullæ resembling those of ecthyma, which may suppurate, or cause deep ulceration, or end in gangrene. It is sometimes fatal. Its contagiosity is shown by its occurrence in limited epidemics, which have been observed to follow the practice of a particular midwife. It is also local in its distribution, being comparatively common in some places and unknown in others. It occurs exclusively among the poor, and is associated with unclean linen and want of antiseptic precautions, like the "Tetanus neonatorum." It seems clear, therefore, that this name is applied to an inoculable bacterial disease closely allied to, or perhaps the same as ecthyma and impetigo contagiosa.

This affection is certainly rare in this country, but appears to be commoner on the continent of Europe.

II. PEMPHIGUS CONTAGIOSUS.—This disease of hot climates is probably closely allied to that just described. It is defined by Dr. Manson as "a non-febrile, highly contagious skin disease, peculiar to warm countries, characterised by the formation of large vesicles or bullæ, which are unattended by marked inflammation, ulceration, or the formation of crusts or scars." It is common in South China, the Straits Settlements, Madras, and apparently other parts of India. Manson regards it, apparently with justice, as a variety of, or closely allied to, impetigo contagiosa.

III. The name P. NEONATORUM has also been given to a severe bullous eruption caused by congenital syphilis. It indicates the gravest form of inherited syphilitic infection, and has the peculiarity of appearing immediately after birth, without the period of incubation seen in most forms of congenital syphilis. The bullæ are seen especially on the palms and soles, which is a valuable diagnostic sign. It is accompanied by profound cachexia, and is generally fatal.

IV. PEMPHIGUS SYPHILITICUS, so called, of adults, that is, a purely bullous syphilide, is a very rare affection. I have seen but one case. Others have been recorded by Mr. Hutchinson and Dr. Crocker. The diagnosis is made by the accompanying symptoms and the results of treatment. To speak of syphilis as a cause of pemphigus is, however, a mode of expression better avoided, as leading to confusion.

V. CONGENITAL TRAUMATIC BULLOUS DISEASE, also called *Congenital Pemphigus*, *Traumatic Pemphigus*, *Epidermolysis bullosa* (*hereditaria*), is a condition which has often been described as pemphigus.

It consists in an abnormal vulnerability of the skin, in consequence of which friction, blows, or other slight injuries produce blisters, each of which, taken by itself, precisely resembles a bulla of pemphigus. The condition is present from birth, and is not known to pass away spontaneously, or to be affected by treatment.

The first published description was that of Goldscheider in 1882, under the name of "Hereditary tendency to formation of bullæ." In the

same year I published an account of a case which had been under my care since 1874 (as pemphigus); and subsequently I recorded two other cases. Dr. Wickham Legg published two cases in 1883, and since then many others have been recorded in this country and on the Continent. Dr. Wallace Beatty has published a summary of known cases with additional ones.

Definition.—A bullous affection having the following characters:—(*a*) Bullæ varying in size are produced on various parts of the body by friction or any injury, but not otherwise; (*b*) the bullæ are often hæmorrhagic; (*c*) the nails may be affected by similar injuries, becoming deformed or even quite destroyed; (*d*) there is not generally any disturbance of the general health, and the condition is unaffected by drugs or other treatment; (*e*) the affection is congenital, or at any rate dates from infancy, and sometimes occurs in several members of the same family.

Pathology.—From the above characters it is clear that this remarkable condition cannot properly be called a disease. It is a property of the tissues which may be compared on the one hand to factitious urticaria, and on the other hand to hæmophilia. Observation, confirmed by histological examination, shows that there is no true inflammation. Klebs, on examining the histology of one case, found changes which he thought to indicate imperfect formation of the walls of the blood-vessels, and which may have some bearing upon the facility with which hæmorrhage is produced in these cases. In some cases the healing of the bullæ is followed by the production of spots of milium, or by subepidermic cysts, which, however, do not indicate any special variety of the disease.

The epithet *hereditaria* was given by Köbner, but it is not necessarily a hereditary or family affection.

Although it seems best to separate this affection from pemphigus properly so called, it cannot be denied that it presents some points of analogy with that disease. Cases have been reported (Colcott Fox) in which this vulnerability of skin occurred in patients suffering from true pemphigus. It has been suggested above that a special vulnerability of the skin may be the reason why some persons show bullous pemphigus as the result of a nervous disturbance which in others would produce a milder lesion. There would be some justification, therefore, for calling the affection traumatic pemphigus rather than traumatic bullous disease.

For a fuller description I must refer the reader to the records quoted below.

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HYDROA, OR DERMATITIS HERPETIFORMIS

SYN.—*Pemphigus pruriginosus; P. hystericus; Herpes gestationis; Hydroa gestationis; Herpes circinatus bullosus; Erythema bullosum; Dermatitis polymorpha pruriginosa.*

THIS disease first received its present name from Duhring in 1884, having been previously known as a form of pemphigus, or as hydroa; while special forms of it had been known by other names. As the nomenclature is somewhat perplexing, it seems better to consider briefly the several affections, previously known under other names, which Duhring has included under dermatitis herpetiformis.

1. **Pemphigus** or **Pompholyx pruriginosus.**—These names were given by Willan, Chausit, and Hardy to a slight form of pemphigus accompanied by severe itching, and characterised also by a multiplicity of lesions. Besides bullæ properly so called, there are papules and vesicles with patches of erythema or urticaria. The general constitutional symptoms are slighter than in pemphigus properly so called. The severer forms, however, closely resemble pemphigus in their clinical history, the disease being chronic or, to speak strictly, recurrent, and sometimes persisting through life. There is no doubt that many cases recorded as pemphigus are of this kind, and would have been thus named by most dermatologists of the last generation, and even by some at the present day. But admitting the close resemblance of such cases to true pemphigus, as elsewhere defined, there is an undoubted convenience in giving them another name.

2. **Hydroa bullosa** and **Pemphigus arthriticus** of Bazin.—This author described as hydroa an affection allied to herpes, and distinct from pemphigus, of which he recognised three forms, one of which, the bullous, appears to be the disease now spoken of. He also described, under the name of pemphigus arthriticus, a more severe form of what appears to be the same affection.

Tilbury Fox, in 1873, quoted Bazin's descriptions, and added some cases of his own. He recognised the existence of a form of disease "midway between herpes and pemphigus," but objected to the name hydroa, thinking all cases might be described either as herpes iris or as pemphigus pruriginosus. Later, however, in 1880, he adopted the name hydroa and distinguished three varieties—(i.) H. simplex; (ii.) H. herpetiformis; (iii.) H. pruriginosa, of which the two latter at all events belong to the disease now under consideration.

3. **Herpes gestationis.**—This disease, called Hydroa gestationis by Liveing, and Erythema gestationis by Wyndham Cottle, was first separately described by Milton in 1872. Cases had, however, been recorded previously, generally as pemphigus or pompholyx. Willan in 1808 gives under the latter title a figure which, though rough, shows the main features of the disease. This eruption is claimed by Duhring as a variety of his D. herpetiformis.

4. **Erythema bullosum.**—Cases of E. multiforme, in which bullæ are formed, approach very nearly to some forms of D. herpetiformis. Dr. Pye-Smith regards the disease now spoken of as coming under the head of Erythema.

5. **Dermatitis polymorpha pruriginosa.**—Under this name Brocq, in the most elaborate and complete criticism of Duhring's observations which has been published, has described forms of this disease, and collected a large number of cases.

He distinguishes the following types:—

(i.) Dermatitis polymorpha pruriginosa chronica "à poussées successives."

(ii.) Dermatitis polymorpha pruriginosa acuta.

(iii.) D. p. p. graviditatis recurrens.

It appears, then, that Duhring's merit is not to have discovered a new or unobserved disease, but to have united under one type and name certain forms of disease, previously known by several names, and referred to different maladies; and this is undoubtedly a useful clinical generalisation.

Nomenclature.—Among the bewildering variety of names which have been applied to this disease or group of diseases it is difficult to choose. The most accurate, as definitions, are undoubtedly those of Brocq, but they are too long (as he admits) for general use. Duhring's name is most commonly accepted, but it has the disadvantage of laying too much stress on one feature of the disease. I agree with Unna, therefore, that Bazin's original name hydroa is the most suitable. That it has no distinct meaning is not a drawback, since a name need not be a definition.

If it had been slightly extended by Tilbury Fox, so as to include the cases known as pemphigus pruriginosus, it would have covered the whole ground. For reasons to be given later, I shall describe hydroa gestationis as a separate disease (p. 657). The impetigo herpetiformis of Hebra was first included by Duhring under this head, but afterwards admitted by him to be a different disease.

Definition.—A polymorphous inflammation of the skin not produced by external injury: (i.) displaying successively or simultaneously all or more than one of the following lesions, namely, erythematous patches, urticarial wheals, papules, vesicles (sometimes arranged in groups like herpes), and bullæ, which may suppurate, as may also the vesicles; (ii.) accompanied by itching, or burning, or other painful sensations; (iii.) for the most part chronic or recurrent; (iv.) not generally causing severe constitutional disturbance, though possibly accompanied by fever. In Duhring's original memoir he introduced the character "of herpetic nature," a phrase which itself needs definition. The nervous or neurotic origin of the disease is also insisted upon by some authors; but though this is a very probable hypothesis, it cannot be verified in each particular case, and should not therefore form part of the definition.

Pathology.—The accompanying nervous symptoms, which are very severe in proportion to the severity of the cutaneous lesions, raise the presumption that a morbid condition of the nervous system may be the origin of this disease. A special localisation of the vesicles or bullæ in the distribution of one special nerve, as in herpes, is indeed seldom seen; but the symmetry and general arrangement of the eruption are quite consistent with a nervous origin. The patches of erythema, again, closely resemble those forms of erythema which it is generally agreed to refer to an angio-neurotic hyperæmia. Since vesication, as before remarked, may be only a more severe form of the same disturbance which causes erythema —and indeed the latter lesion may become bullous—there seems nothing to forbid the supposition that all the lesions of D. herpetiformis may be of neurotic origin. But no concomitant organic lesion of the central nervous system has ever been discovered. The analogy with urticaria is also very striking. Indeed we might suppose, in some cases at least, that the disease is produced by an irritant like that of urticaria, but of much greater intensity; or acting on a skin endowed with feebler powers of resistance. Urticaria may be equally chronic, obstinate, and rebellious. The hypothesis is, then, that a functional or organic disturbance of the central nervous system causes a hyperæmia with altered nutrition in certain parts of the skin, which manifests itself in different lesions according to circumstances. The hypothesis of a morbid condition of the peripheral nerves will not bear examination, as the distribution of the eruption does not correspond to nerve areas. The only other hypothesis is that of a supposed internal toxin producing irritation; but even such a cause would probably act through the nervous system, and the extreme persistence of this disease makes such a supposition improbable.

The *morbid anatomy* of this disease has been little studied; but it is

plain that all the cutaneous lesions are distinctly superficial, involving the epidermis only. The vesicles or blebs, if punctured or broken, do not yield any continuous discharge. The slighter lesions appear to be identical with those of erythema. Hence no scarring results, except perhaps from excessive scratching. In this respect they exhibit a marked contrast with the vesicles of H. zoster. Pigmentation gradually appears in chronic cases. The blood has been found, in some cases, to contain an unusual number of eosinophilous leucocytes; but this occurs in other morbid conditions also.

The *causation* of this remarkable disease, even if we refer it to the nervous system, is quite unknown. It is difficult to ascertain even the remoter causes. In a certain number of instances the eruption is said to have been preceded by overwork, anxiety, or some other of the familiar category of nervous troubles; but in the majority of cases no such antecedent is recorded. A very few cases seemed to reveal some hereditary bias or family disposition to the complaint.

Symptoms.—The initial symptoms of an attack are usually slight; sometimes there is none, or there is a general feeling of illness, slight shivers and flushings, with itching. In the cases I have seen there has not been any rise of temperature at the beginning, though this has been observed by others. In severe cases there is often moderate fever when the eruption is well developed. In general there is no serious disturbance of health through the whole course of the disease, but to this rule there are very striking exceptions.

The eruption begins usually, but not invariably, with itching. Then some one or other of the characteristic cutaneous lesions will appear. Any one of these lesions may appear first—erythematous and urticarial patches perhaps most frequently; but sometimes herpetic groups of vesicles, and less frequently bullæ, appear on sound skin.

Distinct forms of the disease have been distinguished by Duhring according as the erythematous, vesicular, bullous, or other lesions may predominate. Moreover a mixed form is described (Stelwagon). But it is very difficult to draw such distinctions, as the different phases follow one another rapidly, or may be present at the same time. In my experience the great majority of cases belong to the "mixed form," and, unless the lesions are polymorphous, it is difficult to establish the diagnosis, though one or other lesion may predominate at any given time.

With whatever lesion the disease may begin it is at the outset local, attacking perhaps the neck or the forearms and hands; but if it is not widely diffused at first it soons becomes so. No region of the body is exempt; both the flexor and extensor aspects of the limbs, and the anterior and posterior surfaces of the trunk, and all parts of the skin being liable to the eruption. It may ultimately become almost, if not quite, universal.

The several lesions have certain distinctive characters. The erythematous patches do not differ from those of E. multiforme, except in their

persistence. Broad areas are sometimes seen, and also ringed or curved patches. They are often complicated with papules (E. papulatum), and may be the origin of vesicles or blebs.

The wheals resemble generally those of urticaria, but very often show a central papule or vesicle (U. papulosa). They are, however, more persistent than those of ordinary urticaria.

Isolated papules are among the less common lesions, they often change into vesicles.

The vesicles are larger than those of eczema, and often pass into small bullæ. They often dry up without bursting, and if they do so, form a small crust without giving rise to continued exudation. Their most striking feature is that they occur generally in small clusters on an erythematous base, and thus correspond to the anatomical definition of herpes. This is no doubt a striking feature of the eruption, but is hardly predominant enough to justify the denomination of herpetic, or herpetiform, as applicable to the whole disease.

The bullæ or blebs vary remarkably in size, from that of a pea to an inch or two inches in diameter. They are mostly round or oval, but may be of more irregular shape; and sometimes, especially when they form the margin of an erythematous patch, they are circinate, curved, or even so prolonged as to be almost linear.

Pustules and suppurating bullæ are rather uncommon manifestations of the disease. One would be inclined to attribute their occurrence to secondary infection of the vesicles and bullæ by pyogenetic organisms; and my own experience is that the suppurative condition is a secondary one, and may be controlled by treatment. However, Duhring and Stelwagon record cases in which pustules seem to have appeared from the first. The pustules are surrounded by a red areola showing an extension of the inflammation. More severe constitutional disturbance, which may be attributed to absorption of septic products, occurs in some of these cases.

It should be observed that the lesions of this disease, like those of pemphigus, may affect the mouth, throat, nose, and even the conjunctiva (Stelwagon). So far as these lesions can be clearly observed they appear to be generally bullous.

General course of the disease.—Brocq distinguishes an acute and a chronic or recurrent variety. A truly acute form, ending spontaneously in two or three weeks, is certainly rare. Brocq has collected a certain number of cases, but doubts whether all of them properly come under this head. Some of them were distinctly recurrent; others made an approach to E. multiforme. Not having seen any cases which could fairly be called acute, I refer to Brocq's description of these cases.

The *chronic recurrent form* is the commoner, and to this the following description applies :—

The coming on of the eruption is usually somewhat sudden, or at any rate rapid. The first attack may last several weeks, or even months. Then, with or without treatment, it may subside, and there may be an

interval of months, or possibly of years; though I have myself never observed so long an interval. As time goes on the recurrences tend to become more frequent and the intervals shorter, till the patient is never free from a persistent eruption for the rest of his life. The duration of each individual lesion is seldom more than a few days or a week. In a very severe case under my care there was no cessation or even mitigation of the disease for more than a year before death, which occurred from cancer of the thyroid. In another class of cases the disease is persistent; that is, the patient is never quite free from the eruption, though fresh outbreaks or exacerbations take place from time to time.

In all these respects this disease has a strong resemblance to chronic pemphigus.

The anatomical character of the eruption is not constant, yet all the forms above mentioned may alternate. During the continuance of the disease the general health is sometimes very little affected; but insomnia and exhaustion from the continual irritation are sometimes serious.

Age or time of life.—This disease may arise at all ages. It began in the earliest case I have seen under one year old, during the first dentition; but it resembled urticaria at first, and gradually assumed the typical characters. The eruption disappeared under treatment at six years old. The disease has been known to begin in advanced life. Unna has distinguished the infantile form as *Hydroa puerorum;* and notes, among other characters, the beginning of the disease in early life, and its gradual or complete cessation at a later age; also that it occurs in the male sex. In these respects the case above mentioned agreed with Unna's definition; but it did not present all the characters enumerated by him, for which reference must be made to his memoir (16).

Prognosis.—Putting aside the so-called acute cases recorded by Brocq, which require further investigation, it is to be expected that this disease, once established, will recur again and again, perhaps becoming persistent; and will last for a good many years, possibly for the rest of life. Therefore, even when there is, apparently, complete recovery, the prognosis must be extremely guarded. For reasons stated above, the expectation in cases occurring in early life is more favourable.

The disease does not generally threaten life, though some remarkable cases are recorded in which, apparently from exhaustion, death resulted. Six such cases were mentioned in the discussion at the Dermatological Society of London in 1898.

Diagnosis.—Well-marked cases present no difficulty, but a discrimination has sometimes to be made between this and the following diseases—pemphigus, erythema multiforme, urticaria, eczema.

Pemphigus.—If we adopt the strict anatomical definition of pemphigus as a purely bullous eruption, there is no difficulty; for the polymorphous character of D. herpetiformis is distinctive. In addition, the constitutional symptoms of pemphigus—namely, cachexia in chronic cases, fever in acute—are usually much more marked; but these symptoms may vary indefinitely in their severity, being sometimes very slight. The difficulty occurs

chiefly when the D. herpetiformis is of the bullous variety, or in the bullous stage; though the bullæ are generally smaller than in pemphigus. In such cases, as Duhring implies (7), it is necessary to wait till the change to an erythematous or vesicular type shows that the disease is not pemphigus. The latter disease, though frequently recurrent, recurs always as a bullous eruption. Itching is also an uncommon symptom in true pemphigus.

Erythema multiforme.—This is the disease which bears the closest resemblance to D. herpetiformis. In both cases there may be polymorphous lesions—erythema, papules, vesicles, bullæ; but the three last bullæ especially are decidedly uncommon in erythema. The eruption of D. herpetiformis is, as a rule, much more severe; and in erythema its conspicuous feature of itching is usually wanting. Duhring lays stress on the absence of pustules in erythema; but this may depend on the short duration of the eruption, which does not last long enough to become infected with pyogenetic organisms. Erythema is generally an acute and even a transitory affection; and, though it may be chronic or locally persistent, does not then present the multiform characters. Unless, therefore, the erythematous form greatly predominate, D. herpetiformis is not likely to be mistaken for erythema. However, as Duhring admits, this disease may in rare cases be combined with E. multiforme, or even merge or lapse into it; and this is also true with regard to pemphigus.

Urticaria.—Though this disease is analogous to D. herpetiformis, it rarely resembles it closely. When, however, the wheals are raised into vesicles or bullæ a very close approach is made; and the resemblance is heightened if the urticaria be accompanied by itching. The distinction is that the exudative lesions do not arise independently of wheals, and the eruption will not present the great multiformity of D. herpetiformis. However, the latter disease may at the outset present an urticarial form.

Eczema.—It may be thought that this disease could not be confounded with D. herpetiformis, nevertheless cases of erroneous diagnosis have occurred. The distinction, as formerly pointed out, resides essentially in the different character of the vesicles in the two diseases. Also, even in the most vesicular forms of D. herpetiformis, the vesicles do not spread into large irregular areas as in eczema, but remain limited to groups, however large; and a moist surface with continuous exudation is not produced. In any case prolonged observation would show some of the other lesions which characterise eczema.

The affections commonly known as Herpes, namely, H. labialis, H. zoster, and even H. iris (Erythema iris), have so little resemblance to dermatitis herpetiformis, that, in spite of their exhibiting the same elementary lesions, no mistake is likely to occur.

The general conclusion is that in many cases (as Duhring strongly urges) continued observation is necessary to establish a positive diagnosis; and this, though unsatisfactory when an immediate decision is required, is perhaps the most important practical rule that can be laid down.

Treatment.—The effective cure of a bad case of this disease is one of the most difficult problems in the therapeutics of the skin. There is certainly no specific remedy. In the first place we are told to improve the general health and nutrition,—a measure which, if called for, certainly no wise physician would neglect. But the fact remains that, as is generally acknowledged, most of the patients are in the main healthy; they are not usually anæmic, or cachectic, or gouty, or rheumatic, or neurotic, or even dyspeptic. General hygienic measures seem to me, therefore, to play but a small part in the therapeutics of the disease.

We consider, first, the effect of internal remedies. Free purgation with salines will often, as in eczema, alleviate the itching and diminish the hyperæmia of the skin; but it has no permanent effect on the disease. Drugs called by the vague name of "nerve tonics," such as quinine and strychnine, appear to be of some service, the eruption becoming milder under their influence. But the only internal remedy which appears to have much effect is arsenic. This drug, though decidedly less efficacious here than in pemphigus, is sometimes of great value. The eruption may disappear completely while it is taken, and a recurrence may be satisfactorily treated in the same way; yet in a disease so capricious and so subject to sudden spontaneous changes, it is easy to draw fallacious inferences from the apparent effects of remedies. Indeed there are cases, and these the most severe, in which arsenic seems to have not the slightest effect.

Sedatives, such as chloral, opium, antipyrin, belladonna, are often required to relieve the irritation and procure sleep.

Local or external remedies are of great use in alleviating the symptoms, but do not appear to influence the course of the malady. For erythema, lead lotion (Goulard) is most serviceable in reducing the redness and burning. Also for the erythematous as for the papular lesions lotions containing some coal-tar preparation, such as liquor carbonis picis or similar compounds (1 per cent or less), are very useful. Carbolic acid lotion (1 to 2 per cent) has the same effect and is more decidedly antipruritic. For the vesicular and bullous forms ointments are more suitable, such as zinc ointment with carbolic acid (℥ xx. to xxx. ad ℥j.); or compound tar ointments (for example, liq. carbonis, ℥j.; hydr. ammon. gr. x.; paraffin, ℥j.), or other compound ointments such as are used for eczema. Duhring, besides tar and carbolic acid, recommends thymol, ichthyol, resorcin, and especially sulphur; the latter he applies in the form of an ointment (1 : 4), which should be firmly rubbed in, so as to break the vesicles, bullæ and pustules. A variety of local remedies will probably have to be tried before the best one is found; and in any case the result is often disappointing, as the healing of existing lesions does not appear to prevent the occurrence of fresh ones.

Baths, especially alkaline or containing a small proportion of tarry solutions, do much to mitigate the painful symptoms. The continuous bath has been recommended. In the case of a little boy under my care, mentioned above, sea-bathing (not recommended by the physician)

effected a rapid cure, with some relapses which were controlled by domestic baths containing Tidman's sea-salt. It would be rash to generalise this observation, but the treatment might be worth trying. In an erythematous eruption with some vesication of more than a year's duration in a man of 40, judged by several authorities to be an early stage of this disease, similar treatment, combined with quinine internally, was very successful.

Hydroa Gestationis

Syn.—*Pemphigus* or *Pompholyx; P. pruriginosus; P. hystericus; Herpes circinatus bullosus* (E. Wilson); *Herpes gestationis* (Milton); *Hydroa* (Crocker); *Hydroa gestationis* (Liveing); *Erythema gestationis* (Cottle); *Erythema bullosum* (Pye-Smith); *Dermatitis herpetiformis* (Duhring); *D. pruriginosa polymorpha recurrens graviditatis* (Brocq).

Many cases of this affection are recorded by earlier observers—Willan, E. Wilson, Hebra, Chausit, and others—nearly always as pemphigus. In 1872 Milton proposed the name Herpes gestationis. Liveing in 1880 proposed Hydroa gestationis. Since then Herpes gestationis and D. herpetiformis have been the more usual names.

This affection should, I think, be separated from the more chronic affection delineated by Duhring for the following reasons:—

(i.) The cause, being evidently a functional irritation of the nervous system, starting from the uterus, is not the same as the persistent condition of the nervous system to which the more chronic condition is ascribed.

(ii.) Though in rare cases it occurs in women independently of pregnancy, the cause in such cases is probably, as Brocq remarked, none the less uterine.

(iii.) The affection is on the whole milder, and passes by gradations into an affection hardly distinguishable from bullous erythema. Suppurative lesions are rarely or never observed. Brocq, in an able discussion, concludes that while the anatomical elements and functional disturbances are the same as in D. herpetiformis, the differences in development, etiology, and pathogenesis require that it should be separated from this disease, and retain its special name.

Course.—This disease arises at first in connection with pregnancy and childbirth; sometimes immediately before or after delivery, more often during pregnancy, mostly in the later months. It may recur in successive pregnancies; in one of my cases this happened six times. Generally it increases in severity with repeated attacks. It may be absent in one pregnancy, though recurring afterwards. When once established it may, though rarely, recur in the intervals of pregnancies or independently; but the beginning is always as above mentioned. When it begins during pregnancy it mostly subsides after delivery, but sometimes it continues and may become aggravated.

The beginning is sometimes marked by shivers, illness, and fever, sometimes is gradual and without symptoms. Itching or burning sensations always go before.

Symptoms.—Excessive itching, burning, or pricking sensations are always present. Neuralgia does not seem to be often observed. Insomnia and nervous exhaustion sometimes render it a serious disease. Fever is not always present, but is sometimes high.

In the eruption, though always polymorphous—presenting papules, vesicles, bullæ, and erythematous areas—certain characters predominate. Without drawing too sharp a line, it may be said that there are two chief varieties—(A) erythematous patches with exudation in the form of vesicles or bullæ, which may be called the *erythemato-bullous variety;* (B) papules or vesicles arranged in groups like those of herpes—the *herpetiform variety.* This distinction is not exclusive, but indicates the predominant lesion. It has happened that the cases I have seen have been chiefly of the former variety, in which herpetiform vesicles were absent or inconspicuous. The case figured by Dr. Stephen Mackenzie appears to have been of this kind. These cases could only by a strained use of language be called herpes, or even herpetiform. On the other hand, many cases have been described in which groups of vesicles were the predominant lesion, though rarely the earliest; hence the name herpes gestationis.

The first variety, writing from diagrams and a picture of a case which was carefully studied, I should describe as follows:—

The eruption covers nearly the whole of both aspects of both limbs, including the hands and (partially) the feet, also the back and shoulders, face, and upper part of the chest; but it is absent from the abdomen. It consists of erythematous patches, some of which are rounded plaques, two or three inches in diameter; others wider areas, involving a large part of one limb. The smaller patches have a central vesicle or small bulla; the larger are raised up at certain parts into larger or smaller bullæ, and in some places the margin forms a bullous ring. There are also bullæ without erythema, but no herpetic groups. The bullæ vary from the size of a pea to that of a pigeon's egg. This eruption was preceded by an eruption of flat papules precisely like lichen planus, which passed into or gave place to the appearances above described.

Similar cases are recorded in Brocq's collection of 22 cases, and he remarks that the rule is for the eruption to begin with erythematous elements, red patches, or papules. Much more rarely are vesicles and bullæ seen at first—a conclusion supported by all the records of cases which I have consulted, and by my own experience. In the herpetic form the eruption consists chiefly of "circular clusters of vesicles, not more than half-a-dozen in number, which come in successive crops and extend widely over the body." They may be hard and papular at first. From these herpetic groups larger bullæ may arise, which may be accompanied by erythematous patches and urticarial wheals.

The eruption may also begin with an urticarial stage, showing wheals

with a central papule or vesicle. In one of Cottle's cases the first two outbreaks were purely urticarial. However it may begin, the eruption will generally in the end become polymorphous, presenting, successively or simultaneously, the lesions observed in D. herpetiformis. It is remarkable, however, that the grouped vesicles usually called herpes may be absent from first to last. It is to be understood that all the elements of the eruption appear in successive outbreaks, and are not absolutely persistent. The disease has no natural termination, not at any rate before the end of pregnancy.

From the multiformity of the eruption the name herpes seems too exclusive; nor does the name erythema, used by Wyndham Cottle and Pye-Smith, seem quite appropriate, since erythema is but a part of the eruption; though the affinity to E. bullosum is unmistakable. Hence the neutral name hydroa appears most suitable.

Pathology.—This disease is evidently a nervous or angio-neurotic reflex derived from the uterus. It is difficult, however, to regard it as an absolutely isolated and definite morbid phenomenon. It seems rather to be the ultimate or highest degree of a series, of which pruritus, urticaria, erythema, etc., are minor degrees. The cause of the excessive severity of the lesion may be due to a higher intensity of the neurotic disturbance, or to a lower degree of resistance in the cutaneous tissues. I agree entirely with the following remarks by Mr. Wyndham Cottle:—

"The pregnant condition is known to be often accompanied by neuroses which have many cutaneous expressions. Most commonly they present themselves as urticaria, erythema, abnormal pigmentation, pruritus, and so forth. Eczema also is an occasional accompaniment of pregnancy. Similar symptoms too, in less degree, frequently attend menstruation in some women, and take the form of acne, urticaria, altered pigmentation, or affections of the mucous membranes. These considerations tend to range 'herpes gestationis' as a neurosis depending upon uterine irritation. The earliest and least marked symptoms seem to take the form of pruritus and neuralgic pains. Then with increasing nerve irritation, urticaria, papules, and erythema papulatum would present themselves, and vesication would take place, if the neurotic disturbance reached a state to exert an influence of sufficient intensity."

I would add that in one severe case of urticaria in pregnancy, which came under my care, there were wheals with a central papule or vesicle; so that, if somewhat intensified, the eruption would have become vesicular or bullous. I submit that these variations are due to varying degrees of resistance in the cutaneous tissues of different individuals.

The *diagnosis* can present no difficulty if all the accompanying circumstances are taken into account.

The *prognosis* is good as regards the particular attack, since for the most part the eruption ceases after delivery. As regards future attacks it is unfavourable, since subsequent pregnancies are likely, though not certain, to be accompanied by the same. It is improbable that the disease will recur independently of pregnancy.

Treatment.—The number of recorded cases is not sufficient to afford a satisfactory indication as to treatment, except that the disease is extremely intractable. My own experience is based on four cases treated continuously, and some few others seen casually. The general indication is that external treatment must be palliative, and internal treatment functional. The external applications will be such as have been mentioned under D. herpetiformis. General treatment, improvement of nutrition, and tonics seem, as might be expected, to be of little service. Arsenic also appears to do no good. The drugs which I have found of service are opium, chloral, belladonna; especially the last. In two of my cases there was some improvement, but the disease was not arrested. In a third complete recovery took place; in this extremely severe case, admitted into St. Thomas's Hospital, after trying various remedies, extract of belladonna was given in increasing doses till some symptoms of belladonna poisoning (dilated pupils, dryness of throat, etc.) were produced. The eruption then subsided completely, and the patient was free for the remainder of her pregnancy. In the fourth case belladonna was equally efficacious. As a hypnotic, chloral proved more suitable than opium. Possibly some of the newer hypnotics might be preferable.

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HYPERTROPHIC AND ATROPHIC CONDITIONS

ICHTHYOSIS

SYN.—*Fish-skin disease; Xerodermia ichthyoides.*

Definition.—A congenital, developmental disease or malformation of the whole integument, characterised by its excessive dryness, roughness, and scaliness.

This definition is not intended to embrace cases frequently described as "acquired ichthyosis," which occurs in advanced life, and results from a form of seborrhœa; nor, again, various conditions named "local ichthyosis" or "hyperkeratosis," such as arise from venous stasis, from chronic irritation in various trades, or in connection with neuritis or central nerve disease (tabes, hemiplegia, etc.) A description of so-called "ichthyosis palmaris et plantaris," hereditary and acquired, will be found under the sub-heading of Tylosis, p. 689. On the other hand, the denomination of "ichthyosis hystrix" is retained; although many authors, both British and foreign, are inclined to group it with keratoid, neuropathic, and other forms of nævus.

To the milder forms of the condition the names *xerodermia* and *xerosis* are frequently, but quite unnecessarily, applied.

ICHTHYOSIS FŒTALIS GRAVIOR (SYN. *Harlequin fœtus*).—The most exaggerated form of ichthyosis is represented by the so-called "harlequin fœtus," where the marked changes resulting from deficient or perverted keratinisation of the rete Malpighii occur during intra-uterine existence. The reports of no less than forty-two cases have been collected and carefully analysed by Ballantyne. In almost all instances the child had been born prematurely; but there is only one record of the birth of a dead or asphyxiated ichthyotic fœtus (Barkow). On the other hand, no such fœtus has been known to survive more than nine days (Jahn).

A "harlequin fœtus" presents a peculiarly repulsive appearance. Its whole integument is thickened, hardened, and split up into plates and scales by fissures and furrows of varying depth and width. The

general colour is dirty grayish or yellowish ; but the intersecting furrows are reddish, purplish, or brownish. The skin is cold to the touch, and its consistence is variously described as horny, cartilaginous, leathery, pergameneous, and so forth.

The epidermic plates vary, as to size and shape, within wide limits, and may be either angular or rounded in outline. The largest are found where least movement occurs (back, arms, hands, thighs, feet) ; the smallest are present on the head, the front of the chest and abdomen, and about the anus and genitals. Their average thickness is from 4 to 5 mms., but in some cases they attain a thickness of 8 mms. Their outer surface is smooth or undulating, and studded with the dilated ducts of sebaceous glands ; their under surface is usually attached firmly to the subjacent skin at the centre ; less intimately so at the margin. When forcibly detached some bleeding may result, and a group of conical interlacing projections are revealed on the under surface of the scales and on the upper surface of the exposed cutis. Sometimes the intervening cracks are covered over by a thin pellicle ; but more frequently a sanguinolent or purulent fluid, with a fœtid, cadaveric odour, exudes from them.

The mouth almost always gapes, owing to the contraction of the surrounding parts ; and rhagades, comparable to those of congenital syphilis (Thibierge), radiate outwards from its angles. In most cases the nose is practically absent, but is represented by two apertures surrounded and blocked by epidermic plates. The eyeballs are normal, but are entirely concealed by the enormously congested, œdematous, everted eyelids. The external ears are seldom represented by more than mere tubercles. The genital organs are invariably arrested in development, and the limbs maintain their intra-uterine position of flexion, the hands and feet being greatly thickened and deformed.

No abnormality has been observed in the mucous membranes, nor is there any constant abnormality of the internal organs.

The causes of death in such cases are complex. "The children are originally weak, being prematurely born ; this weakness is rapidly increased by insomnia (due to pain on movement), by inability to suck, by hindrance to respiration, and by suppuration in the various cracks and fissures, which soon become the haunts of pyogenetic microbes ; further, there is interference with the functions of the skin due to the horny investing layer, although recent investigations have tended to show that this is a less potent cause of death than has been supposed ; and, finally, there are the visceral congestions and especially inflammatory states of the lungs and pleura. From one or other, or from all these causes, death ensues" (Ballantyne).

The only ascertained facts bearing upon the *etiology* of the grave type of fœtal ichthyosis are that in 7·6 per cent of the recorded cases the mothers bore more than one child similarly affected, and that close consanguinity of the parents (uncle and niece) may be responsible for one case. The hereditary nature of the condition has not been established.

Winfield reports a case in which the thyroid was absent.

Pathology.—The original view of Sir James Y. Simpson, that it is an ichthyosis occurring in the womb, has received much more support than Ferdinand Hebra's later opinion, recently urged again by Mr. Bland Sutton, that it consists in a general seborrhœa. The arguments in favour of the former view may be briefly stated as follows:—(i.) a certain number of cases, of similar nature but milder in degree than that described, have been known to survive, and to undergo various changes in the direction of ordinary ichthyosis; (ii.) ordinary ichthyosis, although admittedly a congenital disease, is not usually apparent at birth, probably on account of the prolonged soaking of the skin in the amniotic fluid, though cases are recorded in which the condition was distinctly recognised at birth; (iii.) the pathological anatomy and clinical features of the two are essentially the same, the differences noted being of degree rather than of kind; (iv.) in recent years several well-marked instances have been recorded of a condition ("attenuated fœtal ichthyosis") which forms a distinct connecting link between grave fœtal ichthyosis and ordinary ichthyosis.

Dr. Radcliffe Crocker (10), who examined Mr. Sutton's sections, decided that the anatomy certainly resembles that of ichthyosis, and he considered the case therefore to be "a true ichthyosis congenita."

Unna contends, and with many ingenious arguments, that the pathology of this condition differs wholly from that of ichthyosis. He classifies it among "stagnatory tumours," as a progressive disturbance of nutrition; he denotes it as "hyperkeratosis universalis congenitalis," and considers the predominant feature of the disease to be a congenital excessive firmness of the whole horny layer, more closely allying it with diffuse keratoma (horns) than with true ichthyosis. He lays much stress on the normal or even excessive development of the sweat (coil) glands, which in ichthyosis are atrophied.

Little or nothing is known of the epiblastic changes which result in the formation of the ichthyotic plates; but it is certain that the change begins between the third and fourth months of intra-uterine life, before the differentiation of the sebaceous apparatus occurs. The suggestion advanced by Ohmann-Dumesnil, that this as well as the milder forms of ichthyosis are due to persistence and adherence of the epitrichial layer, is not tenable, as quite a different condition—unfortunately named "ichthyosis sebacea" (Hebra)—results from these conditions.

ICHTHYOSIS FŒTALIS MITIOR.—The mild form of fœtal ichthyosis forms a connecting link between the disease just described and ordinary ichthyosis. Thirty cases have been collected by Ballantyne.

The disease may be defined as a skin affection of the fœtus "characterised at birth by the presence of a continuous layer of a collodion-like substance over the whole body, later by the desquamation of this substance in the form of small flakes resembling pieces of tissue paper; accompanied sometimes by ectropion and eclabium; not usually proving fatal to life, but occasionally terminating in complete or partial cure" (Ballantyne).

As in the grave form, family prevalence is frequently noted. Most of the affected children are prematurely born, and a comparatively large number die young.

At birth, or after the removal of the *vernix caseosa*, the whole body is covered with a tense, dry, shiny membrane, or thin pellicle, sometimes of a dark-brown or yellowish-brown colour. In the course of a few days, as a rule, fissures and cracks form, following the lines of the natural skin-folds; and scales or lamellæ of epidermis of various sizes are exfoliated, leaving a slightly moist surface. The mouth, nostrils, ears, eyelids and genitals are affected in a manner similar to that described in connection with the "harlequin fœtus," but to a less degree; and the extremities are fixed in a position of semiflexion. The symptoms resulting from these conditions are similar, consisting in difficulty of suction, deglutition and respiration, in immobility of limbs, and so on. In the majority of the patients who attain adult life the condition merges into ordinary ichthyosis.

The **histology** of the disease has been exhaustively studied by Caspary, who found (*a*) great hypertrophy of all the layers of the epidermis, especially of the horny and granular layers; (*b*) atrophy of the true skin, which was poorly supplied with blood-vessels and deficient in connective and muscular tissue; (*c*) atrophy of the subcutaneous adipose tissue; (*d*) absence or great diminution in the sebaceous glands, with very great reduction in the number of hair follicles; (*e*) remarkable development of sweat-glands.

I. Ichthyosis simplex.—**I. vera.**—*Historical.*—The recognition of the milder forms of ichthyosis is undoubtedly due to Willan, who first clearly described them and distinguished them from the severer forms of I. hystrix (for example, as presented by the celebrated Lambert family), to which many fantastic names were attached, chiefly based upon fancied resemblances to certain animals. Willan's description of the clinical appearances of the disease is almost complete, and his division into the two classes, I. simplex and I. cornea, is still adopted. Alibert and Rayer in France, Hebra in Austria, Gaskoin and Erasmus Wilson in England, added considerably to our knowledge of the subject. Unna's investigations into its pathological anatomy constitute the most important contribution of recent years.

Symptoms.—In the mildest forms the ichthyotic process is confined to the hair follicles and their immediate vicinity (I. anserina vel Keratosis follicularis), and represents a keratosis of the pilo-sebaceous ducts (Besnier). The skin is dry and exhibits innumerable, closely packed, minute, firm, conical projections, which give almost a nutmeg-grater-like sensation to the hand when passed over it. Each cone corresponds to a hair follicle, and is crowned by a firmly adherent tiny scale; while in its centre is an atrophied, twisted hair. The lesions are commonest on the back and outer sides of the arms, and, accompanied as they often are by some redness, may cause considerable disfigurement.

They are also common on the outer sides of the thighs, and occasionally affect the forehead and cheeks; but in these situations they are usually of extreme fineness.

In severer cases (I. nitida) the scales are not so limited, but form a more or less thick coating over the whole skin surface. Thibierge happily likens the condition to a layer of collodion beginning to crack. The scales, which vary greatly in size and thickness, are at first adherent all over, but gradually become detached from the margin inwards, while occasionally their arrangement is imbricated. When very small they desquamate like a fine white bran; when larger they usually become of a grayish or brownish tint; the skin assumes a characteristic dirty-looking appearance, and is dry and harsh; its natural elasticity is diminished, and its lines and furrows are exaggerated. Where the epidermic scales are thin and adherent, however, the skin is unduly smooth, its furrows are partially obliterated, and the appearance of a scar after a burn is simulated. In cases of still greater severity the skin does not desquamate in scales, but presents large epidermic plates having a somewhat tesselated appearance; thus it resembles that of a reptile (I. serpentina, sauridermia). The plates are polygonal, square, or lozenge-shaped, of very variable size, and sometimes attain several millimetres in thickness; they are separated by deep fissures or rifts, corresponding to the natural lines of the part, and almost invariably assume a dark brownish, greenish, or even black colour (I. nigricans), owing to the decomposition of fatty matter and the adherence of atmospheric impurities.

In the most exaggerated cases (I. cornea) a condition comparable with the skin of a rhinoceros or elephant may be attained; and it is said that in some a noise like that caused by a rattlesnake can be produced by vigorous rubbing (Alibert).

The lesions always present various degrees of intensity in various situations. The minimum of intensity is usually on the face, which generally shows, at most, only a few fine scales about the forehead and cheeks; but I have frequently noted, even in mild cases, a somewhat glazed appearance of the cheeks. The other parts, either exempt from the disease or nearly so, are the armpits, the bends of the elbows, the groins, the perinæum, the popliteal spaces, and the genital organs especially the penis. On the other hand, the maximum of intensity is usually attained over the tips of the elbows and knees, the posterior and outer aspects of the arms, forearms and thighs, the anterior and outer aspects of the thighs and legs, the buttocks, and the fronts of the shins. In cases of doubtful diagnosis these seats of predilection should always be carefully examined by the physician. The symmetry of the disease is almost invariably perfect as regards locality, form and severity.

The statements of authors regarding the condition of the palms and soles vary widely. The statement, made by Unna (p. 1154) and others, that the palms and soles are never affected is far too sweeping; as is that of Thibierge, that they are very seldom invaded. My own

experience entirely confirms the statement of Dr. Radcliffe Crocker, who says: "Ordinarily the palms and soles are particularly dry and smooth, and while the major natural lines are deepened, the minor ones are absent." Besnier is of the same opinion. In many cases I am wont to liken the palms to those of a labouring man. The comparative immunity of the palms in a certain proportion of cases is undoubtedly due to the softening and separation of the scales by the free sweating which frequently takes place there, especially in summer; and the same explanation holds good of the mildness of ichthyosis in the armpits and flexures generally.

Variants—("I. paratypiques," Besnier).—In certain rare cases the situation of the ichthyotic phenomena is different from the foregoing, or even entirely opposed to it. Thus Thibierge cites a case of Besnier's in which the maximum intensity of a universal ichthyosis was reached in the axillæ.

Subjective symptoms.—These are often absent; but in a certain proportion of cases there is a peculiar sensitiveness to changes of temperature, especially to cold; and considerable pruritus is often complained of. Where the ichthyotic plates are thick there is some diminution in tactile sensibility.

By far the most important practical point in connection with the milder forms of ichthyosis is the extreme vulnerability of the skin, which, on the most trivial exposure to heat, east wind, and the like, or without any obvious or external irritant, is liable to severe and troublesome dermatitis or moist catarrh. The obstinacy of many so-called "eczemas" is due to this cause, and an erroneous prognosis is often founded upon imperfect recognition of this disease; or, again, the extent and persistence of such an eczematous condition, arising as it does in early life, may give rise to an erroneous diagnosis of "prurigo."

Hair is generally scanty over normally "hairy" parts, and often completely absent over the trunk and limbs. Although the disease is seldom marked on the face the beard is usually scanty; and there is often complete alopecia of the outer parts of the eyebrows, such as occurs in syphilis.

Over markedly ichthyotic parts sweat secretion is usually diminished; but, on the other hand, in regions but slightly affected (for example, the palms, soles, and flexures) there is often marked hyperidrosis, and even superabundance and hypertrophy of the sweat-glands, as shown by Aubert.

The relief afforded to the symptoms by free sweating in summer, and the consequent softening and removal of scales, is very grateful to ichthyotic patients as a rule; but exceptionally they feel better in winter.

The secretion of sebum is diminished but not abolished, the scales always feeling somewhat greasy to the touch.

The nails usually present no abnormality, but are sometimes dry and brittle. The external ears are occasionally ill developed.

Ichthyosis never affects mucous membranes; the condition often miscalled "ichthyosis of the tongue" has no relation whatever to the disease under discussion.

Ichthyosis even affects extensive scars (for example, of burns), rendering them indistinguishable from the surrounding skin.

The general development and health of ichthyotic subjects are not below the average; nor, despite the extensive cutaneous abnormalities, is albuminuria ever noted. The coexistence of asthma is not infrequent (Jamieson), becoming less aggressive if the ichthyosis improve under treatment. Ichthyotic skin, as already remarked, is peculiarly liable to obstinate moist catarrh; it is comparatively often the seat also of acne, boils, and other dermatoses due to the pyogenetic organisms which are apt to lodge in its crevices.

Course.—Ichthyosis is seldom well marked before the end of the second year of life, but in carefully nursed children it is generally observed in the first few months. Its absence at birth has been attributed to prolonged bathing in amniotic fluid during intra-uterine life; and the frequent ablutions to which children of tender age are almost invariably subjected undoubtedly mask the signs of the disease for a time. Cases classified as ichthyosis, but appearing for the first time after childhood, cannot be accepted as such. At about the age of ten years the malady attains its highest degree; in which phase it persists throughout life, although sometimes with seasonal remissions in summer and exacerbations in winter. Reports of cases reputed to have ceased at puberty or after pregnancy are to be looked upon with suspicion. Temporary improvement may certainly occur after variola or any of the eruptive fevers, but no well-authenticated case of real and permanent recovery is on record.

Causation.—The causes of ichthyosis, so far as we know them, may be summed up in a word—that it is a family disease; it is generally hereditary, and often affects several members of the same family. In my opinion it is by far the most hereditary of skin affections, the only other disease comparable to it in this respect being psoriasis, also an epidermic malady. Its transmission is very irregular; Nayer (quoted by Thibierge) reports its continuous transmission throughout six generations; but such facts are exceptional. It affects boys and girls with practically equal frequency, but has a curious tendency to pick out children of one sex in a family. I have under observation a family of five, of whom the three girls are markedly ichthyotic, but the two boys have healthy skins. Similar and more striking instances are recorded by Kaposi and Radcliffe Crocker. Leloir has observed twins, one of whom was ichthyotic, the other not. The disease may skip one or several generations, or may be transmitted collaterally.

Hutchinson, quoted by Jamieson, states that he has frequently observed ichthyosis in the children of persons suffering from psoriasis, and suggests that "it is an intensified form of psoriasis, beginning at a very early period, and deriving peculiarities accordingly"; but his

observation has not been generally confirmed, nor his suggestion adopted. The only point in its favour appears to be the frequency with which the tips of the elbows and knees are affected.

Jablonowski states that ichthyosis of severe type is endemic among two Albanian tribes along the shores of the Adriatic; and similar statements are made with regard to Hayti and Paraguay.

Maternal impressions and various similar fanciful reasons have been invoked to account for the occurrence of the disease.

Differential diagnosis.—The disease most apt to be confounded with ichthyosis is that described by Hallopeau and Watelet as "exfoliation lamelleuse des nouveaux-nés," which is identical with the "I. sebacea" of Hebra; it is due to the persistence until birth of the epitrichial layer of cells, which, in the normal fœtus, is cast off at the seventh month. In such cases the child at birth is covered with a thin, smooth pellicle comparable to a layer of collodion or oiled paper; this soon separates, either in large sheets or in small pellicles, leaving the underlying skin somewhat branny. The skin assumes a normal appearance after a week or two, and the child's health is unaffected. The nature of the affection has been elucidated by Grass and Török, and by Bowen of Boston, U.S.A.

Morbid anatomy and Pathology.—Although the records of the morbid anatomy of ichthyosis simplex are curiously scanty, considering the comparative frequency of the disease, Dr. Radcliffe Crocker's statement, made in 1893 (10, p. 350), that it "has not yet been made out" is misleading. Thibierge cites, among recent writers, Rokitansky, von Bärensprung, G. Simon, Neumann, Hebra, Kaposi, Esoff, Leloir, and Lemoine as having substantially contributed to our knowledge of the subject. The discrepancies in their writings are probably due to the comparison of very various grades of intensity in the cases examined.

All agree that the salient characteristics are the exaggerated production of epidermic cells, and their increased cornification and cohesion. The stratum corneum is greatly thickened, its cement substance being abnormally abundant. The rete Malpighii is sometimes thickened, and its cells abnormally large. In severe cases the hair follicles are destroyed; in milder cases they are atrophied, and their orifices blocked by epidermic masses, the hairs being wasted and twisted. The sebaceous follicles are either absent, or scanty, or atrophic. The sweat-glands are almost always normal; Esoff's description of them as greatly altered, cystic, and with proliferation of their lining membrane, is based upon the examination of a so-called "acquired" case. The subcutaneous fat is always greatly atrophied. All these writers practically agree in considering the disease as a primary disorder of keratinisation, which ought to be looked upon rather as a malformation than as a disease, and as one for which no reasonable explanation is forthcoming. Leloir attempted, but without conviction, to argue in favour of the dependence of ichthyosis upon changes in the central or peripheral nervous system.

Several of these writers noted changes in the derma suggestive of

inflammatory phenomena of a mild degree, but all apparently agree that these were secondary to the epidermic changes.

Unna (p. 322) is of an opposite opinion, and supports his views in an extremely elaborate article, to which reference must be made for details. He considers the inflammatory phenomena, necessarily situate in the true skin, as primary ; and he classifies the disease as an "infectious inflammation." He describes such marked divergences between the two principal degrees of the affection as to justify their clinical distinction ; they may be briefly summarised as follows :—

In I. nitida hyperkeratosis holds the field, the horny layer being much thickened ; the prickle layer is thinned, and may be reduced to one or two rows of cells, which are much reduced in size, especially as to their protoplasm. The papillæ are flattened. The granular layer is everywhere absent, the prickle cells passing directly into the horny cells without the formation of keratohyalin or other secondary products. The hyperkeratosis extends into the ducts of the follicles, which may be converted into hair-cysts. The sweat-glands are almost invariably of normal size, but characteristic changes are always observed in their ducts, the lumen of which is dilated, and the cells hypertrophied and regularly nucleated. These changes doubtless correspond with the anidrosis and asteatosis present. The papillary layer is more cellular than normal and the cells larger ; the endo- and perithelia of all the capillaries of the skin are increased, but spindle cells are never present ; there are no formation of "plasma cells," and no leucocytes, while "mast cells" are very scanty. The collagenous (connective) tissue is thickened ; the lymph spaces and panniculus adiposus are correspondingly contracted. The oblique muscles in the upper part of the corium are uniformly hypertrophic.

In I. serpentina the histological type is different. Although the horny layer is even thicker than in I. nitida, the prickle layer is well developed, its lymph spaces are wide, its cells are hypertrophied, and a well-marked granular layer develops between it and the horny layer. The inflammatory changes in the cutis are also more pronounced ; cellular infiltration is more abundant, collections of "plasma cells" are met with at intervals along the vessels, and the number of "mast cells" is greater.

Upon the ultimate pathogeny of the disease Unna's researches throw no further light than those of his predecessors.

Treatment, if persistently and intelligently carried out, although probably never really curative, is on all hands admitted to be efficacious in controlling ichthyosis. The indications are threefold :—(*a*) To remove superabundant epidermis. In mild cases and in children, a daily warm bath suffices for this purpose, the use of superfatty alkaline soaps, or the addition to the bath of alkalies, borax, bran, or starch enchances its value and amenity. In severer cases the free use of glycerine, either pure or diluted—according to the tolerance of the patient—in the intervals of the baths, usually converts the skin con-

dition in about a week or ten days into that of apparent health, when less stringent measures may be resorted to. (*b*) To maintain the normal pliability of the skin by combating the diminution of its natural lubricants—the sweat and sebaceous secretions. In my experience the most generally convenient remedy for this purpose is glycerine, either in simple solution, mixed with 10 per cent of aqua laurocerasi, or as the officinal glycerinum amyli. The use of the latter may, on the ground of expense, be reserved for the face. In any case the remedy should be rubbed in with sufficient frequency and in sufficient quantity to keep the skin supple and unctuous without being sticky to the touch. Many other substances may be employed for the same purpose, such as lard, vegetable fats, cold cream, lanolin, vaseline, or the petrolatum liquidum of the U.S.P., to which, to control itching, from one-half to one part per cent of menthol or naphthol may advantageously be added. Circumscribed, excessive thickenings of epidermis may be removed by salicylic acid, either in ointment or plaster form. (*c*) To avert attacks of dermatitis, whether due to changes of temperature, to chemical or other irritants, or to the (possible) invasions of microbes. In all weathers flannel underclothing should be worn, its thickness varying with the season of the year; if pruritus be a prominent symptom the flannel garments may profitably be lined with thin washing silk. The daily use of ointments containing a small percentage of sulphur, resorcin, salicylic acid, boracic acid, or naphthol may be resorted to; or these drugs may be incorporated in the habitual lubricant employed.

There is a general consensus of opinion that internal treatment is of no avail; but Besnier insists upon the value of long-repeated minute doses of arsenic, and Brocq upon the utility of cod-liver oil. I have satisfied myself of the great benefit to be derived from the administration of thyroid extract, with all the due precautions now so fully recognised; and I am inclined to consider the amelioration of the skin nutrition under this drug as fairly comparable, in certain cases, to that which occurs under similar treatment in myxœdema. In some cases the use of jaborandi, or of its alkaloid pilocarpin hypodermically, is attended by temporary alleviation of symptoms.

ICHTHYOSIS HYSTRIX—(*ἴστριξ, a porcupine*).—The disease occurs in two forms which present some features of difference, but in point of severity and extent rather than in more essential characters. It may, in very exceptional cases, coexist with ordinary ichthyosis.

I. h. gravior. SYN.—*Porcupine skin disease, Hystricismus, Leontiasis hystrix, etc.*

Definition.—A congenital condition in which thick epidermic plates or horny masses cover extensive papillary, wart-like growths projecting a variable distance above the surface of the skin; but in which the integument is never universally involved.

Historical.—The most remarkable instances recorded are those of

the well-known Lambert family, in which the disease existed in four successive generations. The first member seen was described by John Machin as "an uncommon case of a distempered skin." He was the only member of the family affected, and his skin was compared to the bark of a tree, the hide of a rhinoceros, the quills of a porcupine, and so forth. All of his six children were affected, the disease always showing itself at the age of about two months; only one survived the age of eight years. Both father and son contracted small-pox, during which their warty growths were shed. The malady affected the male members of the family throughout four generations at least, and in some the growths were cast off at regular intervals. A full account of all the cases, and of the copious literature appertaining to them, may be found in Dr. Ballantyne's work already referred to.

Clinical.—The only case in which the condition was present at birth is recorded by Ollivier; but as the infant in whom the disease was observed had been immersed in the Seine, probably for a period of three weeks before examination, the record is doubtful.

In the great majority of cases the disease becomes perceptible, or well marked, at the age of about two months. In a few rare instances the skin between the warty growths has been xerodermic, or merely "not altogether healthy" (Ballantyne); but these form the only connecting link with I. vera. On the ground of cases recorded by Radcliffe Crocker and Byrom Bramwell, Ballantyne suggests that the papillary growths may arise from abrasions resulting from intra-uterine pemphigoid eruptions; but this will certainly not hold good in the great majority of cases.

The general symptoms of the disease may be gathered from the various names applied to it, and—like its morbid anatomy—may be described as an exaggeration of the far commoner condition described in the ensuing section.

I. h. mitior (SYN. — *I. hystrix partialis; Neuropathic papilloma; Nerve nævus; Nævus verrucosus, linearis, unius lateris*). Several other names have been used to indicate minor differences in individual cases; of these the most unfortunate is I. herpetiformis (Hutchinson).

Historical.—The earliest recorded case is due to Thomson. The peculiar distribution of the lesions suggestive of nerve origin was first pointed out by von Bärensprung in 1863, and many papers on the subject have since been published, the most extensive of which is by Neumann.

Symptoms.—As a rule the condition is present at birth, although it frequently passes unperceived; sometimes, however, a mere dirty-looking streak, or red point, is noticed which is not removed by washing. About the age of two months the lesions become prominent, papillary; they are soft and pale brownish in colour, and their linear arrangement is already striking. With increasing age they extend with very various degrees of rapidity, becoming more and more extensive, harder, more prominent, and of deeper tint; finally, in marked cases, they constitute

warty-looking growths, consisting of elongated and thickened papillæ covered by greatly hypertrophied, dark brown or greenish, hardened epidermis. These coalesce to form pointed or flat-topped, horny or leathery projections of variable size, which are grouped in patches or streaks, their general direction being usually transverse upon the trunk and longitudinal upon the limbs. These masses may project an inch or more above the general skin surface, and may have broad, truncated bases. In the armpits and other hot and moist parts they are often very vascular and succulent; their growth may be extremely luxuriant, and they may bleed freely or ulcerate and vegetate, in either case secreting a peculiarly offensive fluid. The coexistence of a moderate degree of vascular nævus is not infrequent; a very marked example of this association is described and well illustrated by Gaucher. More frequently the chief inconvenience of these growths is that their horny caps catch on articles of clothing and the like, and, being thus torn off, disclose bleeding and hypertrophied papillæ. The skin surrounding the streaks, or between them, is often deeply pigmented.

A corresponding condition on the mucous membrane of the cheek, palate and tongue has been described by Church; and on the palate alone by Ryan.

Although sometimes widely disseminated, the condition is never universal as in ichthyosis proper. In the immense majority of cases hystrix is unilateral and sharply demarcated by the median line; if bilateral it is never symmetrical. The disease cannot be said to have any marked seats of predilection; but the face is comparatively seldom attacked, as is the case with the palms and soles, and the genital regions.

In a considerable number of cases severe itching is complained of; in others spontaneous attacks of inflammation occur, resulting in localised eczematous changes and the exfoliation of some or all of the growths. The benefit ensuing is but temporary.

The general health seldom suffers; but hystrix—as is not surprising—is sometimes associated with epilepsy or other nervous diseases, or with congenital deficiencies of mind or body.

Causes.—Hystrix, as a rule, is not a "family disease." It afflicts the two sexes with practically equal frequency. Often it corresponds in distribution with superficial cutaneous nerves (von Bärensprung); in other cases the distribution of the deep nerves of the part is followed; in others, as pointed out by Philippson, the streaks follow the lines of intersection between the areas of distribution of the cutaneous nerves—"Voigt's lines"; or, again, they accurately follow the direction of the lymphatics of the part (Heller), or of the metameric developmental fissure-lines (Unna).

Mr. Hutchinson has suggested, but without any cogent evidence in favour of the suggestion, that hystrix may be the result of intra-uterine herpes zoster.

Gross changes in the central nervous system have been observed in a few cases, but their connection with the disease in question is not clear.

Pathological anatomy.—This varies widely in different cases. In all, however, there is hypertrophy of the papillæ of the corium, with absence or marked atrophy of its elastic fibres; the connective tissue being lax and rich in lymph cells, while the arteries are abnormally large, and the ordinary signs of dermic inflammation often well marked. The horny layers are greatly hypertrophied, and dip deeply down between the papillæ—interpapillary "acanthosis" and "parakeratosis." In contradistinction to true ichthyosis, kerato-hyalin and eleidine are present in the stratum granulosum. The rete Malpighii is thinned and its lower layer deeply pigmented. Max Joseph describes dilatation of the sweat ducts as a constant feature, and von Petersen and G. T. Elliot have recorded very similar cases in which extreme cystic dilatation of the sweat ducts and glands was present over the affected areas ("intra-canalicular adenoma-cystoma in a nævus unius lateris"). The sebaceous glands are unaffected.

Some cases [for example, Hallopeau's (16)] described as originating in adult life, and ending in spontaneous recovery after varying periods, appear to me to be indubitable examples of lichen planus, or planopilaris in bands.

Treatment is usually only resorted to when the lesions are on exposed parts (face, neck, or hands), or where they give rise to discomfort, bleeding, or irritation. Small growths may always be controlled, and sometimes permanently removed, by free applications of concentrated salicylic collodion, or of salicylic acid plasters; strong tarry ointments, although disagreeable, are sometimes efficacious; repeated painting with tincture of iodine and oil of cloves may remove the growth. The activity of these remedies may be enhanced by the previous use of strongly alkaline soaps, or of a careful application of 50 per cent solution of liquor potassæ.

For larger growths excision is sometimes the best plan of treatment; but in the majority of cases removal with the galvano-cautery is preferable. This can usually be carried out, under cocaine, without the administration of a general anæsthetic, the growths being attacked piecemeal.

In a case recorded by Max Joseph the horny growths fell off while the patient was under thyroid feeding.

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SCLERODERMIA

SYN.—*Scleroderma; Scleremia; Sclerema adultorum; Scleroma; Scleriasis; Chorionitis; Dermato-sclerosis; Sclerostenosis cutanea; Cutis tensa chronica; Elephantiasis sclerosa; Sclerodactylitis; Morphœa, etc.;* Fr. *Sclérodermie; Sclérème des adultes;* Germ. *Hautsclerem; Sclerodermie, Scleroderma.*

Definition.—An idiopathic affection of the skin, more or less chronic, in which the integument, in small or large areas, becomes altered in consistence and colour, hard and rigid, without inflammation, and with subsequent "hide-bound" contraction.

The first known example of this disease was described by R. Watson in 1754, from a case in Naples under Curcio. This account was quoted in full by Willan in 1808, and it still holds its place as a classical description of the disease. Willan gave it the name "Ichthyosis

cornea." The condition was also fully described by Alibert in 1817,[1] under the genus "scleremia," in which he included also the œdematous sclerema of infants. He referred to two cases of generalised sclerodermia in adult women, and to two cases of "sclerema circumscripta" in men, which were evidently instances of localised sclerodermia or morphœa.

The disease seems to have attracted but little attention until 1842, when Thirial published two cases under the name "sclerème des adultes." Shortly afterwards Gintrac adopted the name "scleroderma" —more correctly "sclerodermia," by which it has since been generally known. Much confusion, however, has been caused by various authors who have recorded cases under such names as "Icthyosis cornea" (Startin, 1846); "True keloid" (Addison, 1854); "Lèpre vitilige" (Gibert), etc. As will be seen farther on, Erasmus Wilson applied the name "Morphœa" to certain localised forms.

Symptoms.—In sclerodermia the most marked character is a peculiar hard stiffening and immobility of the skin, which may involve any part, and to any extent. The face, neck, scalp, arms, and the upper portions of the trunk are the most frequent sites of invasion; but the lower extremities may also be affected, as well as, in very rare cases, nearly the whole of the surface of the body. Large areas of skin may thus become diffusely and symmetrically thickened; or, on the other hand, patches of indurated integument may be irregularly scattered over large surfaces, or, more commonly, restricted to particular regions.

The cases may be thus classified under two categories:—

(A) Those in which the skin changes are diffuse and symmetrical, and (B) those in which the lesions are circumscribed and irregular. In this country the latter class of cases is known under the name of "Morphœa"; and were it not that anatomically there are certain essential points of resemblance, and that in some cases both the circumscribed and diffuse lesions pass into each other, or are found in the same subject, the different clinical features might suggest their separation as distinct diseases.

(A.) DIFFUSE SCLERODERMIA is certainly a very rare disease: Dr. M'Call Anderson had two cases in 11,000 of diseases of the skin; Dr. Crocker two in 10,000; the American statistics two in 16,863.

During the last ten years I believe that only one case has presented itself at Blackfriars. A typical example was exhibited (Stowers) at the International Medical Congress in London, 1881; one at the International Dermatological Congress in London, 1896 (Stephen Mackenzie); and one, in a boy, at the Dermatological Society of London in 1898 (Pringle). Very few others have been shown, at the Dermatological and other societies of London, for many years past.

[1] Curiously enough, in Alibert's *Monographie des Dermatoses*, 1836, I can find no reference to the affection.

As Professor Osler has remarked, it is probable that cases come more often under the notice of the general physician than of the specialist.

In many of the cases, before the characteristic alteration of the skin has become manifest, the patients have presented various prodromal symptoms—such as neuralgic or rheumatic pains, chilliness, tingling, itching, numbness, or other changes in sensation, turgescence of the skin, and eruptions of erythema, papules, vesicles, or bullæ. In other cases no premonitory symptoms have been observed, and the onset has been comparatively sudden. The usual course is for portions of the skin, in symmetrical positions, to become swollen and thickened, with a sensation of stiffness—the induration and rigidity gradually spreading until considerable areas are invaded. The skin cannot now be pinched up, nor can it be made to move freely over the underlying structures; indeed, the surface involved becomes veritably "hide-bound." The invasion of the neighbouring skin may be rapid, or the lesions may take months or years to extend. In some cases the induration has gradually "resolved" until the skin has regained its normal character; but in most of them, after a variable time, the "pseudo-œdema" gives place to a slow, atrophic contraction—the layers of the skin becoming thinner, harder, and even more immobile. The pressure on the subjacent structures from this tightening of the skin may be so great that atrophy and ulceration of the tissues may ensue, especially in prominent parts such as the elbow. The "feel" and appearance of the sclerodermatous skin has often been likened to that of a frozen corpse, to thick vellum, to leather, or to marble; and its hardness to that of a wooden board. In the early stages the cutaneous secretions and sensation are but little interfered with; but later both the sudoriparous and sebaceous functions may be abolished and sensation diminished. The temperature of the skin also is generally lessened to an extent sometimes of two or three degrees (Fahrenheit).

The surface of the skin may at first be unchanged; or it may become glossy, or rough and scaly. Stigmata, or spots of enlarged capillaries, may make their appearance; and in some cases (Jamieson) eruptions of vesicles or blebs.

The arms and the neck are often the first parts to be attacked. When the limbs are affected the joints may ultimately become absolutely fixed in semi-flexion by the contracted integument, and the fingers "clawed" (sclerodactyle, acrosclerodermа); or, when the face is attacked, the features become "drawn" and all facial movements impossible—the rigidity and retraction of the skin giving a terrible expression to the patient. The use of the muscles of the cheeks and lips may be so interfered with, or even abolished, that the ingestion and mastication of food become most difficult.

Similarly, when the thorax and abdomen are implicated, the movements of respiration are seriously impeded; and if the "hide-bound" condition become universal the general helplessness is complete.

The nutrition of the parts may be affected to such an extent that ulceration and local gangrene may result.

In some few cases the induration has extended even to the mucous membrane of the mouth, pharynx, eyelids, and vagina.

According to Thibierge, a true myositis is a frequent accompaniment; and a marked case in which most of the muscles of the limbs and body were thus affected is mentioned by Kaposi. Its association with marked muscular atrophy has also been recorded (M'Guire).

There is always, sooner or later, some change in the colour of the integument; although at first the condition may be felt rather than seen. When fully established, and especially when contraction has begun, a waxy or parchment-like appearance is characteristic; and there is often increased pigmentation in the neighbouring skin, or even over parts at some distance from the sclerodermic integument, as well as over the latter area.

The disease may last for years, remaining stationary, or slowly increasing, and death may ensue from general inanition, or more frequently from some intercurrent abdominal, cardiac, or other affection. Some patients have died suddenly, without apparent cause; a few have recovered, especially when the process has stopped at an early stage.

Although most cases are chronic, a few have been acute in their course (Dühring, Graham, Jamieson, etc.) In a case under the observation of the editor of this work the disease progressively occupied the chest, lower neck, and both arms. The integument became dense, tallowy in colour, and otherwise changed according to the type. It was suspected that a slight degree of the change was perceptible in the face. There was some such disturbance of the general health as described above, but chiefly in the prodromal and early phases. The patient, an artist of eminence, was some fifty years of age at the beginning of the attack. He was so crippled in his arms as to pursue his calling with great difficulty, though, perhaps, never wholly incapacitated. After reaching its full extent the morbid process slowly receded and gradually disappeared, so that the skin regained, or practically regained, its normal quality. Some dozen years must now have elapsed since the patient considered himself well. The course of evolution of the integument to recovery was, roughly speaking, the inverse of the involution. The amendment seemed to be spontaneous, and could not be credited to any method of treatment. Although far from robust, and subject to neurotic dyspepsia and other nervous disorders, the patient was and is a fairly healthy man. The causes of the attack could not be detected, but it was surmised that it was a neurotic perversion, and rest and tonic treatment were of course prescribed.

Pathology. — Among recent observations on the microscopical anatomy of sclerodermia, those of Unna are of particular interest. He found, from sections from a case at four different periods, that the main process was "a hypertrophy of the pre-existing collagenous bundles which affects equally all parts of the cutis, and leads to simple pressure

atrophy of the vessels, as well as of the epidermic structures." The cellular elements were diminished, and the arteries became narrowed and cord-like, and the elastic tissue was pressed asunder by the swelling collagenous tissue and collected in bundles. The fatty tissue also disappeared, and was replaced by collagenous substance. The intradermal muscles were not atrophied. In the final atrophic stage, which Unna admits may be sometimes brought about by an obliterating endarteritis, a parchment-like, thin, cutaneous plate is left, without a papillary layer or subcutaneous tissue but with a covering of atrophied epidermis.

Other authors variously consider that a peri- and endarteritis, leading to obliteration of the lumen, is the primary pathological change, the collagenous hyperplasia being secondary; that the lymph-channels are primarily affected, with resulting stasis; that the changes in the skin are due to a perversion of nutrition analogous to myxœdema, and finally that the sclerosis is a "trophoneurosis." The last is the view most generally held; although, as Kaposi remarks, there is at present no decided anatomical demonstration of any nerve changes. Even Schwimmer, who found disease in the peripheral nerves and warmly supported the trophoneurotic suggestion, admitted that the latter may be inferred rather than demonstrated.

Causes.—As may be surmised from the above short account of the pathology of the affection, its causes are not yet known. It occurs most frequently in adult life—from twenty to forty years of age—although children, even infants in the second year, and older persons are sometimes affected. The majority of the cases have been in women. Some of the patients have put down their disease to cold and subsequent rheumatism; others to influenza, pregnancy, arrest of menses, shock, and so forth.

The association of sclerodermia with certain other lesions may possibly have some etiological significance. The abnormal and irregular pigmentation, for instance, in so many cases, has led to the suspicion of adrenal implication; and in a few instances degenerative changes have been found in one or other suprarenal capsule, or in both.

Osler considers that "the deepening of the colour is only part of a trophic change in the sclerodermia, and has nothing to do with true Addison's disease."

Several cases have presented the phenomena of Raynaud's disease both in the early and later stages (23, 56, etc.)

Moreover its occasional concurrence with the symptoms of Graves' disease (Leube, Jeanselme, Eichhorst, Singer, Grünfeld, Osler, etc.) has not only arrested attention, but has suggested thyroid feeding as a means of treatment.

In a typical case of diffuse sclerodermia, Singer found one lobe of the thyroid much reduced and fibrous; in another Hektoen found the glandular part of the thyroid quite atrophied, and suggested a connection between the conditions of arterio-sclerosis, dystheriosis and sclerodermia.

Diagnosis.—The recognition of the disease should be easy, having

regard to the history of the case, the characteristic immobile sclerosis, which is an early and prominent feature, and the progressive atrophic contraction.

In the early stages it has to be distinguished from the brawny, solid œdema of the legs, sometimes associated with renal or cardiac dropsy; from certain cases of scorbutic sclerosis, myxœdema, or Raynaud's disease, and from leprosy; as Osler also points out, certain rare cases of sclerodermia which present vaso-motor and trophic phenomena, extreme cyanosis associated with the infiltration, pigmentation, and perhaps superficial ulcerations, may readily be mistaken for one of the above or for some other disease.

In the later stages, when contraction has begun, confusion is just possible with neural leprosy, Morvan's disease, syringomyelia, and chronic rheumatic arthritis; but all such cases will have their proper histories, and the hardening and contraction of the skin which any of them may present will be a late and derivative phenomenon of the disease.

Kaposi's xeroderma pigmentosum, or parchment skin,—especially the stationary type,—might also be confounded with sclerodermia in the atrophic stage; but the atrophy in xeroderma is not preceded by sclerosis; moreover it is a disease which always begins in early youth and steadily progresses.

In two of Mr. Hutchinson's cases death took place from erysipelas.

Treatment.—Cases which are only in the initial stages sometimes, but very rarely, get well spontaneously; and in certain cases the condition can certainly be ameliorated, or the progress of the disease retarded, by appropriate internal and external remedies. When, however, the sclerosis has disappeared and atrophy become established, little or nothing can be done to restore the tissues to their normal state. Numerous drugs have been used in sclerodermia—mercury, iodides, arsenic, iron, quinine, cod-liver oil, belladonna, digitalis, valerian, bromides, diaphoretics, etc., but it can only be said generally that, in most cases, tonics are indicated, such as cod-liver oil, quinine and iron; and that more important, perhaps, are good food and good air. Within the last few years thyroid feeding has been tried in a number of cases; results apparently successful have been recorded by Marsh, Lustgarten, Grünfeld, M'Master, and others, and unsuccessful results by Dreschfeld, Lewin, Heller, and Osler. The last-named author observes that the thyroid extract has certainly no such specific action in sclerodermia as it has in myxœdema; the most that he could say of it was that in two of his cases the disease did not progress under its use. He thinks that "it may be tried without harm, and, should it fail, frictions and saline preparations should be used."

Externally, warm natural sulphur and other mineral waters are recommended, with Turkish baths, and massage with bland, oily substances; satisfactory experience has also been recorded (Schwimmer, Brocq) by the use of electric baths or the constant current. It is most

important to avoid cold or sudden chill; and of course any accompanying vascular or other affection must be suitably treated.

(B.) Morphœa.—Syn.—*Circumscribed scleroderma; Addison's keloid; Sclérodermie en plaques.*—The name "Morphœa" had been used for blotches of leucodermia (vitiligo), and for atrophic cutaneous patches in leprosy, before Erasmus Wilson employed it to designate those patches of indurated skin ("morphœa alba lardacea") which he then thought had something to do with leprosy, but which, as Fagge pointed out in 1867, are essentially examples of circumscribed scleroderma.

Symptoms.—The circumscribed, which is far commoner than the diffuse, scleroderma (p. 674), may occur in several forms:—(i.) roundish, oval, or irregular white patches; (ii.) scar-like bands; (iii.) small depressed patches, as though let in to the skin (Unna's "card-like scleroderma"); and (iv.) in raised areas somewhat resembling keloid.

In a case of circumscribed scleroderma, which was under my own observation, there was a deep-seated oblong dermal thickening, which was only apparent to the touch, the surface being neither raised nor changed in colour.

The distribution is usually irregular; but more or less symmetry in the arrangement of the patches has been observed (Hutchinson and many others). The clavicular regions, the mammæ, the face and neck, and the arms are most frequently affected, although the lesions may occur on any part of the body. In one of my cases morphœa was confined to one ankle. Hutchinson lays special stress on its frequent "herpetiform" distribution; that is, following the course of particular nerves. The distribution may, on the other hand, rather correspond with the cutaneous vascular areas.

The patches may be single, or, less frequently, multiple.

Morphœa generally appears as yellowish white, waxy, or ivory-like spots, surrounded by a rosy or purplish areola. The patch may be slightly raised above the level of the surrounding skin; hard, polished, and "lardaceous" in aspect: or it may be but little raised, slightly coloured all over at first, and becoming pale and parchment-like in the centre. The lesion can be felt as well as seen, and, except in the older cases when the induration has extended to the subcutaneous tissue, or atrophy has set in, the patch may not be absolutely immovable on the subjacent structures.

The portion of skin attacked may remain in the first stage for months or years, and involution may then set in, and the skin ultimately resume its normal state; or atrophy may take place, and a permanent contracted scar be formed, which may so involve the underlying tissues that much deformity of the part may result. This is not infrequent in *hemifacial morphœa*, which has been more than once mistaken for hemi-atrophia facialis.

There is often much pigmentation, especially in the later stages; and at one time, on account of the varying colour in different cases, it

was customary to speak of "M. alba," "M. nigra," as well as of "M. atrophica," as distinct varieties of the disease.

Some cases begin as slightly coloured purplish spots, assuming the waxy appearance subsequently, at first in the centre.

Pathology.—Unna found within a patch of morphœa, as the main thing, great hyperplasia of the collagenous tissue; this mechanically narrowed the blood-vessels and lymph channels, but there was no thickening of the coats of the vessels. The coil glands and hair follicles were elongated, the former with their loops separated by the intervening increased connective tissue. The papillary layer was flattened, with much disappearance of the capillaries, and great thickening of its normally fine collagenous fibres; its elastic fibres were preserved, and its lymph channels increased in size, but diminished in number. The epidermis was but little affected. At the marginal part of the patch the collagenous hypertrophy was absent, but the connective tissue cells were increased, particularly along the blood-vessels. The vessels in the neighbourhood were evidently pressed upon by the growing sclerosis and the veins were dilated—thus causing the surrounding bluish zone.

In the form of sclerodermia which Unna calls "card-like," that observer found, in the early stages, changes principally in the papillary layer of the corium, which was flattened out; and in the epidermis. In the former the capillaries and lymphatics were dilated, and the connective tissue cells were increased in number near the blood-vessels, but not in their immediate neighbourhood, and these cellular collections were abundant around and beneath the patch. The collagenous and elastic tissues of the skin were not hypertrophied at this stage, the thickening being due chiefly to interstitial œdema. The epidermis exhibited great diminution of the prickle-layer and thickening of the horny layer. All this explains the depressed surface, the pearly lustre, and the increased resistance. The older patches showed general collagenous hypertrophy, narrowing and ultimate obliteration of the vessels, and disappearance of the cellular infiltration; while the horny layer of the epidermis was still more increased at the expense of the prickle-layer.

Dr. Crocker examined sections of circumscribed sclerodermia in the early and late stages, and found in the former but little alteration in the epidermis, flattening of the papillæ, thrombi in the papillary vessels, and numerous masses of cells, especially about the superficial longitudinal vessels; in the latter still greater flattening out of the papillæ, and great increase of the connective and elastic tissues, with obliteration of many vessels, and atrophy of sebaceous and coil glands.

Diagnosis.—When typical, morphœa should be mistaken for nothing else; its waxy hue, parchment-like consistence, and roseate margin being sufficiently characteristic. It has to be distinguished, however, from leucodermia, which is soft, never depressed, and of a dull white colour; from scar of burns, acne, and the like; from true keloid, which is redder,

more solid, and often with claw-like branches; from atrophic and leucodermic patches of leprosy; and from cutaneous scirrhus: I have even known a lymphatic œdema mistaken for it. The pigmented patches in one case might have been mistaken for those of leprosy, abnormal cutaneous tuberculosis, or granuloma (Darier and Gaston).

Causes.—The remarks made under the sub-head "Diffuse Sclerodermia" may here apply. It is more common in early adult life, although it may begin in childhood. Women of neurotic temperament seem to be especially affected.

It has followed Raynaud's disease in several cases (23), local irritation from a fall, friction of clothing, and the like; and in one of my patients, a lady violinist, a patch appeared on the left wrist above the thumb, possibly from the constant strain of holding the instrument.

In a case reported by Dr. Cavafy morphœa developed in a long-standing patch of apparent lupus erythematosus; and in one reported by J. T. Elliott progressive muscular atrophy was present.

Most authors now accept the "trophoneurotic" view of its origin.

Treatment.—This has but little effect. Massage with emollients, cautious stimulation of the nerves, by the constant as well as by the interrupted current, may be tried; as well as, according to Brocq, electrolysis. He recommends also the constant application of Vigo's plaster.

Thyroid feeding has also been tried in these cases and encouraging results have been recorded in a few instances.

Sclerema Neonatorum

Syn. — *Scleroderma neonatorum; Sclérèmie des enfants* (Chaussier); *Œdématie concrète* (Doublet); *Thirial's disease; Algor progressivus; Induratio telæ cellularis; Induratio telæ cellularis neonatorum; Algidité progressive* (Hervieux); *L'endurcissement athrepsique; Sclerom der Neugeborenen.*

Under the above names two diseases which appear to be distinct, occurring in newly-born infants, have been described indifferently by authors, until Parrot in 1887 pointed out their confusion.

In the one class of case—to which dermatologists, following Parrot, are now inclined to restrict the name "Sclerema neonatorum"—the skin rapidly becomes waxy in appearance, leathery in consistence, very rigid, and adherent to the underlying tissues. The whole integument may become so hardened and stiffened that all movements of the limbs become impossible. In this state, indeed, the infant resembles a dead child in "rigor mortis," or a stone figure; and the likeness is heightened by the fact that there is always a fall of several degrees of temperature. The colour is generally yellowish white, although it may sometimes be

livid. The condition appears generally from the second to the tenth day after birth; but it may be present at birth, or not begin until a later period. The parts first affected are often the calves of the legs, the induration rapidly spreading upwards to the back and the rest of the body. All functions seem to be impeded, food cannot be taken, the respiration and pulse-rate fall, and death ensues usually in from two to five days from the onset; although some patients have lingered for a longer time. Various complications may coexist, such as erythematous eruptions, ulcerations, pulmonary and abdominal complaints, and so forth.

It was a case after this type which was first described by Uzembezius in 1718, and afterwards by Underwood in 1784.

Pathology.—Parrot found the integument greatly thinned and diminished in volume—especially the corium and rete layers. The stratum corneum was not affected. The fat of the corium was atrophied, and the vessels contracted, especially in the papillary layer. He considered that there was a desiccation of the skin, but no true sclerosis. A microscopical examination has also been made by Ballantyne, who observed an increase in the connective tissue.

Causation.—According to Parrot the cause is malnutrition following diarrhœa, pulmonary complaints, syphilitic taints, defective feeding, bad air, and so on; and it seems that such conditions have generally preceded these cases. Even in those instances in which the affection begins *in utero*—or shortly after birth—without apparent previous disease, the intra-uterine nutrition may have been at fault.

Treatment.—When the sclerema is complete it appears that little or nothing can be done. Nutritious food should be administered if possible, even by syringe, and artificial warmth applied, either by woollen coverings and hot-water bottles, or by the "incubator." Rubbings with cod-liver oil might be tried. In a few partial cases recovery has taken place (Barr).

Œdema Neonatorum

Syn.—*Sclerema neonatorum.*

Many of the cases described as "sclerema neonatorum" have really been instances of a solid œdema, appearing first in the legs and feet, and spreading upwards, in newly-born infants.

The subjects are as a rule feeble, often prematurely-born infants; and they usually become drowsy before the affection is manifest—which is generally a day or two after birth. The skin becomes cold, swollen, and hard, pitting with some difficulty; and the surface tense, glossy and of a reddish or livid colour. As the œdema spreads upwards the swelling may diminish in the regions first attacked—leaving the skin thinner, hardened, and wrinkled. The immobility of the skin and the

stiffening of the joints are much less than in the true sclerema neonatorum.

In the usual course the child dies in from two to ten days—the temperature gradually falling, and all the functions becoming obsolete.

Anatomically, no cellular infiltration or connective tissue hypertrophy has been found, but only an œdematous increase of fluid in the corium and subcutaneous tissue, and an increased and altered fatty deposit in the latter. According to Ballantyne, the condition is analogous to adult anasarca from renal, cardiac, or pulmonary disease. The proximate cause, as Kaposi observes, is no doubt a retardation of the capillary circulation—either from cold, feeble action of the heart, or from thrombosis; and of the remote causes may be diseases of the heart, lungs, or digestive system; or malnutrition from syphilis, bad food, and the like.

The disease seems to be more common on the continent of Europe than in this country.

The treatment is the same as for sclerema, and it is said to be occasionally successful; namely, warmth, promotion of the circulation and careful nourishment.

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KELOID

SYN.—*Cheloid, Keloid of Alibert; Chelis, Kelis; Cheloma; Cancroid, Fatty tetter; Cancroïde, Dartre de la graisse; Knollen krebs.*

Description.—The name of keloid is given to certain non-inflammatory, long-standing, tough, fleshy excrescences; smooth or nodulated, oval or elongated; and often with "claw-like" prolongations.

The lesion was first recognised and described by Alibert, in 1810, under the name of "Cancroïde"; he placed it in a somewhat intermediate position between the "dartrous" and "cancerous" affections, because on the one hand he thought that the tumours sometimes exhibited a furfuraceous desquamation, and on the other that their growth was sometimes accompanied by acute and lancinating pains, as in "cancer." The name, however, was founded upon the bifurcating prolongations, like the claws of a crayfish (écrevisse), which frequently protrude from their borders.

Alibert subsequently, with the same notion, adopted the name "Keloide" (from χηλή, a claw)[1]; and he then included under the one generic name of "Keloide" two forms or "species," which he distinguished as (A) "True keloid," and (B) "False keloid"; the former being "ardently pruritic and painful," the latter "indolent, and the result of a cicatrising inflammation after a burn or ulceration."

Considerable confusion was many years afterwards (1854) caused by Addison using the name "true cheloid" to designate a very different affection; namely, sclerodermia.

Until comparatively recently the view was generally held that there were really, as Alibert taught, marked distinctions between the "true" or "idiopathic keloid," which was supposed to arise spontaneously, and was more painful and more lasting, and the "false keloid," which

[1] This is the only derivation that concerns the reader; the k being regarded as interchangeable with ch, and more convenient. Addison, however, formed the word upon κηλίς (a mark), and others perhaps upon κήλη (a tumour).—ED.

formed in scar tissue, and was called by Dieberg, in 1852, "cicatricial keloid." Mr. Hutchinson, in 1870, threw doubt upon the prevalent view; and since the report of the committee appointed to consider a case exhibited by Dr. Goodhart, at the Clinical Society of London, in 1880, the opinion has been gaining ground that there is really no essential difference between the so-called "true" and "false" keloids. The committee came to the conclusion that the supposed spontaneous cases had probably occurred after a solution of continuity or scarring of the skin, slight as it might have been; and they recommended that the qualifications "true" and "false" be discarded.

The keloid growths arise as small, reddish, papular indurations, which gradually increase in dimensions in one or more lateral directions; or, occasionally, neighbouring spots may coalesce, until raised masses are formed which are ovoid, irregular, plate-like, band-like, or cord-like in shape; and often, at one or both ends, they present characteristic radiating extensions, simple or branched, which may be continuous with secondary bands passing across the growths. Their consistence is hard and cartilaginous, and their colour often pink or rosy, but occasionally of a darker purplish or brownish tint. When large they may be flattened or depressed in the centre; and the edges at places may somewhat overhang the neighbouring skin (1, 27). The surface is usually smooth and shiny, and arborescent blood-vessels may be seen upon them, especially near the borders. After attaining a certain size, in the course of months or years, they may remain stationary for an indefinite period; or become partly or wholly softened, shrunken, and wrinkled, and either disappear entirely, or leave a depressed cicatrix behind.

Keloid in the young (18), and the so-called hypertrophic cicatrix, and that following syphilis, tubercle, and the like, have a greater tendency to spontaneous cure than the older, harder, and more long-standing cases. Those occurring after syphilis are said to be softer, less liable to encroach on the neighbouring skin or to produce spurs, and to be more prone to ulcerate (18).

These growths are often tender, or may even be very painful, with pricking, itchy, and shooting sensations. Their most common situation is over the sternum, although they may form on other parts of the trunk, neck, and head, and indeed on the site of cutaneous lesions on any part of the body; though more rarely on the limbs. Keloid tumours may thus be single or multiple.

They arise in the scars of burns, cuts, and abrasions, earring punctures, after caustics and blisters, flogging (22), leech-bites, tattooing, syphilitic lesions (32, 31, 7, 18), leprosy, furuncle, acne, lupus, scrofulodermia, vaccination, small-pox (12, 14), "prickly-heat" (22), herpes zoster (18), psoriasis (23, 5), morphœa; or indeed after any other affection of the skin which might cause the slightest scar. In a case of pruritus under my care, multiple keloid tumours, some of them large and almost pedunculated, appeared on the legs as a result of the scratching.

Keloid very rarely ulcerates; but, in a remarkable case recorded by W. Anderson, that process set in, and the growth ultimately became malignant; and in one exhibited by myself several large nodules showed extensive ulceration.

Keloids are occasionally so vascular that an erectile character has been observed.

Pathology.—All authors agree that keloid is an acquired, circumscribed, connective tissue, or collagenous neoplasm arising in the corium, and, as a rule, not extending into the subcutaneous tissue or papillary layer. Sections taken from the younger growths exhibit an increased vascularity and a hyperplasia of fibrous elements, fusiform cells, and bundles of fibres—chiefly in the neighbourhood of the vessels (10, 19, 20, 30, 28). In older growths the collagenous hypertrophy may become so extreme that the vessels and other structures are contracted or even atrophied; and the mass comes to be made up almost entirely of dense, white, tendinous, fibrous tissue; the bundles lying mostly parallel to the surface, and to the long axis of the tumour. As the tumour increases in size it may compress and push aside the neighbouring unaltered parts of the corium, and so become imperfectly encapsulated. The surrounding vessels, which may be increased in number, and those of the spurs, are accompanied by round and spindle cells (19, 30, 6, 28); so that the opinion is now prevalent that the growth mainly has its origin in perivascular fibroma.

Kaposi and others have maintained that there are histological differences between the "true" keloid, the "cicatricial" keloid, and the "hypertrophic cicatrix"; that in the first the papillæ and the interpapillary prolongations of the epidermis are unaffected; in the second the papillæ are absent in the centre, but present at the periphery; and in the third the papillæ are quite absent. The arrangement of the fibrous bundles was also said to be looser and more irregular in the two latter, and the epidermis thinner. These distinctions have not been always observed; and it may be pointed out that, supposing the new growth to start in a very minute cicatrix, the subsequent sections of the growth which has extended in the surrounding normal corium would scarcely exhibit the irregularity of formation, absence of papillary layer, and so forth, to be anticipated in keloid growing in a larger scar, after perhaps some considerable loss of substance and imperfect replacement of the original tissues.

Diagnosis.—As a rule there should be but little difficulty in recognising keloid. A raised sclerodermic patch might perhaps be mistaken for it, but there would be no prolongations, and the colour and texture would be different (see "Sclerodermia," p. 674). Cutaneous sarcoma or carcinoma might resemble it superficially; but the more rapid growth of these tumours, their tendency to ulceration, and the general history of the case, should be sufficiently distinctive. Myoma and fibromyoma are also possible simulators, but the softer texture and general appearance, as well as the clinical history, should decide the case.

Causation.—Why some skins, after the slightest injury, should degenerate into keloid is not known. To call it a peculiar idiosyncrasy is not to explain it. Not even a microbe has been as yet demonstrated in these tissues.

Keloid may occur at all ages; one case was congenital (8). Fagge suggested a previous intra-uterine skin lesion; and older infants have been affected, and children of various ages: it is commoner, however, in adult life, though rare in old persons.

The sexes seem to be equally liable to its occurrence.

Climate has no etiological bearing upon it, but race perhaps has; for it is frequently seen in negroes.

Hereditary disposition has been indicated in some cases, and instances are on record of more than one member of a family becoming affected (33, 9, 15, 8).

Treatment.—Excision has been often tried, and very generally without success; for even when the growth has been widely removed recurrence has taken place, and more extensively. An occasional good result has, however, been recorded (Erichsen).

Caustics, and indeed any irritating applications, may also have disastrous effects. The growths were seen, in one case, to shrink under the application of ice (26) and of elastic pressure.

Brock recommends the long-continued application of Vigo's plaster; and endorses the value of Vidal's frequent deep scarifications, not only in permanently relieving the severe pain, but, if continued long enough, in removing the new growth; he also, like Hardaway, claims to have had good results with electrolysis, which he sometimes alternated with scarification.

Internal medication has so far had no effect on keloid; but it may be necessary to give opiates and inject cocaine, etc., for relief of the pain.

Acne keloid (Acne keloidienne, Nackenkeloid, Dermatitis papillaris capillitii).—I may here mention the keloid-like excrescences occasionally observed on the back of the neck, and more rarely on the scalp, which are probably the sequels of a peri-follicular inflammation (Leloir). In an earlier stage the protrudent granulations may have a superficial resemblance to yaws (Sycosis frambœsiformis (Hebra)); but they are not of that nature, nor are they really akin to sycosis or acne. Kaposi calls the affection "Dermatitis papillaris capillitii." According to Brocq they may be treated with a saturated solution of boric acid in alcohol, and by repeated deep scarifications.

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TYLOSIS

SYN.—*Tyloma; Callus; Callosity; Callositas; Durillon; Ichthyosis palmaris and plantaris; Keratoma; Keratodermia.*

Definition.—A hypertrophic condition of the horny layers of the epidermis of parts subjected to prolonged but intermittent pressure, or friction; or due to other local irritation.

The name "tylosis" thus includes all the more or less circumscribed and local epidermic thickenings or keratoses, without papillary hypertrophy, which in certain trades and occupations may appear on the hands, or elsewhere; and on the feet from the pressure of shoes, boots, or sandals, or of standing, or walking; as well as those resulting from prolonged contact with alkalies, acids, or other irritating substances; or again the sequels of certain local, chronic, irritative diseases.

The epidermic thickenings are practically the same in all these cases—tough, hard, horny plates, of a yellowish colour, merge at the edges into the surrounding skin; when removed they appear to the naked eye homogeneous and translucent.

Those which are the result of intermittent pressure and friction are frequently to be seen on the palms of the hands in workmen; and the trade or occupation of the patient can often be determined from the particular situation of the callosity.

Tylosis is usually painless, and may give rise to little inconvenience, unless it be from some dulness of sensation, and from interference with the suppleness of the integument. Deep, painful fissures, however,

may form in the hard unyielding skin, and the underlying and surrounding corium and subcutaneous tissue may sometimes become inflamed. If wide suppuration ensue, deep necrosis may result, and the thickened epidermis may be cast off.

A condition of tylosis of the palms and soles may follow or accompany long-standing eczema, psoriasis, lichen planus or ruber acuminatus, pityriasis rubra pilaris, syphilis, and so on; but in many of such cases the thickening may be more generalised over the plantar and palmar surfaces, and there is more implication of the other elements of the skin. Although in these cases standing in no primary causative relation, pressure and friction will enhance the condition.

Tylosis is sometimes accompanied by hyperidrosis, and, the orifices of the sweat-ducts becoming partially occluded, a sodden condition may ensue. This is not infrequent in the soles of the feet in shop assistants who have much standing.

Pathology.—The chief feature in the pathological anatomy of tylosis is the increase in bulk mainly due to a hypertrophic condition of the horny layers of the epidermis—the cells becoming condensed or "welded" together, and the superficial ones not being shed as in the normal state. According to Unna, the process is a pure "hyperkeratosis"—not an "acanthosis" or hyperplasia of the prickle-cells—with subsequent cornification. Indeed, the Malpighian layer of the epidermis, the papillæ, and other parts of the corium are not primarily affected; they only become involved in an ensuing inflammation. Corns, one or more, often form in the area of a tylosis of the foot.

Treatment.—When troublesome, the hard epidermis can be pared away, after softening with warm water, water dressings or poultices; or treated with certain substances which soften or destroy keratinous tissue. Dilute solutions of caustic potash may be painted on frequently; or acetic acid; or, better still, soft soap in solution or ointment may be kept applied; but the most efficacious means of destroying the hardened epidermis is the application of salicylic acid in 10-20 per cent plasters, or as a collodium paint of similar strength, kept on until the desired effect is produced. In these plasters or paints it is advisable to incorporate cannabis indica, creasote, or carbolic acid to alleviate any pain which may be caused by the application.

The most important indication, however, in the treatment of all cases is the abolition, if possible, of the immediate cause—that is, the friction or intermittent pressure; otherwise the hyperkeratosis will certainly reappear.

When the epidermic thickening is associated with eczema, syphilis, and other diseases, these must, of course, be suitably treated; and, as with the simpler cases, avoidance of pressure and irritation must be enjoined.

OTHER HYPERKERATOSES.—Those hyperkeratoses which are con-

genital, idiopathic, or without any apparent local cause, those which appear after the exhibition of certain drugs, as well as those obviously trophoneurotic cases which may occur in the course of central and peripheral nerve diseases, may be considered apart from the local tyloses. Some of them have been described elsewhere. In this category may be mentioned :—

1. Congenital keratodermia, which is always symmetrical, often hereditary, and accompanied by papillary hypertrophy (Thost).

2. Symmetrical keratodermia of the extremities (Besnier), which begins in early life, and is erythematous.

3. Symmetrical keratodermia of the plantar surfaces, which begins in isolated multiple patches (Besnier).

4. Keratodermia erythematodes ("Erythema keratodes" of Brooke), which has a marked erythematous base.

5. The keratodermiæ of leprosy and other diseases, in which, as perhaps with the foregoing, we may suspect some central or peripheral nerve lesion, and which are therefore essentially trophoneurotic.

Under this category I may also allude to the so-called "perforating ulcer," so often associated with tabes, diabetes, leprosy, and other diseases ; in these also there is a pre-existing callosity.

6. Keratodermia arsenicalis, which may appear on the palms and soles after prolonged exhibition of the drug.

In many of the above, hyperidrosis may be a prominent and early symptom, and other parts of the skin besides the epidermis may be more or less changed.

Clavus

Syn.—*Corn ; Spinæ pedum ; Cor ; Durillon aux pieds ; Œil de perdrix ; Hühnerauge.*

A corn is a localised tylosis occurring in particular situations, where there may be intermittent pressure from without and solid resistance from within.

The hypertrophied and hardened horny layers of the epidermis form a sub-conical mass, slightly raised on the free surface, with its apex pressing upon the papillary portion of the corium, and so causing pain and often inflammation. The central part of the corn is usually the most dense and hardened—the so-called "core" ; and, as long as the conditions obtain, its lower surface is constantly being added to by the formation of new cornified cells. This downward growth may lead to atrophy of the papillary layer, and deeply indent the corium.

The peripheral parts of the corn are less dense, and beneath them the papillæ may be normal or hypertrophied.

They commonly grow on the upper surfaces of the joints of the toes, wherever there is friction or pressure from the boot or shoe ; on

the plantar eminences; on the ball of the big toe, upon which there is most pressure from the leather sole; and on the sides of the toes when these are squeezed together. The last named, except on the outside of the little toe, are the so-called "soft corns," the hypertrophied epidermis being softened to some extent by the natural moisture of the parts; they often show a central harder depression on the surface (œil de perdrix) representing the upper end of the core.

Unna finds that in the "core" the sweat-ducts may be lost; in the rest of the corn they are dilated.

The surrounding skin is often hyperæmic; and hæmorrhages may take place in the corn itself from rupture of the papillary capillaries.

The growth of a corn may be so extensive as to cause atrophy of all the underlying tissues, with inflammation and suppuration in the neighbouring structures.

As might be expected from its formation and situation, when the corn is inflamed the slightest pressure upon it causes great pain, which is occasionally mistaken for that of gout.

When the horny layer is hypertrophied over a bursa, the so-called "bunion" is the result, and the inflamed synovial sac may require more serious surgical treatment.

Corns seem to be peculiarly hygroscopic, and on the approach of rain are apt to become swollen and painful.

Treatment.—By careful scraping and cutting, the hardened epidermis, including the core, can be wholly removed without injury to the surrounding parts, with or without previous softening in warm water; but this requires expert manipulation. The best method of treatment under ordinary circumstances, is first of all to remove all pressure by a large "corn plaster" or isolating ring, and to wear properly fitting boots; and, secondly, to soften and remove the corn by the application of salicylic plasters or paints, as recommended for tylosis. After each renewal, every day or two, of the plaster or paint (which should not extend over the neighbouring skin), as much of the softened and swollen epidermis as possible must be scraped away; and in less than a week the corn should be gone. Short boots, as in growing children, are very apt to produce corns. Soft corns can be cured by soft soap on lint kept between the toes, or salicylic wool maintained in the same position. Boots and shoes with pointed toes are their principal cause.

Cornu Cutaneum

Syn.—*Cornu humanum; Keratiasis; Ichthyiasis cornigera; Ichthyosis cornea.* Fr. *Corne.* Germ. *Hauthorn.*

Definition.—Horny epidermic outgrowths from the skin, arising from a papillary base, and resembling in some measure in structure the "horn" of the rhinoceros.

The occasional occurrence of "horns" growing from the human integument attracted attention in very early times. They are certainly now very uncommon.

In 1791 Everard Home brought the subject before the Royal Society in a paper published in the *Philosophical Transactions* of that year, and he discussed a number of cases which had been recorded before that time. Erasmus Wilson also considered these peaks at length, and later, a Committee of the French Academy of Medicine collected all available information on the subject. More elaborate investigations into their nature were published by Lebert in 1864, who gave references to 109 cases. In more than half the cases hitherto recorded, the horns have developed upon the scalp, forehead, and temples—chiefly in the first situation ; but they may occur on the thighs, legs, penis (chiefly on the glans), and indeed upon any part of the body.

Old persons seem to be more liable to their formation than the young, although there are cases on record in which they have appeared in early youth.

A slight majority of the cases have occurred in women. In shape they are elongated and conical, with an ovoid, roundish, or angular cross-section, or sometimes they are short and stumpy ; the longer ones are usually curved or twisted ; or they may be spiral, like a ram's horn. They have been known to attain a length of 14 or more inches, but as a rule they are much smaller. In one case a large horn with a broad base, 14 inches in circumference, very soon divided into three large branches. Their surface is generally rugose, with transverse ridges and longitudinal striæ; and their colour varies in different shades of gray, yellowish, brown, greenish, or black. The outer layers of the horn may be hard, but are nearly always softer than true horn ; and the central parts may be still less dense in consistence. Although generally tough, they are occasionally brittle and friable.

The surrounding skin may be hypertrophic, with raised margins overlapping the base of the horn ; that is, the latter may seem to be set deeply in a sulcus which surrounds it.

The growth is generally slow and intermittent, although at first it may be somewhat rapid. After attaining a certain size the horn may be broken or fall off ; but in this case it is usually soon reproduced.

In most instances there has been but one horn, but sometimes—ten per cent of the cases, according to Lebert—they are multiple.

When the horns are very numerous the case may easily be mistaken for one of false ichthyosis.

Pathology.—Cornua cutanea were at one time (Home, Astley Cooper) supposed to arise principally from sebaceous and atheromatous cysts, and Lebert and Wilson warmly supported this view ; the probability, however, is that they develop more frequently from warty conditions (Malpighi, 1685, Morgagni, etc.) They may also arise from fibroma, and occasionally after some trauma.

In structure the cutaneous horn is mainly epidermic, but elon-

gated papillæ may extend from the corium far into the base. It has been regarded, indeed, as being virtually an aggregation of acuminated warts.

The hard tissue is chiefly made up of columns of horny cells, the latter being arranged in an imbricated manner (Lebert). According to Unna, cutaneous horns are "papillary and medullated keratomata growing upon a warty base."

Treatment.—The most radical method of treatment is by free excision, or the horn can be cut away or torn off from its papillary base, and the latter freely cauterised with acids or alkalies, nitrate of silver, or chloride of zinc. Thorough destruction or removal of the underlying papillary layer is essential, not only to prevent a recurrence of the growth, but also in view of the possible development of an epithelioma. Many cases have been recorded of cutaneous horns becoming cancerous at their base.

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ATROPHY OF THE SKIN

Atrophia cutis ; Atrophodermia ; Atrophia cutis senilis ; Xerodermia albidum ; Striæ atrophicæ ; Striæ albicantes ; Maculæ atrophicæ.

As the atrophic conditions of the various appendages and of the pigment of the skin have been considered under other headings, my remarks will be confined to those in which, diffusely or locally, the elements of the corium and epidermis are affected rather as a whole.

From this restricted group, moreover, must be excluded the atrophies consecutive to other affections, or symptomatic of them, such as the syphilides, tuberculides, lupus erythematosus, leprosy, sclerodermia and morphœa, lichen planus and ruber, pityriasis rubra, some alopecias, favus, and so on, as well as "Kaposi's disease" (X. pigmentosum), the atrophic skin of facial hemiatrophy, and the "glossy skin" ("liodermia essentialis" (Auspitz), or atrophodermia neuriticum), which may be the result of other neuroses. Cutaneous atrophies on the site of traumatic injuries, ulcers, and cicatricial skin in general, will also be excluded.

The atrophies here to be considered are, therefore, primary and idio-

pathic, or are, at any rate, not directly connected with other diseases or injuries of the skin.

They may be either generalised over the whole body or restricted to particular parts.

The following varieties may be briefly mentioned :—

I. **Senile atrophy of the skin** is the result of the same disturbances of metabolic processes, and altered relations of waste and repair, which are characteristic, more or less, of all the tissues of the body in old age. The skin becomes thinned, wrinkled, loose, and dry ; yellowish or more darkly pigmented, and especially prone to degenerative deposits, sebaceous warts, fibromatous and epitheliomatous growths, and the like ; subjective sensations, especially cold and pruritus, are frequently present also.

All the elements of the skin may be simply atrophic, and equally affected, or some more than others ; or degenerative granular, fatty, colloid, hyaloid, or other changes may be confined to one or more of its parts. According to Neumann, the fibrous tissue of the senile skin may undergo a coarsely granular, a finely granular, or a vitreous degeneration, as well as general atrophy or shrinking, with more or less atrophy or degeneration of the epithelial, nervous and muscular elements, and flattening of the papillæ. The hair follicles are shortened, the sebaceous glands dilated, and the capillaries enlarged. Pigment is irregularly accumulated in the thinned epidermis. M. B. Schmidt and Reizenstein considered that the main degeneration is in the elastic fibres ; and Unna that there is a considerable collagenous as well as elastic change, substances which he calls "collacin" and "elacin" being formed. The last-named observer found no degeneration of the muscles.

II. (*a*) A case of **congenital atrophy of the skin** has been described by Behrend in an infant. The skin was affected generally, except on the buttocks. There was at the same time hypertrophy of the nails.

(*b*) In a case, recorded by Hardaway, of "general idiopathic atrophy of the skin" in a blind man, the condition was said to have been present from infancy. The man's sister was similarly affected.

(*c*) A congenital condition of the skin, in its thinness and looseness resembling that of old age, has been described by Charcot under the name of "géromorphism cutanée." The forearms were symmetrically affected.

III. In **atrophodermia albida**, which Kaposi considers to be the second variety of his "xeroderma," the cutaneous atrophy also appears to be congenital, or to date from the earliest childhood. It affects the legs, and more rarely the forearms, and remains stationary. The skin is unusually white, with the epidermis thinned, wrinkled, and glistening ; the palms, soles, and tips of the fingers, on account of the insufficient epidermic protection, are painful. Kaposi considers that the thinness of the skin distinguishes it from ichthyosis, and its congenital character from atrophic sclerodermia.

IV. Cases of "**idiopathic, diffuse, progressive atrophy**" of the skin

have been described by Buchwald, Touton, Pospelow, Bronson, Elliot, Groen, and others. The type is so definite that Bronson has proposed for it the name of "Buchwald's atrophy," after the observer who first described it.

Areas of skin, particularly on the legs, thighs, and buttocks, and also less frequently on the arms, become very much thinned, dry, and inelastic, with the blood-vessels showing through. The affection, which may spread diffusely to the trunk, has been observed in adults of both sexes, more often after middle age, and in marasmic subjects. In Elliot's case the advancing atrophy was preceded by a cyanotic zone.

Microscopic examination has shown atrophy of fatty tissue, papillæ, follicles, and glands, as well as of the muscular and fibrous elements, and the epidermis.

V. An atrophic condition of the skin of the female genital organs has been described by Breisky, Janowsky, and Ohmann du Mesnil, under the name **Kraurosis**. Extreme pruritus is the prominent symptom.

VI. **Circumscribed idiopathic atrophy** may be seen as ovoid or roundish, scar-like patches (*Maculæ atrophicæ*), one or more cm. in diameter, of a whitish and glistening appearance; or as striæ or linear markings of varying lengths (*Striæ atrophicæ*).

(*a*) Although these markings seem to appear spontaneously, it is probable that they are caused mechanically by the over-stretching of the integument by the rapid growth of underlying parts; hence they are especially frequent over the pelvic regions of the body, where, in consequence of the special direction of the pelvic growth, the lines are mostly oblique, or inclined to the perpendicular in women and horizontal in men. In some cases, however, the lines have appeared, during convalescence from fevers and the like, without apparent growth or distension of subjacent structures (Plagge, Wilks, Bradshaw, Shepherd, Barrs, Duckworth).

Purplish discolorations are often the first change observed, and, according to some authors, these are due rather to thinning of the integuments, which renders the cutaneous vessels more visible, than to an erythematous or inflammatory condition.

(*b*) The white marks sometimes seen on the skin in cases of rapidly increasing obesity or ascites are of a similar nature; as are the *liniæ albicantes* over the sides of the abdomen, which appear in many pregnant women, and on the over-distended mammæ during suckling; these lesions being the result of stretching of the skin.

The chief anatomical changes in atrophic striæ take place in the corium, where the fibrous bundles become rarefied and arranged in the direction of the tension, with rupture of the elastic fibres (Troisier and Ménétrier), which are therefore more or less deficient within, and accumulated without the striæ. The papillæ are flattened out and the epidermis thinned. Unna has also found that those elastic fibres which have resisted the tension are either converted into inelastic "elacin," or broken up into very fine fibrillæ.

(*c*) The "liniæ atrophicæ traumaticæ"—following injuries from without, as pointed out by Erasmus Wilson, on the forehead of certain patients—may here be alluded to; and, as with the cases of cutaneous atrophy following external injuries, recorded by G. H. Fox and Klotz, it is seen that the atrophy may spread beyond the region of the injury—a result indicating here a probable trophoneurotic origin.

VII. Several cases of **multiple atrophic spots** have come under notice since Erasmus Wilson's original paper in 1868.

(*a*) In one case, now under my care, of "atrophodermia guttata"—in a woman of about 30—depressed scar-like spots, 2-3 mm. in diameter, apparently beginning as telangiectatic maculæ, are thickly scattered over the neck and shoulders; among them are (*α*) slightly raised, larger indurated spots, which I take to be the intermediate; and (*β*) vascular maculæ, which are probably the first stage of the process. (*b*) Jadassohn's case of *Atrophia maculosa cutis* or *Anetodermia erythematodes*, in which the symmetrically arranged atrophic spots, chiefly limited to the extensor surfaces of the upper extremities, were preceded by a papulo-erythematous condition, is analogous to the above; and here also must be mentioned (*c*) the *Partial idiopathic cutaneous atrophy* of Vidal and Leloir, with whitish, yellowish, or brownish spots from 2 to 6 c.m. in diameter—the skin being thinned and flaccid. Marked diminution of the elastic fibres was the principal anatomical feature in Jadassohn's case. (*d*) A case of multiple atrophic patches, symmetrically limited to the dorsal surfaces of the hands and feet in a young girl, has been described by Zinsser.

VIII. In Schwenniger's and Buzzi's case of so-called **multiple benign tumours** there really appeared to be atrophy of the elastic elements of the skin in circumscribed spots.

IX. The so-called **cutis laxa** or **cutis hyperelastica** (Unna) also is sometimes included among the atrophies of the skin. Here there seems to be a degenerative atrophy of the white fibrous or collagenous tissue, which may become myxomatous (Ohmann du Mesnil), thus enabling the elasticity of the skin to come more into play; or the white fibres may become looser, and much split up, with the elastic fibres and vessels elongated and winding; there is always extreme looseness of the subcutaneous tissue. The general result is that the integument can be extensively stretched and pulled out like india-rubber.

X. A congenital deficiency or arrest of development of portions of the integument has occasionally come under notice, and to this the name of **adesmosis** has been given by Auspitz.

DIAGNOSIS.—After what has been stated little need here be said upon this topic. Idiopathic cutaneous atrophies are apt to be mistaken particularly, for (*α*) morphœa and atrophic sclerodermia; (*β*) xerodermia, and the slighter forms of ichthyosis; (*γ*) the atrophic stage of lichen planus and other diseases; and (*δ*) cicatricial conditions after traumatic and other lesions.

TREATMENT.—In most cases of cutaneous atrophy therapeutical

measures are naturally of little avail. Attempts to improve the nutrition of the skin may, however, be made by means of local massage and electrical stimulation, as well as by general treatment with arsenic and other nerve tonics.

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P. S. A.

AFFECTIONS OF THE PIGMENTARY SYSTEM

Ephelis

(A Hippocratic name; probably derived from ἥλιος, the sun.)

Syn.—*Freckles; Ephelides; Lentigo.*

Definition.—Multiple, circumscribed, small pigmentary macules usually situated upon portions of the skin exposed to sunlight.

Symptoms.—Freckles as a rule appear in the seventh or eighth year of life, but seldom become marked till the second decade. Children with fair skins, delicate complexions, and especially with red hair, are specially prone to them; but they are occasionally seen in mulattoes, or even in negroes. They occur chiefly upon the face, especially on the root of the nose, the forehead and cheeks, and on the neck, backs of the hands and forearms; not infrequently they appear also on parts of the body not exposed to direct sunlight ("cold freckles"). To such cases some authors, especially of the French school (Rayer, Bazin, Hardy, Thibierge), unnecessarily suggest the restriction of the name *lentigo;* unless, indeed, Unna's (5) view be correct that "cold freckles" are really small pigmentary nævi: the back, buttocks and genital regions are, perhaps, the parts most frequently thus affected. In colour, freckles usually vary from a pale buff to a deepish brown, but sometimes are of greenish tint. They may often be discerned as originating round the orifices of ducts (Jamieson). They range in size from a pin's head to a lentil, and in outline may be either roundish or irregular; they may be sparse or very abundant, sometimes even confluent, so as to form considerable pigmented patches.

Freckles usually appear for the first time with extraordinary rapidity in summer, and totally—or more frequently partially—disappear in winter, to reappear in succeeding summers. Cases have been described as unilateral in distribution (Robinson of New York). As a rule persons liable to freckling do not bronze, or become generally deeply pigmented after exposure to strong sun or sea-winds. No subjective symptoms are caused by freckles, but the amount of disfigurement which

they produce frequently prompts those who suffer from them to apply for relief. After middle life the condition tends to diminish, and on the attainment of old age to disappear entirely. Dr. Crocker, however, states that lentigo forms part of the skin-atrophy of old age, and that it occurs on covered parts after eczema in senile persons.

Pathology and morbid anatomy. — Cohn's researches show that a freckle is merely an increase of true melanin in a circumscribed portion of the basal layer of cells of the rete Malpighii, with a few pigment granules in the papillary layer. The cutis and the vessels are normal.

Causes.—From the etiological standpoint freckles may be considered as *actinic melanoses*,—a pigment disorder due to the influence of the chemically active rays of the sun. The heat rays, as for other allied conditions (for example sunburn), probably play no part in their production; nor is "inflammation" a factor in their causation. There seems little or no reason to invoke the participation of moisture, fogs, and the like, as was done by the older writers. Both sexes are equally liable to the affection, and it is impossible to avoid the conclusion that there must be a personal as well as a family susceptibility to irritation by the actinic rays of sunlight. Unna's views of the nature of "cold freckles" have already been stated; if supported by further investigation they would certainly tend to enlighten us on this subject. The occurrence of freckle-like pigmented spots in some cases of rheumatoid arthritis is described under this head (vol. iii. p. 88).

Differential diagnosis.—Freckle-like lesions appearing in the first or second year of life are almost always the precursors of the grave disorder termed xerodermia pigmentosa (*q.v.*) The accompanying inflammatory changes and subsequent roughness (xerodermia) with atrophy and wart-like malignant growths, as a rule, enable a differential diagnosis to be easily established. A considerable number of cases have, however, been published, by Jamieson, Hutchinson, and others, which appear to form a clinical connecting link between simple freckles and the graver disease. I am inclined to classify Crocker's lentigines of old persons with the senile form of X. pigmentosum described more particularly by Falcao of Lisbon. The seat and discrete distribution of ephelides distinguish them from the diffuse pigmentary disorders described under the title of Chloasma (*q.v.*)

Prognosis.—Freckles spontaneously diminish, or disappear in winter and after middle life.

Treatment.—This is practically identical with the treatment of chloasma—to which reference may be made (p. 704). In some cases good results may be obtained—at least temporarily—by touching each freckle with pure carbolic acid; in others electrolysis, employed in the same manner as for the destruction of superfluous hairs, has been recommended.

Wearing a red or light brown veil is a useful prophylactic measure; and ointments containing peroxide of hydrogen and oxychloride of

bismuth, with lanolin and vaselin, have been advocated (Unna), and are worthy of further trial.

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Chloasma

(χλοάζειν; to be pale green.)

Syn.—*Melasma; Melanodermia; Liver-spot.*

Definition.—Single or multiple, yellow or brownish pigmentary patches on the skin, larger than those described as ephelides, and not attributable to the effects of sunlight.

This definition is intended also to include diffuse forms of pigmentation, dependent upon constitutional causes, which are sometimes described under the name of Melasma.

Symptoms.—Patches of *idiopathic chloasma* are usually situated on the face and neck, where they are frequently symmetrical, with well-defined margins; but they may be present on any part of the body, and the colour may merge gradually into that of the surrounding skin. The condition is rare, and nothing is known of its etiology, except that it is often congenital and hereditary. The pathological condition consists merely of a great increase in amount of the normal skin pigment in the rete Malpighii over the affected area. Patches of stained skin may be due to various local irritants, and it appears convenient to consider such a condition here. The so-called *Chloasma traumaticum* includes such as the discolorations produced by pressure and friction (for example, of trusses or bandages); or by local irritants, such as blisters, sinapisms, or tincture of iodine. It is of practical importance to remember that in a certain small proportion of cases the pigmentary patches thus produced may be permanent; while in others, as in a case recorded by Dubreuilh of Bordeaux, the pigmentation may extend widely beyond its original distribution.

The vagabond's disease, or *Morbus erronum* of Greenhow, is simply an extensive pigmentation of the skin due to the combined effects of pediculosis, scratching and exposure. In a few rare cases (Thibierge) the mucous membranes are said to have been affected. The disease probably corresponds to the pityriasis nigra of Willan. The grave disorder described as Acanthosis nigricans (*q.v.*) begins as patches of deep pigmentation, usually accompanied by warty growths; and patches of deep pig-

mentation, especially in old people, are often the precursors, or the first stage, of various forms of malignant disease of the skin.

Chloasma caloricum is generally due to prolonged exposure to extreme heat. The face and neck, chest, hands, and forearms are consequently the parts most frequently affected. Crocker (1) and Carrington report similar cases from exposure to great cold.

Chloasma uterinum is generally observed in women who have been frequently pregnant, but is not infrequently seen in sterile women in association with various uterine, ovarian, or other pelvic diseases or disorders. The pigmentation is most conspicuous on the face, especially on the forehead and in the temporal regions, whence it spreads over the cheeks. It is also present over the nipples and central line of the abdomen. The women severely affected are frequently of dark complexion, and the amount of disfigurement produced is often very distressing. In exceptional cases the colour may be quite "bronze," while in others the appearance is that of severe freckling. After parturition the pigmentation usually diminishes, but only to recur with each succeeding pregnancy. The chloasma of sterile women often undergoes marked monthly or seasonal exacerbations. Both forms of uterine chloasma usually disappear or diminish after the menopause.

Kaposi, quoted by Crocker, reports the curious case of a lady with a large pigmented mole on the neck, which became quite black at each pregnancy; and this was always the first manifestation of her condition.

The name *Symptomatic chloasma* connotes various conditions in which the pigmentary changes are the result of antecedent skin eruptions, or indicative of concomitant cachexial conditions. The pigmentation following multiform erythema, its congener purpura, or any other form of hæmorrhage into the skin, is seldom of long duration. That which results from lichen planus (which is sometimes almost black), various syphilides, and urticaria pigmentosa is, on the contrary, generally of extreme persistence, and is often of great value as a diagnostic point; but it must be borne in mind that psoriasis, especially when treated by arsenic, or any old-standing eruption below the knee, especially in persons with varicose veins, may become deeply pigmented. My own experience is that the importance of pigmented scars as diagnostic of old syphilis is greatly over-estimated.

With leprosy, sclerodermia, fibroma, and senile atrophy of the skin, patches of chloasma generally coexist. The "dappled," purely pigmentary syphilide, which is a common early syphilitic manifestation seldom as it may be recognised, appears almost invariably in women, and is confined to the neck; it ought to be distinguished carefully from pigmentary patches following inflammatory specific manifestations. It is curiously persistent; indeed, there is some doubt whether mercury has any effect upon it or not.

Deep pigmentation of the skin, assuming various tints from a mere sallow, earthy discoloration to a deep brown hue, is present in Addison's disease, in regions of the body normally most pigmented (armpits,

navel, buttocks, genital regions and flexures of larger joints); and it often invades the mucous membrane of the mouth also; in Graves' disease it may be either general, patchy, or freckle-like; and it is seen in rheumatoid arthritis (Spender, vol. iii. p. 88) and in abdominal tuberculosis, as well as in various diseases of the liver and stomach.

Dr. Radcliffe Crocker (2) records a case, apparently the result of severe constipation, independent of uterine disorder; and the dependence of seborrhœa nigricans upon this condition is fairly well established. Probably the acme of general or extensive hyper-pigmentation of the skin is reached in persons suffering from old-standing malaria, especially from that form known as the Black disease of Assam (Clark). Diffuse "dirty-looking" pigmentation, with deep black stigmata, often results from the long-continued medicinal use of arsenic; and mention only need here be made of the dark yellow-brown or even greenish tint characteristic of jaundice, of the deep bluish discoloration resulting from prolonged ingestion of nitrate of silver, and of the introduction of pigments into the skin by the practice of tattooing.

Causes and Pathology.—From what precedes it will be obvious that numerous and widely divergent pathological conditions underlie the various forms of hyper-pigmentation of the skin comprehended under the term chloasma. And, in view of our extremely scanty knowledge, even of the normal pigmentation of the skin, no exhaustive attempt to discriminate between them on etiological grounds could profitably be attempted here.

The following statements, modified from a classification by Kromayer, may, however, be made without transcending the limits of our positive knowledge.

Excessive pigmentation of the skin may result from—(i.) hæmorrhage into the skin or subcutaneous tissues, as for example in erythemas, various "purpuras," ecchymoses, etc. Here the derivation of the pigment from the colouring matter of the blood is obvious.

(ii.) As the result of inflammatory changes with transudation, produced by chemical or other irritants (blisters, sunburn, Röntgen rays, pruriginous affections).

(iii.) As the result of other inflammatory affections of the skin which may be called "idiopathic," to indicate that we are totally in the dark as to their etiology (lichen planus, pemphigus, psoriasis, "eczema" especially in dependent positions). In this group the derivation of the pigment from that of the blood is fairly manifest.

(iv.) As a pure hyper-pigmentation, unaccompanied by inflammatory changes but evidencing diseases of other organs (syphilis, Addison's disease, Graves' disease, leprosy, malaria). By many writers this form of hyper-pigmentation is considered as "reflex"; but no argument worthy of the name can be adduced in favour of this view, unless it be its occurrence in connection with pregnancy and sexual disorders of women. By other writers this form of pigmentation is regarded as "toxic." In this class of case the pigment is true melanin; that is, it gives none of the

chemical reactions of the iron salts, and its mode of derivation from the blood pigment is obscure.

(v.) As the first stage in various malignant skin diseases; for example, xerodermia pigmentosa, acanthosis nigricans, pigmentary sarcoma and carcinoma. The occurrence of senile xerodermia pigmentosa (Falcao) from freckles of life-long duration, and of malignant disease from congenital pigmentary moles, is significant of a closer connection between the various members of the group than is at first apparent. Here again the pigment is true melanin.

Differential diagnosis.—The seat of the colouring substance in the skin distinguishes chloasma from pigments or pigmentations on its surface. Colouring matters applied—not very infrequently—by hysterical or designing women to simulate disease, or to excite sympathy, can always be washed off with soap and water, or a weak solution of hypochlorite of soda. The discoloration resulting from chromidrosis (or seborrhœa nigricans) can be removed with ether or spirits of chloroform. Tinea versicolor and erythrasma produce brown but scaly patches, and the microscopic examination of scrapings reveals at once their characteristic fungi (see article on "Parasitic Diseases").

Prognosis.—Occasionally the pigmentation of symptomatic chloasma disappears after removal of its cause. As a general rule, however, the treatment of all chloasmata is unsatisfactory, and has, at best, but a temporary success.

Treatment.—Constitutional treatment depends upon the underlying cause, and need not be further discussed here.

The object of *local* treatment must be, of course, the destruction and removal of the epidermic layers of the skin, in the deepest of which the greater part of the pigment lies. Unfortunately, however, most—if not all—agents capable of effecting these objects are chemical or mechanical irritants, such as blistering or scrapings, which tend either, by causing congestion, to produce an increase of pigmentation after a time, or, by causing deep destruction of tissue, to result in indelible scarring.

Advice is generally sought for freckles as well as for the chloasmic patches on the face. The treatment of the former I have described on p. 700.

In larger pigmentary patches the treatment is less satisfactory. The following are the procedures most generally employed:—

(i.) Corrosive sublimate in almond emulsion applied several times daily, beginning with a solution not stronger than 2 grains to the ounce, and cautiously increased according to the tolerance of the patient's skin.

(ii.) A one per cent solution of corrosive sublimate in water or spirit, applied on lint carefully cut out to the size of the patch, and maintained in position for several hours, which produces vesication; the epidermis is then removed and the subjacent surface dusted with some antiseptic powder. This method of treatment, advocated by the elder Hebra, requires very careful watching.

(iii.) The following substances, similarly applied, have all been recom-

mended: acetic, boric, carbolic, citric, and hydrochloric acids; tincture of iodine; caustic alkalies. Of these carbolic acid is, in my experience, the most manageable and successful.

(iv.) Salicylic acid, either in plaster, plaster-muslin, or paste form, applied for twenty-fours at a time, or as a saturated solution in alcohol applied repeatedly for several hours, is certainly one of the safest and most efficacious remedies for extensive patches.

(v.) Resorcin pastes (gr. xx. cautiously increased to ℥j. ad ℥j.) are excellent, if temporary, remedies. They are Unna's familiar "scaling pastes." Plaster-muslins containing the same drug may be used for circumscribed patches.

(vi.) An admirable formula, which we owe to Unna, is as follows: —℞ Bismuthi oxychloridi, ℥j.; hydrargyri subchloridi, gr. $\frac{1}{6}$; hydrargyri peroxidi (10 vol. solution), ℥j.; adipis lanæ, vaselini, āā ℥iv.

It may be applied at night, or continuously, until the effect desired is produced.

TATTOOING.—The practice of tattooing is largely carried out in all countries, even among the highest classes, and in persons of intelligence. The designs are usually coats of arms, allegorical figures, initials or names of beloved persons; and are sometimes of extraordinary complexity, if not of much artistic beauty. The "art" is especially cultivated in Japan, but is practised in wonderful perfection in this country also. It is unnecessary to describe the operation, which consists in introducing into the skin different forms of carbon (Indian ink), vermilion, and indigo, by means of various and even complicated instruments. No permanent yellow or green pigments have yet been discovered.

The practice is not unattended by danger. Thelwall Thomas records three very interesting cases of tattoo syphilis, the skin having been moistened, previously to the insertion of the needles, by the saliva of the operator. Warts and lichen planus may also arise from tattoo marks, as from any other areas of defective skin.

Treatment.—No completely successful method of removing tattoo marks, short of excising them, has been discovered. A method, sometimes partially successful, consists in pouring a concentrated solution of tannin over the mark, re-tattooing with a bunch of needles, and then rubbing in nitrate of silver. Inflammation is thus set up, and after the separation of the scab a very superficial scar is left.

Many tattoo marks can be excised without leaving disfiguring scars; and in a certain number of cases the application of Thiersch grafts may be advantageous: the results thus obtained are excellent.

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Leucodermia

(λευκός, white; and δέρμα, the skin.)

Syn.—*Vitiligo; Acquired achroma; Piebald skin; White leprosy.*

Definition.—An acquired disease of the skin, characterised by the appearance of white patches with convex outlines extending at the periphery, surrounded usually by hyper-pigmented skin, and generally symmetrical in distribution.

Frequency.—This varies widely in different countries. Dr. Crocker gives it as about 1·5 per 1000 in this country. In the last statistical report of the American Dermatological Association it is returned as only 1 per 1000, despite the large negro population of the United States. Crocker quotes Garden's statistics in India as being 1 in 36; Erasmus Wilson's in London as 1 in 400; M'Call Anderson's in Glasgow as 1 in 2500. Such statements are widely open to criticism. The affection is notoriously commoner in tropical than in temperate climates.

Symptoms.—In many, possibly in all cases (Crocker), an increased deposition of pigment precedes the appearance of the white patches. These are milky white in colour, roundish or oval, or irregularly outlined; they gradually extend at the periphery, their margin being convex outwards. The line of demarcation between the patches and the surrounding skin is abrupt, and is accentuated by the increased pigmentation of the latter, which gradually shades off into the natural colour of the skin. By coalescence of adjacent patches extensive and variously figured depigmented areas may be formed; but the spreading margin is always convex, or festooned if several patches become confluent. The hair over the affected areas becomes white. Patches, which are often strikingly symmetrical, may appear on any part of the body, including the scalp; and spreading slowly, it may be for years, may ultimately involve the larger part of the skin. In such cases the diseased may be mistaken for the healthy integument.

The condition is often more striking in summer, owing to the increased pigmentation of the normal skin; but some writers deny this, or even assert that the contrary is the case. It progresses irregularly, sometimes with periods of temporary arrest. When it is complete on any given part (for example, face or hands) it gives rise to but little disfigurement. Tactile, thermic, and pain sensibility over the parts are unimpaired. It is not, as a rule, accompanied by subjective symptoms, but I have seen a considerable number of cases in which itching was troublesome. In some instances pruriginous sensations precede the appearance of the leucodermic spots.

I have also seen cases of very rapidly extending leucodermia in persons suffering from severe syphilis, which have convinced me that the

syphilitic virus may cause loss, as well as increase, of pigmentation. However, so-called syphilitic "leucodermia" is usually a melanodermia.

Causes.—Both sexes are equally affected. It is rare before ten or after forty years of age, but Dr. Crocker has seen a case in a girl aged four years. In a few rare instances it "runs in families." Exposure to the sun is held by many writers to be responsible for it in some cases, and thus to account for its frequency in negroes. On the other hand, it may result from exposure to extreme cold. Its start from a pigmented mole, from minute scars, or even from sites of pressure (for example, of studs) has often been observed. General depressing conditions, such as acute febrile diseases, not infrequently precede the appearance of leucodermia. My own experience coincides with Crocker's, that it generally occurs in neurotic persons; and, as with locks of gray or white hair, its association with megrim, retinitis pigmentosa, morphœa, alopecia areata and Graves' disease, bears out the opinion that it is of nervous origin—a "trophoneurosis."

Prognosis.—Leucodermia is usually indefinitely progressive, but it may become arrested spontaneously. Reported cases of "cure" are almost certainly examples of complete extension of the disease.

Pathology.—The opinion generally held concerning the origin of the normal pigment of the epidermis is that it is not formed there, but in the cutis, whence it is conveyed to the Malpighian layer.

Unna thinks that the pigment is carried outwards by the lymph-stream, and reaches the interior of the cells along the channels by which the intracellular nerve filaments, described by him, are distributed. The doctrine most generally held is that of Ehrmann, who attributes the transference of pigment to certain migratory cells, probably of epithelial origin, which are supposed to be analogous to the chromatophores of the amphibia. Ehrmann believes that he has demonstrated that these cells are absent when pigmentation ceases to take place. Many careful observers have failed to find any evidences of these so-called chromatophores in the skin. According to the cellulagenous hypothesis of the formation of pigment, melanin is elaborated in the epithelial cells themselves, either from the nucleus, or from the protoplasm, or from the colouring matter of the blood. Karg has demonstrated that a portion of white skin grafted on an ulcer in a negro very soon becomes quite black; and a portion of negro's skin grafted on a white man very soon loses its colour.

Hypothetically, then, leucodermia may result from (i.) destruction of the pigment in and by the epithelium (Aeby and Karg); (ii.) absence of chromatophore cells (Ehrmann); (iii.) backward transport from the epithelium (Riehl and Jarisch).

Differential diagnosis.—This can seldom be a matter of any difficulty, if the symmetry of the disease, its convex outer border, and progressive extension are noted, as well as the otherwise absolutely normal condition of the skin. In the tropics it may be mistaken for the pale areas which occur in nerve leprosy, but over these there is always more or less

anæsthesia; thickening of nerves and other symptoms of leprosy would probably also be present. The margin, convex outwards, will distinguish leucodermia from chloasma. Not infrequently, however, the resemblance to morphœa may be considerable, especially when the latter is in its latest stage, and is superficial. In morphœa the consistence of the skin is appreciably altered, being somewhat pergameneous; or, if atrophic, it is finely wrinkled, and characteristic patches in a less advanced condition can usually be discovered.

Treatment is utterly unsatisfactory. Tonics and nourishing food may be recommended on general grounds.

Locally, various irritant applications may be used, perhaps chrysarobin is the best; or the patches may be stained with walnut juice. Bulkley claims good results from centripetal galvanic currents. The surrounding over-pigmented parts may sometimes be depigmented by the measures recommended for chloasma, with temporary benefit.

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Albinism

Syn.—*Congenital leucodermia; Achroma.*

Symptoms.—The sole feature of this condition is the congenital absence of pigment, which may be complete or partial. In complete albinism pigment is not only absent from the skin, but also from the hair, iris, and choroid; its subjects are called albinoes. The skin appears white, or pinkish, in the parts where the vessels show through. The hair is soft, silky, and quite white, or it may have a yellowish tinge; in one case (Folker's) it is said to have been "red." The irides appear pink and the pupils red, the choroidal vessels not being obscured by normal pigment. For the same reason the retina is unprotected, and there is consequent photophobia. Nystagmus, nyctalopia, and nictitation also are always present. Albinoes are seldom of robust constitution, and many become tuberculous; they are often, too, of low mental calibre, but to this rule there are many striking exceptions.

Albinism in mankind is certainly commoner in coloured than in white races; it is of frequent occurrence in the lower animals (ravens, rats, ferrets); many animals physiologically become white in winter.

Partial albinism is a much commoner condition. It is more frequent and, of course, more noticeable in negroes than in "white" people. The patches are often roughly circular in outline, and well defined; they may be symmetrical. They are commonest on the scalp, breasts, face, and

genital regions. They do not usually increase with age. They are the antithesis of the flat pigmented moles, and may, like them, be distributed in nerve areas (Crocker). The hairs over the affected region are white.

Causes.—In exceptional cases albinism is hereditary, but most albinoes are born of healthy parents. Several albinoes often occur, however, in one family. It is certain that the progeny of a healthy person and an albino is generally normally pigmented; but probably the offspring of two albinoes is an albino. The condition is said in all text-books to be endemic in some tropical countries (Lower Guinea, Loango), but no very convincing evidence on the point is forthcoming. Of the ultimate causation of albinism we know nothing.

Treatment is unavailing.

J. J. PRINGLE.

CUTANEOUS HÆMORRHAGES

PURPURA. PETECHIÆ. See vol. v. pp. 575, 585.

CONDITIONS OF NECROSIS

GANGRENE OF THE SKIN

Sphacelodermia

Gangrene of the skin is due to many causes, and is dealt with under different headings in works devoted to general medicine and surgery; but there are certain conditions under which it appears which are more conveniently considered from the point of view of cutaneous medicine. The causes of gangrene may be classified for our purpose as follows:—

Classification of Causes of Gangrene of the Skin

1. Traumatism; arising from mechanical violence, chemical action, heat, cold; as in injuries accidentally or self-inflicted.
2. Virulent bacterial invasion of the skin; as in dermatitis gangrænosa infantum, noma, etc.
3. Changes in the composition and quality of the blood; as in diabetes, and in certain conditions associated with purpura.
4. Alterations in the means of blood-supply to the skin:—(*a*) Pressure on vessels from the exterior, as by tumours, exudations, and the like. (*b*) Diminution in calibre of vessels owing to changes in the muscular coat; chronic contraction as in ergotism; temporary spasm, as in Raynaud's disease, etc. (*c*) Diminution in calibre of vessels owing to changes in the internal coat, as in the endarteritis obliterans of syphilis, the results of atheroma producing senile gangrene, etc. (*d*) Obstruction of the lumen as in thrombosis, and embolism.
5. Disease or injury of the central or peripheral nervous system, as in syringomyelia, leprosy, etc.

It is not proposed to consider this table in detail, but simply to remark on certain examples of these groups.

Erythema gangrænosum.—This condition is one which, under different names, has given rise to considerable discussion from time to time. Usually the course of events is that irregular patches of erythema appear on the skin, which in a short time become gangrenous, and give rise to

round or "punched out" ulcers, and finally heal, usually after a considerable time, leaving rounded scars conforming to the shape of the ulcer. The cases of this affection have nearly always occurred in women displaying evident neurotic or hysterical stigmata; the affection occurs usually on the extremities, or on readily accessible parts of the body, and the evidence is overwhelmingly in favour of the conclusion that the lesions are self-inflicted. That this condition has been caused for purposes of malingering, or for exciting sympathy, or for "hysterical" reasons, has been definitely proved in scores of cases. Occasionally, however, cases occur which are difficult of explanation in this way. A recent example is one described by Dr. Max Joseph, in a man in whose case no neurotic symptoms were ascertained. This person ultimately showed twelve scars on the left arm and six on the right. Joseph thinks that artificial means of producing the eruption were excluded in this case, and that the lesions were produced by neuropathic disturbances of unknown origin. This case is cited in order to illustrate the difficulty, even for skilled observers, of ascertaining how such injuries are produced; for there can be little doubt that the injuries in Joseph's case were self-inflicted. There remains a small residuum of such cases in which central nerve changes have seemed to be the cause of peripheral gangrene; and it must be recollected that in certain cases of syringomyelia, as well as in other varieties of lesion of the spinal cord, peripheral gangrene occurs not uncommonly as a symptom. But in them, as in the painless whitlow of Morvan's type of syringomyelia, septic inoculation on tissues suffering from low nutrition has probably more to do with the gangrene than the actual loss of nerve influence. This type of gangrene is very different from the gangrene in rounded areas occurring on the skin of the forearms, legs, and trunk, which is so characteristic of the type of lesion known as erythema gangrænosum.

It must be concluded that any patient, male or female, showing this peculiar form of skin affection should be strongly suspected of producing the disease by artificial means, and that, unless it be in certain cases of grave disease of the central nervous system, gangrene of the skin anything like this is practically unknown.

Bedsore.—This name is applied to a form of gangrene, the result of injury by intermittent or constant pressure on skin which is usually in a condition of feeble nutrition, the result of acute or chronic disease. In healthy persons, if pressure be maintained on an area of skin for a sufficient length of time, the cells deprived of blood-supply will degenerate. When the blood returns to the part it is no longer properly retained within the blood-vessels; these are first distended, producing a dark erythematous flush on the surface; and if the process have gone to a sufficient extent, the blood itself escapes from the blood-vessels, infiltrating the surrounding tissues, at first with serum and finally with blood-cells. Necrosis of an area affected in this way must necessarily result. In cases still more severe the blood never returns to the part pressed upon, which remains anæmic, and finally separates as a grayish or brownish dry

slough, leaving an ulcer of variable depth and extent. In both cases the process of mechanical necrosis from pressure is complicated by the invasion of bacteria and extension of ulceration, and suppuration is likely to result. Pressure of this character results from lying in the same position for a sufficient length of time; the weight of the body or extremities, the pressure from splints, bandages, or other applications, or even the weight of bed-covering, is also sufficient to produce this result.

The parts commonly the seat of the lesion are therefore those most likely to be exposed to pressure, such as the regions of the upper part of the sacrum, of the lower vertebræ and trochanters, the skin over the malleoli, the heels, the front of the knees, and other bony prominences. The destruction of the tissues may be most extensive, so that the muscles and tendons may slough, and the underlying bone may be exposed. The bone itself may show necrotic changes and be partially destroyed. If septic changes in such an area become severe, "spreading gangrene," septicæmia, and pyæmia are natural consequences. Fortunately in the present day the bedsore has become almost unknown, at any rate to the student; and thus its perils are sometimes not appreciated. But it must be recollected that not long ago it was quite a common thing to see a patient with ordinary fractures of the leg or thigh presenting bedsore; that it was considered almost impossible to prevent "sores" in a case of prolonged illness; and that if the illness were due to disease or injury of the spinal cord with incontinence of urine or fæces, the appearance of bedsores was regarded as a matter of course.

The comparative infrequency of bedsores at the present day is due to the appreciation of the factors which produced them, and the care taken by the nurse to avoid the causes. A good nurse knows that the appearance of a bedsore is discreditable to her skill and care; she regards it as such even in the most difficult cases of spinal disease, and strives to prevent its appearance. It may be said that a nurse's skill can be estimated by the infrequency and slightness of bedsores in cases of fracture of the spine, transverse myelitis, and lesions of similar character. It is the nurse who knows the disgrace of bedsores, and who watches with the greatest pleasure the gradual healing and cicatrisation of the sores of a neglected case when brought under her care. In cases of destructive lesions of the cord the difficulty in preventing the formation of acute bedsores is by far the greatest. The skin over the sacrum, trochanter, and other areas of pressure becomes congested, and sloughs appear with alarming rapidity. When the "trophic centres" are destroyed by such a lesion the difficulties in preventing injury are no doubt greatest, but it should be recollected that even in such cases the factor of septic infection is still the most dangerous one. (*Vide* art. "Nursing," vol. i. p. 431.)

Treatment.—The preventive treatment of bedsores is by far the most important, and the responsibility of this rests on the attendant or nurse of the patient. Every precaution should be taken to prevent continuous pressure on any one part of the skin. If the patient retain power of voluntary movement, the slight movement of muscles, without changing

the position of the patient, helps the circulation in the skin greatly. If possible the patient should be encouraged or helped with proper care to change his position from time to time. Anything that presses unduly on the skin—bandages, clothing, etc.—should be watched, and at once removed; and, as occasion serves, aid to treatment, such as felt plasters, air pillows, water beds, etc., should be called into requisition, to distribute the pressure produced by the body-weight over as large an area as possible. The next measure is the care of the skin itself. Absolute cleanliness must be maintained, and, after the necessary ablutions are carefully performed, the skin must be made perfectly dry. All moisture from washing, sweat, urine, or any other cause, left in contact with the skin will tend to macerate the horny epidermis and to promote bedsores. After drying the skin the use of a dusting powder, containing boric acid, siliceous earth, zinc oxide and powdered rice or starch, is advisable.

We are often recommended to rub the skin gently with alcohol, so as to harden the surface. This procedure may possibly be of service in the case of healthy persons confined to bed from injury, and the antiseptic effect of the alcohol may also be beneficial; but in all cases of disease, or when the skin is already apt to be œdematous or discoloured, the less rubbing of the surface the better. The best treatment for the unbroken surface is cleanliness and dryness. When the skin becomes discoloured in the slightest degree, all pressure on that area should if possible be removed, and distributed elsewhere; while the prevention of soiling should be secured with the utmost solicitude.

It is only after the surface has unfortunately become broken that antiseptics should be used. At first mild applications of boric acid, or some other appropriate antiseptic, arranged so as to protect the surface, should be used; but in cases of old neglected sores with much slough or tendency to suppuration, the most strenuous efforts to render the wound aseptic are necessary; and such drugs as the perchloride of mercury, or carbolic acid, in the form of fomentations or lotions, will prove of service. A preparation which has long enjoyed a high reputation in the treatment of the sloughing ulcer from bedsore is the tinctura benzoini composita (Friar's balsam), which, from its deodorant as well as its antiseptic properties, is very useful.

The further treatment of the ulcerated surfaces will be conducted on general principles; but in spite of all precautions the ulcers may heal very slowly, and the scars are extensive and disfiguring.

EFFECTS OF COLD—CHILBLAIN

SYN.—*Erythema pernio.*

Description, etc.—This very common affection may be considered as a subacute variety of erythema of the angio-neurotic kind; occurring most frequently in young persons, and in those with a peculiar form of feeble circulation; usually brought about by cold or a fall of temperature.

The disease affects the young of both sexes very commonly in winter time, the eruption vanishing as warm weather arrives; it is also noted that with increase of years the tendency to the occurrence of chilblains diminishes; yet some persons remain liable to chilblains all their lives, often indeed in a very extreme degree. These are often "delicate" persons; they may suffer from a tendency to enlargements of the lymphatic glands from very slight causes, and usually their circulation is feeble, that is, the blood-pressure is lower than normal, and the circulation is carried on with difficulty through the extremities; their cutaneous venous capillaries also tend on very slight cause to become distended, giving a purplish or cyanosed aspect to the affected parts. The same tendency in these persons produces circinate eruptions caused by local congestion, more usually seen, however, as a result of the opposite condition of exposure to heat, and producing "ephelides ab igne." The heart-beat is often infrequent; and it is not uncommon in such persons to find the pulse-rate ranging normally between 40 and 50 in the minute, even lower rates being recorded. With this feebleness of circulation there is usually a tendency to hyperidrosis, the hands and feet being often clammy and moist. There are other patients again, of a class not so well recognised, who also present very low arterial pressure, associated with varying degrees of acceleration; in one case under my own observation at present, the pulse-rate varies between 110 and 180 beats in the minute. Such patients show a permanent, though varying, dilatation of the cutaneous capillaries over the whole body, and are exceedingly liable to chilblains; as also to many other slight ailments due to the insufficient resistance of their tissues.

Persons showing the infrequent pulse and other symptoms mentioned above, have long been recognised as belonging to one of the habits of the so-called "scrofulous diathesis." Recently it has become customary to distinguish this peculiar form of feebleness of circulation as the "chilblain circulation," and patients of this habit of body are not only liable to suffer from chilblains all their lives, but on very slight lowering of the temperature, long before the freezing-point is reached, they will present the characteristic lesions. The parts of the body most subject chilblain are those subject to exposure, especially where the circulation is terminal; thus, the fingers and toes are perhaps the most

common situations; the ears are frequently affected, and it is not uncommon to see the point of the nose the site of chilblain.

The **anatomical lesions** occurring in this condition are, first of all, a diminution in calibre of the cutaneous capillaries, owing to the stimulation produced by cold while the neuro-muscular vascular mechanism is still active. The result is pallor of the affected area, and the condition, when it affects the hands, is known as "dead fingers" (vol. vi. p. 579). On the reaction from this condition, provided the vaso-motor mechanism be not destroyed, there is erythema of the affected area. If the depressing influence is sufficiently severe, the cutaneous venous capillaries and smaller veins remain distended, and do not contract after their engorgement. The result is that serum, or in severer cases even blood, escapes from the vessels, and the cutis and epidermis become œdematous. Swelling of the affected area results, the sodden tissues are very easily injured, and the epithelium especially becomes very readily removed. It is very rare to see the epithelium spontaneously raised from the surface in the form of a bulla, but very slight friction is often sufficient to cause its removal, when a broken or ulcerated chilblain is the result. The ulcers so formed are difficult to heal, on account of the poorly-nourished condition of the part; and, if septic inoculation take place, serious loss of tissue may occur from the extension of the ulcerative process.

As the weather becomes milder the paretic vessels recover their "tone," serum is no longer exuded, the œdema drains away along the distended lymph-vessels of the part, and gradually it becomes restored to its normal state. In severe cases, where ulceration has occurred, varying degrees of scarring may occur.

It is unusual to find exudation of anything more than the serum, or of a small quantity of blood, producing the blood-stained chilblain sometimes observed; round cell formation of the inflammatory type is rare.

It will be observed how closely the history and the lesions of chilblain bring the disease into relationship with certain angio-neurotic conditions, and also with true lupus erythematosus on the one hand, and with erythema induratum on the other. The peculiar lesions which have been so much discussed recently under the name of "folliclis, acneiform, and necrotic tuberculides," etc., and which bear so much resemblance to erythema induratum, might be described as "necrotising chilblains"; the necrotising process depending greatly on the degree of the lesion, indicated by the amount of inflammatory exudation.

The **signs and symptoms** of chilblain are well known. The affected part varies from a dusky red to a deep purple colour, and presents a varying amount of œdema. The lesion is accompanied by sensations of pricking and itching, which may be so severe as to cause the patient to rub and scratch the part with vigour, in spite of the obvious damage thus caused. The health is not affected, unless abrasion of the surface result in septic infection, when serious constitutional symptoms of absorption of septic products may appear. Usually, however, even in bad cases of chilblain, the disturbance produced is more uncomfortable than dangerous.

Healthy persons when exposed to severe degrees of cold, below the freezing-point, may suffer from the destructive effects of the temperature. Usually these are classified in three degrees: first, that of contraction of blood-vessels followed by congestion, and usually intense lividity, a stage which clinically resembles closely the condition we have just described as chilblain; indeed the first stage of frost-bite is sometimes said to be identical with it, but the etiology of the condition is not the same. If this stage like frost-bite be reached, the second degree, which is characterised by subsequent paralytic œdema and the production of bullæ, is also likely to set in; and from the accession of still greater degrees of cold no attempt at recovery can be made, and the third degree, gangrene—at first of the dry variety—results. The first stage of cold-trauma, characterised by paretic disturbance of the vaso-motor mechanism only, has under favourable conditions a natural tendency to pass on to recovery; but when the two farther degrees are reached, loss of tissue, more or less serious in amount, is bound to follow.

Treatment.—Preventive treatment is by far the most effectual, both in the case of chilblains and in the somewhat analogous injuries produced by cold.

Chilblains.—In the case of young persons, and in those liable to be affected by chilblains, every means should be adopted to aid the tissues to withstand the strain put upon them by the lowering of temperature. The extremities should be warmly clothed, and the use of tight boots and gloves carefully avoided. Exercise should be encouraged, so as to keep the tissues of the peripheral vessels in as good condition as possible, and to stimulate the circulation. The use of local massage is often of great use. Care should be taken to dry the perspiration, which is so often present, from the skin, using warm water to wash the hands and feet in the first instance; the skin should be left perfectly dry, and an antiseptic dusting powder employed, such as boric acid 50 per cent, siliceous earth 25 per cent, powdered rice or starch 25 per cent. The addition of a small amount of camphor or menthol to this powder is frequently grateful. The general health should be well guarded and depressing conditions avoided, especially in the case of persons with feeble circulation.

During the first stage of the chilblain, while the blood-vessels are contracted, slight stimulation of the surface may be used, or warmth gradually employed. It is in this stage that the stimulant applications, at one time so much in vogue in the treatment of chilblain, are of some service. These applications contained solutions of alkalies, acids, iodine, volatile oils, etc., with the intention of producing hyperæmia in the regions affected; but it is needless to say that such applications should be used with much care. When the second stage, that of venous engorgement, has arrived, the main indications are to preserve an equable temperature in the affected part, and to await the recovery of the vascular tone. Gentle pressure by bandaging, when practicable, is often of service. To prevent the itching, which is often so troublesome, the use of the dusting

powder already mentioned, with menthol, is useful. Cooling lotions, such as weak solutions of the liq. plumbi subacetatis in alcohol, are often grateful, but moist or oily preparations should be used with caution, so as not to macerate the already fragile epidermis. The parts should still be kept dry and free from sweat. If, in spite of our efforts, ulceration occur, the sores must be treated on general principles of cleanliness. Salve or paste dressings containing antiseptics, such as salicylic acid, carbolic acid, resorcin, ichthyol, or camphor, are of service; a very useful formula being the following:—Resorcin, ichthyol, of each 5 parts; salicylic acid, 3 parts; soft white paraffin to 100 parts (Unna).

In the case of *injury from freezing*, the first degree of which simulates the lesions of chilblain, the affected part should be permitted to recover its warmth gradually, so as to prevent the too rapid production of the livid condition which succeeds; if no further injury is done the treatment will follow on the lines indicated above in the case of chilblain; but if the more severe lesions of the second and third degree are produced, treatment must pursue the general lines indicated in all severe mechanical or chemical injury of the integument. It is well to remember that the amount of tissue destroyed in such cases is considerably greater than is at first apparent.

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EFFECTS OF HEAT

The explanation of the lesions produced by heat on the skin must now be given from a different standpoint, as it is necessary to distinguish the effects of heat accompanied by light, as in the case of the sun's rays, from the effects of mere rise of temperature as in the case of the cautery. Many of the dermatoses which have hitherto been attributed to the heat of the sun's rays—as erythema solare (sunburn), hydroa æstivale, the important affections known as xeroderma pigmentosum—are more probably due to the violet and chemical rays of the spectrum. Somewhat in the same category may be included the "burn" produced by the effects of the electric light, and possibly the injury produced by the X rays of Röntgen. The discrimination of the

various results on living matter produced by the various radiations of the spectrum has been greatly extended by the researches of Niels Finsen of Copenhagen, and others, who have proved the irritant and destructive effects of the violet rays and the soothing effects of the red rays on living cells, and adapted their properties to the treatment of various forms of skin affection. One of the mildest forms of dermatosis produced by the action of heat is the *ephelis ab igne*. This eruption occurs usually on the legs of elderly persons who are in the habit of sitting in front of the fire for warmth. It is produced by repeated congestions of the capillaries of the skin; the venules become paretic and allow of the escape of blood-cells, and the deposition of blood-colouring matter in the cutis. There remain circinate areas and lines of pigment in the cutis corresponding to the vascular areas; and this peculiar pigmentation, which gives rise to the name of the condition, remains permanently, although, unless the erythema be renewed, it tends to fade. The eruption is most commonly seen in the old; but occasionally it is seen in the young, without any history of exposure of the lower extremities to high temperature. Possibly other causes of chronic venous congestion are capable of producing a similar result.

Higher temperatures, or long application of comparatively low temperatures, produce burns in their various degrees. These are now generally described as three; the first or erythematous, the second or vesicant, and the third or escharotic extending to the cutis vera and deeper tissues. It is well to remember that the characteristic lesion of the burn is destruction of tissue, and although a scar need not result in the first degree nor even in the second, destruction of tissue has taken place. In this way a burn can be distinguished from the lesions of true angio-neurotic origin which may closely simulate milder degrees of burn. The more severe degrees of burn are of interest to the dermatologist, not only on account of the extremely severe local injury which results, but also on account of the serious constitutional effects produced by the loss of large areas of epithelium. The shock following these cutaneous lesions is most serious, and it is not infrequent to find coma supervening, with a low body temperature, before the fatal result. Occasionally, on the other hand, restlessness and delirium are observed. Very remarkable alterations in the composition of the blood are noted, consisting in the destruction of the red blood-cells, and alterations in the character and number of the white cells. The active cells of such organs as the liver and the kidney are also affected with degenerative changes, often preceding the loss of their function. The peculiar ulceration of the duodenum is a rare but well-recognised remote result. Numerous complications, the result of septic changes affecting the exposed surfaces, may occur; such are erysipelas, suppuration, pyæmia.

Treatment.—It is wise to recognise the importance of general measures in the treatment of severe burns. Great pains must be taken to prevent the effects of shock, to prevent the loss of the body heat, and to take every care to secure rest for the patient, as by means of opium,

and to use every means of promoting nutrition. Alcohol is, as a rule, indicated.

Locally, burns of the first degree should be treated by cooling applications, as by solutions of the subacetate of lead, by the well-known Carron oil, or by the free use of dusting powders such as have been mentioned in the case of dermatitis from cold (p. 716). In burns of the second degree the most careful precautions as to cleanliness should be taken to prevent the septic complications which are frequently so troublesome. The blisters should be carefully drained, and the covering epithelium left in place as far as possible. Although antiseptics are nearly always necessary, care should be taken to provide against the absorption of such antiseptics as salicylic acid, carbolic acid, or mercury. Thus it is that boracic acid is of such great service in the treatment of burns. Recently the use of picric acid has been strongly recommended in the treatment of the bare and granulating surfaces; picric acid baths have also been recommended by Thiery as of use. In the third degree the means of treatment already indicated should be carried out with even greater care. The use of general baths, the patient being allowed to remain in them for long periods of time, has been recommended, especially by Hebra. The granulating surfaces left by burns are often slow of healing, and skin grafting or transplantation is often of service; but with the greatest care and cleanliness the formation of keloid, of thickened hypertrophied scars, and of subsequent deformities and contractions involving joints, cannot be avoided.

Other eruptions indicated above, in which the ultra-violet and chemical rays of the spectrum are more concerned than heat, are described in other sections of this work; it is evident, however, that in certain of these lesions, such as erythema solare, ephelides, etc., and more markedly in xeroderma pigmentosum, the increase of pigmentation is to be considered as an attempt by the body to protect the living cells from the irritant and destructive action of the chemical rays by the intervention of a pigmented "screen"; a process which has come about much more perfectly in the dark races inhabiting regions where the sun's rays are stronger than in temperate climates. It is interesting to note that recent experiments of Dr. Niels Finsen tend to show that the colour of the blood itself protects the living tissues against the action of the chemical rays; and that, to allow of therapeutic effects being obtained by his apparatus for concentrating the violet rays of the spectrum, the parts must be emptied of blood.

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DERMATITIS GANGRÆNOSA INFANTUM (Crocker); VARICELLA GANGRÆNOSA (Hutchinson); *Ecthyma térébrant.*

THIS somewhat rare affection occurs in children, and probably results from the implantation of virulent pus-producing micro-organisms on lesions which have previously destroyed the surface of the skin. The early cases described by Hutchinson followed varicella, and the majority of the cases since described have occurred as sequels of this disease; but, as cases have been noted following vaccinia, "hydroa," and miliaria, the name given to the disease by Dr. Radcliffe Crocker seems more appropriate than Mr. Hutchinson's earlier designation. Probably any one of the pus-producing organisms is capable of producing the affection. The character of the destruction of tissue suggests the action of the streptococcus pyogenes; though the staphylococci aureus and albus, when they are in virulent condition, are capable of producing very similar lesions. Ehlers of Copenhagen has shown that B. pyocyaneus is present in cases of "ecthyma térébrant."

The character of the onset varies with the nature of the primary affection, but as a rule it begins before the eruption of varicella has subsided, and attacks the lesions of this disease. Before the varicella crust is thrown off, ulceration occurs below it, an inflammatory areola is observed to spread round the lesion, and in the course of a day or two the spot of varicella has transformed itself into a deep black slough, which may be an inch and a half in diameter, and may extend deeply through the epidermis and true skin down to the subcutaneous tissue. On reaching a certain size the slough separates, and leaves a "punched-out" oval or rounded ulcer, with abrupt edges, and with necrotic tissue or unhealthy granulations on its floor. The ulcer thus formed rarely spreads farther, and rapidly shows a tendency to heal; but occasionally deep suppurations may ensue, especially if the lesions occur on the scalp. In the case of a child admitted to the Great Northern Hospital suffering from the disease in its typical form, which was said to have followed an attack of varicella, a large abscess of the scalp was found under the occipito-frontalis aponeurosis, and this had resulted from perforation of the aponeurosis by one of the lesions, so that pus collected between the aponeurosis and the cranium. From such lesions as these all degrees of injuries may be seen to slight superficial pustules, which may not advance farther, or may be but the first stage of the more serious mischief. When the disease is engrafted on the lesions of varicella, for example, it does not confine itself to the varicellar lesions, but many fresh foci of infection are established, which may remain isolated or may coalesce to form large ulcers with circinate margins. In this case the patient may be studded over from head to foot with gangrenous lesions of various shapes and sizes. The constitutional disturbance is, as

a rule, very great; the pyrexia is excessive, and septicæmic or pyæmic complications are usual. In the case already referred to, with symptoms of general pyæmia, numerous broncho-pneumonic lesions were found after death.

The children who suffer from the disease are usually feeble, and very often exhibit the lesions of rickets or tuberculosis, or the signs of privation and neglect. In well-cared-for children the disease is very rare. The majority of the cases occur in the marasmic children so frequently seen in the out-patient department of city hospitals or dispensaries.

The *prognosis* is naturally very serious, and varies with the extent of the disease, and the presence or absence of complicating disease, such as tuberculosis.

The *treatment* consists mainly in rendering the skin and ulcers aseptic as quickly as possible. The use of boric acid in glycerine of starch, as a bath, or applied in soft paraffin or some similar convenient antiseptic excipient, should be adopted in the first place; and all pent-up pus should be evacuated at once. In the case of the child already mentioned, after the abscess of the scalp had been dealt with marked improvement was noticeable; and it was not for some days that the fatal pyæmic complication supervened from other sources. The utmost efforts should be made at the same time to improve the general nutrition of the patient by appropriate food and general hygienic precautions. If the child survive the shock of the disease recovery is to be hoped for. The ulcers must be treated by the usual methods, and, as convalescence is established, they heal rapidly. The deep scars are necessarily permanent.

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James Galloway.

AFFECTIONS OF THE SWEAT-GLANDS

A. Functional Diseases

Introduction.—Although the functional disorders of the sweat-glands have been known to physicians from the earliest times, and have been made, indeed, the subject of very special study, their structural diseases form a comparatively recent branch of pathological research. The main reasons for this delay have been well summarised by Pollitzer, who indicates "the obstacles which the location of the chief portion of the gland at the bottom of the cutis creates; the fact that the great number and close relation of the glands make it difficult to observe clinically the beginning of a disorder in a single gland; and, finally, the early involvement in most cases of the neighbouring cutis, which may entirely obscure the relation of the sweat-gland to the pathological process." He further adds, "there is no reason to believe the sweat-glands are favoured with an exceptional immunity to the disorders to which all other glandular structures are subject." Our knowledge would undoubtedly be greatly increased if "biopsies," or the excision of portions of living tissue, were more frequently resorted to; but in a class of cases, many of which are comparatively trivial, the objections to such a procedure are obvious.

The dual function of the sweat-glands, in that they secrete a certain amount of fat as well as of sweat, was demonstrated, in 1844, by Krause, and has been confirmed by the more recent researches of Kölliker, Meissner and others, especially of Unna. The close relationship existing between sweat and sebaceous secretion is further shown by the coexistence in abundance of both sets of glands in many regions of the body (scalp, flexures, genital regions, etc.), and, mainly on clinical grounds, I fully endorse Duhring's opinion, "that the two sets of glands act in concert, both in health and in disease, more commonly than is generally admitted by physiologists and pathologists."

In many conditions, loosely denominated as "eczema," the primary and essential changes are seated in the sweat and sebaceous glands concurrently; and functional changes, chiefly in the direction of increased activity (sudorrhœa, seborrhœa), generally form a prelude to structural changes, especially those of an inflammatory nature. This interesting subject cannot, however, be further elaborated here.

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HYPERIDROSIS

SYN.—*Idrosis, Hydrosis, Polidrosis, Sudorrhœa.*

Definition.—A functional disorder of the sweat-glands resulting in excessive perspiration.

Symptoms.—Sweating, either general or local, within normal limits is a physiological process. It is when sweating is excessive in proportion to the stimulus that it becomes pathological. Local sweating may be confined to certain regions, such as the armpits, palms, soles, interdigital spaces, and genital organs; or it may be limited to the area of distribution of a single nerve-root, or to a peripheral branch of a nerve—the fifth nerve, for instance—under some local excitement. Less frequently a limb may be affected, or the whole of one side of the body (Bichat, Roque). Although in cases of transverse lesion of the spinal cord the whole of the body below the level of the lesion may be thus affected, Bauer records an interesting case of a man, aged thirty-six, who suffered for fourteen years from crossed hemihyperidrosis affecting the right armpits and the left calf. Hyperidrosis may be accompanied by hyperæmia, or by vaso-constriction of the cutaneous vessels; and certainly it is not always accompanied by a rise of temperature of the part affected. The cold sweats of certain emotional states, and those frequently present just before death, may be contrasted with the hyperidrosis of moist covered parts, such as the axillæ, where, as Aubert has shown, the temperature may be raised half a degree. General sweating may be so excessive as even to appear to be the cause of death (Myrtle).

In hyperidrosis the part affected is damp, moist, and clammy; and in more marked cases the sweat may flow off in little streams. If the sweating continue, the epidermis, continually saturated with moisture, becomes wrinkled and assumes a whitish tint; while its superficial layers become so softened as to be readily detached by rubbing. This condition is generally seen in the palms and soles; in the case of the scalp and armpit a more or less well-marked hyperæmia of the skin is present, and the horny layer of the epidermis becomes partially detached.

Much discomfort may be caused by hyperidrosis of the hands and feet; the latter becoming sodden and tender, or even eczematous, while both palms and soles may pass into well-marked hyperkeratosis.

Course.—Hyperidrosis, once established at a certain pitch of intensity, may remain almost stationary, showing but slight changes of importance,

though varying from time to time in amount as the cases increase or diminish. Spontaneous cure is not very often observed; nor is local hyperidrosis, as a rule, affected by the intervention of constitutional disease, or by its cure. In regions, like the genitals, where adjacent skin surfaces are in contact, it frequently passes into "eczema" or "intertrigo."

A case of hyperidrosis associated with pompholyx has been recorded by Dr. Perry in a girl of seven and a half years. A vesicular eruption on the face, occurring along with hyperidrosis, and called "dysidrosis," has been described by Hallopeau, Rosenthal, Jackson, and Jamieson; but these are almost certainly examples of the disease now known as hidrocystoma (p. 738). Such cases, which are by no means rare, bring the phenomena into very close relation with pompholyx (p. 748).

Causation.—General sweating occurs in many constitutional diseases, and as the systemic vigour is increased the tendency to excessive sweating, on exertion or otherwise, diminishes. Pyrexia usually causes free perspiration, not only while the temperature is raised, but also for some time afterwards; a result due to persistent functional disturbance of the heat-regulating centre. Obesity is also a frequent cause of it, and in these cases there is usually a hyperæmia of the cutaneous vessels. The moist palm of the habitual tippler is familiar to every one; and a similar condition is common in neurotic women, in persons addicted to excessive tea-drinking, or under long courses of arsenic. The disease may at times be congenital; and cases have been recorded which seem to show that it may also be hereditary. Thus Ollivier records the case of a patient who suffered from hyperidrosis in the area of distribution of the right inferior maxillary branch of the fifth nerve, and whose maternal grandfather, maternal aunt, and one sister were affected with the same complaint. Lobstein has recorded similar cases, and states that sometimes all the members of a family may be affected.

In diseases such as ichthyosis, where considerable areas of the skin are practically functionless as regards the sweat, complementary hyperidrosis may be present in other areas, such as the palms of the hands, which are free from disease. Emotional disturbance is a frequent cause of temporary hyperidrosis; and it has been said that organic lesions of the nervous system, and new growths more especially, may induce a more or less permanent increase of sweat excretion in certain areas. Thus Bouveret records a case of gumma of the brain with unilateral hyperidrosis; and Adamkiewicz mentions a case of abscess of the brain with hyperidrosis of the opposite arm. The same author has also described the discovery of a glioma after death in a case in which there had been hyperidrosis. Organic lesions of the sympathetic system have also been said to produce the disease; and the excessive sweating associated with Graves' disease may perhaps be ascribed to functional disturbances of the same system.

The hyperidrosis which occurs in cases of peripheral neuritis is most

easily explained by assuming that the lesion is chiefly of the inhibitory fibres of the sweat-glands; thus again the sweats of phthisis, chronic alcoholism, and arsenicism and plumbism may best be explained [*vide* vol. vi. p. 682].

Pathology.—The classical experiment of Claude Bernard, demonstrating that paralysis of the sympathetic is followed by excessive sweating, is the starting-point of the experimental physiological study of the sweat-glands. Clinical cases have since been recorded which seem to show that lesions of the sympathetic leading to paralysis may also lead to functional activity of the sweat-glands, as also may irritative lesions of other parts of the central nervous system.

Dr. Weir Mitchell has described local hyperidrosis as a sequel of division of nerves by gunshot injuries. The local sweats which often accompany megrim or neuralgia probably own a similar origin. That sweating is brought about by nervous influence, and not by direct action on the secreting cells, is well shown by the following experiment:—In a cat the sciatic nerve is divided on one side, and the animal is placed in a hot chamber; the sweat does not appear on the foot of which the nerve is cut, though the other feet are bathed in perspiration. Similarly, dyspnœa causes no sweating of the foot of which the nerves are cut, but profuse sweating of the foot of which the nerves are intact.

The secretion of sweat is not entirely dependent on dilatation of the cutaneous vessels, or necessarily accompanied by it; in health, an actively perspiring skin is usually a flushed skin, but the vascular dilatation is a concurrent condition, not the cause of the secretion. When in the dog the peripheral end of a divided sciatic nerve is stimulated, a copious secretion of sweat is produced on the foot of the same side, although by excitation of the vaso-motor nerves the vessels are generally constricted. On the other hand, atropine abolishes the secretory power of the sciatic, though leaving its vaso-motor influence untouched; pilocarpine stimulates secretion by direct action on the sweat-glands, or on their nerve-fibres, as distinguished from any effect on the vessels. The dependence of the secretion of sweat upon nervous impulses is in direct contrast with the mechanism of secretion in the kidney. In the kidney blood-flow is the chief factor; in the case of the sweat-glands, although vascular dilatation may aid secretion, the nervous impulse to secretion is the essential part. We should bear in mind that the solids of the sweat are but accidental impurities of the watery vehicle which contains them, while of the urine the solids are the important part, the water being but the vehicle of their removal. In other words, urine is an excretion, sweat is a secretion, essentially necessary for the proper heat regulation of the body but apt to be secreted in abnormal amount when the innervation of the sweat-glands is faulty.

Prognosis.—It is seldom possible to form an accurate prognosis in a case of hyperidrosis, for the disease, when apparently improving under treatment, may recur; or it may disappear spontaneously when we least expect such a result.

Treatment.—Before proceeding to any local treatment, the general condition must be carefully investigated and any abnormalities rectified, so far as is possible, by appropriate internal and general treatment. Constitutional diseases—such as phthisis, alcoholism, or obesity—must be treated on the usual lines; and it will be found, as a rule, that improvement in the general health will be accompanied by diminished tendency to excessive sweating. Anæmia, neurasthenia, malaria, or general want of tone must be treated by appropriate remedies. The local as well as the general condition may be further improved by the frequent use of the cold bath and cold douche, either with or without a preceding warm bath, according to the vigour of the patient. Such hydrotherapeutic methods, though directed primarily to the cutaneous vaso-motors, also have a direct, if more or less temporary, effect on the sweat-glands. We have seen that certain drugs act directly upon the sweat-glands through the nervous system; and as by means of pilocarpine we can induce a copious secretion of sweat, so by the administration of belladonna, or atropine, we can inhibit the secretion completely. Belladonna may be given as the extract or tincture; or hypodermically as atropine, in doses of $\frac{1}{100}$ gr. gradually increased. The familiar effects of an overdose of these drugs must be constantly borne in mind, and their administration curtailed or stopped on the appearance of symptoms of intoxication; indeed, at best, their good effect is often but temporary.

Many other drugs have been recommended, and from their number their value may perhaps be estimated. Ergot, aconite, veratrin, agaracin, picrotoxin, and many others have been prescribed; but Dr. Crocker's remedy is probably the best, and certainly does give good results in some cases; this is a drachm of precipitated sulphur administered in milk twice a day; if it produce too much purging, he combines it with pulvis cretæ aromaticus.

External treatment should, however, always be combined with the constitutional; dusting powders and astringents, applied after the part has been wiped thoroughly dry, are often of great service. The use of hydrotherapeutic methods has already been mentioned, and attention may also be drawn to electric baths and the use of the constant current. Baths medicated with perchloride of mercury, hydrochloric or tannic acids, alum, turpentine, or naphthol, may be tried in suitable cases. After the bath the part must be very carefully dried, and then powdered over. The best dusting powder is one containing salicylic and boracic acids with alum and starch, the proportions of which must be varied according to the chronicity and extent of disease; as a rule about 15 grains of salicylic acid and 30 grains of boracic acid to the ounce make a suitable strength. Chloral hydrate, in quantities up to a drachm to the ounce, may be added to the starch powder; or powders of tannoform, salicylic acid, talc, bismuth, or lycopodium may be employed.

Dr. G. H. Fox advised a lotion containing 1 per cent of quinine in alcohol; and other physicians have recommended alcoholic solutions containing 2 per cent of tannin or alum.

When these methods of treatment are not successful, and the disease is confined to the feet, where the secretion often becomes fœtid, the following method of Hebra may be adopted :—The stinking stockings and boots, which may have been impregnated with sweat for weeks or months, are to be destroyed; then the foot is to be well washed and dried, and a small quantity of simple diachylon plaster spread on linen applied to it; pledgets of lint covered with this ointment are also to be introduced between the toes, to prevent contact. An ordinary sock may now be drawn over the foot, and over this a new shoe, which must be light, and must not cover the dorsum of the foot. After twelve hours the dressing is removed, the foot rubbed dry with a cloth, and dusted with one of the powders previously mentioned. This treatment is to be continued twice a day for eight or nine days, the patient going to his business meanwhile; at the end of this time the dressing is finally removed. In a few days' time the superficial epidermis begins to peel off the areas affected with the disease, and when this layer has become completely detached, the foot may for the first time be washed. The hyperidrosis will be cured within two or three weeks after the first application of the dressing, and will last for some time, or may even be permanent; but generally a repetition of the treatment is necessary. A modification of this treatment (Duffin) is to strap the feet with lead plaster every day for a fortnight; the result is much the same as in Hebra's method, the superficial layers peel off in considerable strips, and leave the deeper layers quite healthy. Instead of lead plaster, ointments composed of zinc, ichthyol, salicylic acid, or resorcin may be substituted; but they must be applied continuously for some days. In treating hyperidrosis of the feet, a distinction must be drawn between feet that are cold and sweating, and feet that are warm and sweating. When the feet are cold, methods to induce hyperæmia are to be adopted; thus they may be bathed at night with solutions of perchloride of mercury (0·5 per cent), of soda (5 per cent), of permanganate of potash (3 per cent), of silver nitrate (10 per cent), or in water containing hydrochloric or acetic acid. Should the patient be able to stand it, a further stimulating ointment may be applied during the night; or the foot may be painted with a 3 per cent solution of liq. ferri perchloridi (Legoux). Trichloracetic acid may be substituted as a paint; or, provided there be no cracks in the epidermis, the method, adopted in the German army, of painting with a 5 per cent chromic acid solution once a week. Kobert, however, has seen perforation of the nasal septum and also nephritis to follow the application of chromic acid. Should the patient be unable to stand such heroic methods, a weak ointment containing 5 per cent of ichthyol may be applied during the night after the bath; or, in more acute inflammation, a plaster-mull of zinc and ichthyol. In the morning the feet are to be cleansed, and an alcoholic solution applied containing 3 per cent of naphthol, or 5 per cent of salicylic acid. After this has dried, the feet and the inside of the socks are to be dusted with one of the powders previously mentioned, special attention being paid to the interdigital clefts.

In the case of feet that are warm a less energetic line of treatment may be adopted. Warm baths at night are prescribed with the addition of a little alum or borax, followed by the application of some such ointment as the following:—℞ Ichthyol gr. v., terebinthinæ ℥x., ung. diachyli Hebræ ʒj. The consequent local anæmia and inhibition of secretion after several repetitions become more or less permanent; especially if a paint containing 2 per cent of resorcin be applied during the day. A powder of tannoform is extremely useful to apply to the feet, and to dust inside the socks when the patient is moving about.

In all cases large and comfortable boots are to be worn, and woollen stockings or socks, frequently changed.

A similar distinction is to be drawn between the hyperidrosis of cold and warm hands. The former may be treated with baths containing camphor, acetic acid, or other substances which induce hyperæmia, followed by the application of an ointment containing half a drachm of camphor and a drachm of ichthyol to the ounce of zinc ointment. During the daytime Kaposi's alcoholic solution may be employed:—℞ Naphthol ʒj., spt. Colon. ʒiij., spt. vin. gall. ʒij. Ft. lotio.

Warm sweating hands are best treated with weak alkaline baths, such as 5 per cent borax; or by infusions of oak bark combined with formalin soap, the lather of which is allowed to dry on. Weak ichthyol powders may be dusted on during the day.

Numerous soaps have been recommended for hyperidrosis, especially those containing zinc and formalin. Buzzi strongly recommends a soap with 10 per cent of camphor, and for hyperidrosis pedum a 10 per cent creolin soap.

An excellent temporary remedy for sweating armpits—sometimes a very irksome complaint in women—is the application of a sponge wrung out of water as hot as can be borne, followed by the use of a 1 to 2 per cent solution of quinine in eau de Cologne, or of a 3 per cent salicylic acid powder.

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ANIDROSIS

(*a, privative ; ἱδρώς, sweat.*)

Definition.—A functional disturbance of the sweat-glands giving rise to a deficient secretion of sweat.

The amounts of sweat normally secreted by different persons in similar circumstances vary greatly. Deficient secretion of sweat may be local or general, complete or partial ; symptomatic, as in pyrexia, albuminuria, prurigo, and diabetes ; or congenital, as in ichthyosis. The condition again may be diffuse, as in tuberculosis, carcinoma, and diabetes mellitus ; or it may occur only in areas in which the sweat-glands have been injured, or to which the nerve-supply is abnormal. In certain skin diseases, such as eczema, psoriasis, sclerodermia, diffuse or localised and anæsthetic leprosy, the secretion of sweat over the diseased area is very often deficient, or even absent ; and there is every reason to think that the disordered innervation, which seems to be the cause of the skin affection, gives rise to the anidrosis also.

The atrophy of the skin of old age is usually accompanied by a diminished secretion of sweat. In a dirty skin the openings of the sweat-ducts are blocked, the secretion is reabsorbed by the lymph-stream, and possibly atrophy of the sweat-glands ensues. Cessation or diminution of sweat may under certain circumstances be but temporary ; whether temporary or permanent, a diminution of excretion by the skin must be compensated by an increase of activity of the kidneys or lungs, if toxic substances are not to accumulate in the organism.

Anidrosis at times accompanies megrim, and then usually affects the temporal region. It may also occur in cases of sympathetic paralysis, associated with myosis and vascular dilatation (Möbius). Cases of anidrosis have been recorded in infantile paralysis, and in transverse myelitis ; the secretion of sweat returns with the electric reactions of the limbs. Improvement or cure of any skin disease which gives rise to anidrosis is accompanied by renewal of sweat-secretion in the affected area. Unna states that the parakeratoses in general are accompanied by a diminished secretion of sweat ; and Eulenburg has recorded the same fact in erythromelalgia, a disease attributed by him to a central lesion of the posterior and lateral parts of the gray matter of the cord (vol. vi. p. 613).

Causation.—Anidrosis is sometimes congenital, as in ichthyosis ; but, as a rule, it is acquired, and is then frequently a symptom occurring in the course of some other disease.

Pathology.—The disorder, when occurring in the course of pyrexia, has been ascribed by Unna to an occlusion of the sweat-duct by swelling of the epidermic structures, especially of the stratum lucidum. That occlusion of sweat-ducts, if sufficiently general, will bring about anidrosis

is obvious, but Unna's suggestion does not seem at present to have met with general acceptance, the anidrosis being attributed rather to disordered innervation of the sweat-glands accompanying the disordered thermotaxis. As has been pointed out under the head of hyperidrosis, the secretion of sweat is not entirely dependent on dilatation of the cutaneous vessels; moreover, such dilatation may be accompanied by anidrosis. Kaposi has shown that, under such circumstances, anidrosis is due to nutritive changes in the skin; and it is found that the anidrosis of such diseases as eczema disappears when the disease is cured. No doubt this condition may be due to a trophic disturbance of the nerves of any cutaneous area.

Treatment.—Any coincident disease, and especially any skin disease, must be treated primarily. The secretion of sweat may then be stimulated by the application of warmth and vapour to the skin; for instance by "Turkish" or "Russian" baths, and the ingestion of hot drinks. Nitrate of pilocarpine may also be given in doses of gr. $\frac{1}{6}$ hypodermically; or jaborandi may be given by the mouth, adequate precautions being observed against "catching cold." This treatment, if persistently carried out, is often of great service in the anidrosis of true prurigo.

The skin may be stimulated by mustard powder or like irritating substances; and recourse may also be had to the constant and faradic currents. In some cases massage, applied regularly every morning, is of great service.

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BROMIDROSIS

(*βρῶμος, a stench; ἱδρώς, sweat.*)

Syn.—*Osmidrosis.*

Definition.—Offensive odour of the sweat, due to changes in its composition either before or after secretion.

Symptoms.—The odour of the sweat is often unpleasant, especially if the clothes are allowed to become saturated with it; under certain circumstances the sweat of certain parts of the body becomes positively and obtrusively offensive. It is in the feet especially that this odour is most penetrating, and as a rule the flat-footed and those who are most continuously on foot suffer most. In young persons liable to hyperidrosis the sweat is especially apt to become offensive; thus maid-servants, waiters, soldiers, postmen, and the like, may be rendered unfit to earn their livelihood. Hyperidrosis is almost invariably present also, soaking the boots and stockings with a stinking matter; and the feet exhale a rancid, sickening stench. The feet also become tender and sodden; walking is extremely

painful, as the skin, especially of the soles and sides of the feet, becomes inflamed and macerated, and may be the seat of a vesicular or bullous eruption.

It is, of course, evident that the less frequently the coverings of the feet are changed, and the more impermeable they are to moisture, the more saturated they will be with the offensive secretion, and the more prone the feet will be to eruptions of various kinds. Bromidrosis also affects the armpits, pubic region, perineum and groins; but the smell here is more "fusty," and not so overpowering as that of the feet. In the former regions intertrigo is a frequent complication.

True bromidrosis is quite distinct from the peculiar odours of the sweat in negroes; and in the various diseases of which such odours are said to be pathognomonic. Thus, the acid smell of rheumatic fever is very familiar; in scarlatina the sweat is said to smell like new bread; in miliary fever like decomposing straw; in small-pox like a menagerie: indeed, the older physicians trusted largely to their recognition of these peculiar characters in the diagnosis of disease. Emotion may certainly give rise to a peculiar odour of the sweat; and in certain nervous disorders Monin and Hammond have recognised agreeable odours of the sweat, as of violets or pine-apple.

Pathology.—It has been shown that, if the shoes and stockings be removed from a patient suffering with bromidrosis, if his feet be washed thoroughly, and he be kept in bed for a few days, the feet have a far less offensive smell than the shoes and stockings. The secretions of the feet are seldom offensive in themselves; the intolerable smell arises from the decomposition of the fatty ingredients under the influence of the Bacterium fœtidum of Thin. Bacteria of various kinds may be found in the decomposing sweat, and horny and fatty materials which accumulate on the surface of the skin in these cases; and several of them probably assist in the decomposition; caproic, caprilic, and other fatty acids being formed and exhaling their characteristic fœtors.

Treatment.—Complete cleanliness is before all things essential. The coverings of the feet, or of the armpits, should be of absorbent material and be frequently changed. Baths, containing a small amount of alum or borax, may be used night and morning for the affected part; and during the day an ointment or dusting powder containing boracic or salicylic acid. In the German army a 2 per cent ointment of salicylic acid is largely used. A powder containing 1 in 20 of resorcin may be used instead; or the following:—℞ Sod. salicyl. gr. xv., bism. subnitr. gr. xxx., pot. permang. ℈iss., and pulv. cret. prep. ad ℥j. Vinogradoff of Kazan claims good results from a 6 per cent aqueous solution of chloride of zinc. This is applied after a tepid bath at bedtime, and the feet are then dried.

As I have said in the preceding section, painting with a 5 per cent chromic acid solution is a method adopted in the Prussian army with good results, since it is stated to be successful in over 90 per cent of cases. Dr. Thin saturates the stockings and cork soles in a jar containing boric acid for hours, thus rendering them inimical to the B. fœtidum.

Antiseptics, such as mercury in weak solutions, may also be employed, and other measures already described under hyperidrosis. Internal treatment is not successful.

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CHROMIDROSIS

(χρῶμα, *colour*; ἱδρώς, *sweat.*)

SYN.—*Pityriasis nigricans*; *Seborrhœa nigricans.*

Definition.—Secretion of pigmented sebum or sweat.

Historical.—Coloured sweating may occur in most parts of the body, but the affection is always a rare one, although the somewhat mysterious character of the disease has given rise to an extensive literature. The name was first given to the disorder by Le Roy de Méricourt in 1864; but cases had been published previously, the first recorded being by Yonge in 1709. Lecat, in 1765, and Billard had observed examples of pigmented sweating; and Teevan had published a singular case of a black secretion from the skin of the forehead and upper part of the face. Bousquet, Neligan, and Erasmus Wilson had also recorded cases before de Méricourt, to whom, however, we owe the first complete analytical examination.

Symptoms.—Though the disorder giving rise to coloured sweat sometimes concerns the sweat-glands only, in several cases the sebaceous glands also have been primarily affected, and the sweat-glands little if at all. In the former class the coloration is of rapid, in the latter of slow formation (Crocker). Féréol has published a case in which neither the sweat nor the sebaceous glands were affected, and for such cases he proposes the name "chromocrinia."

Chromidrosis most frequently affects the face, and especially the eyelids, cheeks, and forehead. The chest and abdomen are not often affected, and it is of extremely exceptional occurrence on the hands and feet. Occasionally the sweat of the armpits, groins and popliteal spaces is pigmented. The colour is usually dark brown or black; but it may also have a shade of blue or indigo, or be even a somewhat light blue (cyanhidrosis). Green, red, and yellow sweats have also been recorded; and the chromidrosis may be accompanied by pigmentation of other secretions or excretions. Thus Macker had under his observation a girl of nineteen with an indigo pigmentation of the orbits and forehead, accompanied at times by a blue coloration of the saliva. Teevan, Billard, and Neligan found black pigment in the urine, fæces and vomit,

besides its presence in the sweat. Pigmentation of the urine and milk has, moreover, been observed unassociated with chromidrosis.

Macker's case was also interesting on account of some pigmentation of the hands, and a similar case has been recorded by Germain. A very rare yellow pigmentation of the sweat of the hands, in a married woman of twenty-four, was under the observation of Barrié; and the case was still more unusual in that the chromidrosis alternated in the two hands; it never affected both at the same time. The disorder was present only during the two days of menstruation, and no pigmentation was to be seen on the rest of the body. Yellow chromidrosis has also been observed by de Moerloose and by Purdon; Tison had three cases among the servants of the same house, one being a boy of sixteen, and the other two adults over thirty years of age.

De Méricourt brought before the Academy of Medicine in 1884 a case of pink chromidrosis in a lad of twelve; and Speranza saw green chromidrosis of the feet and back supervene during an attack of rheumatic fever in a cachectic girl of fourteen. A case of unilateral yellow chromidrosis in a man has been recorded by White of Boston; and one of blue sweating of one side of the scrotum by Conradi. In some cases it is stated that the colour of the sweat changed while the patient was under medical supervision. But, without discussing other remarkable cases, such as that of Mollenbroeck where the secretion was stated to have the colour and appearance of honey, it is necessary to utter a word of warning against deception. Some undoubted cases have, however, been observed in this country, and have stood most careful investigation. Thus one has been recorded by Dr. Colcott Fox, and two more by Dr. Crocker; but there is reason to believe that from time to time cases have been published as examples of chromidrosis which were not entirely worthy of credence. It is further stated that in some even of the largest dermatological clinics abroad not a single case has ever been recorded. Finally, it is only necessary to add that the majority of cases have been observed in hysterical women, suffering in many instances from menstrual disorder.

Course.—Cases of chromidrosis usually get well rapidly under treatment, but the disorder is very prone to recur. A return of menstrual troubles, or even of the normal menstrual period, very frequently causes a recurrence of the affection; and it always tends to reappear, or, if present, to undergo an exacerbation, with the onset of any great emotion or any nervous disturbance. The cases which supervene on some constitutional disease, such as rheumatic fever (Speranza), tend to recovery with the general symptoms.

Causation.—The great majority of cases occur in women, probably as much as 85 per cent. Most of the patients suffer from chronic and well-marked constipation, and many also from menstrual disorders. But almost all agree in presenting the stigmata of hysteria, or they are at any rate of extremely neurotic habit, emotional and excitable, and an easy prey to anxiety and excitement.

Pathology.—Microscopic examination has clearly shown that chromidrosis has not always its origin in the sweat-glands; indeed, Dr. Crocker and other authors state that the affection may likewise be due to a disturbance of the sebaceous glands, which gives rise to a secretion of pigmented sebum. The material is certainly in some cases largely composed of fat, is soluble in ether, spirit of chloroform and glycerine, and not in water; and contains amorphous granules, usually of an indigo colour. These granules do not, however, give the usual chemical reactions of indigo; and there is much doubt about their chemical composition. It has been supposed that, even if the pigment of chromidrosis be not indigo, it is some combination of indigo with an organic substance, the indigo being originally derived from the indol of the fæces. I have said that many of these patients are the subjects of constipation, and it is well known that long-continued constipation, such as occurs in intestinal obstruction, is apt to be associated with considerable quantities of indican in the urine. Practically nothing is known about the pigments found in cyanhidrosis, or in yellow and pink sweating.

Treatment.—Attention must be paid to the general health, and any constipation or menstrual disorder energetically treated. The local condition must be met by complete cleanliness, and the application of a lotion containing ether and spirit, combined with boracic acid or naphthol.

Sweats coloured by drugs.—In addition to cases of true or idiopathic chromidrosis, cases occur from time to time which can be traced to the effect of some drug, whether taken internally or applied locally; or to the presence of some microbe.

Pink, blue, and green sweats have been ascribed at various times to the use of different drugs. Thus Temple had under observation a man of sixty, whose silvery hair and beard became light pink after taking about eight grains of iodide of potassium three times a day for a week. His linen became stained, and if his handkerchief was used to wipe off the sweat it also was discoloured pink. Withholding the iodide caused the colour to disappear gradually, but it returned when the medicine was resumed. Kollman has recorded a case of blue chromidrosis in a patient taking considerable quantities of iron; and iron sulphate was found in the sweat.

Green sweat is frequently observed among workers in copper (8), the dust or fumes entering the lungs, being absorbed by the skin, or ingested with the food. The linen becomes freely stained with the coloured sweat, and even the hair may be discoloured. Hyde has observed a case due to the application of a copper electrode to the abraded skin.

Red sweating is in some cases "idiopathic," as in the case recorded by Dubreuilh; but a considerable number of cases have been reported as due to micro-organisms. Such cases are not true examples of chromidrosis, but are due to a growth of the B. prodigiosus on the hairs of a moist warm region, such as the armpit. Such a spot is an excellent medium, especially if it is not spoilt by the too free use of soap and water, and Babesiu, Babès, and others have discovered zoogloea-like

masses growing upon the axillary hairs and giving them a well-marked red colour. The roots of the hairs are not involved, but the zoogloea masses become detached, and may be washed off in the sweat if it be at all profuse. The affection is quite a common one.

Hæmatidrosis is the name applied to the escape of blood from the mouths of the cutaneous glands, whether sudoriparous or sebaceous. In most cases it is due to a hæmorrhagic exudation into the lumen of the gland and into its duct, the extravasated blood being carried to the surface of the skin along with the secretion of the gland, and making its appearance at its cutaneous orifice. Hebra has, however, himself seen a jet of blood escape from the uninjured dorsal surface of the hand in a young man, the jet corresponding in size to the duct of a sweat-gland, and rising an appreciable distance above the surface of the hand. Neither in this patient, nor in others who have come under observation, has there been any reason to suspect hæmophilia, though the affection has some similarity to purpura. The similar cases recorded by Finol and Erasmus Wilson were cases of hæmorrhage from the skin. In some instances the hæmorrhage may be a vicarious menstruation; but it occurs so frequently in hysterical young women that it must be regarded as one of the hysterical stigmata. This view is taken by Parrot, who points out the coincidence of other hysterical phenomena with this affection; and it is confirmed by my own experience of one striking case. It seems probable that many of the cases which have been recorded were impostures; nevertheless genuine cases do occur, even in hysterical subjects. It is necessary, however, to call attention to the fact that cases of cutaneous hæmorrhage unconnected with the orifices of the sweat or sebaceous glands are in no sense examples of hæmatidrosis.

Treatment must be directed to the cause of the hæmorrhages; as in purpura, for example.

Phosphorescent sweat is extremely rare, though cases are said to have occurred after the ingestion of phosphorus in fish, or as medicine. This phosphorescence may in some cases become more apparent after violent muscular exertion, when even the body linen may be luminous. The phenomenon is probably due to phosphorescent bacteria, numerous varieties of which have been described.

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URIDROSIS

A minute amount of urea is normally present in sweat. In certain circumstances it may exist in sufficient quantity to impart a urinous odour to the body, or even to appear on it as a crystalline deposit like hoar-frost. The latter condition is reported by Frazer-Nash (quoted by Crocker) to be of no infrequent occurrence in India ; and by him it is attributed to a diet of milk, fruit, coarse bread, and water. A urinous odour of the sweat is common in uræmia ; it may arise in cholera ; and, immediately before death, in many diseases in which the kidneys are intact.

B. STRUCTURAL DISEASES

HYPERTROPHY AND ATROPHY

As these conditions are of little practical clinical importance their consideration here will be very brief.

HYPERTROPHY of the sweat-glands (Spiradenoma—Unna) occurs either as a congenital or acquired change.

Congenital hypertrophy may be part of a general excessive development ; but is more frequently found in connection with localised hypertrophies of the epithelium and corium, such as occur in ichthyosis, hystrix, and soft warts.

Acquired hypertrophy occurs under various circumstances, for instance, from increased functional activity, as in chronic tuberculous diseases and articular rheumatism ; under any chemical, mechanical, or thermic irritation ; as the result of many chronic affections of the skin—probably as a consequence of irritation,—such as prurigo, chronic eczema, elephantiasis, lupus, and so on.

As long as the function of the glands remains unaltered, and the epithelium conforms to its type, these conditions may be pathologically considered as true hypertrophies. Should secretion, however, be arrested, or offshoots be thrown out from the primary convoluted tubes, or other such changes occur, the growths must be regarded as adenoma ; and

further changes resulting in the various carcinomatous conditions are described, and are probably not infrequent. (For further information on this obscure subject reference may be made to an extremely elaborate article by Unna (11), who discriminates spiradenoma (adenoma of the coil-gland) from syringadenoma (adenoma of the duct of the coil-gland).

Clinical course.—The fate of hypertrophied sweat-glands varies as the causes. Congenital cases usually persist unaltered for years, or may become the starting-point of carcinoma.

Cases dependent upon irritative processes either atrophy; become inflammatory (see "Hidradenitis"); become cystic, as the result of occlusion of the sweat-ducts; undergo fatty, hyaline, or colloid degeneration; or become merged in the disease which originally caused them (for example, lupus, syphilis, epithelioma).

One form of adenomatous growth, originating almost certainly in sweat-gland or duct, is sufficiently distinctive to merit separate description. This is the:—

ADENOMA SUDORIPARUM of Darier and Jacquet.—Syn.: The condition was also described by these authors (4) as *Hidradénomes éruptifs* and as *Epitheliomes des glandes sudoripares;* by Quinquaud as *Cellulome épithélial éruptif;* by Török as *Syringadenoma* and *Syringo-cystadenoma;* lastly by Unna (12) as *Syringoma.*

Besnier asserts that Kaposi's so-called *Lymphangioma tuberosum multiplex* is undoubtedly the same disorder.

Symptoms.—Most of the reported cases have been in young persons of either sex, and probably the eruption appears most frequently about puberty. In the only case seen by myself, probably the only case observed in England, the patient was a lad of eighteen, who said the lesions had come out in a month. The distribution of the disease is characteristic; it is always over the front of the thorax and neck, and most abundantly in the infra-clavicular regions. A few lesions may exist on other parts of the trunk, or on the flexural sides of the limbs. They are seldom present on the face, if ever; and this point distinguishes them at once from the *Adenoma* (vel *Acanthoma*) *adenoides cysticum* of Brooke, Fordyce, Perry, and Balzer; as well as from the *Congenital adenoma sebaceum* described by myself (8), both of which again differ widely in their anatomical characters from the disease under discussion (Unna).

The lesions consist of little nodules, slightly pinkish or yellowish, round or oval, and varying in size from a pin's head to a pea. They are of about the same consistence as the skin in which they are superficially embedded. The little growths are usually numerous, therefore closely aggregated; although never in groups, they often are in linear series. The skin over them is smooth or slightly crinkled, and never shows any depression or excretory duct. The disease is a source of slight disfigurement, but never gives rise to any subjective symptoms; when once established it is said to be permanent; but in my own case, when last seen, it certainly showed signs of spontaneous amelioration.

Pathology.—This is very fully discussed by Unna in the work already referred to. The bulk of evidence is in favour of Török's view that the growths arise from embryonic epithelial inclusions connected with the ducts of the sweat-glands. It is in this purely pathological sense that the name of epithelioma has been applied to them. The condition is, however, quite benign. Philippson's attempt to identify the Colloid milium of Wagner and Besnier (p. 765) with a colloid degeneration of adenoma sudoriparum is generally held to be unsuccessful.

Treatment.—If any be considered necessary the little growths may be incised and squeezed out with the fingers, or the dermal curette may be employed. In either case a shallow permanent pit will result.

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HIDROCYSTOMA

(ἱδρώς, sweat; κύστις, a bladder or bleb.)

Syn.—*Hydrocystoma.*

Definition.—A cystic affection of the sweat-glands and their excretory ducts, giving rise to the formation of spurious vesicles, always localised upon the face.

Historical.—This comparatively rare but interesting affection was first described by Robinson of New York in a paper read before the Dermatological Society of America in 1884; in a subsequent paper he added an account of its morbid anatomy. The same affection has been described by Jackson under the designation of "Dysidrosis of the face," a title which has been adopted by Rosenthal, Hallopeau, and Crocker. It is, however, inappropriate and misleading, inasmuch as the condition varies widely from the dysidrosis of Tilbury Fox (cheiropompholyx of Hutchinson), and Robinson's original name is therefore maintained. Jamieson has recorded examples, with microscopical examinations; cases have been reported by Hutchinson also, by Hyde of Chicago, Adam of Hamilton, N.B., and others.

Symptoms.—The lesions invariably appear on the face, and when present in small numbers are discrete; but they may attain a very

considerable number, when of course they are nearer together; but it is rare to find them crowded closely. They occur on the forehead, nose, cheeks, around the orbits, and sometimes on the lips and chin. They occasionally attack the neck or lower jaw, but are never found upon the rest of the body. Hutchinson and Jamieson have described cases in which the affection was unilateral; and Jamieson noticed in his case that sweating was much more free upon the side of the lesion; a fact also observed in one case by Hutchinson, where the condition was associated with violent headaches and neuralgia of the tongue on the same side. The lesions in the first instance are deep-seated, and of a whitish colour, closely resembling boiled sago-grains, but subsequently they become clear and vesicular; when larger they assume a bluish tint, most marked at the periphery. In the case of the larger lesions slight hyperæmia may be observed at the periphery, but as a rule there are no signs of inflammatory disturbance. In size they vary from that of a pin-head to that of a pea, and in shape they are round or ovoid. The vesicles contain a clear, pellucid fluid, which is slightly acid in reaction, and never turns red litmus blue. There are usually no subjective symptoms, but slight itching or smarting may be present. The contents dry up without rupture after an existence of one or more weeks; the desiccated contents, appearing whitish, thus assume a somewhat close resemblance to milium. The area of the eruption then reassumes its usual appearance; or, if the lesions have persisted longer than usual, a slight temporary pigmentation may be left.

Etiology.—The disease is comparatively common in New York, Robinson having observed from thirty to forty cases; and apparently in Glasgow also, where Adam has seen nine cases, three of them in men; in England and on the continent of Europe it is much rarer. It almost always occurs in women who are middle-aged, or who have passed this period. As a rule they are washerwomen, or are employed in work which exposes them to a warm, moist atmosphere which causes sweating of the face. Examples are infrequent among the well-to-do classes. Hutchinson describes sweat-cysts in connection with xanthoma, and always confined to the eyelids, which he considers of the same nature as hidrocystoma. The recurrence of the menstrual period is sometimes associated with an exacerbation of the disorder (Hallopeau), and it is invariably worse in the summer, improving, if not altogether disappearing, during the winter months. Thibierge, who records a case in a man, suggests that the disease is of nervous origin; a view which receives cogent support from the reports of the cases associated with unilateral sweating and neuralgia. At the Dermatological Society, in February 1894, I showed two well-marked cases in a brother and sister, aged respectively ten and twelve years. Both had severe sweating of the nose and parts immediately adjacent.

Pathology.—The vesicles result from a dilatation of the ducts of sweat-glands, and of the coils of the glands due to obstruction of the ducts at a point peripheral to or nearer to the surface than the cyst.

The lumen of the tube becomes dilated, and the epithelial cells lining it are compressed against the basement membrane by a granular fluid resembling that found in normal glands. Sections passing through a cyst show, in some parts of the section, glands containing the granular material inside the lumen of the duct. The obstruction is found to occur always at a point within the corium not far distant from the subcutaneous tissue, and no abnormal changes can be found in the epidermis or sebaceous glands. The cause of the obstruction is not very evident, but the anatomical changes point to a hyperplasia of the cells lining the duct, so that the channel becomes diminished and finally disappears. It is argued that the dilatation below the obstruction is not a passive one, since the entire cyst wall becomes lined with an epithelium which must be derived from proliferation of the duct-epithelium. Such an argument is not perhaps quite conclusive, especially if we examine the section of a retention cyst; but at any rate it would be remarkable that, if such were the case, the obstruction should not occur where the elasticity of the surrounding tissues is least and the channel narrowest; that is to say, where the duct passes through the epidermis. Some perivascular exudation of leucocytes is frequently found in the corium around the cyst; and, when this is sufficiently abundant to cause pressure on the rete, a considerable leucocystosis may be present in the papillary layer also.

Dr. James Adam, whose observations have already been referred to, suggests that the cysts arise from hypertrophy of the secreting part of the sweat-glands, without compensatory means, in the excretory part, for getting rid of the excess of secretion.

Diagnosis.—The diagnosis is always obvious to any one familiar with the disease. The lesions might perhaps be mistaken for those of eczema, adenoma of the sebaceous and sweat glands, localised lymphangioma, milium, colloid milium, sudamina, or pemphigus of the face; but they may be readily distinguished by their exclusive distribution on the face, their long duration, their annual exacerbations, their consistence and general appearance, and their clinical history.

Prognosis.—The eruption tends to disappear spontaneously at the approach of winter, but it recurs in summer if the patient be still exposed to its causes. The disease may persist to an advanced age.

Treatment.—The vesicles should be punctured, the contents expressed, and an antiseptic lotion applied freely night and morning. In some cases the galvano-cautery may be employed. A soap containing camphor and Peru balsam is accredited with good results; and dusting powders, containing boric acid, sulphur, silicic acid, dermatol and starch, are all useful. Other means for combating local hyperidrosis ought also to be employed. Such occupations as are known to induce the eruption must, if possible, be abandoned.

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KYSTES GRAISSEUX SUDORIPARES

Under this title Dubreuilh and Auché of Bordeaux describe two unusual cases of multiple cystic dilatations of sweat-glands, the contents of which were abundant in fat. One of these had previously been recorded by Sabrazès under a different title. The patients were aged 70 and 71 respectively, were anidrotic, and had rough skins. They suffered from slight general pruritus. The lesions consisted of innumerable tumours, varying in size from a hempseed to a hazel-nut, but averaging that of a pea, situated in the subcutaneous tissue, or loosely attached to the lower surface of the derma ; in form they were globular or ovoid, in consistence either firm or fluctuating ; they were scattered all over the body, but existed in immense numbers in the axillæ.

When punctured they gave issue to almost pure fat or oil. Microscopic examination of numerous sections clearly revealed their origin in the sweat-glands, and—in contradistinction to similar cystic dilatations of sebaceous glands—extremely few epithelial cells were present in their contents. An uninterrupted series of changes in the sweat-coils was observed from the beginning up to the end of the disease.

These interesting observations lend powerful support to the views of Kölliker, Unna, and others as to the steatogenous functions of the sweat-glands. The authors claim, as a probable example of this disease, a case recorded by Neuberger complicating another cutaneous condition ; they suggest that possibly the affection is not a rare one. This opinion I cannot share.

Differential diagnosis.—*Multiple cysts of the skin due to cysticerci*, and of very similar clinical characters to those under discussion, are of no infrequent occurrence. A microscopic examination of their contents, which are not oily, and invariably contain "hooklets," will prove their nature at once.

Far greater difficulty will be experienced in discriminating this disease from the *multiple follicular cysts of the skin*, described by Bosellini in a man aged 41, the clinical characters of which, as well as the chemical nature of the cystic contents, almost exactly corresponded with Dubreuilh's case. Excision of the cysts and careful microscopic examination, however, showed their origin in the sebaceous glands, some scanty remains of which persisted in portions around the cyst walls.

A case identical with Bosellini's, but at first mistaken for an example of Kystes graisseux sudoripares, I exhibited to the Dermatological Society ; it is published under the provisional name of *Steatocystima multiplex* (5).

No treatment has yet been proposed for the disease, as it gives rise to no symptoms of moment; excision of the cysts, if justifiable, seems the only feasible procedure.

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SUDAMINA

Syn.—*Miliaria crystallina; Crystallina* (Unna).

Definition.—An eruption of short duration, consisting of small, extremely superficial vesicles containing sweat, without any inflammatory phenomena.

Symptoms.—Sudamina always appear suddenly, either in the course of acute febrile diseases—especially enteric fever, acute rheumatism and pneumonia, or immediately before death as an agony phenomenon. They are usually connected with excessive sweating, especially of a so-called "critical" nature; but they may appear on a perfectly dry and very hot skin, where perspiration is deficient (Liveing).

The rash is most abundant on the trunk, chest and neck; but it may be present anywhere. The lesions may be few in number, or extremely numerous; although generally discrete and small in size they may coalesce and form comparatively large superficial bullæ. The surrounding skin is unaltered in colour. The vesicles themselves are so thin-walled, and their contents so pellucid, that they look like drops of water on the skin. Their contents may become slightly turbid and milky in appearance, especially if poultices have been applied. They cause no subjective symptoms. Rupture of the vesicles occurs in a few days, a little desquamation ensues, and no trace of the eruption is left behind. Sometimes, however, successive crops arise.

The disease is of no diagnostic or prognostic significance.

Dr. Crocker records a case of **chronic miliaria** occurring upon the palms and soles of a woman aged 56, and lasting for years; the precise nature of the affection has not been settled.

Pathology.—The vesicles lie entirely between the layers of the stratum corneum, and sweat-ducts can be easily seen opening into them at their lowest part (Török). Their contents consist of sweat, and are slightly acid in reaction. Pollitzer, who recognises that sweating is not a necessary concomitant, suggests that possibly nutritive changes in the skin, due to the state of vital depression of the patient, produce a modified keratinisation, and are a factor in the obstruction at the orifice of the sweat-pore, which must undoubtedly exist. "The stopping of

the pore takes place when the skin is dry and the sweat function is in abeyance. The first outpour of sweat must dilate the duct just below the point of obstruction." No treatment is called for.

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Inflammatory Affections

MILIARIA RUBRA

Syn.—*Prickly heat; Lichen tropicus; Miliaria papulosa et vesiculosa; Strophulus infantum.*

Definition.—An acute eruption of papules and vesicles, for the most part around the sweat-pores, accompanied by much itching, and tending to relapse.

The disease is always met with in hot weather, and is therefore most common and most severe in the tropics, especially among persons born in temperate climates. Negroes are never affected, probably on account of the naturally free lubrication of their skins. Any part of the body may be affected, but the seats of predilection of the eruption are the back and trunk; the face and arms being rather less frequently attacked. In my experience, people who have suffered in the tropics are peculiarly prone to relapse in temperate climates in comparatively warm weather. Persons wearing an excessive amount of clothing, especially of flannel, are especially liable to prickly heat; as for the same reason are infants, in whom the affection ("red-gum") may, very rarely, be unilateral, and confined to the side of the face and arm habitually held to the mother in nursing (Crocker).

Symptoms.—The onset is usually sudden, and may follow a full meal, or the ingestion of copious hot and alcoholic drinks. The affected skin is intensely itchy, burning and red. On examination it will be found thickly studded with innumerable small acuminate papules, and especially vesicles, from the size of a pin's point to a pin's head, containing clear alkaline (therefore inflammatory) fluid, and surrounded by a narrow red zone. In tropical cases the number of papules is greater than that of the vesicles, hence the misleading name "lichen" attached to the condition; the affected areas are extensive, and the suffering is often excruciating. Copious general sweating almost always precedes and accompanies the eruption, the elemental lesions of which can be seen, with a lens, to involve the sweat-pores and their immediate vicinity.

The vesicles always remain discrete; in a few days their contents become

opaque and milky (miliaria alba); they never discharge spontaneously, or give rise to any general weeping, except as the result of scratching or injudicious treatment; therein they present a marked contrast to all forms of "eczema." Unless severely scratched, they soon dry up, minute scabs form, and recovery ensues in about a week; but relapses are very apt to occur as long as warm weather persists. Anything calculated to promote sweating, such as exercise or hot drinks, always aggravates an attack and provokes increased irritation.

Cessation of the cause is generally accompanied by immediate subsidence of the eruption and its symptoms, but with their cause these tend to recur indefinitely.

Pathological anatomy.—Although clinically nothing could be more evident than the connection of this condition with excessive sweating, there are some differences of opinion as to the nature of this connection.

The chief changes are found in the epidermis. In the rete are numerous rounded cyst-like spaces, which are dilated sweat-ducts; their contents may be clear or comparatively rich in cellular elements and epithelial debris. Török was unable to trace any connection between these vesicles and the sweat-ducts; but subsequently Pollitzer, in a paper based on a microscopic examination of numerous serial sections of eight cases in different stages, established their nature beyond doubt. The coexistence of vesicles indistinguishable from those of eczema is, however, admitted by this author as an epiphenomenon.

The cells of the horny layer are swollen and vesicular-looking; and their nuclei persist in rod-like form, especially round the sweat-pores. The vessels in the papillary layer of the corium are congested and surrounded by moderate leucocytic infiltration. There are no well-defined morbid changes in the coil-glands themselves.

Pathogeny.—The cystic dilatation of the sweat-ducts is due to obstruction at their orifices. This is probably caused by the swollen condition of the cells of the horny layer already referred to, which occludes the sweat-pores at a time when the sweat secretion is in abeyance. With the succeeding flow of sweat the duct dilates, and this continues until the tunnel-shaped spiral canals through the epidermic layers are formed. Pollitzer makes an ingenious suggestion as to the freedom of negroes and southern races from the disease, which may also apply to the immunity enjoyed by many natives of temperate climates; namely, that in unaffected persons the epidermis is unusually well lubricated with oil and epidermic cells permeated with fat, which do not absorb water, and therefore will not swell and occlude the sweat-ducts.

Unna, arguing from the analogy to cheiropompholyx, suggests the possible agency of micro-organisms; but there seems to be no positive fact in favour of the notion.

Differential diagnosis.—This need only be established from eczema and sudamina. Prickly heat is distinguished by its rapidity of onset, its patchy distribution, its seat, its transitory nature, the absence of all discharge, the coexistence of copious sweating, and the concomitant etio-

logical conditions of hot weather, or unsuitable (flannel) or excessive clothing.

It must not be forgotten, however, that secondary eczema may result from scratching or other mechanical irritation; or, in obese persons, in positions liable to intertrigo.

The prognosis may be inferred from the foregoing sketch.

Treatment.—The first indication is the removal of the proximate cause. In severe cases changes from a tropical to a temperate or hill climate may be necessary, or a sea-voyage may for a time be efficacious. Attention to the underclothing is of prime importance; silk or fine woollen materials being greatly preferable to cotton or linen, as they lessen the risk of chills or rapid changes of skin temperature. The underwear should be frequently changed. The diet ought to be simple, nutritious, but non-stimulating; and alcohol is certainly most deleterious. During the acute period of an attack the bowels should be kept well open with salines and diuretics; more especially the acetate and nitrate of potash are generally useful. Lemon or lime juice in barley-water makes an excellent cooling drink.

Locally, evaporating lotions are of service, such as weak solutions of liquor carbonis detergens with lead or spirit; or lotions leaving a powder on the surface, such as the familiar calamine lotion, made up with cherry laurel water. Alkaline, borax, or bran baths, at 90° to 95° Fahr., are useful; and free dusting with zinc oxide, boric acid, or starch powder often gives much relief. The addition of 2 to 3 per cent of ichthyol to either lotions or powders lessens the risk of eczema.

The inunction of the body after the morning bath with vaseline, or some fatty material, is a valuable prophylactic in persons subject to attack.

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MILIARY FEVER

SYN.—*Sweating sickness; "La suette Anglaise"; "La suette des Picards."*

Historical.—This curious malady was first observed in England in 1485; subsequent epidemics occurred in Calais, among the English inhabitants only, in 1507, 1518, 1529, and 1551. The disease also occurred in Germany in 1652, 1802, 1864; and in France in 1718 (2). A severe epidemic recently prevailed in the central provinces of France (1).

Symptoms.—The onset of the disease is sudden, and is ushered in by profuse, often fœtid sweating, with dyspnœa and malaise; the tongue is coated, headache is complained of, and cerebral symptoms are common. The rash appears at the end of two to four days. The skin becomes red, either all over or in patches; minute acuminate papules arise on the

reddened areas, which soon become vesicular, the lesions having all the characters of sudamina, or miliaria rubra. Similar phlyctenules appear on the mucous membrane of the mouth, tongue and palate. As the eruption first shows itself on the face the disease is very apt to be mistaken for measles.

Desquamation soon ensues, beginning on the face and extending downwards. The scales are fine and branny over the trunk, but large flakes may form on the hands and feet. The tongue also desquamates.

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HIDRADENITIS SUPPURATIVA

SYN.—*Hidradenitis destruens suppurativa; Hydrosadénite phlegmoneuse; Acnitis* (Barthélemy).

Definition.—An inflammatory affection of the sweat-glands resulting in the formation of pus, the destruction of the glands, and the production of scars.

Historical.—Suppurative inflammation of the sweat-glands was first described by Verneuil in 1864; and he maintained that the superficial axillary abscesses, observed long before by Velpeau and others, were examples of the same affection. Similar cases had been recorded by Richet, Chassaignac, and Nélaton; more recently an admirable account of the disease has been given by Pollitzer, to whom we owe its modern name. Cases have also been published by Dubreuilh and others; one described by Lukasiewicz, under the designation of "Folliculitis exulcerans," bears a close resemblance to Hydradenitis suppurativa; and a case denoted by Bronson and Fordyce as "Acne varioliformis of the extremities" is certainly identical with the disease under consideration.

Symptoms.—As to seat, the lesions may occur in either sex singly or in small numbers, in the armpits, about the anus, on the mammæ, or in the genital regions; but far more frequently they are present in large numbers wherever sweat-glands are abundant. They may thus be thickly disseminated over the face and neck, extremities and trunk. I have seen several cases in which the palms were affected, and a few affecting the soles, although Pollitzer states that no case of the latter situation is on record.

The first manifestations appear as nodules situated deeply in the subcutaneous tissue. They are firm and tense to the touch, painless, and cause no subjective symptoms. The skin at first is freely movable over the nodules; but as these enlarge it becomes more or less adherent to them. The growth of the nodules is slow, and there is no obvious

projection of the skin surface until the disease has existed two or three weeks, when it is usually reddened. An incision into a nodule at this point is followed by the escape of a small amount of pus; but, if it be left untouched, the pus gradually finds its way to the surface and escapes, along with a certain amount of blood and shreddy tissue. The swelling then subsides; but some pigmentation persists, and finally a depressed scar marks the position of the vanished pustule. Sometimes adjacent nodules coalesce to form firm, flat projections of considerable size which rupture at various points. In other cases the nodules are indolent, never inflame, but persist for months, and finally are absorbed without suppuration. The disease is always extremely chronic, lasting sometimes for years; so that all stages in its evolution and involution are usually present in any given example.

Pathological anatomy.—Pollitzer, in his most careful investigations, describes the tumours as consisting of a dense aggregation of small round cells, epithelioid cells and large multinuclear masses resembling giant cells, but more regular in outline; the latter being extremely numerous and occurring in clusters. The remains of the sweat-glands can be recognised only at the periphery of the tumours, as the destructive central changes take place very rapidly. The endothelium of the blood-vessels is swollen, and may occlude their lumen. The epidermis is affected secondarily, in the later stages of the disease.

Causation.—Nothing definite is known of the immediate cause of the acute, diffuse, inflammatory and often suppurative changes which attack the sweat-coils and periglandular tissue in this disease; although personal uncleanliness is a powerful general cause. Bacteriological researches, carried out by Pollitzer and Darier, have proved fruitless. The orifices of the sweat-ducts appear to me to form an unusually "open door" for invasions of pyogenetic cocci; and the great frequency with which such invasions take place in allied sweat affections (for example, in dysidrosis) gives additional colour to this supposition of pyococcal invasion. I have also good reason for thinking that suppurating hydradenitis often occurs concurrently with an analogous process affecting the sebaceous glands in cases roughly classified as *Acne indurata*, *inveterata*, *varioliformis*, etc. Dr. Crocker has pointed out the frequency with which the disease is associated with hyperidrosis. Young adults of either sex are especially prone to the disease, and often show traces of scrofula or other constitutional depravity.

Diagnosis.—Suppurative hidradenitis may be confounded with acne in its various forms; with boils, or—when confined to hairy parts—with ringworm. It is more likely to be simulated by the "syphilide gommeuse" of Bazin, which this author indeed regarded as seated primarily in the sweat-glands. A full consideration of all the facts and appearances will determine a correct diagnosis.

Treatment must be directed, in the first instance, to any general deviation from health. Fresh air, moderate exercise and careful living are obviously indicated; and the administration of tonics—such as quinine,

iron, arsenic, sound wine in moderation, cod-liver oil, and so forth—is usually of advantage.

Locally, prolonged antiseptic baths containing perchloride of mercury (one or two drachms with a drachm of dilute hydrochloric acid in 30 gallons), sulphur, izal, or similar substances, are most useful. Where these are not obtainable, or as an adjuvant to them, antiseptic washes, containing corrosive sublimate, resorcin, salicylic or boracic acid, have their utility. Abscesses, when they form, must be treated on general surgical principles; and I believe that the duration of the disease is very materially shortened by puncturing the lesions as soon as the subjacent skin becomes clearly adherent to them. I have also seen very satisfactory results from the constant application of Unna's mercury and carbolic acid "plaster-mulls," under which many nodules, which apparently would otherwise have inevitably suppurated, have been absorbed in a surprising manner.

In spite of treatment the disease, in its disseminated form, is always of long duration.

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POMPHOLYX

(πομφώλυξ, a bubble.)

Syn.—*Cheiropompholyx* (Hutchinson); *Dysidrosis* (Tilbury Fox).[1]

Definition.—An acute or subacute inflammatory disorder of the hands and feet, usually associated with excessive sweating, and characterised by the appearance of peculiar grouped vesicles or blebs, which do not rupture spontaneously, but have a marked tendency to recur.

Historical.—The first published account of the disease is by Tilbury Fox (2), who called it Dysidrosis, and considered the vesicles as the result of sweat-retention. Mr. Hutchinson's lecture on the subject, delivered in 1871, was not published till 1876; he contested Tilbury Fox's views as to the sweat origin of the eruption, and proposed the name Cheiropompholyx. Robinson's nomenclature of pompholyx is now generally adopted as more comprehensive than Hutchinson's. In Germany the condition is still generally considered a form of eczema; in France Tilbury Fox's name is generally used.

[1] The name Pompholyx as synonymous with Pemphigus (Willan and Bateman) has long been obsolete.

Symptoms.—The onset of an attack of pompholyx is usually preceded by burning, tingling, itching, stiffness, or even acute pain in the hands, or, more rarely, in the feet. Soon deeply-set vesicles appear, either singly or in small groups, on the palms and interdigital spaces, or along the sides of the fingers. In exceptional cases the backs of the hands or even the wrists are invaded, and similar vesicles may appear in corresponding positions on the feet. The lesions are usually roughly symmetrical, but one side is usually worse than the other. In very rare instances—of which I have seen one striking example—the feet alone may be attacked.

In the earliest stage small transparent rings of fluid are visible round the sweat orifices (Tilbury Fox and Crocker), but this appearance is of very short duration. As the vesicles enlarge they resemble boiled sago-grains embedded in the skin, and often show a dark point in the centre. In this stage the eruption can be felt as well as seen. The vesicular contents, at first clear, soon become turbid; in reaction they are neutral or alkaline. There is very slight inflammatory redness of the skin, if any; but œdema is generally marked, causing much stiffness and discomfort. The number of vesicles may increase enormously, and they often coalesce to form large blebs which tend to be flat on the sides of the fingers, and semiglobular on the palms. The blebs being formed by the coalescence of numerous vesicles are multilocular, and may be as large as an inch in diameter. The lesions never rupture spontaneously; their contents are absorbed, and at the end of ten days or a fortnight the epidermis is exfoliated, either in small pieces or in large flakes, leaving the skin underneath red and tender, but never moist or weeping as in an eczema.

Before and during the eruption the hands are often markedly hyperidrotic, but this is certainly not always the case (Hutchinson, Jamieson). After the shedding of the epidermis the skin soon hardens, but relapses always occur. After each attack the nails often show transverse furrows. Rather severe general symptoms usually accompany an attack such as has just been described. Prominent among these are malaise, shiverings or heats, anxiety and depression of spirits. Before the attack the patients are seldom in good general condition, and usually have clammy hands.

Variants.—Mild or abortive cases of pompholyx are of frequent occurrence; in these cases only a few sago-grain-like vesicles appear in the palm, or along the edges of the fingers, accompanied by itching, hyperidrosis, and some depression of spirits. Dr. Crocker doubts whether such cases should be regarded as pompholyx; but I have observed many instances, relapsing regularly every spring or summer, and sometimes merging into typical cases such as have just been described.

On the other hand, in an extremely neurotic American, under my own observation, relapse succeeded upon relapse for more than three months; and the disease had existed for several years almost without remission.

In some severe cases an eruption may appear on the forearms in direct anatomical continuity with the pompholyx, or on distant parts of

the body, which is usually described as an eczema. Careful examination will reveal, however, that it is not of the nature of an eczema, but rather of a miliaria rubra or prickly heat, a condition very closely allied to pompholyx.

Etiology.—Women are certainly more frequently attacked than men. The disease is rare before puberty and after middle life; its subjects are generally neurotic, overworked, or underfed; and in such persons the handling of irritating substances seems sometimes concerned in its production. It is common in spring and summer, but rare in winter. It generally recurs for years in circumstances similar to those in which it first arises.

Pathology.—Tilbury Fox, who first described the clinical features of the disease with absolute accuracy, subsequently (3) described its morbid anatomy. He regarded the characteristic vesicles as dilatations of the sweat-ducts caused by some obstruction at their orifices. No other observer has confirmed his views. Robinson, Santi, and Winkelried Williams have clearly demonstrated—the latter in no less than 229 serial sections of pieces of skin from his own hands—that the vesicles are not dilated sweat-ducts, but are very similar to the vesicular lesions of eczema. Dr. Crocker, who at first adopted Tilbury Fox's views in a conjoint paper, has recently changed his opinion.

The vesicles form in the rete Malpighii, immediately beneath the horny layer, either over the papillæ or in the inter-papillary spaces; their contents are fibrinous and highly albuminous, thus showing clearly their inflammatory origin. As the fluid increases in quantity the prickle cells are pushed aside, and when the vesicle has attained the size and appearance of a sago-grain the whole depth of the prickle layer is involved. As the vesicles enlarge, sweat-ducts passing by them are also pushed aside, but they never open into the vesicles, or emerge from them. The loculi of the compound blebs formed by the fusion of these vesicles are composed of greatly stretched prickle cells. Unna believes that he has found the cause of pompholyx in a special bacillus, which is found, either singly or in groups of two or three, in the contents and roof of the vesicles. They are best stained by the iodine method, and are the same length as tubercle bacilli ($2\frac{1}{2}$ to $3\frac{1}{2}$ μ), but broader ($\frac{1}{2}$ to $\frac{2}{3}$ μ). They are most abundant, and in clumps, in the roof of the vesicle. In comparison with the staphylococci of impetigo they are present in small numbers, and must, therefore, have a powerful chemiotactic action. Their presence is constant, and no other organisms are present.

Unna makes the following interesting surmise as to the pathogenesis of the affection:—"In the thick horny layer of the palm of the hand of certain individuals definite pathophoric bacilli lead a latent existence. The increased sweating in summer or in the course of certain diseases is necessary to induce their proliferation, and this is naturally most active in the neighbourhood of the sweat-pores. Here there ensues a maceration of certain basal horny cells, and then rapidly, if the part is scratched, a chemiotactic setting free of fibrinous exudation with a few leucocytes.

The organisms disperse themselves in the vesicles, which increase until the bacilli, after about a week, die; the vesicle is then encapsuled by a new horny layer, and then the attack of cheiropompholyx is ended." In addition to the typical pompholyx vesicle sudamina are often present, but they give rise to no special symptoms and are not perceptible to the naked eye. It may be added that Unna's discovery of the bacteria upon which these views are founded has received no confirmation from other observers.

The inflammatory changes (migration of leucocytes, capillary dilatation, etc.) are always confined to the superficial papillary layer, and are invariably slight in intensity; so that Unna regards the vesicles of pompholyx as "the most perfect example of chemiotaxis."

Pompholyx is generally regarded as a neuritic inflammation, or vasomotor neurosis, leading to inflammation of the skin with associated disorders of sweat function. It is frequently classified with herpes and pemphigus.

Diagnosis.—In the earlier stages the itching vesicles may be mistaken for scabies, but careful examination will always avoid the commission of such an error. Acute eczema of the hands is much more difficult to discriminate, and, as already stated, the distinction is not admitted on all hands. The crucial points of difference have been indicated in the article; but it must be borne in mind that, by poulticing or other injudicious treatment, a true catarrhal dermatitis may be set up.

Treatment.—The general condition of the health must first be improved, and the nervous system more especially braced up. Rest, mental relaxation or diversion, and change of air, ought all to be recommended according to circumstances. Internally strychnine, iron, quinine, hypophosphites, and cod-liver oil are valuable tonics; and arsenic, pushed so as to produce its physiological effects, is probably instrumental in warding off relapses. Alcohol, tobacco, tea and coffee are almost always injurious.

Local treatment is of secondary importance. Weak astringent or anti-pruritic lotions may be used; but as a rule emollient ointments, constantly and carefully applied on strips of linen, afford most relief: such are zinc oxide or zinc oleate ointment, cold cream, Lassar's paste, and the like. Above all things, no strong application must be employed.

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J. J. P.

AFFECTIONS OF THE SEBACEOUS GLANDS

ACNE

UNDER this general name we include :—1. *Acne punctata*, or the condition giving rise to comedones. 2. *A. vulgaris*, inflammation of sebaceous glands founded on A. punctata. 3. *A. pustulosa simplex*, suppuration of sebaceous glands without comedones. 4. *A. artificialis*, produced by drugs taken internally, or by external irritants.

Definition.—An inflammation of the sebaceous glands connected with hairs, especially with undeveloped or permanently rudimentary hairs, sometimes partly implicating the hair follicle itself. In many cases, but not always, it depends upon the previous accumulation of sebaceous matter called a *comĕdo*.

Comedo is the name given to a plug of sebaceous matter occupying the duct of a sebaceous gland generally connected with a rudimentary hair. It is also known as grub, worm, black-head, or "waster"; and the condition is called acne punctata.

The essential feature is accumulation of sebum in the duct; not due to mechanical obstruction, since the orifice of the duct is generally wide and patent, nor to excessive production of sebum, since the amount of oil normally present on the skin and hairs is often deficient, but partly to an unduly thick consistency of the sebum, and partly to anatomical peculiarities in the glands and hair structures thus affected.

The end of the comedo is often black, a colour generally attributed to external dirt, though this is denied by Unna. I am bound to say I have found black masses deep down in the comedo, remote from the surface, and therefore think some abnormal pigment production may play a part in the blackening of the sebaceous mass, though the influence of dust and dirt cannot be denied.

The thickened consistency of the sebum is not due only to its retention, but depends on impaired function of the gland. When the mass is squeezed out, in the familiar shape of a "worm" or blackhead, it is found on examination to consist in large part of fatty and other granules representing dried sebum, also epithelial cells from the sebaceous gland or duct, and sometimes one or several abortive hairs, as first observed by Gustav Simon in 1842.

Occasionally the parasite *Demodex folliculorum* is found in the duct of the gland; but in my experience it is very rare either on healthy or diseased skins. It has nothing to do with producing comedones, at least not in the human subject.

The immediate cause of comedones is not perfectly clear; but it has some connection with the peculiar distribution of this affection, and with the special time of life at which it chiefly occurs.

Comedones are only exceptionally formed in the glands connected with well-formed and complete hairs. They arise in connection with rudimentary or imperfect hairs; either those which are in early stages of development, as the hairs of the beard and of some other parts before puberty in the male sex, or those which remain rudimentary throughout life, like the corresponding structures in the female sex, and in the large glands of the nose and adjacent parts in both sexes, which appear to be unconnected with hairs, but which were shown nevertheless, by Kölliker, to be attached to rudimentary hair structures. In parts of the surface quite destitute of hairs, such as the palms and soles, comedones never occur; and they are wanting likewise in those rare situations (certain parts of the genital organs) where sebaceous or fatty glands occur unconnected with hairs.

Thus the regions where comedones may occur are the face, the ears (on the outer aspect), sometimes the nape of the neck, the shoulders and back, the sternal region, and adjacent parts of the chest. Exceptionally they may be found on the abdomen and fronts of the thighs of hairy men; possibly (though I have not seen them) on corresponding parts of the arms.

These regions, apparently covered with lanugo only, must be richly provided with undeveloped hairs. Even in the female sex the rudimentary structures must be there, and in very hairy individuals it is there that the most copious development is seen. It is worthy of notice that these regions are thickly covered with hair in lower animals, including the anthropoid apes; as if development, gradually transforming a very hairy into a comparatively hairless animal, had left the rudimentary structures.

Regions exempt from comedones are, besides perfectly hairless parts, the front of the throat and neck above the clavicles, the seats of permanent hairs, scalp, axillæ, pubes, and other parts of the body not mentioned above.

Rudimentary hairs have certain peculiarities which favour accumulation of sebum: (*a*) the sebaceous gland is large in proportion to the hair-sac; (*b*) the imperfect hair does not reach the surface, or hardly projects beyond it; (*c*) the musculi arrectores pilorum are badly developed, or do not form connection with the hair-sacs and glands. Normally the growth of the hair helps to carry off the sebum, and the movement of the muscles favours expulsion; and as both these factors are wanting in rudimentary hairs, we see why accumulation is likely to occur.

This is confirmed by the observation that comedones sometimes

occur in damaged portions of skin, such as the scars of burns or of lupus, if in its appropriate regions; and again on the skin covering deep cutaneous tumours, such as molluscum fibrosum, though quite unconnected with these growths. The comedones of scars sometimes present the curious phenomenon known as a "double comedo" when two sebaceous glands communicate below the surface, the partition being destroyed by atrophy or suppurations. Double comedones are occasionally seen in other situations.

The time of life at which comedones chiefly occur is also very significant. They are generally unknown in childhood (with an exception which will be afterwards referred to); they begin at the approach of puberty, from fourteen to sixteen, or sometimes later. The liability to them continues at least till in the male sex the beard is well developed, and till about the corresponding period in the female, but they may last longer. It seems clear that the tendency to their production is connected with the stimulus to hair-growth which accompanies the functional development of the genital organs. They appear first on the face, especially those parts afterwards covered with hair; and when they occur on the chest and shoulders, where the hair-growth appears later, I believe they are always of later formation.

Exceptional production of comedones.—In rare cases comedones appear in children much below the usual age for acne—at ten years old, or even earlier. These are most often seen in the form of a broad band across the forehead, sometimes invading the hairy scalp for a short distance; but they may occur also on the cheeks in symmetrical groups. In such cases the affection is easily cured, or disappears spontaneously. It is strange that this curious affection does not seem to have been observed till about the years 1883-84, when several cases were shown to the Dermatological Society of London by Dr. Radcliffe Crocker, Dr. S. Mackenzie, the author, and others. The grouped form has been described by Dr. Thin.

Etiology of comedones.—The causes above indicated, namely, the activity of sebaceous glands attached to rudimentary hairs at a particular period of life with imperfect removal of sebum, have no doubt a powerful if not exclusive influence in the production of comedones. But it has been thought that some other factor is necessary, and by some authors great weight has been laid upon imperfect nutrition of the skin. But while many patients with acne are anæmic or chlorotic, we also see this affection in healthy and robust young people. Again, it has been attributed to unsuitable diet, or other disturbance of digestion. I have never been able to trace such influence in the production of comedones, though these factors may influence the inflammation which converts them into ordinary acne. The old notion that this affection depends upon either deficient or excessive function of the sexual organs is probably quite groundless.

Regarding these causes as inadequate, some have sought an explanation in the action of bacteria. The sebaceous plug or cavity often

contains many and different micro-organisms, as the staphylococci of the skin, and the saccharomyces of the scalp (regarded by Unna as a bacillus) which occurs on the surface. These must be regarded as extraneous organisms which find a suitable cultivation medium in the comedo. Besides these, Unna describes the diplococcus thought by him to be the cause of seborrhœic eczema ; and a special bacillus found in the interior of the sebaceous plug, which he regards as the cause of comedo-formation (not like the other organisms an accidental complication), on the ground that it is constantly present and in the deepest part of the mass. Unna admits, however, that it never occurs in the comedones of scars, mentioned on the previous page, so that it is not proved to be essential to the production of this affection ; it may be a saprophytic organism flourishing in decomposing fatty substances. The subject is more fully set forth hereafter in the article on "Bacteria of the Skin."

Transformation of comedones or acne punctata into acne vulgaris.—It is generally admitted that the commonest form of acne is based upon, and succeeds to the previous occurrence of comedones. The sebaceous glands and in some degree the hair follicles become inflamed, and the well-known pustules of acne vulgaris result. This inflammation takes two special forms : either it is confined to the gland so that a simple pustule results—*acne pustulosa ;* or the inflammation is deeper and infiltrates the surrounding tissue, forming a small abscess, with induration around it—the so-called *acne indurata ;* but there is no absolute distinction between them. The epidermis may form over the small abscess after it has once opened so that it is quite shut off from the surface. The severe or indurated form may occur on the face, causing great disfigurement ; but it is more common on the shoulders and back where the hairs are more deeply implanted, especially in the male sex. The severe form leaves distinct and sometimes extensive scars ; while the combination of suppurative and indurative inflammation constitutes a formidable eruption too well known to need description.

Causes of true or inflammatory acne.—*Microbes.*—The causes which set up inflammation of the simple comedones, and thus produce acne vulgaris, are not clear. It is natural to attribute this result to the invasion of the blocked sebaceous ducts by pyogenetic micrococci, and this no doubt plays a part ; but it must be admitted that these organisms are sometimes absent, or so few in number as to be unimportant, pustules of acne differing in this respect from those of impetigo. Unna denies the activity of the staphylococci entirely, and regards all stages of acne, even the most severe, as due to his acne bacillus. The suppuration of acne follicles is often connected with a seborrhœic process of the skin, or the adjacent scalp, whence microbes are scattered upon the face and shoulders. It is noticeable that this form of suppuration does not cause enlargement of lymphatic glands, which even with a slight eruption of impetigo swell up immediately.

Influence of diet.—On the other hand, I am persuaded from observation and personal experience that certain articles of food have a direct

influence in causing the suppuration of acne. Many persons who are subject to comedones find that inflammation of the follicles is produced with certainty by malt liquors, sweets, or rich food generally. Sparkling wines are credited with the same effect. Some young men can produce this result with experimental precision, especially if living in town and taking insufficient exercise, although with abundant open air exercise they can indulge in such articles of diet with impunity. Constipation, gastric and hepatic disturbances are also important contributory causes; and, in women, disturbances of menstruation.

Time of life.—The time of commencement of acne in the form of comedones is, as already stated, about the time of puberty; but the period of occurrence of severe acne is naturally somewhat later. The liability to this affection continues through adolescence and early adult life, sometimes lasting till thirty or even later; it continues longer on the shoulders and back than on the face. It may come to an end spontaneously, when the beard and the hairs of the trunk are fully developed; or may not be checked till the affected glands and hair follicles are actually destroyed by suppuration, leaving scars.

There is no proof that any *constitutional condition* has much to do with the production of acne, though like other obstinate inflammations it has been called scrofulous. A white face and pasty complexion often accompany the disease in young girls; but the condition of the skin itself is often responsible for this, and not general anæmia. It often occurs in healthy and robust young men. Perhaps a certain vulnerability of tissue, which predisposes to inflammation in general, may also dispose to this, or make it more severe.

Acne is not often complicated with any other affection of the skin except seborrhœa of the scalp, which is a very frequent accompaniment.

A combination with eczema of the face is not common, but, when it occurs, constitutes a serious difficulty in treatment. Boils are not specially common in the subjects of acne.

Simple pustular acne.—Suppurative inflammation of the sebaceous glands may occur independently of the previous occurrence of comedones, producing small pustules which, if not exclusively, are chiefly seen on the face, neck, and shoulders. This form of acne occurs in some women at the menstrual period; in other cases it is connected with seborrhœa of the scalp, and accompanied by seborrhœic patches on the same region. As it is not limited to any particular period of life, and not based upon comedones, the significance of this particular form of acne is often missed. It can only be understood in its connection with seborrhœa, which is explained in the article "Seborrhœa" (p. 759).

Artificial acne.—Beside these an eruption called acne is produced by certain drugs and external irritants. The eruptions produced by bromide and iodide of potassium are often of this kind (see subsequent section on "Drug Eruptions"). Tar, paraffin, or similar substances

rubbed into the skin penetrate the hair follicles, and in course of time set up inflammation of the follicle and sebaceous gland, producing red and hard papules, which have received the name of tar acne. Tar alone rarely causes suppuration, but stronger irritants, such as croton oil, readily do so. These eruptions, being of artificial origin and quite unconnected with the disease acne, are not further considered here.

Treatment of Acne.—(1) *Treatment of Comedones or Acne punctata.*—No constitutional or general treatment is of much avail: the indications are to cleanse and sterilise the skin, to make up by mechanical means for the deficient mobility of the rudimentary hairs, and to extract the comedones when necessary. It is usually recommended to steam the face over hot water, but this is not always satisfactory; indeed I have known patients complain of its producing new comedones. It is better to sponge with hot water, and then to apply soap to the skin with energetic friction. Soft soap is useful if the skin be not too delicate, or yellow soap may be used; but there are advantages in using medicated soaps containing sulphur, tar, or a combination of these substances. Ichthyol soap serves the same purpose. On washing off the soap, friction with a towel or some form of "massage" is very useful. The best local application is sulphur in the form of lotion: ℞ Sulph. præcipitat. gr. xxx., glycerin. ʒss., spirit. camph. ♏ij., aq. calcis ad ℥j. Ft. lotio. For delicate skins half the lime water may be replaced by rose water. It improves with keeping. If a milder sulphur lotion be indicated, the following is useful: ℞ Sulph. præcip. gr. viii., pulv. amyli gr. viii., glycerin. ♏xv., aq. rosæ ad ℥j. Lotions of perchloride of mercury are also useful, but must not of course be used with sulphur applications. Comedones should be pressed out with a suitable instrument, but only when they come out easily. It is undesirable to use common keys or watch-keys, as these tubes cannot be cleaned. It is only necessary to have a tube of convenient size open at the top or sides so that it can be properly washed out. With a little skill a piece of thick-walled glass tube may be adapted, but other suitable instruments may be bought in the shops.

Lotion containing sulphur, or some antiseptic, should be applied immediately after the extraction.

No internal treatment has any effect on the production of comedones, but, as the skin is generally dull, pale, and badly nourished, its condition may be improved by small doses of arsenic. Some would give iron. Great improvement may be effected by treatment, but it should be remembered that recurrence of comedones is probable, and in persons under twenty almost certain; and that the affection is always chronic.

(2) *Treatment of Inflammatory Acne.*—Even in the inflamed stage common acne requires the same local treatment as that recommended for comedones, but more active antiseptics are necessary. It is well to begin with washing the face and head with an antiseptic soap—one containing biniodide of mercury I find the most useful; or a perchloride solution

(1 to 1000) may be applied daily; or the following: ℞ Hyd. perchlor. gr. j., mist. amygdalæ ℥j. Ft. lotio. These mercurials must not be used simultaneously with sulphur, as a black compound may be formed. The sulphur lotions before mentioned may be used with the addition of five or ten minims of carbolic acid, or ten grains of resorcin, to the ounce. If there be much heat and redness of the skin, oxide of zinc may be combined with sulphur. Sometimes ointments are preferable, especially for direct application to the pustules; for instance, ℞ Sulph. præcipitat. gr. xv., acid. carbol. ♏ xv., paraffin. moll. ℥j.—or other preparations of sulphur. Erasmus Wilson recommended iodide of sulphur and hypochloride of sulphur (Chlorine disulphide). Resorcin has an independent value, but its action is much like that of carbolic acid.

Small pustules should be touched with a minute drop of strong carbolic acid, larger pustules incised, and a little carbolic acid introduced on a pointed piece of wood after the pus is squeezed out. Subcutaneous abscesses should be thoroughly treated in order to prevent or minimise scarring. It should be remembered that the prolonged use of sulphur preparations on the skin may lead to hypertrichosis. For reasons stated elsewhere, the scalp should receive antiseptic treatment.

Internal treatment in this form of acne is not to be neglected. Diet should be regulated by excluding malt liquors, sweets, and rich kinds of food. Stimulants must be rigidly restricted. Purgatives are often necessary, of which the best is some natural saline water taken every morning. Gastric indigestion, if present, requires treatment especially by bismuth and alkalies; and the profounder forms of indigestion, referred to the liver, call for blue pill or calomel, drugs which sometimes have a remarkable effect on the complexion.

There is no specific for acne, but the internal administration of sulphur in confection or the old-fashioned "brimstone and treacle" has often a striking effect. It is not necessary that it should act on the bowels, but that it should be absorbed into the blood and be eliminated by the cutaneous glands.

Great stress is laid by some upon the anæmia of acne patients and its treatment by iron. Doubtless any fault in general health requires correction, but I am doubtful about the connection of acne and anæmia. Arsenic, on the other hand, is sometimes useful by improving the nutrition of the skin.

Abundant fresh air and exercise, which favour oxidation, undoubtedly check the inflammation of acne; and free perspiration exerts a favourable influence. By a combination of external, internal, and dietetic treatment the suppuration of acne, which is the worst feature of the disease, can be controlled or abolished, even though the tendency to the production of comedones should remain.

J. F. Payne.

SEBORRHŒA

Definition.—A disturbance of the function of the sebaceous glands, giving rise either to increased secretion or to imperfect removal (or both) of the sebum, which accumulates on the surface of the skin.

The name seborrhœa (more correctly steatorrhœa) is not a satisfactory one. It ought to mean an excessive flow of sebum, but in many cases there is no excessive production, only an alteration in the quality of the secretion. There are two varieties of this affection: (i.) *Seborrhœa oleosa* and (ii.) *Seborrhœa sicca* (also called Pityriasis capillitii, Alopecia pityrodes, dandriff). In the former kind there is an excess of oleaginous secretion, so that the parts affected appear oily and the hairy greasy. The dried secretion forms crusts, and sometimes, especially in children, thick yellow masses looking much like eczema; but it is distinguished from this disease by the facts that the skin is pale and not inflamed. The second, or dry seborrhœa, is the commoner form. On the scalp it is characterised by profuse formation of scales, the scales being sometimes dry, silvery, and loose, but on the other hand sometimes yellowish and closely adherent, so as not to be seen without close inspection. They may occur either in discrete patches, limited to certain parts, or diffusely. Although these scales do not appear greasy to the eye, when examined microscopically, or treated with ether, a large amount of oil may be demonstrated. According to Pincus, two-fifths of the weight may be extracted by ether. Besides this scaly condition, known as dandriff, there is a peculiarity of the hairs also: they are dry, without lustre, and look dusty. This is due to the fact that the sebum accumulates in the epidermic scales instead of spreading down the hair-shaft. The individual hairs also become finer and smaller, that is, atrophied; and they often fall out, so as to produce baldness. There is, generally speaking, much itching, often a sense of heat, and even actual congestion, causing palpable warmth of the surface. When there is distinct inflammation of the skin the condition is generally spoken of as eczema.

(i.) **Seborrhœa oleosa** is more common in children. If the heads of new-born infants are left unwashed, as is the custom in some countries, a thick brown greasy crust is formed, representing the vernix caseosa which covers the body of the fœtus; it is very rarely seen in this country. It may come on in older children, from neglect and sometimes in adults, usually from unexplained causes. One variety, producing thick crusts on the scalp, occurs in syphilis, but it is different from other syphiloderms.

To understand the production of crusts we must remember that sebum is not a pure secretion, but that the fatty matter results from metabolism and breaking down of the glandular cells; consequently the sebum contains epithelial structures, or their remains.

This form of seborrhœa sometimes comes on the scalp in an acute form, and may cause considerable falling out of hair. More rarely it affects the face, forming thick yellow crusts, and may be (like the dry form) the forerunner of eczema.

(ii.) **Seborrhœa sicca.**—In this condition the sebaceous secretion does not appear to be increased, but it is thicker and less oily than natural. In addition to production of fat the cell metabolism appears partly to take the form of keratinisation. The excretion is not obstructed (as in acne), but the altered secretion spreads along the epidermis as usual. The surface then appears less greasy than usual, and as the thickened sebum is unable to run down and lubricate the hair-shaft, the hairs have the characters noted above. The whole process has much analogy with the first stage of acne (or production of comedones), and is frequently combined with it. Unna regards the process as one especially affecting the sudoriparous or coil glands, to which he attributes the production of cutaneous fat. But one reason, among others, against this opinion is that the seborrhœic process never occurs on parts destitute of sebaceous glands (for example, the palms and soles); nor on parts where these structures are destroyed, as the bald scalp, though the sweat-glands remain active.

General course of seborrhœa sicca.—This condition may begin at any age, and has no relation to any one stage of development of the skin or its appendages. Many causes have been assigned; it has been attributed to conditions of bad health, indigestion especially, but it is often found in perfectly healthy people. It has also been set down to various ways of covering the head, especially to tight hats; but it is equally common in women who do not wear such head-coverings. In all probability it is due to some specific microbe or microbes, though it should be remembered that some degree of desquamation of the scalp is normal, being the physiological method by which the skin of the head is kept free from external contamination. But the distinct morbid process marked by desquamation of skin and atrophy of hair is itself very common, and its cause therefore must be widely distributed. Contagion, which would be evidence of specific infection, is on this account not easily traced, but the affection certainly sometimes spreads in families, and common customs of hair-cutting and so forth favour contagion. Numerous attempts have been made to isolate some specific form of bacterium. The organisms met with are very numerous. Besides the common saccharomyces, or yeast of the scalp, regarded by Unna as a bacillus, large numbers of micrococci are continually met with. Numerous other organisms of various kinds may be cultivated from the scales. Unna believes he has found the specific organism in a special kind of diplococcus. Sabouraud's recent elaborate researches have shown that a bacillus apparently identical with Unna's is found not only in seborrhœa, but in acne and in alopecia areata also. He accordingly regards these three diseases as produced by the same bacillus; though in the case of acne combined with others to which part of the morbid

process is due, these important conclusions cannot be fully discussed here (see subsequent article on "Bacteria of the Skin").

Diagnosis.—There is generally no difficulty in recognising common seborrhœa. The severe forms may be confounded with eczema, or with psoriasis. From eczema it is distinguished by the less marked irritation and the absence of exudation, but, as seborrhœa may pass into or give rise to eczema, the distinction is one of degree. Psoriasis forms thicker and more silvery scales, is generally limited (not universal), and does not destroy the hair. But, since psoriasis of the scalp is often complicated with seborrhœa, the distinction can sometimes be made only by treatment, the seborrhœa being cured while the psoriasis persists.

Prognosis.—If the seborrhœic process be unchecked it sooner or later causes atrophy of the hairs, and is one of the chief causes of baldness. In women it may be the chief or perhaps the only cause; in men it complicates the typical alopecia which we regard as hereditary or inevitable.

Seborrhœa corporis.—The same condition which affects the scalp may affect the skin of other parts, and usually after it has existed for a considerable time on the head. It frequently extends on the face, affecting the eyebrows and forehead, then the nostrils and adjacent parts of the cheeks, and less frequently the chin. Sometimes it extends over the nape of the neck and the ear. In these situations it takes the form of bright or pale red patches, covered with thin branny scales, sometimes thick and continuous, which are often yellowish from the admixture of fat. Isolated patches may also be seen on the sternal region of the chest, and between the scapulæ behind. In this situation the scaly patches are sometimes annular, and were formerly described as lichen annulatus (Erasmus Wilson), circinatus, or circumscriptus. Each begins, however, with a papule, like acne, which extends peripherally to form a scaly patch. If the central portion heal, the form of a ring is produced. On slightly scratching these papules or patches we see minute points of hæmorrhage, not of exudation; whereby we distinguish the process from eczema. The scaly patches or rings are somewhat raised, and yellowish with bright red points; while the smooth central areas are of a pale fawn colour, which is very characteristic. Surfaces some inches in diameter may be thus affected. The production of these patches on the trunk is so much favoured by warm underclothing that the eruption has been called "flannel rash." It is especially produced when the same underclothing is worn day and night.

Connection of seborrhœa with eczema.—According to Unna and others the whole process above described is a kind of eczema, but I think it better to give the latter name only to those cases in which there is distinct inflammation and exudation of the eczematous type. Eczema often originates in seborrhœa, though perhaps not until the latter has existed for some years. When this takes place the affection is much more likely to extend, and secondary patches of inflammation, called seborrhœic

eczema, are produced on the face, trunk, or limbs. The true seborrhœa corporis has much the same regional distribution as acne. The connection of this affection with dandriff of the scalp was first brought out by Unna, an important clinical generalisation.

Other consequences of seborrhœa.—The persistence of dry seborrhœa on the scalp appears to convert that part into a nursery of various kinds of microbes; and this fact is probably responsible for the occurrence of scattered foci of suppuration on the face, neck, shoulders, and adjacent parts of the surface. These secondary suppurations may take the form of—(i.) Inflammatory acne. The original acne punctata is probably concurrent with seborrhœa, not caused by it; but the suppuration of acne spots I believe to be largely influenced by the falling down of bacteria (micrococci?) from a scurfy head. A form of simple pustular acne, without comedones, may be even directly caused by this process. (ii.) Boils on the neck and shoulders. (iii.) Stye (hordeolum) in the eyelids of children. The therapeutic indication derived from this connection is obviously to render the scalp aseptic.

Treatment of seborrhœa.—There are many popular remedies for dandriff. Washing, alkalies, lime water, borax, etc., have some efficacy in removing the scurfy condition, for a time. And admitting that this condition is almost certainly due to the action of microbes, we treat it upon this supposition. Hence first we shall disinfect the skin of the head as thoroughly as possible. For this purpose an antiseptic soap may be used; I prefer one containing biniodide of mercury. After washing with this a few times the scalp is to be brushed over with perchloride of mercury solution (1 to 1000), either aqueous or alcoholic. But this treatment is not sufficient, and irritation is often produced by the antiseptic; we then have recourse to sulphur combined with carbolic acid or tar as follows:—℞ Sulph. præcip. gr. xv., acid. carbol. ♏xv., ol. amygd. amar. ♏iij., paraffin moll. ℥j. Ft. unguent. Coal-tar solution may be substituted for carbolic acid, and the ointment may be scented with any essential oil. Resorcin, either in a lotion (2 to 5 per cent) or combined with sulphur in an ointment (the same proportions as given for carbolic acid), is also a very efficacious means. The ointment should be rubbed thoroughly into the roots of the hair once a day for a fortnight, and afterwards used occasionally. Since patients will not tolerate greasy applications for very long, a lotion or hair wash must then be substituted. The following prescriptions are useful:—℞ Liq. carbon. deterg. ♏iv. ad x., glycerin. ℥ss., aq. rosæ ad ℥j. Ft. lotio. ℞ Glycerin. acid. tannici ℥j. ad ℥ij., acid. carbol. ♏v., aq. rosæ ad ℥j. Ft. lotio. ℞ Acet. cantharidis ℥ss., hydrarg. perchlor. gr. j., spirit. camph. ♏iij., aq. destill. ad ℥j. The latter is used only when there is an entire absence of inflammation, as a stimulant to hair-growth.

Too frequent washing with insufficient drying greatly favours the production of dandriff, and must be avoided; but occasional washings with antiseptic soap should be continued. Seborrhœa of the body, if

not complicated with eczema, is easily got rid of by thorough washing followed by a sulphur ointment or lotion, or one of the other remedies recommended above for the scalp. In all affections of the head, brushes, combs, and other articles should be kept thoroughly disinfected with borax or carbolic acid.

Treatment of seborrhœa oleosa.—The first step here is thoroughly to remove the sebaceous crusts, for which purpose inunction with some oily substance—such as pure olive oil, carbolised oil, a mixture of equal parts olive oil and fresh lard, or others—is necessary. These should be left on for twelve hours, and the head then washed with soap or, if the skin is inflamed, with yolk of egg. The subsequent treatment is the same as for the other variety. Sulphur in some form is the most efficient remedy.

Internal treatment of seborrhœa.—Generally speaking, no internal treatment is necessary, and from my own experience I believe that internal conditions have little to do with the production of seborrhœa. But two points have to be considered :—

(1) Gastric dyspepsia, though far from producing seborrhœa of the scalp, may aggravate the condition when present, chiefly by producing irritation of the skin and consequent scratching. The same is true of constipation. It may then not be superfluous to correct morbid conditions of the stomach and bowels as far as possible.

(2) The general nutrition of the skin may be bad, and consequently the seborrhœic process gets firmer hold. Hence it may be advantageous to give a course of arsenic, which has acquired a special reputation in the treatment of certain forms of seborrhœa corporis.

J. F. PAYNE.

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J. F. P.

MILIUM

SYN.—*Grutum; Strophulus albidus.*

Definition.—A collection of sebaceous matter with epithelial cells, situated just below the epidermis, without any excretory duct or opening, projecting slightly above the surface.

Milium forms firm white or yellowish masses, from the size of a pin's head to that of a small pea. The mass is composed of dry sebaceous matter surrounded by numerous epithelial cells arranged concentrically, so as to form a globular or lobulated structure, which, when the epidermis is incised, is easily shelled out. Kaposi states that it is covered by a thin layer of corium as well as epidermis. The little tumour originates in a sebaceous gland, the orifice of which is obstructed, either mechanically or by the accumulation of glandular epithelial cells which only partially undergo the usual fatty degeneration, becoming dry and horny, so as not to be excreted in the usual form of sebum. Mechanical obstruction is seen when milium follows some inflammation of the skin, such as pemphigus or erysipelas (as observed by Kaposi), or is produced in the scars of various destructive processes. In the more ordinary form there is no mechanical obstruction; but the accumulation of sebaceous product is caused by imperfect metabolism, as above described.

Some authors, as Robinson and Philippson, maintain that some milia originate independently of any connection with sebaceous glands or hair follicles, or superficial epidermis, in groups of horny epithelial cells deeply embedded in the corium. In this case it is necessary to assume that such groups of cells are composed of embryonic epithelium, derived from the glands or rete mucosum, and misplaced at an early period in the development of the skin.

Situation.—Milium is most commonly seen on the upper or under eyelids and the adjacent parts of cheeks or forehead; more rarely on the margin of the lips; but not on the nose or on the hairy parts of the face.

Another common situation is the genital organs; on the scrotum, or more especially the prepuce and corona glandis, they are sometimes very numerous. In the female sex they may occur on the inner surface of the labia minora. On the other regions of the body they occur very rarely, and then only in scars.

The distribution of this affection thus corresponds partially to that of comedones, being limited to parts where sebaceous glands are numerous. Milium differs from comedo in being covered with epidermis, and in not being connected with the rudimentary hairs which are the starting-points of comedones. I should add that Virchow and Rindfleisch trace

the origin of milium to the sacs of the finest lanugo hairs; yet this would not explain the origin of milium on the prepuce, where there are neither hairs nor rudiments of hairs. In other regions of the body there are probably no sebaceous glands unconnected with hairs, complete or rudimentary. At all events the hair follicle itself is not involved in this process, unless very exceptionally.

Course and development.—Milium arises slowly and, when once formed, may remain unchanged for years. Sometimes the contents become calcified, as little calcareous masses or cutaneous calculi.

Etiology.—No constitutional or internal cause can be traced. In some cases milium of the eyelids is combined with xanthelasma palpebrarum, and may thus be associated with some disturbance of the function of the liver. They may be very numerous in children, and this form received from Willan the name of Strophulus albidus.

Treatment.—If, in consequence of the disfigurement of the face, any treatment be required, the skin over the little tumours must be incised with a fine knife, and the contents squeezed out. There is little bleeding, and no scar results.

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J. F. P.

MILIUM COLLOID

SYN.—*Colloid milium; Colloid degeneration of the skin.*

THE peculiar affection thus named was first described by E. Wagner in 1866.

It consists of small tumours or lumps, the size of a hemp-seed or more, covered by continuous epidermis. The substance is yellowish, translucent, and of gelatinous consistence; there is no orifice, but on incising the skin over them some gelatinous material may be squeezed out.

The distribution of these little tumours is remarkable. They are found especially round the orbits or the adjacent parts of the cheeks, and on the forehead. I have also seen them on the ears, and behind the ears.

The cause of this affection is quite unknown; it is not produced by any external irritant, nor can any constitutional state or internal cause be traced. Wagner regarded it as a colloid degeneration of ordinary milium, but this can hardly be maintained. Besnier and other French

authors call it "Colloid degeneration of the skin" (corium); and Dr. Robert Liveing calls it "Colloid disease of the skin."

Since the change evidently begins in certain definite structures, not in the skin generally, and there is some production of new material, the term "degeneration," though partially true, is inadequate; other observers have traced the morbid process to the sweat-glands. Philippson refers it to the degeneration of collections of epithelial cells misplaced during development of the corium.

From a careful histological examination of the only case which has come under my care, I have arrived at the conclusion that the colloid change begins in isolated foci deep in the corium, about the level of the sweat-glands, and that these foci are apparently nothing but sweat-glands, altered by degeneration into a translucent material. The colloid material infiltrates the neighbouring connective tissue, and ultimately reaches the epidermis, forming the translucent tumours. If this be so, the affection has no connection with the sebaceous glands, and does not properly come under the head of milium.

Treatment.—There is absolutely no treatment for this affection except the removal or destruction of the nodules. Caustics, such as acid nitrate of mercury, electrolysis, or excision may be tried. But all these processes are painful and leave scars, so that a patient (as happened in my case) may prefer to keep his malady rather than to undergo vexatious treatment for its removal.

J. F. PAYNE.

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J. F. P.

ADENOMA SEBACEUM

SYN.—*Nævus sebaceus* (Bandler); *Végétations vasculaires* (Rayer); *Nævi vasculaires verrugueux* (Darier).

Definition.—Benign tumours situated upon the face, consisting of hypertrophied sebaceous glands; of congenital origin, although not usually noticed at birth.

Historical.—In Rayer's *Atlas* is an undoubted example of this disease under the heading above mentioned; and two cases are distinctly described by this author in his *Treatise* (cases 174, 175).

Two cases which Dr. Crocker regards as examples of adenoma sebaceum are described, provisionally, as forms of "Lichen," by Hilton Fagge in the

Catalogue of Guy's Hospital Museum, Skin Models (1876), and discussed by Addison and Gull in 1850 in relation to vitiligoidea (xanthoma); but only one of them (No. 262) can be accepted. Considerable attention has been drawn to the disease in recent years, dating from two observations by Balzer (1885-86), to whom we owe the name now usually associated with the condition; and a comparatively large number of cases has been recorded in France by Vidal, Hallopeau, Darier, and Besnier; in Germany by Caspary; in the United States by Pollitzer; and by Radcliffe Crocker, Mackenzie, Jamieson, and myself in this country.

Symptoms.—The characteristic lesions consist of little tumours or nodules (sometimes miscalled "papules"), situated on the face, especially in its middle two-thirds; that is, in the usual area of distribution of rosacea. They are most abundant over the nose and along the naso-labial folds, where they are often closely aggregated, although never confluent. In this region the eruption is usually remarkably symmetrical. On the forehead the nodules are less abundant, less symmetrical, larger in size, and less regularly circular in outline. On the chin and cheeks the lesions are intermediate, both in number and in their other characters, between those on the forehead and those about the nose.

The nodules are roundish, firm to the touch, painless, and vary in size from a pin's point to a split pea; they project boldly above the general skin surface; and the epidermis over them, although generally smooth, is sometimes rough, or even warty. When they are pricked and squeezed inspissated sebum is extruded. The uncomplicated lesions are pale waxy white, yellowish, or brownish in colour; and sometimes faintly translucent. In the great majority of cases, however, the presence of vascular telangiectases over and around the essential sebaceous tumours gives the affected area a pinkish or even a vivid crimson colour.

The amount of telangiectasis present varies widely in different cases, and, in what may be called the "telangiectatic type," constitutes its most predominant feature; as the names attached to the disease by Rayer and Darier testify. Generally a few lesions are present at birth, and they continue to increase in number till puberty, the individual nodules remaining unchanged. In a considerable number of cases the condition is not noted till puberty, or even later; thus in Caspary's case it appeared in the seventeenth year, in Pollitzer's in the thirty-first. Occasionally, cystic degeneration of the central portion of some of the nodules occurs, and their softened contents are discharged; but, as a rule, they persist indefinitely without change, although a few may disappear spontaneously, leaving faint cicatrices.

In the great majority of cases other skin deformities are present. Warts, moles, hairy and pigmentary nævi, and multiple skin fibroma may be present in great abundance over the trunk and limbs. The most usual concomitants are groups of hair follicles on the back, surrounded by fibrous thickening so as to form colourless, hempseed-sized papules, and flat fibrous-looking patches dotted over with large comedones (Crocker). In one of Crocker's cases—admirably delineated in his *Atlas*—

and in one of my own cases a large patch of this sort was situated in one iliac region.

The condition is by no means so infrequent as its scanty records and general non-recognition would lead one to suppose. Almost all well-marked cases occur in persons of low mental calibre, or in epileptics, hystero-epileptics and imbeciles, who in early life are relegated to asylums. Almost all the recorded cases have been in persons of the lower classes.

Variants.—Unilateral and circumscribed aggregations of hypertrophied sebaceous glands, appearing in adult life, without concomitant telangiectasis, and in persons of normal mental development, have been described by Crocker, Jamieson, Pollitzer, Bandler, and others, as examples of adenoma sebaceum. It is doubtful to my mind whether they ought to be accepted as such.

Pathological anatomy.—The epidermis is usually normal; in exceptional cases it may be thickened, its interpapillary processes especially being hypertrophied. The true skin is much thickened, owing chiefly to the enormous increase in number, size and complexity of the sebaceous glands. The individual cells are of normal size, and are physiologically active, as the sebaceous matter present in the enlarged acini is healthy. There is no marked round-cell infiltration about the growths, and beyond their hypertrophy no abnormality of the blood-vessels.

Dr. Crocker describes the concurrent existence of hypertrophy of the enormously increased number of sweat-glands, and regards the disease as "really a pilo-sebaceous hidradenoma"; but this view is not borne out by my own observations, nor by those of Unna. Oddly enough, Balzer's case, on which our present nomenclature is based, is now universally regarded as an adenoma of sweat-glands (adenoma *vel* acanthoma adenoides cysticum); upon this complex subject Unna's very elaborate article may be consulted.

Etiology.—The disease is congenital, and the growths arise from isolated portions of the germinal epithelium. As the changes are purely hypertrophic, and not hyperplastic, there seems every reason for accepting the modern view, recently urged by Bandler, that adenoma sebaceum ought to be included in the group of nævi.

Differential diagnosis must be established from hidradenoma, colloid milium, xanthoma, and rosacea. The exudation of sebum after pricking is of importance, and the concomitant phenomena must be taken into consideration. Walker mentions a case of lymphangioma of the skin which absolutely simulated adenoma sebaceum, and suggests that this error in diagnosis is frequent. Excision of a nodule (which can usually be done easily) and microscopic examination will readily clear up any doubt.

Prognosis.—The disease tends to persist indefinitely, although a few elements may disappear spontaneously, leaving some atrophy of skin. At puberty it usually increases, and the disfigurement caused by it may be greatly increased by concomitant rosacea.

Treatment.—The little tumours, if small and few in number, may be successfully destroyed by electrolysis; the negative pole is inserted into them, and a current of about 5 milliampères employed. In conglomerate cases repeated curetting and scarification may achieve a cure, but in my hands these measures have not proved efficacious. Small patches may often be advantageously excised.

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AFFECTIONS OF THE HAIR

I

ALOPECIA.—Alopecia is the generic title for baldness in all forms; whether complete or partial, general or local. Baldness may be classified into congenital, premature—either idiopathic or symptomatic—and senile.

Congenital alopecia.—This is very rare and seldom complete, the hair being usually scanty or in patches; concomitant defects of development of the teeth and nails are not infrequently present.

A comparatively slight development of the hair in all parts of the body is not uncommon, and often shows a family prevalence.

Idiopathic premature alopecia may attack persons of any age after puberty, but is much more common in the male sex. The baldness begins in the posterior part of the vertex and in the temples; in the latter position the hair-line recedes until there is only a central crest, and this also ultimately disappears, and the whole of the top of the head is denuded, leaving only a fringe of hair of varying width below.

The loss of hair is not steadily progressive. The process may be arrested for a time, and there may be even temporary improvement; but unless persevering treatment be adopted the ultimate result is only delayed.

Causes.—In certain families all the male members lose their hair prematurely through many generations. Complete denudation of the regions usually affected generally takes several years, but sometimes is only a matter of months. Although family disposition certainly plays an important part, in the great majority seborrhœa is present, although it may be masked by frequent washing, or by the application of pomades. In these cases the baldness is then symptomatic, and, if the hair is to be restored, the treatment for seborrhœa must be adopted. The family proclivity is only, therefore, a local tissue proclivity favouring the invasion of seborrhœa.

Symptomatic premature alopecia.—While most of the cases of apparently idiopathic baldness are really symptomatic of seborrhœa, a larger number of cases of baldness are secondary to more obvious causes, local or constitutional. Any constitutional condition which leads to the depression of the vital powers is apt to be accompanied or followed by

the falling of the hair in greater or less quantity. The most common and best recognised of these are specific fevers, and general cachectic conditions, such as syphilis, leprosy, phthisis, diabetes mellitus, or myxœdema; or it may follow nervous depression, such as violent shock, intense or prolonged anxiety, and other depressing emotions. Local causes are extremely numerous, but the most fruitful cause, more common than all the rest put together, is chronic dry seborrhœa of the scalp, or, as some authors name it, seborrhœic eczema; although there are no clinical signs of inflammation. It occurs in both sexes and at all ages, and, if left untreated, leads to permanent baldness of the parts most affected—the vertex and temples. Most inflammatory diseases of the scalp, if the inflammation be severe enough, will lead to more or less loss of hair. Erysipelas, small-pox, eczema, and psoriasis are common examples in which the loss is often considerable, but varies with the intensity of the inflammation. In scarring lesions the follicles are destroyed, and permanent baldness therefore results; of this lupus erythematosus, morphœa, and the tertiary lesions of syphilis are well-marked examples. Keratosis, with or without ichthyosis, leads to permanent atrophy of the follicles. Vegetable parasitic diseases may lead to permanent loss of hair, such as occurs in the cicatricial atrophy following favus; or the loss may be temporary, as in tinea tonsurans. Local injuries, such as blows, friction, or continual straining of the hair, will lead to baldness, either temporary or permanent; while baldness in patches is the characteristic feature of alopecia areata.

Treatment.—It is obvious from the foregoing that this depends to a large extent upon the accurate diagnosis of the cause and the possibility of removing it. In morbid constitutional conditions attention to the general health is essential, and whatever means, whether medicinal, dietetic, or hygienic, will restore it to its highest degree, will be best calculated to renew the hair; though local stimulation, to increase the activity of the circulation of the scalp, is also desirable. In congenital and senile baldness treatment is of no avail. In the so-called premature baldness the treatment for seborrhœa is most likely to be successful, but, as in constitutional baldness local treatment is useful, so in local baldness constitutional treatment should be adopted if there be any indication for it in the condition of the patient; for it must be remembered that vigorous hair-growth cannot be expected unless the patient be at the highest standard of health of which he is capable.

When the disease is due to an inflammation of the skin, the hair generally grows again rapidly and vigorously on this being subdued, unless the inflammation had been very intense and suppurative. Local stimulation after this is generally contra-indicated, lest the inflammation be renewed. In parasitic diseases, like ringworm or favus, the destruction of the parasite by means of parasiticides is an obvious indication; and loss of hair is not permanent except after such severe inflammation of the skin as in kerion, or after prolonged pressure as in long-standing favus. Alopecia from syphilis readily responds to appropriate constitutional treatment, with the local application of mercurial preparations, such as the diluted

nitrate, ammoniated, or perchloride of mercury ointment. The treatment for chronic seborrhœa is given in the section on sebaceous diseases (p. 762).

II

ALOPECIA AREATA.—SYN.: *Porrigo decalvans; Tinea decalvans; Area Celsi; Alopecia circumscripta.*—**Definition.**—A form of baldness rapidly produced, with complete denudation of the affected parts, which begins in round patches, but which, by spreading and coalescence, may affect large areas, or even the whole of the hairy system.

Under alopecia areata are comprehended at least five classes of cases:—first, cases where there is universal denudation of the hair and often of the nails, generally of acute onset, and not necessarily in patches; secondly, where there are one or more patches in the course of a nerve or in the site of an injury; thirdly, where there are small atrophically depressed patches; fourthly, the common form which occurs in patches or bands of irregular distribution with characteristic stumps of hair at the border of the spreading patches; and, fifthly, a small seborrhœic class. The first two classes are universally admitted to be of trophoneurotic origin; the third is probably so, and the fourth is the subject of much dispute, many contending that this also is trophoneurotic, although a growing minority, which includes myself, consider it to be of parasitic origin. Assuming this to be correct, the first three classes might be included in one group—Alopecia neurotica, with sub-groups universalis, localis, and circumscripta; while the fourth and fifth would form a group of Alopecia parasitica.

1. Alopecia universalis.—This may be regarded as a malignant form of alopecia. In the worst cases the whole of the hair of the body may be swept off in a few days, together with some or all of the nails; and permanent baldness may result. This may occur without any apparent defect of health, either before or during the defluvium; but in the majority of cases there have been either severe mental or physical shocks—such as acute worry or severe fright, or injuries to the head, by falls or otherwise. In these acute cases the hair does not come out in patches but in masses, or by a general thinning. Where the loss is not so acute, patches may be formed resembling other cases of alopecia areata, and complete denudation is produced by the multiplication of the bald areas and their subsequent coalescence. In this form weeks or months may elapse before the baldness is complete. The nails may be deeply furrowed or pitted, but are seldom lost; and the prognosis for recovery, though still bad, is not so hopeless as in the former case.

2. Alopecia localis seu neuritica.—This form includes cases in which one or more patches of baldness form at the site of an injury, or in the course of a recognisable nerve; and there can be little doubt that they are the result of a neuritis. The patches, when once formed, do not spread. They are often preceded by severe and persistent neuralgia, and may be associated with patches of white hair; not infrequently, indeed,

the hair, when it grows again on the bald patches, is quite white, and it may never recover its colour. This class comprises a comparatively small number of cases.

3. **Alopecia circumscripta seu orbicularis** (Neumann). — This form also is rare, and, the hair-bulbs being completely destroyed, recovery is impossible. The patches in this class are not always circular, but always small, from a lentil to a pea in diameter; they are much depressed below the surface, occur frequently in irregular groups, and are often associated with a marked diminution of the sensibility of the skin. Nutritive changes not infrequently occur at the same time in the nails. These patches must be distinguished from pea-sized, smooth, white bald spots, which occur in the fourth class in some cases, but are not attended with the deep depression of the skin which distinguishes Class 3. The etiology and pathology of this form are unknown, but the implication of the nails is suggestive of a trophoneurotic origin.

4. **Alopecia areata**, in its classical form from which the previous groups have recently been distinguished, comprises a very large percentage of all the alopecias in which the denudation of the affected area is complete; and, taking all forms of skin disease together, it constitutes from 2 to 3 per cent in England and France, about half that number in Scotland, and from ½ to 1 per cent in Germany and America.

This disease usually begins in the scalp, though in men it is not very uncommon in the whiskers or beard; it is comparatively rare for it to begin in other parts. The patches may be single or many. In the latter case they appear at irregular intervals, and without any particular arrangement, symmetry being unusual. While the patches may form in any part of the head they most frequently begin in men at the back part, corresponding with the line of closest contact with the hat. Each patch is primarily circular, and from a half to two inches in diameter. It spreads slowly, but, by coalescence with neighbouring patches, a large area may soon become bald; and in some instances, by a repetition of the process, the baldness may eventually become universal. In more favourable cases, after the patches have attained one or two inches in diameter, they cease to spread; and after a time restoration sets in. In some cases a complete band of baldness is formed all round the lower borders of the hair, with or without patches of the ordinary kind in the upper part.

A bald patch in alopecia areata is perfectly smooth and abnormally white, the tissue is thinned, has lost some of its elasticity, may pit slightly on pressure, and is often slightly depressed below the surrounding surface. The affected skin is also much less sensitive to irritants which would inflame the normal skin, but do not excite any inflammation in the affected patch. So long as it is spreading at the borders, short and characteristic stumps occur usually in small numbers at the spreading edge; they are not numerous as a rule, and are shaped like a note of exclamation (!). The thickening at the free end is but apparent, as it represents the normal thickness of the shaft which is broken off short, the fine end being the atrophied root which is gradually

being extruded. These truncated hairs are of practical importance for diagnosis and prognosis. In my experience they are not found in the indisputably neurotic cases; and, inasmuch as they can be pulled out almost with a touch, and drop out spontaneously a few days after their appearance, they indicate that the disease is still extending. They are usually seen only on the borders of the patch; but when the latter forms very acutely they may be very abundant, and for the first week or two more or less all over it. The activity of the disease may also be gauged by the looseness of the apparently healthy hair round the patch, a moderate pull removing many hairs at a time.

The course of the disease varies both in extent and acuteness. In the most favourable cases there may be only one or two patches of moderate size, which may have formed without attracting the attention of the patient during the process; in others the patches form very rapidly, quantities of hair coming out every morning when combed or brushed, sometimes accompanied with slight itching or some redness of the skin, but more frequently without any obvious symptoms. In the most acute cases fresh patches are continually forming and enlarging, both by peripheral extension and coalescence with their neighbours, until the whole of the scalp is denuded of hair. Eyebrows and eyelashes may also be involved, a condition which imparts a peculiar staring appearance which at once attracts attention; and there is often not a hair left on the face. The trunk is less frequently attacked; but the axillæ and pubes may be denuded, and in some cases even the lanugo hair of the extensor aspect of the limbs may be cleared off. In the latter instances symmetry in the process of denudation is sometimes observed, although on the scalp the absence of symmetry is equally notable and, except in the occipital region which is frequently the first to be attacked, the arrangement of the patches apparently accidental. The rapid and extensive cases just described are fortunately the least common. As a rule the progress is gradual, many weeks or months being required for the denudation of the whole scalp; and more frequently still the activity of the disease ceases with the formation of a moderate number of patches. Sometimes, however, the apparent cessation of the activity is but temporary or partial, hair growing over some patches while fresh ones form from time to time; or, again, the hair that does grow may not be really strong, it may not get beyond the downy condition, and after a time falls off again.

One of the first signs of improvement is the absence of the stumps already described; then the hair round the patches is no longer loose, and next new hair begins to spring up at the periphery of the patch, or, in the most favourable cases, simultaneously over the whole area. The new hair is at first very fine and colourless, and in some cases, even in dark-haired people, may be perfectly white for some time after it is fully grown, producing a curious piebald appearance; ultimately, however, unless the patient is rather elderly, the pigment is perfectly restored; the pigment appears first at the root end, as might be expected. The duration of the disease is very variable; the majority of cases take

from one to two years for complete recovery; some patients get well in a few months, whilst others take several years. As a rule, however, the prognosis is fairly good for the majority of cases of partial alopecia under fifty; and even of the generalised cases many end in recovery either partial or complete. The prognosis becomes bad if the denudation has been very rapid and complete, or if after a year there is no sign of regeneration anywhere; but no case should be given up until after thorough and prolonged treatment, as sometimes recovery takes place in the most unpromising instances. When, however, the scalp is thinned, and the orifices of the follicles to a great extent are obliterated, the hair follicles have probably atrophied past recovery. Even when the hair has completely grown the patient is not quite safe; relapses occur in fully ten per cent of the cases, sometimes soon after apparent recovery; in others only after many years. The most unfortunate are scarcely ever free from one or more bald patches.

5. The fifth class is not a large one in my experience. There is very marked general seborrhœa capitis with usually only a small number of smooth bald patches. The ! hairs are often absent, and the cases are generally amenable to treatment. This class derives some importance in connection with Sabouraud's hypothesis of the causation of alopecia areata by the seborrhœic bacillus, which will be discussed under the pathology.

Etiology.—The disease is almost equally common in both sexes. With regard to age it is distinctly more common in the young, considerably over half occur in patients under twenty years old, but the extremes are two and sixty years.

The causation of the neurotic groups, about which there is no dispute, has been discussed in their description.

Pathology.—The first three groups, as already explained, are admittedly trophoneurotic; but about the fourth group there is still much difference of opinion, many considering that this form also is trophoneurotic. The grounds on which I and others hold the parasitic hypothesis are as follows:—In a certain number of cases, not very large it is true, but continually increasing, there is conclusive evidence of the communication of the disease by direct contagion; in a very large number the circumstances under which the patients describe the first appearance of the bald patches suggest that contagion was the cause; a considerable number of instances are now on record in which the disease occurred in large groups, either in an institution such as a school, or where men are aggregated together, as in regiments and in a brigade of firemen. Several of these have occurred in France owing to the promiscuous use of the tondeuse or hair-clipper in the army. In some cases there appears to be a relationship between ringworm and alopecia areata. Adults who have been attending to children with ringworm have manifested bald patches indistinguishable from alopecia areata. Instances occur where one member of a family has had bald patches, with note of exclamation hairs, whilst the other children have

had ringworm in the ordinary form. Cases of ringworm occur in which transition into alopecia areata takes place under observation. In countries where ringworm is most common, such as France and England, alopecia areata is common likewise. According to Mr. Hutchinson, adults who have alopecia areata have always suffered from ringworm in childhood. Ringworm, however, is so common that this statement, even if it is to be trusted, would not prove much concerning the kinship of the two diseases. Finally, in a certain number of cases, organisms indistinguishable from those of tinea tonsurans can, in my opinion, be demonstrated in fragments of the root-sheath which is still attached to the hair-shaft, but never in the substance of the hair itself. These organisms are never found in the atrophied ! stumps. The opponents of the parasitic hypothesis rely on the comparative rarity of the instances in which contagion can be proved. They exclude all the cases of children in which bald patches have occurred after contact with ringworm, by asserting that there is a bald form of ringworm which occurs in children only, and which is pathologically different from alopecia areata, though clinically it appears to be identical with it. They point to the fact that, in a large number of cases, no fungus can be found, that those observers who have found organisms are not in agreement as to their nature and identity, and, finally, assert that if an organism be found the case is not alopecia areata.

Against all these it may be urged that there are sufficient authentic positive observations to outweigh the negative objections; to assert that the clinical facts, as regards adults, are accounted for on a trophoneurotic hypothesis, and to refuse to accept a case as alopecia areata if an organism be found, is to beg the question.

Very recently Sabouraud, in an elaborate essay founded on a most laborious and painstaking research, has asserted that the same bacillus which he has constantly found in seborrhœic baldness, and considers to be the cause of it, is also present invariably as the cause of all cases of alopecia areata. Unfortunately, while the presence of these organisms in alopecia areata is not disputed, Sabouraud's suggestion will not account for all the phases of alopecia areata. In short, no one hypothesis will explain all cases, and the clinical facts can only be accounted for by explaining some cases on a trophoneurotic supposition, and others on a parasitic. Whether this be coccogenic, or indirectly hyphogenic, remains for solution by further research and observation.

Diagnosis.—The diagnosis of the ordinary form is not difficult. The occurrence of circular perfectly bald areas, in which the skin is smooth, white and thinned, with, at the outset, a certain number of the ! stumps, is quite characteristic. In microsporon ringworm also there are round bald patches, but the baldness is seen on close inspection to be only comparative; the surface, instead of being smooth, is scaly, and is covered with hair-stumps of a very different character from those of alopecia areata, being bent, broken, and twisted, and only to be extracted with pain and difficulty; or on slight traction they may break off short. Moreover, the

fungus elements are always to be found easily in these stumps, while in alopecia areata they are never found in the stumps, but only, if at all, in the loose hairs of the periphery, to which some portions of root-sheath are attached. In megalosporon ringworm, in which the patches are more definitely circular, the baldness, as a rule, is more complete, and there may be but a few stumps above the surface; these, however, are very brittle, dull, and lustreless, quite different from those of alopecia areata, and the microscope readily reveals chains of sporulated mycelium, situated either on or in the hair-stumps. Cases of pea-sized, smooth, bald spots are also seen to be due to ringworm, and careful search will generally reveal a ringworm stump near the bald spot.

The various groups of alopecia areata have been sufficiently distinguished in their description.

Treatment.—The internal therapeutics of alopecia areata are admittedly unsatisfactory. Those who believe in the trophoneurotic hypothesis for all cases give nervine and other tonics; but even in indisputably neurotic cases I have never been able to note decisive benefit from their administration. On the other hand, when the activity of the disease has ceased, and the purpose of restoring the hair remains, change of air, especially to a bracing climate, has appeared, in a certain number of instances, to start the growth of hair, or at any rate to make it more vigorous. This is only what might reasonably be expected on either supposition, as hair-growth is always largely dependent on the general vigour. In some few instances pilocarpine, administered either hypodermically or by the mouth to the point of sweating, has appeared to be beneficial: it is best given at night; and, to avoid chills, the patient should sleep in flannel, or between the blankets. One-sixth of a grain of the nitrate may be given in solution by the mouth.

Local treatment is, however, of considerable importance. In an early stage blistering is sometimes successful in arresting the spread of the disease; liquor epispasticus may be painted on or around the bald patch, but in my opinion Bulkley's plan of rubbing on strong carbolic acid is preferable. This application does not actually blister, but the skin of the part to which it is applied peels off in a few days; of course a small area only should be treated at a time. The other local remedies which find advocates are legion, and testify rather to the obstinacy of the affection than to the infallibility of the remedies. Viewed as a whole, however, it will be found that the remedies which have the most advocates are all stimulating parasiticides, generally applied with friction; and as one object of the treatment must be to improve the circulation in the diseased area, this may best be effected by rubefacients, friction, and, in a later stage, galvanism or faradism. As a consequence of these principles of treatment, the wearing of wigs should be discouraged as much as possible, as the pressure of the springs interferes notably with the cutaneous circulation; general shaving then, although in itself not injurious, is better avoided because it necessarily entails the use of a wig. In my hands the most useful remedies are perchloride of mercury and turpentine.

These may be usefully combined in the proportion of from two to five grains of perchloride of mercury, a drachm of spirit, and seven drachms of turpentine or oleum pini sylvestris; the mixture must be freshly made every week. Sponging the part with acetic acid in the proportion of one to four of water, and then painting on tincture of iodine, is also useful. In some obstinate cases a chrysarobin ointment—from 5 to 10 per cent—well rubbed into a small area is very valuable. It should not be used too near the face, nor over the whole head, on account of the severe erythema which may be excited by its use. Its use is still further restricted by its dyeing the rest of the hair an indelible purple, and by its staining all articles of linen in a similar manner. Other methods of treatment are rubbing in sulphur ointment, biniodide of mercury ointment (five grains or more to the ounce of lard), strong liniments such as a compound camphor, the expressed oil of mace, and many other similar applications. In all these the shampooing necessary for their thorough application plays an important part in the treatment. Neither the patient nor the medical attendant must be disheartened by the slow progress, which is often the best that can be attained; remembering that steady perseverance is sometimes successful in long-standing, very obstinate, and apparently hopeless cases.

III

CANITIES.—SYN.: *Grayness or whiteness of the hair; Poliothrix.*

There are all grades of whiteness of the hair, both as regards proportion and distribution of the abnormally white to that of the normal tint, and the way the pigment is distributed through each hair.

The white hair may be uniformly disseminated through the normally coloured hair; or it may be more marked in some regions than others; or the white hair may be in one or more tufts; or the scalp may be white, and the rest normal, or only gray; or only one of the other regions—such as the eyebrows—may be affected; or, finally, the whole of the hair in every region of the body may be completely white.

Canities, as a rule, comes on very gradually; but in some cases the change is more rapid; there are some well-authenticated instances in which partial or complete blanching occurred in twenty-four hours. As a rule canities, when once established, is permanent; but there are instances in which the hair of man has behaved like that of Arctic animals, and was gray in winter and dark in summer; and, again, in which perfectly white hair in men of sixty or more has become dark again. In individual hairs also the whiteness may be partial, being limited to either end or both ends; or the whiteness may be in narrow rings alternating with dark rings, constituting the so-called "ringed hair."

Causes.—Canities may be one of many evidences of senile decay, premature or normal as regards the age of the patient; or it may occur in young patients—even in early childhood. In children it is generally in tufts or bands, and occasionally one or more tufts have been present

at birth, and this feature has been hereditary through several generations. When acquired, single tufts have followed severe headache or neuralgia, or have appeared as one of the manifestations of leucodermia; and in alopecia areata the new hair is sometimes quite white for a time. The eyelashes sometimes turn white in symptomatic ophthalmitis, after destruction of the opposite eye. Complete blanching of the whole or part of the hair has occurred after mental shocks, as in poignant grief or intense fear; it may occur also in melancholia. Ordinary premature grayness may follow the exhaustion of specific fevers, or any other such exhausting condition, whether mental or physical. Like other hair abnormalities it often runs in families. Seborrhœa is a common cause of gray hair, but it seldom results from intense follicular inflammation.

The **pathology** of sudden blanching of the hair is supposed to be the rapid formation of minute bubbles of air in the substance of the shaft, but what may be called the normal whiteness of old age is due to the atrophy of the pigment-carrying cells.

Treatment.—As already seen, recovery may take place spontaneously, or as the result of some accidental condition; but this is the exception, and not the rule. Treatment is only likely to be successful if the canities can be traced to a definite and removable cause; thus in a case of chlorosis canities occurred in patches which recovered their colour when the chlorosis was removed. Grayness due to seborrhœa may be successfully combated by treatment appropriate to the latter condition. If it has arisen from nervous or physical strain, then rest, tonics, and other general hygienic measures would be indicated. Pilocarpin nitrate, injected subcutaneously in doses of one-tenth to one-sixth of a grain, has been successful; and faradisation with the electric brush ought to be tried.

IV

Folliculitis.—Inflammation in and around the hair follicle is very common in some form or other, and varies in degree from what clinically appears to be no more than congestion up to destructive suppuration of the whole follicle. It may occur as part of a general inflammation of the skin, as in eczema and psoriasis; or it may constitute the leading feature of the disease, as in the group included under the name "lichen," in pityriasis rubra pilaris, and in several of the hyphomycetic parasitic eruptions such as favus or ringworm, especially the kerion form of the latter; or finally it may constitute the whole disease, as in the folliculitis decalvans of Quinquaud, the dermatitis papillaris capillitii of Kaposi, and coccogenic sycosis. The first two, being very rare, will require only brief notice here.

Leloir's Conglomerative pustular perifolliculitis has been shown by Sabouraud to be due to one of the trichophyton fungi, and is therefore merely a variety of kerion.

Folliculitis decalvans.—This is a chronic folliculitis of the hairy parts, especially of the scalp, which leads to a cicatricial alopecia in patches of about the size of a shilling, smooth and polished except at the

periphery, with an irregular outline, and possibly red points interspersed in the white cicatricially depressed surface. Erythematous, papular or pustular inflammation of the follicles occurs at the periphery of the cicatricial patch. Pus cocci, and other organisms in pairs and fours, have been found in the perifollicular inflammation which characterises the disease. The treatment is an antiseptic one. To stop the disease from spreading, therefore, the parts should be sponged with an acetic acid lotion (one to eight), and then tincture of iodine painted on and round the patch, a procedure which should be repeated for ten days or a fortnight; or, if the patch be a small one, a lotion of perchloride of mercury (one grain to the ounce) may be applied on lint and covered with oiled silk, the dressing being changed night and morning. The hair follicles being completely destroyed by the morbid process, permanent baldness of the parts necessarily results. This disease is probably closely if not pathogenetically related to the next affection, but its site is different, and the process is less deeply seated than the affection described first by Kaposi.

Dermatitis papillaris capillitii is another rare affection which occurs on the hairy border on the back of the neck. It is a suppurative inflammatory process, which begins in the follicles, and is allied to sycosis; being due to the same pus cocci (Ehrmann), but penetrating into the subcutaneous tissue. As usually seen, it forms an oblong patch elevated considerably above the surface; this began as pin's-head-sized papules, pustules, or boils which, being closely crowded together, coalesced into highly vascular papillomatous vegetations, from a quarter to half an inch high, consisting of granulation tissue. In the earlier stage they are crusted and from between the papillæ an offensive sero-pus exudes, and they bleed very easily; ultimately, perhaps after some years, they dry up, shrink, and form an elevated mass of hard connective tissue with tufts of hair projecting through the scar tissue; hence the name, often given to it at this stage, of *Acne keloid*. If seen in the early stage, the best treatment would be to sponge the parts with a one in two thousand perchloride of mercury solution, to syringe out any purulent lesions with carbolic solution, and to dust on iodoform or one of its iodine substitutes. In the hypertrophic scar condition there is nothing to be done except either to excise the projecting mass, or to endeavour to starve the growth by coagulating the blood-vessels at the base by means of electrolysis.

V

Sycosis.—Syn.: *Acne mentagra; Folliculitis barbæ.*

Until recently sycosis was described as being either parasitic or non-parasitic; the parasitic form being due to a ringworm fungus, and sometimes called Tinea barbæ (p. 853). It has now been shown that the so-called non-parasitic sycosis is likewise due to a parasite which has been identified as the staphylococci aureus et albus (pus cocci), which, by their presence in and round the follicles, set up a purulent folliculitis.

We have therefore a coccogenetic and a hyphogenetic sycosis, as Unna

happily called them: it is with the coccogenetic form that this article now deals; the hyphogenetic form or tinea barbæ is described under ringworm (p. 853).

The name sycosis was originally applied to a disease limited as a pustular folliculitis to the beard, whiskers, or moustache; and custom still limits its use to these regions, although a similar folliculitis may attack the eyebrows, lashes, or vibrissæ of the nose, and also the coarse hairs of the axillæ and pubes in both sexes. Folliculitis of the scalp is generally secondary to an eczematous inflammation.

Symptoms.—Sycosis commonly begins in the beard or whiskers by the formation of hemispherical papules or nodules, which soon become pustules, each one pierced by a hair in the centre. At first a few follicles only are affected, and the disease gradually spreads by the invasion of fresh follicles. The extension may be checked when there is only one patch of variable size, or it may gradually extend over the hairy part of the face, chiefly by direct extension, but partly by the formation of fresh foci of follicular inflammation; it has, however, no tendency to travel beyond the hairy margin. At first the hair follicles cannot be pulled out without difficulty and pain, and then always with the root-sheath adherent and swollen all along by serous imbibition. At a later period, if there be free suppuration, the hairs are loosened and can be pulled out easily. Only in the most severe cases are the pustules so closely aggregated that they coalesce, and form fungating projections covered with purulent crusts which present, when these are removed, the appearance of the inside of a fig, whereby the disease gained its present appellation. Most of the so-called typical cases which present this appearance, and were formerly described as true sycosis, are examples of the fungous form of the disease. It is far more common to see the pus dry into thin brown or yellow adherent crusts round the hairs, while fresh pustules form in the neighbourhood from time to time. The result of this inflammation may be complete destruction of the life of the follicle, when the hair falls out, and cicatrisation results with of course permanent loss of hair. The process, as a rule, is very slow, lasting in the majority of cases for many years, with periods of quiescence and activity. It is only in exceptional cases that the whole of the hairy part of the face is involved in a few months. In the more common chronic cases the process is less active; the affected region, as a whole, presents the appearance of general infiltration, with redness partially concealed by white scales or thin crusts with some pustules interspersed, more or less according to the presence of a remission or exacerbation. The process may entirely cease where there is actual cicatrisation, which sometimes results in keloidal thickening. Even when the disease is apparently cured relapses are the rule rather than the exception.

The names *Lupoid sycosis* and *Ulerythema sycosiforme* have been given to a variety which generally begins at the upper part of the whiskers, and travels slowly down with an erythematous margin and marked infiltration of the affected part, on which there may be at first papules, vesicles,

or, in some cases, pustules; or again only redness, scaliness, and thickening. As a result of the process there is cicatricial atrophy and destruction of the hair follicles, but there is probably no essential pathological difference in the process.

Sycosis of the beard and whiskers can obviously occur only in an adult man, though, as already stated, an analogous folliculitis may be seen in other regions in either sex. In those who are subject to chronic rhinitis it begins not infrequently on the upper lip, doubtless from the presence of pus cocci in the discharge. It is said by some authors to be excited by the barber's brush, and although this may occasionally be the case, the disease communicated by barbers is generally the tinea barbæ.

Pathology.—The inflammation excited by these pus cocci is at first perifollicular; then the products of inflammation penetrate the follicle, and produce swellings and disintegration of its cell elements. The pus infiltration decreases in quantity from below upwards; the papilla is comparatively seldom destroyed.

Diagnosis.—The diseases most like it are eczema, tinea sycosis, and tertiary syphilis. Eczema resembles the more chronic cases of sycosis, but is seldom confined to the hairy region; or, if so, probably did not begin there. The inflammation is not primarily follicular, and is at first much more superficial; so that, if a hair be pulled out, it will often be found that the root-sheath is only swollen in the upper part. Sycosis, on the other hand, is always primarily follicular, and extends from the bottom to the top of the follicle. In eczema of long standing, however, the inflammation extends all the way down, and it often clears up everywhere except at the follicle itself, where there is then a secondary folliculitis indistinguishable from the primary; the treatment is, however, at this stage the same. In tinea sycosis the inflammation and whole process are much more acute. The foci have a much greater tendency to multiply, the suppuration, in most cases, is much more free, and the hairs therefore looser, and often may be pulled out painlessly. These conditions should suggest microscopic examinations, and, if hairs with portions of root-sheath attached are selected, the fungus will be found in the sheath, and even in the hair-shaft. Ulcerating tertiary syphilides closely resemble severe sycosis at first sight, and removal of the crusts is often essential to the diagnosis. Ulceration, often of circinate outline, is then discoverable, it will be seen to be not purely follicular, and further examination will generally furnish evidence of past or present specific lesions.

Treatment.—The affection being a local one, no internal treatment is required. Locally, shaving and epilation are important auxiliary measures, to which, however, the patient often objects; either from dread of the pain or because he relies on the presence of the hair to conceal his malady. The pain of either procedure is always much less than the patient anticipates, and when it has once been done he is seldom reluctant to repeat the process. After close clipping the crusts should be softened by soaking in olive oil, when the shaving can be effected

with oil instead of soap. The epilation should be carried out systematically as the hairs grow up, half a square inch or so being cleared daily, until the whole surface has been gone over. Even when the disease has got apparently well, shaving should be continued for a year and more, and relapses are then less likely to occur. The local applications that are most successful are iodoform, or its less disagreeable substitutes, europhen or loretin—10 or 15 grains to the ounce for acute cases. For subacute or chronic cases an ointment of 1 or 2 per cent of oleate of mercury, or the diluted nitrate of mercury, or a weak sulphur ointment (20 grains to the ounce) are appropriate. These ointments are more effectual if rubbed in immediately after epilation. If soap be used for shaving instead of oil, Calvert's carbolic shaving-stick is a useful kind. In cases of long standing, multiple scarification is often valuable, as a preliminary treatment, to reduce the infiltration. In very chronic cases also, liquor potassæ may be painted on a small area, washed off in half a minute, and then boracic or zinc ointment applied immediately. Many other plans are successful, but, whatever the method, steady and unremitting perseverance is essential if the pus cocci are to be completely destroyed.

VI

HIRSUTIES. — SYN. : *Hypertrichiasis ; Hypertrichosis ; Polytrichia ; Trichauxis.*

Hirsuties is applied to an increase in the number or size, or both, of the hairs, which may grow either in the normal or an abnormal position. This overgrowth, when it occurs in normal positions, may be in the direction of the quantity, the coarseness, or the length of the hair ; thus the hair of the head or of the beard may grow to the length of many feet. Overgrowth may also occur in any other part of the natural hairy system ; and occasionally, even where it is usually downy, the lanugo may be developed in length and thickness until the whole body is covered with a kind of fur. This increase seems to be more common in certain races, such as the Burmese, and the Ainos of Yesso.

Slight degrees are common in abnormal positions, while occasionally both women and children may have an enormous growth of moustaches, beards, and whiskers. Among etiological factors, besides occasional racial peculiarities, family disposition often plays an important part. Congenital lumbar hypertrichosis is associated with concealed spina bifida. In women, hirsuties is often associated with disorder of the genital organs, or during the abeyance or disorder of the sexual functions ; it is therefore very common in insane women. It is often associated with amenorrhœa, and with the climacteric period and onwards ; less frequently it may occur at puberty, or during pregnancy. Although moderate excess is common in strong men, many cases of excessive growth in normal positions have occurred after severe illnesses. It sometimes follows local irritation. Unless due to a temporary cause, such as pregnancy or defective health or a local irritant, the overgrowth is usually permanent.

Treatment.—This is only successful when the hirsuties is moderate, such as occurs so commonly on the chin of women; and the only permanently effectual treatment is by electrolysis. A fine needle connected with the negative pole of a galvanic battery is introduced by means of a suitable holder to the bottom of the hair follicle, the needle being kept parallel with the direction of the hair; the circuit is then completed as the patient grasps the positive pole tightly. This pole is a graphite cylinder covered with chamois leather wetted with a solution of salt and water. A current of from three to five milliampères is sufficient. Bubbles of froth appear by the side of the needle, which, if the hairs are coarse, is gently moved round the follicle; after from twenty to thirty seconds the needle is withdrawn, and gentle traction made with forceps; if the hair is not perfectly loose the needle should be replaced. At the site of removal a small red papule is left; this soon flattens down to a red spot, and eventually whitens into a minute scar, which, if the operation were skilfully effected, will only be perceptible where the hairs were coarse. If for any reason this operation cannot be undertaken, temporary removal may be attained by means of epilation, shaving, or depilatories. Epilation makes the hair grow coarser and longer, and frequent shaving is repugnant to most patients; this prejudice habit overcomes, and where the growth is so abundant that it cannot be dealt with by electrolysis, it is the best method of temporary removal, and even by inexpert persons can be safely managed with a mechanical razor. Depilatories are no better than shaving, and are apt by their irritating and caustic action to inflame the skin. One of the best consists of sulphide of barium ℥j., oxide of zinc and powdered starch āā ℥iij. This is mixed into a thin paste with water, and applied to the hairy parts for ten to fifteen minutes; when the skin begins to burn, it is cleaned off, a soothing ointment is applied, and then a starch powder to conceal the redness; but neither this nor any other depilatory is to be recommended. The Röntgen rays remove hair, but how far they can be used safely for this purpose we cannot yet say. In dark persons, to blanch the hair by such means as peroxide of hydrogen has been advised as a mitigation of the deformity.

VII

MONILITHRIX.—SYN.: *Moniliform or beaded hair.*

This is a very rare affection, in which fusiform nodes occur in regular succession from root to tip with narrow connecting portions between them. The nodes and internodes are all uniformly coloured, but the nodes, from their greater thickness, appear darker. The hair easily breaks at the internodes, it is generally short and scanty, and keratosis is a usual concomitant. The affection is not always confined to the scalp, but may affect the whole of the hairy system. In the majority of cases it is congenital, and is then often hereditary through many generations, and

exhibits family prevalence; but several cases have been acquired, one as late as fifteen from nerve shock, other cases as sequels of acute illness.

Successful treatment is only possible in acquired cases, and should be directed towards the improvement of the general health, while local stimulation of the scalp is obtained by the faradic brush. If any seborrhœa be present the treatment appropriate to this condition is indicated also (*vide* p. 762).

VIII

TRICHORRHEXIS NODOSA.—SYN.: *Trichoclasis.*

This is a rather uncommon condition of the scalp, and may be defined as green-stick fracture of the hair-shaft. It presents to the naked eye the appearance of whitish bead-like swellings, situated irregularly along the hair-shaft. Under the microscope, owing to the splitting up of the outer portion of the hair into its constituent fibres, it presents the appearance of two brushes stuck end to end. The remaining central portion gives way on very slight traction, leaving the growing portion of the hair with a bristly end. It chiefly attacks the whiskers, beard, or moustache of men, but it may also attack the coarse hairs of the eyebrows or of other parts of the body; and occasionally the scalp of either sex.

The disease is much more common on the continent of Europe than in Great Britain. It has hitherto been considered as a trophoneurosis, resulting in preternatural brittleness of the hair; but, according to Paul Raymond, who found it frequently on the pubes of women, it is due to a diplococcus, and is to a certain extent communicable by contagion. Hodara described a peculiar bacillus in the disease, and Essen again a different one; so that the true pathogeny is not solved as yet.

The treatment is very unsatisfactory, shaving has sometimes been effectual when long continued; but, generally speaking, the hair grows as badly as ever. Local faradisation may be tried, and change of climate has sometimes seemed to be efficacious. If the parasitic origin be probable, to sponge the hair with antiseptics, such as perchloride of mercury or carbolic acid lotions, would appear to offer the best chance of success. These methods might be combined.

IX

KERATOSIS PILARIS.—SYN.: *Pityriasis pilaris; Lichen pilaris.*

Keratosis pilaris consists of non-inflammatory papules formed by an accumulation of horny cells which plug the orifice of the hair follicles of the scalp sometimes, but more frequently those of the lanugo follicles of the limbs. It appears as pin's-head-sized convex papules of the same colour as the normal skin, or of a dirty gray colour from adherent dust. Although sometimes attended with secondary congestion, it is non-inflammatory in origin, and the whole papule can be picked out by the

nail, leaving a slight depression. A hair may occasionally pierce the papule, or it may be broken off at the surface, or buried beneath it.

In a large proportion of cases it is only a part of a general xeroderma or ichthyosis, in which latter condition the nutmeg-grater sensation communicated to the finger is considerably accentuated. It may, however, occur at the time of puberty, and onwards, in persons who are not subject to ichthyosis, especially in those who wash sparingly. It differs from the true inflammatory lichen pilaris, in which there is a central horny spine, attended to a greater or less degree with inflammatory phenomena. It may always be relieved by alkaline and vapour baths, or by the inunction of soft soap followed by warm baths; after these an oily substance is rubbed into the skin, in the same way as for ichthyosis.

H. RADCLIFFE CROCKER.

REFERENCES

For a copious bibliography of the various literature of Diseases of the Hair, the reader is referred to the appendix of Jackson's *Diseases of the Hair and Scalp*, 2nd ed., 1894.

H. R. C.

DISEASES OF THE NAILS

General remarks.—The nails being merely dermal appendages, it is not surprising that they share in general affections of the skin. They may be atrophied or hypertrophied; and the atrophy or hypertrophy may be variously distributed, giving rise to pitting and the formation of ridges and furrows, or white spots and lines (leucopathia).

The appearances of diseased nails are by no means constant in skin affections, ridging and deformities of the most diverse kinds occurring in the same disease, and even in the same patient. The nails lose their lustre, become yellowish or brown in colour, and are softer than normal. Consequently, it is on the whole true that diagnosis of nail affections can seldom be made without an inspection of the general cutaneous disease present.

The varieties of diseases of the nails may thus be considered:—

(i.) *Chronic affections of the nail itself, associated with chronic cutaneous diseases.*

Under this heading may be mentioned especially the degenerative changes in the nails found in eczema, psoriasis, lichen planus, and, above all, in constitutional and congenital syphilis. The nails in these conditions are black or discoloured, thickened, and usually transversely furrowed with thick, unsightly ridges. In pityriasis rubra, on the other hand, the nails may be much thinned and atrophied, even to actual shedding.

The treatment and applications, local and general, suitable for the above affections are useful for the nails also. Personally, I have found benefit in these cases by soaking the nail in liquor potassæ and scraping much of the diseased portion away. The constant use of some tar preparation is generally beneficial, and this is well applied under india-rubber finger-stalls. Salicylic acid, in the form of the plaster-mull, is a beneficial agent in thickening of the nails. Care must be taken that the substance does not act upon the surrounding skin also.

(ii.) *Acute affections of the nail* (a) *associated with acute dermal affections,* (b) *as local conditions affecting mainly the matrix* (*onychia*).

(*a*) In such maladies as acute pemphigus, acute exfoliative dermatitis, very acute eczema universalis, or erythema, the nails may become thinned, atrophied, and shed. The same thing occurs after acute and exhausting illness. (*b*) The acute local affections of the matrix of the nail are very

important, and the subject has been much complicated by ill-devised nomenclature, which will be avoided as much as possible in this article. Acute inflammatory affections of the matrix of the nail, associated with suppuration, ulceration, and detachment of the horny part of the nail, usually pass under the name of "onychia."

It may be pointed out at once that the true explanation of these cases is the invasion of the tissues by micro-organisms; such as pus-producing cocci, or the organism of tubercle. The ulceration found under the nails in conditions associated with nerve-degeneration, such as leprosy, syringomyelia or lesions of the nerve-trunks, is due, primarily, to loss of nutrition and death of the tissues, and, secondarily, to its invasion by organisms. There are numerous reasons why suppurative and ulcerative affections of the matrix should be frequent. The neighbourhood of the nail is very commonly the seat of cracks and fissures, or of small flaps of torn skin; and pricks and injuries or crushes are peculiarly prone to occur here. Moreover, the common deformity of the nail known as "ingrowing toe-nail," after causing laceration of the tissues, is commonly associated with purulent inflammation and exquisitely painful granulations.

The worst examples of suppuration of the matrix are found in dirty and ill-nourished children after injuries to the end of the finger. The digit swells and is bulbous at the extremity, becomes very tender, livid or bluish in colour. Beneath the partially detached nail is a foul ulcer, with fungating granulations and abundant discharge. The tissues may be extensively destroyed, even to laying bare the terminal phalanx. There can be no doubt that some of these cases are due to tuberculous infection, but probably in the majority they are merely attributable to the ordinary pus-producing organisms. The name "onychia maligna" is often very improperly given to these cases.

Every degree of acuteness of inflammation of the matrix may be met with, and most of us are familiar with the moderate suppurative inflammation associated with loosening and detachment of the nail following a "prick" or crush. These cases should be looked upon with great suspicion in pathologists, surgeons, or other persons who handle cadaveric substances; there can be no doubt that the tubercle bacillus is sometimes thus introduced. In this case the ulcer is peculiarly chronic and unhealthy, and the edges become warty and indurated, the sore putting on all the character of the "necrogenic wart" described on p. 817. In such cases the lymphatics leading from the injured part may be converted into red indurated cords, and the glands above slowly enlarge.

Syphilitic inoculation of the matrix of the nail is a matter of the first importance, and its peculiarities are insufficiently recognised. For obvious reasons surgeons and accoucheurs suffer especially; but I have seen unexplained cases; one instance I have known in a woman who had washed the linen of a syphilitic infant. In exceptional cases syphilis may follow a mere prick, and be associated with scarcely any local manifestations; usually, however, very curious and pronounced symptoms appear. The leading features of digital chancres affecting the

matrix of the nail are as follows:—(α) They are almost always found in adults, and generally in members of the medical profession. (β) They are usually intensely painful, needing even large doses of opium. (γ) They are exceedingly chronic and persistent; an abiding, obstinate ulceration, attended with much pain about the matrix of the nail of an adult, should always lead to the suspicion of syphilitic inoculation. (δ) They may be quite anomalous in form, or a large oval foul chancre may be met with. Usually ulceration is present, but the site of infection may be a mere crack or fissure.

Induration is commonly absent, and the axillary glands do not always enlarge. A syphilide will be found on the skin, and this may first reveal the nature of the case.

In the treatment of the acute suppurative affections of the matrix, the following indications should be carried out. The nail should generally be removed, especially if pus is confined beneath it, or if it be deformed or broken and lacerating the tissues; simple cleanliness and the use of a weak antiseptic lotion are then usually all that are required. In cases of much fungous granulation tissue, or where tuberculous infection is suspected, the curette must be used freely, and followed by the application of pure carbolic acid. After-dressing with iodoform or antiseptic washes will generally effect a cure. At the same time the patient may be put upon arsenic and iron, and a good and generous diet. If syphilis be recognised, or suspected, mercury must be administered, and local dressings of the "black wash" or calomel fumigation applied.

The ulcerations of ingrowing toe-nail are exceedingly common. The treatment is purely surgical, and the subject is only mentioned here lest such mechanical causes of ulceration be treated with local remedies only.

(iii.) *Degenerative changes of the nails* (a) *associated with general malnutrition*, (b) *from interference with nervous supply, general or local.*

Alterations in the shape, texture, rate and mode of growth of the nails in cases of wasting and malnutrition are very frequent, and only form an important feature of the graver malady when exceedingly well marked. In this large class the following may be mentioned:—Transverse ridges and furrows, white spots or lines, the consequences of such illness as bad typhoid fever, severe attacks of sea-sickness, and so forth. In bad cases of syphilis the nails may be shed like the hair; and the same is true in diabetes, and phthisis. In general malnutrition the nails may become thin, atrophied in the centre, and everted at the edges. This has also been observed as a senile change (spoon nails). Clubbing of the finger-ends, with an atrophic condition of the nails, is observed in empyema and congenital cardiac disease. The alteration of the nails and digits in Raynaud's disease will be described elsewhere.

Affections of the nails from loss of nervous supply (trophic lesions) comprise a very large class (vol. vi. p. 572). The nails may be entirely shed, atrophied, or partly atrophied and partly hypertrophied, and altered in shape and form. Ulcers may form about the matrix, and these being invaded by cocci may lead to suppuration and destruction

of tissue. Among general nerve disorders affecting the nails may be mentioned syphilis of the nervous system, leprosy, anterior poliomyelitis, paraplegia, and syringomyelia. In many of these cases the peripheral nerves are also concerned; thus in anæsthetic leprosy ulcerations about the nails of the little or ring finger may be found associated with nodules in the ulnar nerve.

The lesions found in Morvan's disease practically consist in suppuration and ulceration of the matrix with loss of the nail, and, ultimately, with necrosis of the terminal phalanx. The lesions, though distressing, are remarkably painless and associated with muscular paresis and atrophy, contraction of the fingers, and impairment of sensation to heat and cold. Morvan's disease and syringomyelia are now generally looked upon as one malady. The clinical resemblance to anæsthetic leprosy, so far as the fingers are concerned, may be very close.

The nails may be affected in all local affections of the nerves, especially after accidental rupture or division of the nerves of the forearm, and in the varieties of peripheral neuritis. The matrix usually suppurates and ulcerates, and the nail becomes detached; or it may persist in a curiously curved and sometimes thickened form. These phenomena are associated with severe burning pains, contractions, muscular paresis, and that red, mottled, smooth, shining condition of the integument known as "glossy skin." The temperature of the part is generally lowered.

(iv.) *Parasitic affections* (*onychomycosis*).

The most important parasitic affection of the nails is undoubtedly that caused by the fungus of ringworm. Favus attacks the nails in rare instances; I have seen but one case of it. A yellow sulphur-coloured spot may be detected between the nail laminæ; but usually the nails are merely thickened, opaque, and fissured or furrowed. The state of the scalp may reveal the true nature of the nail affection. The mycelium and spores are very difficult to find. Tinea and favus are rarely found in the toe-nails.

In ringworm the nails are thickened and discoloured, lustreless, and furrowed or split into laminæ. Patches will probably be found on the scalp or body also. The practitioner should always think of this affection when a case of chronic disease of the nails in a child is brought before him. I have seen several cases, and, as there is nothing characteristic in the appearance of the nails themselves, the true nature of the malady may easily be overlooked. The spores are of the large kind but not easy to find, so that a scraping of the deeper parts of the nail should always be made. For the same reason the superficial parts must be removed before remedies can act. Accordingly the nail may be well macerated in a potash solution, conveniently kept in contact by a gutta-percha finger-stall. The softened parts of the nail may be scraped away daily. Or a strong solution of salicylic acid may be used in the same manner. Finally, such parasiticides as iodine, creasote, or sulphur should be applied continuously. Every dermatologist has his favourite remedy, but in the care and thoroughness of the application lies the secret of success.

(v.) *Congenital peculiarities and eccentricities of growth.*

The large "double" nails found on fused digits are good examples of congenital deformity; and in congenital ichthyosis the nails may be much fissured, and very small and brittle. Ill-developed nails have been seen in the stumps of amputated digits, and on the stumps of the digits left after the necrotic processes in anæsthetic leprosy (Crocker).

Peculiarities of growth are generally induced by some circulatory disturbance or mechanical pressure. Extraordinary deformities and curvatures are often found in the toe-nails of old people who have worn badly-fitting boots all their lives; or in persons who for years have been bed-ridden ("Ram's horn nail"—onychogryphosis). We meet also with curious deformities and abnormalities of the nails the cause of which is quite obscure; some of these cases are congenital and distinctly hereditary. In some cases every nail on both hands may be thickened, elongated, and curved, like the talons of a bird of prey, giving rise to a distressing deformity.

The *treatment* of abnormal conditions of growth of the nails is purely surgical. The nail has a curious tendency to reproduce any marked deformity again and again, especially overgrowth. I strongly advise in such cases that not the nails only but the whole matrix also should be removed thoroughly. The reproduction of the nail is then prevented, or is feeble and incomplete, so that a permanent cure is effected. Operations for removal of the nails should be conducted under anæsthetics and with the strictest attention to antiseptic details, especially in the case of the toes. Tetanus has occurred as a sequel of these slight operations; and a due apprehension of this terrible calamity will lead to great care and cleanliness, not only in the operation itself, but also in the after-treatment and dressing.

New growths.—It may be briefly mentioned that in rare instances epithelioma or melanosis may arise by the side of the nail. The characters of these affections are well marked, and early amputation is usually called for.

Exostosis springing from the phalanx and displacing the nail of the great toe is often in practice confounded with diseases of the nail itself. The treatment is purely surgical.

M. SHEILD.

TUBERCULOUS DISEASES

LUPUS AND ALLIED DISEASES

LUPUS VULGARIS.—**Definition.**—The name "lupus" in modern nomenclature is applied to a new growth of tuberculous origin, invading the skin and, less frequently, the adjacent mucous membranes. It begins in nearly all cases during childhood or adolescence, shows a preference for exposed parts of the surface, spreads by continuity and by multiplication of foci, rarely infecting the lymphatic glands, and destroys the tissues attacked either by ulceration or by cicatricial transformation without breach of surface.

Causes.—The primary manifestations appear most commonly between the ages of three and six, and almost always before twenty; but secondary areas may show themselves at any period of life, and exceptionally the disease may originate in middle or advanced age. It is more common in females than in males, in the proportion of about two to one; and it is usually associated with inherited or acquired debility of constitution. A history of tuberculosis in the family is discovered in an excessive proportion of cases, and the patient is liable to other tuberculous affections in the course of the disease. Lupus, however, does not appear to be hereditary—as such, and is rarely seen in two members of the same family.

The immediate causes can seldom be detected; occasionally, however, the disease may be traced with more or less certainty to direct inoculation. A case in which lupus appeared upon a tattoo mark is reported by Jadassohn, the infective element being the saliva of a phthisical operator, and a similar local outbreak has been known to follow vaccination; but it is doubtful whether the disease was inoculated with the lymph, or whether the lupus attacked the scar as the point of least resistance. An eruption of disseminated lupus has been seen to follow an attack of scarlet fever (Philippson and Besnier).

Seat.—Lupus may attack any part of the cutaneous surface, and may invade the mucous membranes by extension from the skin; or in rare cases it may affect the mucous surface as a primary lesion, as in a case of primary lupus on the tongue reported by Darier. On the *skin* its seat of election is the face, especially the nose, cheeks, and auricles; it seldom, however, arises upon the hairy scalp, the forehead, or the upper eyelids. It is frequent also upon the limbs, less common upon the trunk, and

rare on the genitals, in the neighbourhood of the anus, in the armpits, or on the palms and soles. Its distribution is almost invariably unsymmetrical, except in cases beginning in adult life, when it may form a butterfly-shaped patch across the nose and cheeks.

In the *mucous membranes* it invades only the neighbourhood of the natural apertures—mouth, tongue, palate, pharynx, larynx, conjunctiva, nares, or anal and vaginal canals; usually by direct extension from without.

The lymphatic glands are scarcely ever affected, whether primarily or secondarily.

Symptoms.—Lupus may assume a number of phases, often described as varieties. The *first appearance* is nearly always that of a little tubercle embedded in the corium, and but slightly elevated above the surface. As it grows it becomes more prominent, and assumes a colour ranging from pale yellow or yellowish red to dark reddish brown, with a peculiar dim translucency not unlike that of apple jelly; but these characters may be masked by thickening or desquamation of the epidermis. It is of soft consistence, painless when untouched, but characteristically tender on pinching, or under firm pressure with the edge of the finger-nail. When scraped with a curette it offers small resistance, and may be shelled out of its bed, leaving a well-defined excavation with hard fibrous walls and base.

The nodule is generally single, but often multiple, and in the latter case the outbreak is usually serial, two or more separate foci seldom appearing simultaneously. The nodule spreads by marginal growth, perhaps coalescing with adjacent areas in case of multiplicity, and in its further extension may assume various appearances. It may form a flat expanse almost plane with the surface (Erythematous Lupus), or a distinctly elevated patch (*L. discoides*), or, extending by a tuberculated margin while healing from the centre, it may appear as a segment of a circle, or as a complete ring (*L. circinatus*); complex figures with festooned outlines may be formed when neighbouring rings or crescents coalesce; or, again, the disease may creep for long distances, leaving a serpentine trail of cicatrisation behind it.

The nodule, ring or patch may progress without breach of surface, leaving cicatricial transformation in its track (*lupus non exedens*); or it may break down into ulceration (*L. exedens*).

The lupous *ulcer*, nearly always seen in the more feeble subjects, varies in depth and character. Its growing margin is more or less raised, and may preserve the original semi-translucency; or it may be roughened and dulled by epidermic desquamation or thickening, or rendered warty by papillary hypertrophy (*L. verrucosus*). Its base is usually indolent; but when irritated it may become incrusted with scabs, or beset with exuberant granulations (*L. vegetans*). If the area of ulceration be small, and include a number of isolated tubercles, it may simulate impetigo; if a little larger, rupia. Where it attacks the hair follicles it may resemble acne or sycosis, according to its position; leaving permanent scars in all cases. It is seldom deep, and does not implicate bones and muscles; but on the nose and pinna it may destroy the cartilages,

and in the fingers is apt to produce great disfigurement (*L. mutilans*). On a limb it may be associated with more or less lymphangitis, and lead to much enlargement of the limb, amounting even to a pseudo-elephantiasis (*L. hypertrophicus*). On the lips, too, it induces considerable thickening, but chiefly from the coincident invasion of both the cutaneous and mucous surfaces.

The *cicatrix* of lupus, if unirritated by local treatment, is generally thin, white, and fairly smooth; often, however, it is unsound and prone to break down into fresh ulcers, or to undergo keloid hypertrophy, especially after treatment by erasion.

Lupus may coexist with a syphilitic taint, usually inherited, and may then form a hybrid of a perplexing and sometimes very destructive kind.

Course.—The progress of lupus vulgaris, although varying greatly in rapidity in different cases, is essentially chronic; yet the infection of the lupous ulcer by the common pyogenetic organisms may lead to a relatively active destruction. The disease usually lasts for an indefinite number of years, yielding with difficulty to treatment, and recurring again and again after long or short intervals. The health of the patient is generally feeble, especially in the ulcerating and multiple forms, and there is a liability to the incursion of other tuberculous affections; in many subjects, however, the local ravages are compatible with a fair amount of physical vigour.

The lesion disposes to two conditions unconnected with the original disease, namely, to erysipelas and epithelioma. Erysipelas is more prone to occur in L. exedens, and the attack may have a beneficial, sometimes even permanently curative, effect on the local disease (Falkenberg). Epithelioma supervening upon lupus is of an especially malignant nature, and may show itself at an unusually early age. In eighty-three cases collected by Steinhauser 24 per cent of the sufferers were under the age of forty, and one patient, a girl, was only nine. In most instances the cancer first attacks the spreading edge of the lupus, but in a considerable number it originates in the cicatrix.

Pathology.—Lupus is essentially a granulation-tissue neoplasm, due to the presence of the tubercle bacillus, or to the ptomaines produced by this organism. On section of the growth it is found to consist of round nucleated cells, of various sizes, lying in the meshes of a delicate fibrous reticulum; giant cells may sometimes be seen, and tubercle bacilli are present, although in such scanty proportion that they may be hard to detect. The centre of the lupus nodule tends to perish by fatty degeneration, without caseation; while at the margin and base a new fibrous tissue is formed at the expense of the irritated structures of the dermal bed. The glands of the skin are destroyed, but may first become obstructed, and so appear for a time as small miliary bodies in the diseased area; eventually, however, all the normal structures of the corium are replaced by cell-growth or cicatrix. The epidermis is at first unaffected, and may remain so throughout; but usually it becomes involved sooner or later, the rete cells degenerating over the nodules while the papillæ atrophy: at the margins, however, there may be

some epidermic thickening with papillary hypertrophy, which in histological sections may give rise to appearances very like those of epithelioma.

Diagnosis.—The conditions which most commonly simulate lupus vulgaris are its two allies—scrofulodermia and lupus erythematosus, and gummatous syphilides.

1. *L. erythematosus* for some eminent dermatologists is really a form of true lupus; and it is certain that the two affections merge into each other in a very perplexing manner. Nevertheless, in the great majority of instances well-marked clinical distinctions are present, and the erythematous lupus may be distinguished from lupus vulgaris by its symmetry, by the absence of tuberculation or ulceration, by the special implication of the orifices of the hair follicles, and by the later age at which the signs first appear.

2. *Scrofulodermia* may appear in the same class of subjects as lupus, and even in the same individual. Ordinarily, however, the former disease is marked by its situation over tuberculous glands, or in the neighbourhood of the natural apertures of the body; by its tendency to suppurate, leaving ulcers with undermined edges; and by the absence of the "apple jelly" nodules of lupus.

3. *Gummatous syphilides*, inherited or acquired, may simulate the tuberculous affection in aspect, but in most instances are associated with the history or signs of syphilis; they are far more rapid in progress than lupus, more deeply destructive, offer more resistance to the curette, and yield readily to the internal administration of iodide of potassium.

Treatment.—A list of the remedies which have won a reputation for the cure of lupus would fill many pages, and, as might be expected under such circumstances, few of the methods of treatment have stood the test of multiplied experience.

No drug has been shown to exercise any specific action upon the growth. In some cases iodide of potassium in large doses has proved beneficial up to a certain point, and general remedies adapted to the special constitutional condition of the patient may of course be useful. Within recent years thyroid extract has been recommended by Dr. Byrom Bramwell, and tried with diverse results by others. It has been found to exercise a strong influence over the disease in a few cases, but it has not proved absolutely curative, and by its depressing effects on the general health has not infrequently proved injurious.

Attempts have also been made for some years past to destroy the disease by introducing antagonistic principles derived from other affections. Koch's tuberculin, streptococcus serum, and direct infection with erysipelas are examples of the new remedies. Tuberculin in its later form is still under trial, but it cannot be said that the results have yet justified the expectations it once aroused. The discovery, however, of a material that has a selective affinity for the tuberculous cell-growth is a step pregnant with colossal possibilities for the future. Local injection of sterilised culture of the streptococcus has also its advocates, but would be a dangerous remedy in inexperienced hands. Lastly,

the inoculation of lupus with erysipelas has not met with a success that justifies the exposure of the patient to the possible dangers of the experiment, although beneficial and even curative results have been observed in a few cases of accidental infection.

Local treatment.—At present it is to the purely local means that we must look for cure; these may be grouped into the more ancient section of bactericidal or caustic applications, and the comparatively modern mechanical resources of erasion, scarification, and excision.

The actual cautery is perhaps the oldest of the destructive agents, and still preserves a high place in the estimation of many dermatologists. It is always accessible, and very manageable; but it has the disadvantage of being indiscriminate. The most convenient means of applying heat is the galvanic cautery; and recently solar rays, concentrated by a powerful convex lens, have been utilised for the same purpose (Thayer). Of the chemical caustics, some, like the strong mineral acids, acid nitrate of mercury, caustic potash, and chloride of zinc, are as indiscriminate as the actual cautery itself; others, such as arsenic, salicylic acid, and pyrogallic acid, are in a measure selective, destroying the lupus cell growth while sparing the healthy or relatively healthy tissues. They have, however, little penetrating power, and do not follow the tubercle bacilli into the fibrous structures investing the lupus nodule; hence they seldom confer immunity from recurrence. The best of the number is probably salicylic acid, which may be used either as an ointment in the strength of twenty to thirty grains to the ounce of vaseline, combined with creasote to diminish the pain caused by the acid, or may be applied in the form of a varnish with collodion. Other remedies, strongly recommended by different authors, are pyrogallol vaseline, 10 per cent (Veiel); parachlor-phenol crystals melted by a heat of 40° centigrade (Elsenberg); and local injections of corrosive sublimate solution (Doutrelepont); but none of these applications can be trusted for the complete cure of the disease, although some of both groups are found useful as accessories to manual treatment.

The latest addition to our practical resources is the "phototherapy" of Finsen of Copenhagen, the principle of which is to bring the concentrated chemical rays of solar or electric light to bear upon the lupus patch, with a view to the destruction of the tubercle bacilli. The results have been striking in some cases. The treatment is painless, and when successful leaves an excellent scar; but at present it has the disadvantages of uncertainty, slowness, and great expense. In severe cases, moreover, its author has found it advisable to supplement the rays by the application of pyrogallic acid, itself a remedy of some power.

The manual methods of erasion, scarification, and excision have been extensively used in recent years.

Erasion by means of curettes of various forms has been practised with striking immediate results. The instrument should be plied boldly, clearing away every particle of tissue that will yield to its edge; and the walls of the resulting gap may profitably be treated farther with salicylic

acid, or some other form of caustic, to reach the organisms protected from the scraper by the firm bounding wall of new fibrous tissue. The process is too painful to be borne without an anæsthetic, and gives rise to free bleeding.

Scarification consists in a mincing of the lupus tissue by the knife, and depends for its success upon the reparative and reactive processes it sets up in the structures attacked. It is effected by a minute cross-hatching of the cell growth with a sharp scalpel, or a special many-bladed knife, carried down to the fibrous bed. Like erasion it is a very painful process, and can seldom be practised to any useful extent without an anæsthetic. It is of most value in the superficial erythematous form of lupus non exedens, and its effects may be increased by the application of a 5 per cent solution of carbolic acid immediately after the operation; but, although sometimes successful, it cannot be regarded as a very trustworthy expedient. It has even been accused of inducing a secondary tuberculous infection by setting free particles of diseased tissue into the vessels (Besnier), but the experience of most observers does not confirm this charge.

Excision has been adopted by many surgeons (Lang, Kramer, Urban, Schütz, Bidwell, and others). It has been used by myself since 1881, and in my experience it is greatly superior in nearly all cases to any other local treatment, and is more in accordance with the principles of modern surgery. It enables the operator to remove not only the new growth, but the bacillus-invaded tissues at the base and margin of the patch; and thus it gives a promise of immunity that no other method at present known can offer. It will accomplish in a single operation more than can be effected by months of less radical measures, and the resulting scar is of much better character than that left by erasion. The incision should always lie about an eighth to a fourth of an inch outside the area of the lupus tissue, more at the growing edge than elsewhere, and be carried into the base to such a depth as the infiltration seems to demand—taking care, however, in facial lupus not to go beyond the subcutaneous fat. The wound may be closed by suture, if small and of suitable form, or covered in with an epidermic graft if larger. On the face, where large areas may be safely excised, it is perhaps better to leave the grafting until healthy granulations are established, the wound being dressed in the meantime with a salicylic and creasote ointment.

It must be borne in mind that no local treatment, however radical, removes the constitutional predisposition; hence it is impossible to promise that the most successful operation will ensure permanent immunity from recurrence. It will be found, nevertheless, that the more surgical the plan of treatment the better the results. It cannot be too strongly urged that radical measures should be employed at the earliest possible moment in the course of the disease, as there is no doubt that the patch of lupus is a nursery for infective germs which may migrate to parts more vital than the skin. The ghastly ravages that daily come before us in our hospital experience are a reproach to our profession; for, had they

been treated rightly in their earlier stages, few of them could have attained to such formidable proportions.

LUPUS ERYTHEMATOSUS.—SYN.: *L. erythematoides, L. sebaceus, L. superficialis.*

Definition.—Lupus erythematosus is a destructive dermatitis, always of extreme chronicity, very resistant to treatment, limited to the superficial layers of the integument, spreading by centrifugal extension and by multiplication of foci, and leaving a superficial cicatrix.

Etiology.—The immediate causes are unknown. In a few instances it has followed injury, and in one case it started in the scar of a mosquito sting (Malcolm Morris); but a history pointing to a traumatic factor is exceptional. The remoter causes may be classified as those of age, sex, and constitutional diathesis.

Age.—The disease is almost always one of active adult life, beginning between the ages of twenty and forty-five; but it is known to appear occasionally in childhood and in old age—from three (Kaposi) to sixty-eight (Kocher).

Sex.—Women appear to be about twice as liable to the affection as men.

Constitutional diathesis.—The question of the relationship of lupus erythematosus to tuberculosis is still undecided. The tubercle bacillus has never been detected in sections of the affected skin, and the attempted inoculation of the disease into the lower animals has failed to produce tuberculous infection (Leloir, Hallopeau). A family history of tuberculosis has, however, been traced in an undue proportion of cases, and the coincidence of lupus erythematosus with tuberculous disease in other parts of the body is not infrequent: hence it may possibly be regarded as a highly attenuated form of skin tuberculosis. The subjects of lupus erythematosus are usually liable to seborrhœa, to chilblains, and to disorders of digestion and menstruation; but there are many exceptions to this statement.

Symptoms.—Lupus erythematosus appears in two chief forms, linked by many intermediate conditions. The types, as recognised by Besnier and Leloir, may be defined as the erythematous and the follicular.

The *erythematous type* consists in plane spots or patches of various sizes and shapes, with a dry, smooth or scaly surface intersected in some situations by linear furrows, more or less red from hyperæmia and sometimes from telangiectasis, and often associated with increased seborrhœic secretion. The patch is rarely elevated unless the derma be involved.

The *follicular type* presents no visible hyperæmia, except at the margin, or in the early stages; it begins with reddish yellow spots, each having a central scale; these fuse into a grayish, dry patch, more or less roughened by minute adherent scales, the removal of which exposes the gaping mouths of the sebaceous and sudoriparous follicles. If the sebaceous glands are irritated the margins of their openings become infiltrated and swollen, and the appearances of acne may be closely simulated. Mr. Hutchinson describes cases of "acne lupus" on the shoulders in association with lupus erythematosus of the scalp.

Course.—All forms of L. erythematosus tend to extend at the margin, and to heal in the centre, leaving a slightly depressed scar, and destroying the glands and hairs. In exceptional cases the disease may spread in a series of concentric rings like erythema iris. Its progress is almost invariably chronic and intractable, more so even than that of L. vulgaris; yet occasionally it vanishes by a spontaneous resolution, and if the stage of destruction has not been reached it may leave little or no trace of its existence.

In rare cases L. erythematosus may assume an acute and dangerous form, invading the skin far and wide; the sebaceous orifices become plugged with masses of epithelium and secretion that may simulate the crusts of impetigo, and the condition may be complicated by enlargement of the salivary and lymphatic glands, hæmorrhagic bullæ, and grave febrile disturbance of a typhoid character, often ending fatally with symptoms of septic poisoning. In these cases the mortality, according to Kaposi, is about 8 per cent.

The *seat* of election is the face, generally the cheeks and bridge of the nose where the disease forms a butterfly-patch shaped like that of acne rosacea. It usually appears first as an isolated symmetrical lesion on each cheek; but occasionally it spreads from a single central area on the nose. It may also attack the scalp, destroying the hair-bulbs; or the auricles. Next to the face in point of frequency come the hands and fingers, the disease usually attacking the dorsal surface, rarely the palmar. It may appear, in more exceptional cases, on the limbs and trunk; and when met with over the extensor sides of the knees and elbows it may simulate psoriasis. In rare cases it has extended into the mouth as far as the palate.

Diagnosis.—The eruption is usually characterised by its symmetry, by its limitation to the superficial layers of the skin, by its tendency to implicate the orifices of the sebaceous follicles, by its marginal extension, and by the destruction of the skin and appendages within the area of the disease. It is, however, remarkably apt to simulate other affections, such as chronic eczema, psoriasis, acne, papular or tubercular erythema, chilblains, and even lichen planus (Crocker); in the early stages a diagnosis may be very difficult, but as the symptoms progress the characteristics described will become manifest.

From L. vulgaris it is distinguished in ordinary cases by the later period of onset, by its symmetry, its superficiality, and its tendency to implicate the sebaceous follicles; but occasionally the disease appears so closely linked with the erythematous form of common lupus that it is difficult to draw a distinction between the two affections.

Pathology.—The disease appears to consist of a peculiar inflammation of the skin, originating sometimes in the vascular network surrounding the sebaceous and sudoriparous glands, sometimes nearer the surface, in and around the follicular orifices. This may lead, in the earlier stages, to hyperæmia of the vessels of the corium, and to increased secretion of sebaceous matter. As the morbid condition progresses the new cell growth

degenerates and causes the destruction of all the normal elements of the corium, replacing them by cicatricial tissue. The epidermic cells also degenerate, the process extending from the rete Malpighii outwards.

The relation of erythematous to common lupus is still undecided. Many observers have seen cases in which an eruption, at its outset simulating the former disease both in character and distribution, assumes later the unmistakable features of L. vulgaris. Hence for some eminent dermatologists, including Hutchinson and Leloir, the two diseases are manifestations of the same pathological state; Vidal, too, believes that L. erythematosus may be the prelude to L. vulgaris. All attempts to discover a parasite in the former, however, have failed; and Leloir has inoculated matter from six cases upon living animals with all possible safeguards against error, but with negative results; hence, until our researches are more advanced, the intimate pathology of the condition must be regarded as undetermined; although from the character and analogies of the lesion there can be little doubt that it is one of the constantly enlarging groups of local affections dependent for its origin upon the specific action of a micro-organism.

Treatment.—Few skin lesions have proved more rebellious, for, while the past thirty years have added largely to our remedies, the prognosis of any given case of erythematosus remains almost unchanged. Occasionally the disease may vanish without our intervention, or yield slowly to treatment; more rarely it may assume an acute phase and even end fatally; but as a rule it pursues its course quietly but persistently, and defies our most strenuous efforts.

The internal remedies are many, but none has yet achieved a high reputation. Iodoform has been given with some benefit by Besnier; arsenic by Hutchinson; iodide of starch by MacCall Anderson; and quinine, which has a remarkable power of contracting the capillaries of the face, by Payne; but none of these remedies can be regarded as certainly curative. General treatment should, of course, be directed towards the maintenance of the nutrition of the body, and to the relief of the dyspeptic conditions which are so often connected with the disease.

Locally, the affected parts should be protected as far as possible from external irritation. For this purpose the application of oxide of zinc with glycerine and lead lotion is useful, especially if the skin be scaly and irritable. Of more potent remedies salicylic acid is perhaps the most trustworthy; it may be applied in the proportion of fifteen to thirty grains to the ounce, according to tolerance, combined with creasote and diluted with vaseline. Carbolic acid, chrysophanic acid, and mercurials may also be tried. Should these fail, manual methods of treatment may be resorted to. Erasion is of less service than in L. vulgaris; but I have found linear scarification, followed immediately by the application of a 5 per cent solution of carbolic acid, of great value. The thermal or electric cautery, when carefully used, may be successful. Lastly, excision is eligible when not counter-indicated by the position and extent of the disease.

SCROFULODERMIA.—**Definition.**—The name scrofulodermia is somewhat loosely applied, but for the present it may be accepted as the designation of certain tuberculous lesions which are clinically distinct from lupus. Three chief varieties may be recognised.

The *first variety* begins as a tuberculous abscess in the deeper layers of the corium and the subcutaneous tissue, commonly over a disintegrating tuberculous lymphatic gland or diseased bone or joint, and tends to open in the centre, leaving an undermined ulcer. The inflammation is subacute and usually painless, and in the earlier stages the skin may retain its normal colour. Sooner or later it becomes dusky red, necroses in the centre, and breaks down into an ulcer with thin bluish or dusky undermined edges, and a base beset with pale, indolent, soft granulations, beneath which in most cases is felt the induration of a diseased gland or group of glands. The granulation tissue yields readily to the curette, and is then found to be supported by a bed of newly-formed fibrous tissue. The undermined skin also is easily removed by scraping; hence when such an ulcer is curetted energetically the first result is a raw surface of very much larger size than that indicated by the appearance of the original sore. Should it heal without treatment it generally leaves a characteristically puckered cicatrix. On examination of the undermined skin and granulations tuberculous elements are always found. The course of the lesion, if left to itself, or treated with milder applications, is to persist indefinitely, often widening its area and producing great disfigurement; eventually, however, it ends by a slow process of cicatrisation. The most common seat is along the track of the lymphatic glands in the neck, axilla, or groin, or over tuberculous bones or joints; in all these cases the affection of the derma appears to be secondary to the deeper disease. Occasionally, however, the skin or mucous membrane may be the primary seat of attack, the lesion first showing itself on the scalp, the lips, the tongue, the palate, or elsewhere; and under these circumstances the deeper structures may be secondarily involved by extension. Treatment by operation is usually satisfactory. If there be deep disease of glands, bone, or joint, it must be eradicated by suitable means, the skin lesion being at the same time excised. Should the ulcer be confined to the skin and subcutaneous tissue, it may be sufficient to apply an ointment of iodoform, aristol, or salicylic acid, but in most cases operative treatment is advisable. The undermined skin, as well as the granulation tissue, should be freely curetted, and an ointment of salicylic acid, of a strength varying from ten to twenty-five grains to the ounce, applied to the raw surface. In some cases a still better result may be secured by complete excision of the sore and closure of the wound by suture; or, if suture be impracticable, by the application of an epidermic graft, either immediately or after the establishment of healthy granulations.

The *second variety* of scrofulodermic lesion appears as an ulceration limited to the neighbourhood of the natural apertures, especially the anus, where it is commonly associated with a tuberculous fistula. It is nearly always accompanied by well-marked visceral tuberculosis. The treat-

ment is similar to that of the previous form, but the prognosis is necessarily unfavourable.

The *third variety* is an inoculated tuberculosis, typified by so-called "anatomical tubercle." This is usually seen as a nodular mass of granulation tissue devoid of the apple jelly translucency of lupus vulgaris, and situated in most cases on the fingers or other exposed parts in persons who are liable from their occupation to contact with dead bodies (dissecting-room porters, etc.). It is very indolent in progress, but after a time it may either cicatrise spontaneously, or may form an undermined ulcer, or spread like an ordinary lupus. A model is preserved in the Museum of the Royal College of Surgeons of England, of a case in which the lesion occurring on the arm of a dissecting-room porter had assumed the form of an annular lupus. The disease may be treated like other scrofulodermic sores, but is most promptly and satisfactorily disposed of by excision.

Besides these well-known forms, a few of greater rarity may be met with. Hallopeau and Goupil describe a peculiar variety which they call "Lymphangeiectasie suppurative tuberculeuse," characterised by the presence of soft tumours, of the size of filberts or larger, occurring in the course of the lymphatic vessels; and when ulcerated giving rise to fistulas from which flows lymph containing tubercle bacilli. The conditions to be next described under the names of *erythema induratum* and *lichen scrofulosurum* probably belong to the same group, but their tuberculous origin is not yet satisfactorily established.

ERYTHEMA INDURATUM SCROFULOSORUM OF BAZIN.—**Definition.**—Erythema induratum is a disease characterised by the appearance of patches of chronic inflammation, usually confined to the legs; at first subcutaneous and painless, but tending in some cases to break down into ulceration by suppuration or sloughing. Its relation to tuberculosis is doubtful.

Causes.—The affection is generally seen in young girls of feeble constitution. Tuberculous antecedents are found in many cases, but not with sufficient frequency to establish any essential connection between the two conditions; nor have tubercle bacilli been discovered in the lesions. It appears to be excited by occupations involving long-continued standing, as in washerwomen.

Symptoms.—The initial lesions are multiple indurations in the subcutaneous tissue, ranging in diameter from a line to one inch, symmetrically disposed, and most frequently located over the outer and posterior part of the legs, but occasionally appearing on the hands, and even on the face. They are at first painless, and can only be detected by pressure, as there is at this time no discoloration or change of level. Later the skin over the nodule becomes of a reddish colour, perhaps deepening to purple in the centre of the patch, and there are slight tenderness and swelling. The inflamed area may subside by resolution, or may break down by suppuration or sloughing, the resulting ulcer appearing as a

round excavated sore with grayish base, but without any undermining of the edges.

The affection is always slow in progress, very resistant to treatment, and prone to repeated relapses, which may extend over many months, or even one or two years.

Diagnosis.—The eruption is distinguished from *erythema nodosum* by its predominant distribution over the outer and posterior aspects of the leg, by its obstinacy, by its tendency to break down in suppuration or necrosis, by its liability to relapse, and by the absence of any connection with the rheumatic diathesis. From tertiary *syphilides* it is distinguished by its localisation and symmetry, by the absence of signs or history of syphilis, and by the inefficacy of iodide of potassium. From *tuberculous ulcers* it differs in its position, in the absence of marginal undermining and of giant cells or tubercle bacilli, and usually in the lack of any distinct connection with tuberculous lesions elsewhere.

Treatment.—The disease is best attacked by suitable constitutional measures, associated with rest, elevation of the limb, and graduated pressure by means of a flannel or india-rubber bandage applied evenly over a layer of cotton wool.

LICHEN SCROFULOSORUM.—**Definition.**—A chronic eruption of flattened papules formed around the hair follicles, chiefly distributed over the trunk. It is associated with more or less enlargement of the superficial glands, and nearly always occurs in young and feeble subjects with a history or manifestations of tuberculosis.

Symptoms.—The papules attain an average size of a pin's head. They are flattened, reddish in colour, crowned by a small scale or minute pustule or presenting the orifice of a hair or sebaceous follicle, and scattered, sometimes without order, sometimes forming rounded closely-set groups of half an inch to an inch and a half in diameter. The eruption affects principally the trunk, with a preference for the lateral aspects; but it may attack the limbs, especially the upper, on the flexor side. It is accompanied by slight itching. The superficial glands are commonly enlarged.

It nearly always occurs in young subjects in feeble health, and having tuberculous antecedents or manifestations. Its course is very chronic, lasting months or years, and subsiding without leaving scars.

Pathology.—The disease consists of an inflammatory process chiefly concentrated in the dermic structures immediately surrounding the hairy and sebaceous follicles. The dilated capillaries occasionally give way, and the eruption may assume a purpuric aspect (L. lividus). The tubercle bacillus has not yet been discovered in this disease.

Diagnosis.—It bears some resemblance to lichen planus and papular syphilides. *L. planus* is usually distinguished by the later age at which it appears, by the absence of tuberculous constitutional tendencies, and by the presence of the characteristic shining angular umbilicated spots (see p. 591). *Papular syphilides* are characterised by the associated history or

symptoms of syphilis, by the wider distribution of the eruption, and by the hardness, polish, and well-defined prominence of the individual spots.

Treatment.—Hebra and Kaposi recommend the internal administration and external inunction, twice or thrice daily, of cod-liver oil. Should the local application be unpleasant, preparations of glycerine or vaseline may be substituted. The constitutional treatment is that of other tuberculous affections.

WILLIAM ANDERSON.

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The number of references accumulated in recent years is so large that the work of selection is difficult. The following are amongst those that may be most probably consulted.

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W. A.

THE ERUPTIONS OF SYPHILIS (SYPHILODERMIA)

Of the Secondary Stage.—Granted that a case of primary syphilis be not treated with mercury, the date of earliest cutaneous manifestation may be put down as, usually, eight to ten weeks after that of infection. I have known it to be as short a time as six to seven weeks; but this is exceptional. On the other hand, many cases occur in which no eruption is detected until periods of three, four, or even more months have elapsed; but these are usually examples of syphilis interfered with by imperfect mercurial treatment. That the early and prolonged administration of mercury may wholly prevent secondary symptoms is now a fact of everyday experience; but whether in untreated syphilis the skin ever escapes, as the mucous membranes certainly do at times, is more doubtful; and the evidence on this point obtained from patients' statements alone is hardly ever to be trusted.

The five chief forms of syphilitic lesions of the skin are:—(i.) erythematous; (ii.) papular; (iii.) pustular; (iv.) tubercular; (v.) ulcerative. The earlier the stage at which the eruption occurs the more transitory and superficial it is. But even in the erythematous or macular syphilide there is a certain amount of cell infiltration, as well as mere patchy congestion of the skin; and this infiltration becomes more and more marked in the later stages of the disease, the lesions having then, moreover, a marked tendency to spread, and but little to heal spontaneously. Symmetry, which is fairly pronounced in the distribution of the early syphilides, is usually absent in that of the later. The term "tubercular," used above, refers solely to the gross infiltration of the skin causing raised nodules, and has, of course, no relation to the tubercle bacillus. It is difficult to include all the multiform skin diseases due to syphilis under these five heads, for there are very few non-syphilitic eruptions which it does not imitate. Syphilitic pemphigus, purpura, and the "pigmentary syphilide" are three distinct but rare forms not thus included. The following list will show the chief resemblances between syphilitic and other skin-diseases:—

(*a*) The erythematous syphilide resembles measles, or an erythema due to certain drugs, etc. (p. 920). (*b*) The papular or papulo-squamous syphilide resembles lichen or lichen psoriasis. (*c*) The pustular

syphilide may resemble variola or acne. (*d*) The tubercular syphilide may exactly resemble true lupus. (*e*) Tertiary syphilitic ulcers may

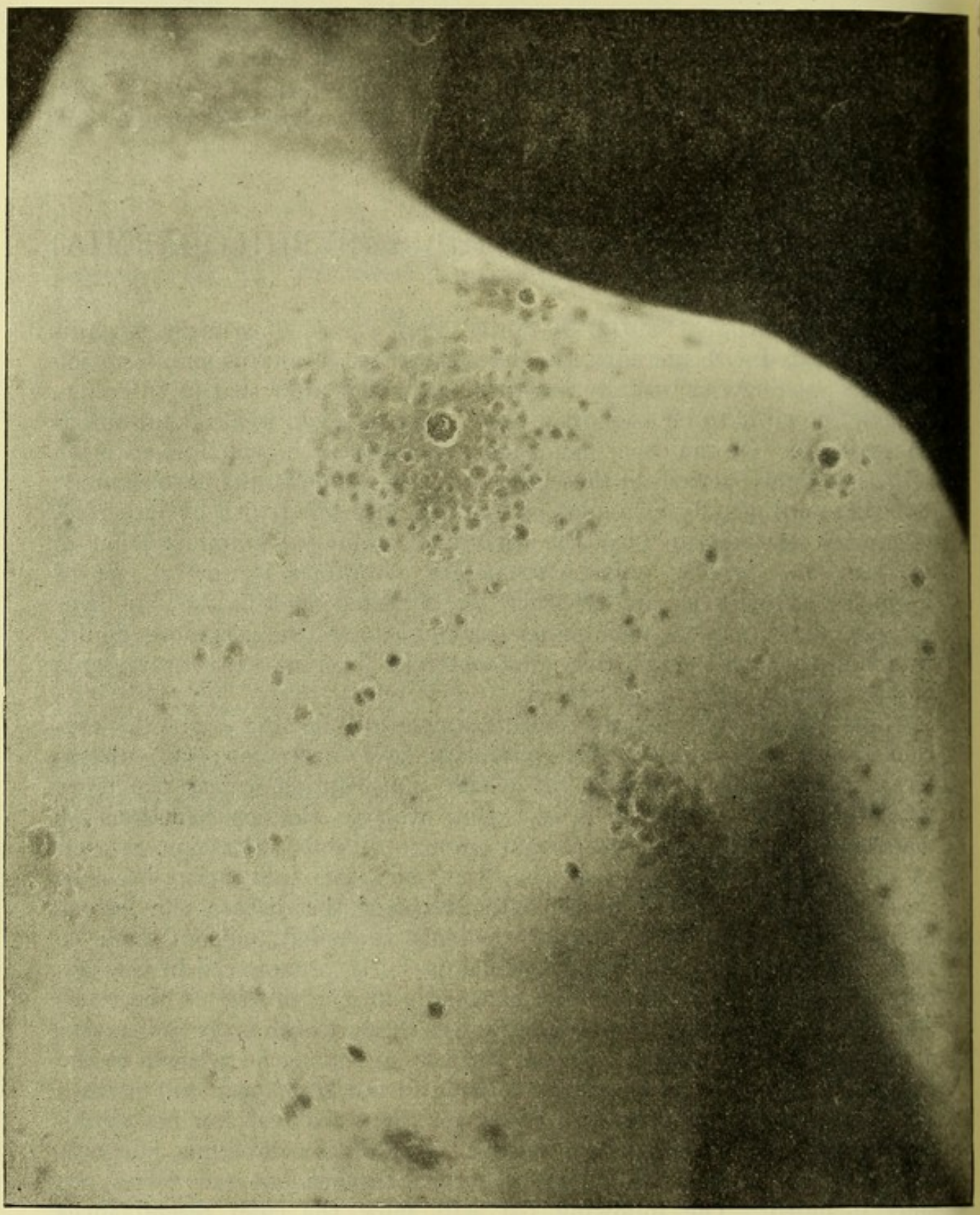


FIG. 8.—The corymbose syphilide; showing groups of small papules around a large central one, besides many macular stains.

be almost indistinguishable from inflammatory or traumatic ulcers, from rodent ulcer, etc.

Perhaps the most remarkable imitation by syphilis is the superficial gyrate eruption shown in Fig. 9, which, without the aid of the microscope, may be impossible of diagnosis from tinea circinata. This tendency to form circles or crescents is a general feature of all but the earliest syphilides—from the annular erythema up to the deep serpiginous ulcers—and is a most important one. Another feature is the polymorphism, or contemporaneous occurrence of several distinct lesions; of this the following good instance may be quoted: A man in the fourth month of syphilis came to me with his chest covered with a macular erythema, his face with a papular and pustular eruption, his thighs with grouped or corymbose papules.

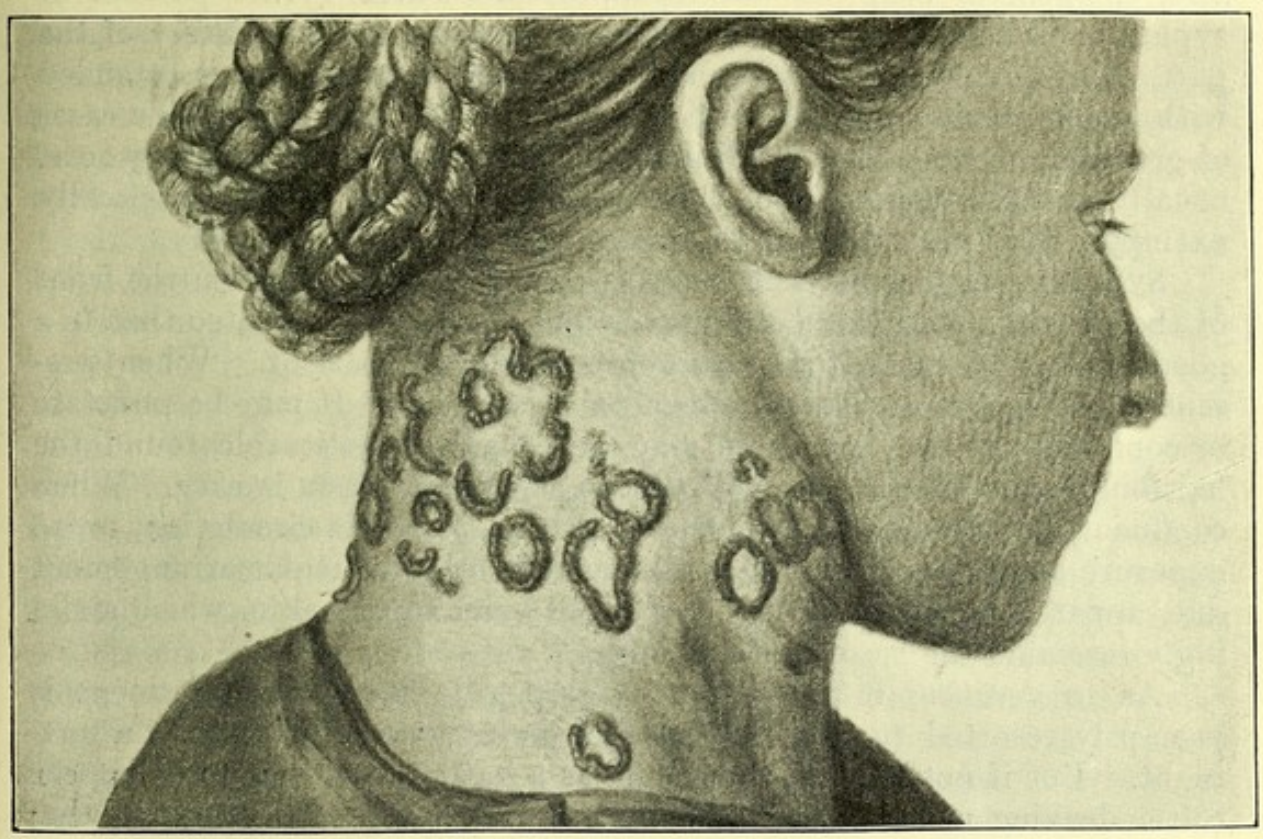


FIG. 9.—The annular or gyrate form of syphilide.

EARLIER ERUPTIONS.—What form does the earliest secondary manifestation assume on the skin? The following is the result of my observation of a very large number of cases of primary syphilis at the Lock Hospital. In them the earliest eruption was—(i.) Papular in 35 per cent (small papules in 31 per cent, the larger or nodular form in 40 per cent); (ii.) papulo-erythematous in 22 per cent; (iii.) papulo-squamous in 8 per cent; and (iv.) erythematous in 35 per cent (distinctly macular in 11 per cent).

Thus the papular form was present, alone or in combination, in 65 per cent of the cases.

The above statements apply, with slight variations, to both acquired and inherited syphilis; and in what follows it will only be necessary to draw attention to certain peculiar features of the latter.

Localisation.—As a general rule secondary syphilides affect chiefly the flexor aspects and parts where the skin is thin; to this rule, however, there are many exceptions. Thus, for example, I have frequently seen cases of syphilitic papular or macular eruption almost confined to the extensor aspects of forearms and arms; and the back of the trunk is commonly as much affected as the anterior surface.

Occasionally the secondary syphilide is confined to one particular region, such as the face; more often to the front of the abdomen. The genital region alone, including the penis, may be especially affected with a papular or other secondary eruption; and peeling, sinuous raised infiltration of the scrotal skin is a common "reminder" of syphilis long after the general eruption has disappeared. These gyrate patches of syphilitic erythema or papulo-erythema are, owing to the moisture of the part, apt to degenerate into condylomata, and are sometimes attended with much itching and discomfort. There are some remarkable cases of grouping of secondary syphilide immediately around the primary sore, usually on the groin-region, the rest of the body being practically exempt. It is very difficult to explain this curious limitation.

Syphilitic erythema or roseola is usually most marked on the front of the abdomen and chest, and may be but slight in degree; so that in a good number of cases it passes unobserved by the patient. When present it becomes more conspicuous after a hot bath. It may be punctate or confluent; if the former, it may be especially noticeable round the hair-bulbs, and the transition of this to a papular lichen is easy. When confluent, it may simulate the mottling due to feeble circulation, or to exposure to fire-heat; and in some cases it has a reticular arrangement due, apparently, to the network of small veins in the skin, which strikingly resemble the "cadaveric staining."

As to *duration*, it varies much; as a rule mercurial treatment is promptly resorted to, and the eruption fades away in a week or a fortnight. But if not treated, though it has a natural tendency to disappear (often leaving macular stains behind), it may persist for some months; or it may pass into other forms of eruption, especially the papular and papulo-squamous. Usually the roseola disappears without desquamation. Microscopic examination has proved that the syphilitic roseola is more than a mere congestive erythema—that a definite cell-exudation is present in the corium, especially around the vessels.

Peeling patches of erythema in the palms, though far from being conclusive evidence of syphilis, are not infrequently due to this disease, especially during the later secondary period—that is, six to twenty-four months, or even more, after contagion. Their bases are usually congested, and often it looks as though a vesicle with red areola round it had burst. Similar peeling patches may be met with on the soles of the feet.

Diagnosis.—It occasionally happens that a rash due to copaiba may appear in a patient who is under treatment both for gonorrhœa and for chancres, and doubt may then arise as to its being a syphilide. One

of the most distinctive signs is the itching and general irritation of the copaiba-rash, a sign conspicuously absent in the syphilide. Another is the grouping of the eruption, copaiba-rash being especially prone to affect the forearms and legs, the dorsal surfaces of the hands and feet in large confluent patches; whereas the abdomen and chest, the bends of the elbows, and the inner sides of the thighs are the favourite sites of syphilitic roseola. It is noteworthy that several authors have described the occurrence of an erythema due to mercurial administration; and, supposing the drug to have been given for primary syphilis, one can imagine that the difficulties of diagnosis in such a case must be great. At the same time this mercurial erythema is so rare, in the judicious use of the drug, that many observers in this country with long experience have never seen an undoubted case.

Papular syphilide—Syphilitic lichen.—On the back especially it may be arranged in lines, running mainly from the spine outwards and downwards, suggesting that the distribution is determined by the spinal nerves. However, this suggestion is quite probably fallacious.

It may be very thick in the median groove of the back over the spine itself, the papules being of a deep cherry-red colour.

The syphilitic papule consists mainly of a well-defined collection of small cells, in greatest abundance around the dilated capillaries, larger multinucleated or giant cells being often found interspersed amongst them. This mass of exudation and proliferating cells flattens out the epithelium and obliterates the papillæ, the epidermis becoming shed; hence the summit of the papule is smooth, shiny, and of a deep pink or (later) of a brown colour. The exact nature of the colouring matter is still a matter of doubt; it may persist long after the papule has undergone resolution, leaving in its place a slight depression. The colour is always deeper, or more purple, on the lower limbs than on the trunk and elsewhere. A very frequent and characteristic feature of the syphilitic papule is a delicate ridge of epidermis all round its margin (sometimes referred to as a "collar") caused by the shedding of the squamous layer over the papule itself. The cellular infiltration in rare cases is mainly grouped around the hair follicles (lichen pilaris); much more often it has no special relation to these structures, or to their glandular appendages, a fact which can be recognised by the naked eye, constituting a marked distinction from the ordinary lichen pilaris. Syphilitic papules vary greatly in size, from small pin-head lesions to nodules half an inch across; or even plaques, like those of lichen ruber planus, may be seen. It is obviously not scientific to divide the eruption into a "large papular" and a "small papular" variety, since all gradations in size are seen—often on the same patient. It is, however, necessary to notice briefly the curious arrangement which sometimes occurs.

The corymbose syphilide.—In this form (see Fig. 8) a ring of small papules, perhaps thirty or forty in number, are clustered around a central one which is, as a rule, much larger and more deeply coloured

than the others. A clear ring may separate the central and peripheral papules; but this is not invariable. This concentric grouping is best seen on the back and arms, and in certain cases of secondary syphilis is an extremely striking feature. It is a rather rare form; and my belief is that, when present, it indicates a grave attack of the disease, one in which iritis, severe throat lesions, and the like, will probably follow. It is, moreover, slow to yield to mercurial treatment, and hence leaves deep pigmentation behind it. When present it is absolutely indicative of syphilis.

Besides this remarkable form of grouped syphilide, we meet with others which are more difficult to describe. Sometimes the papules are arranged in lines following more or less the natural "cleavage-lines" of the skin; at others they may be grouped in curved figures suggesting constellations. I may repeat that there is no proof for the suggestion that syphilitic eruptions are sometimes grouped according to the distribution of sensory nerves.

The nodular syphilide.—The term "nodule" in this connection simply implies an exaggerated papule; and there is practically no limit to the size the nodule or plaque may attain. They are usually of a deep brown or copper colour, and, compared with the ordinary papules, are decidedly rare. More common is the *papulo-squamous syphilide* (the so-called syphilitic psoriasis). The latter name is perhaps worthy of retention, since it emphasises its frequent resemblance to common psoriasis. Its chief features will be brought out in the following points of diagnosis :—

Papulo-squamous Syphilide.	*Common Psoriasis.*
1. Occurs mostly on the flexor aspects, or at any rate is not chiefly grouped on the extensor ones.	1. Affects chiefly the extensor aspects (fronts of knees, backs of elbows, etc.)
2. The scaling is hardly ever free, and may be confined to the edge of the papule.	2. Copious formation of silvery scales is the rule.
3. The colour of the infiltrated papule is usually deeper than in common psoriasis, and the itching less marked.	
4. Yields readily to mercurial treatment, and has little tendency to relapse.	4. Begins as a rule in early life, and relapses again and again.
5. If the epidermic scale is removed a smooth surface is exposed.	5. The surface exposed by removal of the scales is often bright red, and bleeds slightly.

Like common psoriasis and some cryptogamic diseases of the skin, syphilides often tend to assume an annular or gyrate form (see Fig. 9). This is true of the late erythematous eruption, but still more so of the papulo-squamous; and this circinate arrangement is met with in both

congenital and acquired syphilis. Almost perfect circles, or segments of circles, which, by joining, may produce figures of eight or three, are sometimes seen. The same form is occasionally met with in the late syphilitic varieties of eruption.

Condyloma.—Amongst the most characteristic of all the lesions of syphilis occurring on the skin and mucous membranes are the modified papular elevations known as condylomata. They occur on parts where the skin is thin and constantly moist, or where it is liable to seborrhœa; thus they are most frequently seen around the anus of both sexes, the vulva and inguinal folds of the female, the penis and scrotum of the male. Beneath the pendulous breasts of a woman, at the umbilicus or in the axillæ of both sexes, around the oral aperture, on the eyelids and immediately around them, occasionally on the scalp, and sometimes in the external auditory meatus, we meet with condyloma. On the mucous membranes they are seen frequently on the inner surface of the cheeks or on the tongue; and they sometimes spread inward from the anus to the mucous membrane of the rectum (forming the so-called ano-rectal syphiloma). It is with some writers the custom to speak of "mucous patches" as distinct from condyloma of the skin; but no good purpose is served by retaining the former vague name. In their anatomical structure, in the tendency to assume a warty appearance, in the period of syphilis at which they occur, in the contagion of their secretions, the mucous patches agree exactly with condylomata; any differences which may exist being solely due to their situation on a soft mucous membrane instead of on the harder skin. In fact, it is perfectly correct to speak of condyloma of the laryngeal and pharyngeal mucous membranes; and it is by no means improbable that they may sometimes form in more hidden sites, such as the trachea or œsophagus.

The typical condyloma is a more or less circular flat-topped elevation, moist and slightly granular on the surface, having a broad base of attachment. The elevation is due in part to great thickening of the Malpighian or prickle-cell layer (not of the epidermic or horny layer which is frequently thinned or lost), and in part to small-celled infiltration of the corium which accompanies and follows dilatation of the fine blood-vessels and lymphatics. If a condyloma be neglected or badly treated, it shows very little tendency to spontaneous cure; and although it may accompany a general papular eruption, and may be regarded with reason as a modified part of it, yet it will persist for many months after all traces of the latter eruption have faded elsewhere. During the whole period of its existence, so long as there is any discharge or secretion from its surface, there is constant danger of the virus of syphilis being transmitted by its means to other subjects. Thus a woman with vulvar condyloma may convey syphilis to an indefinite number of men; she is a perfect firebrand to the community. A large proportion of the cases of inoculation of syphilis by kissing are due to the presence of condyloma (mucous patches) of the lining membrane of the lips or mouth. Apart from their importance in contagion, con-

dylomata afford one of the least fallible signs in the diagnosis of syphilis; in many cases, indeed, they exist at a period when all other lesions of the secondary stage have practically disappeared.

It must, however, be admitted that (very rarely) raised moist inflammatory patches are seen round the anus, or at other favourite sites for condyloma, which are not syphilitic in origin—these we may call *pseudo-condyloma*. Such patches I have seen between the nates in a case of general psoriasis; and round the anus in two or three children in whom otherwise not the slightest evidence of syphilis could be obtained.

Later Eruptions.—**Ecthyma.**—Of this it may be said that it usually appears after several months, perhaps a year or two, have elapsed from the date of contagion. It by no means depends necessarily upon a depressed general condition of health, and may manifest itself in young and temperate subjects. It is a troublesome form of eruption, inflamed skin being very liable to further irritation by chafing; and in some cases punched-out ulcers, and ultimately depressed scars, may be produced. The thighs and legs are the most usual site, exact symmetry, however, being quite exceptional. From ordinary ecthyma the syphilitic form is usually to be distinguished by the presence of other typical lesions (nodular, papulo-squamous, etc.) and the deep areola around the scabs.

Rupia is one of the most peculiar eruptions of the late secondary stage, closely allied to syphilitic ecthyma. In this the formation of large vesicles or pustules is followed by the drying of the scab, which is so pushed up by the formation of successive and larger layers that an appearance not unlike that of a limpet shell is produced. If the whole pyramidal crust be removed a superficial circular ulcer is exposed, the central part of which is often found to have healed. The individual lesions are widely scattered, with intervening areas of healthy skin. The extensor surfaces are quite as liable to be affected with rupia as the flexor. Rupia invariably leaves scars, which are usually dotted with depressions, and are commonly white and supple.

Bullous eruption—Syphilitic pemphigus.—In acquired syphilis any eruption which can fairly be called pemphigus is excessively rare. The limpet-shell crusts of rupia are sometimes preceded by large vesicles, but the latter have only a short duration. Sometimes, however, bullæ form the prominent lesions on the skin and persist as such. Two remarkable examples are recorded by Mr. Hutchinson, coming on during the sixth and tenth month respectively of acquired syphilis. In each the patient was extremely ill, but eventually recovered under the administration of arsenic and mercury. In each there was a suspicion that iodide of potassium might have been the cause of the pemphigus, and a certainty that it made it worse; but other forms of cutaneous syphilis were present at the same time. In the subjects of congenital syphilis pemphigus is more common, particularly on the extremities; and the

infants may be born with the bullous eruption out on them. Although admitted by every one to indicate a very grave prognosis as regards the life of the child, some patients recover under the judicious use of mercury and other proper means.

Squamous and crustaceous syphilides appear to form by far the commonest secondary eruption met with on the hairy scalp. This is partly due to the difficulty of recognising such eruptions as maculæ in this region, but still more to the fact that seborrhœa (which is extremely common on the scalp and forehead) modifies the syphilitic eruption, causing the formation of flakes or crusts which conceal the papular element. Thus it often happens that we find the syphilitic eruption papular or roseolar on the rest of the body, crustaceous on the scalp. Where the hairy scalp and forehead meet, a band of large and often confluent papules is prone to form, and, as in the scalp, to be modified by the seborrhœic process. To it the name "corona veneris" is sometimes applied, though this name is of wide interpretation, and has been used in respect of almost any form of syphilide occurring in this position.

The tubercular syphilide, or syphilitic lupus, must be noticed here, as it may occur within two years from infection. Indeed, in cases of so-called "precocious malign" syphilis this form of skin disease may, like rupia, or even gumma of the skin, form an important symptom during the first eighteen months, though fortunately such cases are rare.

Although of course by the terms "tubercular" and "lupus" some relation to the effects of the tubercle bacillus is often implied, and hence they cannot always be strictly justified when speaking of syphilitic skin lesions, they have become consecrated by use, and there is a certain convenience in using them to emphasise the extraordinary resemblance which exists between true lupus and its syphilitic imitation. Often the result of specific treatment only will decide the diagnosis. In both there is a slowly spreading infiltration of the skin, which tends to scab over and to ulcerate; in both, the face is more frequently attacked than any other part of the body, and in both there is a tendency to heal in one part whilst spreading in another. Just as lupus erythematosus is prone to occur in the "bat's wing" form over the nose and both cheeks, so syphilitic lupus may be confined to the same regions with almost the same exact symmetry; of this I have seen many examples. It may be noted that the tubercular syphilide is more often multiple, that is, occurring in many isolated patches, than true lupus; the destruction of tissue is, however, more rapid in the first form, and the scars left by the two diseases differ considerably. Those due to ordinary lupus are apt to be thick, congested, and prone to break down; whilst those resulting from the healing of syphilitic ulceration are white, supple, parchment-like, and sound. Further, syphilitic lupus, or spreading tubercular infiltration, often attacks the skin around joints, such for instance as the knees, the shoulders, and the elbows; and one

of its frequent sites is the dorsal region of the trunk—for instance, the lumbo-sacral area, where true lupus is very seldom seen. But the resemblance between the two is very close; and nothing but a careful inquiry into the history, the discovery of other symptoms, and above all the result of treatment, may suffice to decide the diagnosis.

Diagnosis of syphilides.—It is hardly necessary to point out that in any doubtful case a thorough examination should be made for the presence of symptoms other than the eruption. Perhaps the most important region to inspect is the throat. Many a time the discovery of superficial white ulcers on the tonsils, pillars of the fauces, tongue, or mucous membrane of the lips will settle the diagnosis; though it must be admitted that a considerable proportion of sufferers from secondary syphilis (probably 20 per cent) escape any obvious lesions of the mucous membranes. Another part from which confirmatory evidence is likely to be obtained is the anus, where condylomata are so apt to occur, and are so pathognomonic.

Amongst the many forms of skin disease which may coexist with secondary syphilides on a patient may be mentioned (i.) scabies, (ii.) tinea versicolor, (iii.) psoriasis.

The diagnosis is obviously rendered more difficult when two separate lesions of the skin coincide—one syphilitic and the other non-syphilitic. In one case an infant was brought to me with obvious lesions of secondary syphilis around the anus, in the mouth, and so on; and with a general eruption which was in parts very pruriginous. It proved to be a mixture of a syphilitic lichen and scabies; and on examination of the mother (who was suckling her child) it was found that she also had scabies, especially marked on and around the breasts, but no sign of secondary syphilis. The husband had apparently been the source of contagion in both diseases.

The treatment of syphilitic skin disease.—In the great majority of cases this consists solely in the prolonged administration of mercury. If a very rapid effect be desired, resort may be had to hypodermic injection of mercurial salts, of which the best forms are a solution of the bichloride, and calomel suspended in an oily medium. As a rule these injections are made, with full antiseptic precautions, deeply into the connective or muscular tissues. But experience has proved that it is possible without much risk to inject a soluble mercurial salt directly into the veins of arm or leg. Whilst the exact value of these latter methods is still uncertain, it may be positively affirmed that they are to a great extent unnecessary and irksome to the patient, and that the careful administration of mercury by the mouth is for many reasons to be preferred. The details with regard to this are given in the section on general syphilis. In treating cases of the more severe forms of eruption, such as ecthyma and syphilitic lupus, it may be necessary to combine iodides with the mercury. As regards local treat-

ment none is required in the early and slight forms of eruption; but the inunction of an oleate of mercury (5 or 10 per cent) certainly hastens the disappearance of the syphilitic papules, nodules, and the rest. The treatment of condyloma requires strict cleanliness, and the use of a dusting powder containing one part of calomel to two or three of oxide of zinc. Rupial sores heal well under the application of an ointment containing the red or yellow oxide of mercury. Occasionally the application of acid nitrate of mercury, or the actual cautery, may be required in obstinate cases of syphilitic lupus.

J. HUTCHINSON, JR.

NEW GROWTHS OF THE SKIN

Preliminary remarks.—*Classification.*—A simple classification of the new growths of the skin can be readily formulated by shortly reflecting upon the various structures of which the integument is composed. Certain formations, indeed, such as nævus and fibroma, are partly cutaneous, partly subcutaneous; and it is not always an easy matter to distinguish hypertrophic processes from tumour-formation. The skin is covered by epidermis, in some parts thin and delicate, in others thick, horny, and verrucose; but the epidermal cells, in conditions of health, however they may dip down between the papillæ, never transgress their normal limits. The deeper layers, consisting of connective tissue, unstriped muscle and fat, contain within their laminæ the papillæ, the endings of the sensory nerves, numerous blood-vessels and lymphatics, and the sweat and sebaceous glands. From these structures respectively different morbid growths originate, or they may be mingled together in the tumours of any one of them. It is often of vast importance in diagnosis to remember that the growths of the skin obey the ordinary laws of pathology; for example, a huge papillomatous growth on the vulva, where the parts are moist, warm, and excessively vascular, can hardly be recognised as essentially the same formation as a small starved wart upon the horny finger of a workman.

In the classification about to be presented, the cystic affections of the skin-glands will not be considered; and the infective granulomata, such as tubercle, syphilis, or glanders, which so often manifest themselves as tumours or nodules in the cutaneous structures, are dealt with elsewhere. Separate articles, again, will be devoted to such growths as mycosis fungoides, rhinoscleroma, and xanthelasma, the origin and true nature of which are still shrouded in some uncertainty.

Classification

Innocent tumours of the skin.

Originating in the papillæ—Warts, Moles.
" " connective tissue—Fibroma, Molluscum fibrosum.
" " unstriped muscle—Myoma.
" " cutaneous nerves—Neuroma.
" " vessels—Nævus, Aneurysm by anastomosis.
" " lymphatics—Lymphangioma, Lymphangiectasis, Nævus lymphaticus.
" " fat—Lipoma.
" " glands—Adenoma.

Malignant tumours of the skin.

Originating in the—

Papillæ—Melanotic or Epitheliomatous transformation of warts and moles.

Connective tissue—Sarcoma of the skin.

Sebaceous and sweat glands—Epithelioma, Rodent ulcer.

Lymphatics—Secondary deposits of Carcinoma or Sarcoma.

A. Benign Growths

Warts and Moles.—*Definition.*—A wart is a papilloma of the skin, single or multiple, simple or branched, acuminated or flattened; it is covered with a layer of stratified epithelium, and consists essentially of a central supporting axis consisting of loops of vessels and connective tissue. A mole in many instances is merely a pigmented wart; but on the other hand many moles appear as pigmented spots in the skin without a previous wart. The loops of vessels in warts are in rare instances venous and very distinct; the little growth being of a distinctly blue colour. I have seen several instances of this affection on the labia majora.

Origin.—Many warts and moles are of congenital origin. The hairy mole so often seen on the face is always congenital, and so are the warts which occasionally accompany extensive nævus. Multiple crops of warts on the hands are frequently found in the young, especially when the extremities are exposed to the constant irritation of dirt and moisture. The important "soot warts" which grow about the scrotum and thighs of sweeps are well known. The influence of irritation or contagion in producing papillomatous growths is well seen in the crops of warts which attack the gums and palate of sheep feeding upon stubbles. Many facts strongly suggest that warts are contagious; yet the infective element has never been certainly demonstrated. Warty growths about the penis, or the vagina of the female, especially when due to syphilis, are undoubtedly contagious, and their secretion may produce similar growths on another person. It must be remembered that warts in the neighbourhood of the genitals may be produced by any irritating dirty discharge, such as that of gonorrhœa; such formations are undoubtedly locally infective. Thus if a mass of warts occur unilaterally upon the labia, a patch of like nature will appear at the points of contact on the opposite side.

A peculiar wart (Verruca necrogenica) is apt to form about the interdigital folds, or knuckles, of butchers, cooks, pathologists, and others who expose their skins to the local action of cadaveric poisons. In the majority of cases this is really not so much a true wart as a chronic tuberculous infection, spreading slowly by circumferential infection, with much epithelial thickening and papillary hypertrophy. Although common in butchers and those who handle dead animal substances, these formations are also found under other circumstances. Doubtless the tuberculous

virus can be introduced through any accidental wound or scratch upon the hand or fingers. Such an origin is, however, quite exceptional, unless the patient be exposed to cadaveric infection. I have known formations upon the fingers or hands of pathologists which had all the appearances of necrogenic warts, and which obstinately persisted for many years after cessation of exposure to the exciting cause. Indeed, the chronicity and persistence of these growths is a remarkable feature in their history, though in exceptional cases they have disappeared spontaneously. A characteristic instance of this peculiar affection will appear as a dusky-red indurated patch of skin, covered with small warty elevations, and crusted with a yellow or brownish scab. On pressure sero-pus will generally exude; the affection being suppurative in its earlier stages, the scab readily detached, with unhealthy granulations beneath. The lymphatic trunks above may be affected, and stand out as dusky-red indurated cords. The skin immediately surrounding the warty patch is congested and inflamed, and of a dull livid blue colour, very diagnostic of the disease. A superficial crust is usually found; this when detached does not invariably leave a raw surface beneath, but the warty formations on the surface of the patch are always evident. The close relation of such warts to so-called lupus verrucosus will be noted by the reader.

The common wart of the hands or integument is single, and composed of an enlarged papilla branching upon its obtuse surface into a number of filiform projections. It is covered with thick, stratified epithelium mixed with dirt and pigment. Occasionally the papillæ assume a foliaceous aspect, the wart presenting distinct branched projections on its surface (Verruca digitata). On the other hand, the wart may be quite flat (V. plana). I have seen these formations on the scalp, in the axilla, and about the perinæum. Sometimes warts about the skin of the neck, face, or eyelids are quite filiform. Warts are exceedingly common in old age, large crops freshly originating or becoming evident. Such warts are flattened, of a pale lemon colour, or pigmented, and are common over the frontal region. They may be covered with sebaceous secretion and epithelial debris (V. seborrhoica). Warts about the genitals, especially of pregnant women, may assume a peculiar aspect: they are multiple, foliaceous, extraordinarily vascular and luxuriant in growth, form huge friable masses, bleed readily, and are covered with an offensive secretion. I believe they are almost invariably associated with gonorrhœal discharge. Flat warts covered with an abundance of stratified epithelium, and enlarged by hypertrophy of connective tissue, are called condylomata. The sweat and sebaceous glands in them are greatly enlarged, and secrete copiously. Such formations are common at muco-cutaneous situations, or in the axilla, during the eruptions of secondary syphilis; and the exaggerated shape and form are merely due to the local conditions of vascularity, heat and moisture. Thus in a syphilitic person who exhibits a papular or roseolous eruption, flattened condylomata may be found about the anus, perinæum, umbilicus, inside of thighs, between the toes, at the margin of the mouth or vagina, in the axillæ, or deep in

the external auditory meatus. I have never seen these formations thus distributed except as the result of secondary syphilis. The secretion of the sweat and sebaceous glands of a condyloma is highly contagious, and primary syphilitic sores are often thus communicated (*vide* p. 811). Finally, I believe that the colour of warts is generally in great part artificial, and caused by dirt. If a wart be well scrubbed with soap and a nail-brush it will generally appear of a pale lemon or pink colour, or even quite white; and on the scalp large flat white warts of the size of a florin are sometimes observed.

Diagnosis.—The above description will suffice to show that the diagnostic symptoms of warts are usually very evident and simple. The observer may fall into error unless he reflect that warts accompany and complicate such diseases as lupus and lichen planus; and black warty formations are an essential part of that rare pigmentary affection of the skin known as acanthosis nigricans.

Warts may be confounded with adenoma sebaceum, with molluscum contagiosum, and with the tubercles of xanthoma and lichen planus. Adenoma sebaceum, as described by Dr. Pringle, is usually a congenital affection occurring in female children of low intelligence. The formations of this rare disease closely resemble warts, but one of the leading differential symptoms, besides that of distribution, appears to be the effect of a prick with a fine needle, which, in the case of adenoma sebaceum, allows a whitish fluid to exude. In molluscum contagiosum the pearly-white tubercles on the breasts, eyelids, or face, with the history of contagion, are sufficiently characteristic. The tubercles of xanthoma and lichen planus can only be confounded with warts by persons unacquainted with the characters of these diseases (see pp. 894 and 591).

Groups of pigmented warts, hard and horny, may follow the course of certain cutaneous nerves. I have seen several instances of this curious condition in the nerves of the skin of the extremities, and they were all of congenital origin. Lupus verrucosus is probably a form of tuberculous disease of the skin. Again, some forms of epithelioma of the skin are especially likely to be associated with warty growths, which may form large protuberant masses on the surface of the tumour.

It is very difficult to discriminate warts from moles; and these conditions are often mingled, as in the well-known hairy mole of the face, which is generally studded on the surface with numerous warty protuberances. Hairy moles may be situated anywhere. They are of course most common on the face. A curious variety may be mentioned surrounding the pelvic region in the area covered by bathing-drawers. Lastly, it may be mentioned that warts may occur on mucous surfaces, as the bladder, etc. in the larynx of children. They are then termed papillomatous or villous growths.

Hairy moles vary exceedingly in structure, but a definite instance will present fine dark or white hair, warty protuberances, nævoid tissue, abundant pigment, and thickening of connective tissue so as to form a flattened growth raised considerably above the surface, and very un-

sightly. It may be pointed out that some mole-like spots about the front of the thorax and axilla are really rudimentary nipples, which closely resemble ordinary moles, and are often confounded with them.

History and Termination.—The crops of multiple warts, so often seen on the hands, are prone to disappear suddenly. This explains the vaunted efficacy of certain specific remedies. In other cases, as in the warts and moles about the face, the little growths remain permanent through life, doing no harm unless by their unsightly appearance.

Warts, especially the senile flat wart, may in aged persons become the seat of excessive itching; or they may take on active growth, ulcerate and bleed, exuding abundant offensive discharge. The growth then becomes mushroom-like, with a pedicle, and broad tuberculated surface. The mushroom-shaped wart is often seen in an exaggerated form about the belly and genitals of horses and asses, especially after castration (see below). The sebaceous secretion and epithelial proliferation on a wart may in rare instances form a horn, which may attain to a considerable size (p. 692); and this again may be associated with epitheliomatous disease at its base. Venereal warts, unless treated, are very persistent; and, besides the local pain and annoyance, may affect the orifice of the urethra or rectum, seriously interfering with the functions of the parts and giving rise to a persistent profuse offensive discharge. Warts are often abundant about the integument of the thorax in old women suffering from carcinoma of the breast, but this may be mere coincidence.

Botryomycosis (*βότρυς*, a bunch of grapes).—The occasional termination of warts in mushroom-shaped bleeding tumours, and the commonness of these on the bellies of horses and asses, have already been mentioned. This part of the subject derives great additional interest from some observations of MM. Pincet and Louis Dor, in the *Lyon médical* for 24th October 1897. These authors observed formations of this nature in four cases; in three upon the digits, in one near the shoulder. They assert that these growths are identical in nature with the similar but more extensive formations about the belly of the horse, which are very common after castration in this animal (Champignon de castration), and they discuss the organism, which has been cultivated. The cultures closely resemble staphylococci, but are associated with small granules in necroses of a yellowish colour (botryomyces). A cultivation from one of the patients was injected into the nipple of a she-ass by M. Guinard; some local swelling was followed by the formation of a tumour of this variety, which seems, so far, to corroborate the author's opinion. They do not consider the affection to be actinomycosis, though it may be closely allied to this disease.

Undoubtedly the most serious transformation of warts and moles is their termination in malignant disease. Considering the frequency of these growths upon the skin of old people, probably only a very small minority end thus. The transition of warts is into true epithelial cancer, while the mole originates melanosis, which, in most of the cases I have

seen and examined, is a sarcomatous disease occurring usually in dark and swarthy persons (p. 845). The initial changes are merely increased activity and growth, with a proliferation of the epithelium beyond its normal limits. The determining cause is generally some injury, such as picking or cutting the wart or mole, or frequent irritation of its surface with inefficient caustics.

Treatment.—No internal treatment is of the slightest avail for the chronic warts and moles of congenital origin, or for those originating in old age. The multiple warts of the hands, as has been pointed out, are in their spontaneous subsidence so capricious that it is very difficult to assign a true value to vaunted specifics. Magnesia has long been advised as a remedy; and I believe I have seen undoubted benefit from the internal use of Fowler's solution and the local employment of arsenite of potash. The local treatment of these varieties of warts is very various, but is usually designed to destroy their tissue. They may be excised or snipped off, with the aid of cocaine; or destroyed by cautery, or electrolysis. I have had good results with powerful resorcin ointment, acid nitrate of mercury, chromic acid, carbolic acid and glacial acetic acid. Such remedies must be carefully applied to the surface of the wart itself; unless carefully done, this treatment is apt to be followed by troublesome sores.

An excellent application for most warts is salicylic acid, either applied with collodion or in the form of a plaster. Every three or four days the part is well soaked in hot water and the softened portions of the wart peeled away, when the application is renewed. All these remarks apply to the warts of the extremities. Warts upon the faces of old people, especially about the side of the nose, which begin to itch or grow troublesome, or to increase in size and bleed, should never be treated by inefficient measures. They should be excised by an elliptical excision going quite wide of the base of the growth. The free bleeding will be staunched by sponge pressure, and the surrounding integument, being detached subcutaneously with a fine knife, can usually be adjusted accurately by hair sutures. The same treatment should be advised for the "soot warts" found on the genitals of sweeps. Moles may be treated in like manner. It is a curious fact that moles on the extremities, especially about the dorsum of the foot, are likely enough to induce melanosis; and such formations, if they give rise to itching or local trouble, cannot be removed too early.

The large warty growths which occur about the genitals of women are more formidable to deal with. It is unwise to touch these tumours during pregnancy, for then they are exceedingly vascular. After childbirth they often subside greatly. They have been removed by the galvano-cautery hot wire loop, actual cautery, elastic ligature, and excision associated with the rapid application of pressure forceps. Every case must be treated on its own merits. A method I have found very efficacious in several cases is to enclose the base of the growths in a powerful crushing clamp, which is screwed as tight as possible; the mass is then burnt away with a Paquelin's cautery, and the clamp left in

place for two days; on removal it leaves the base of the growths disintegrated for further cure by sloughing. This method is far less painful than strangulation by ligatures. I have also removed these masses with scissors, aided by sponge pressure and the rapid application of pressure forceps.

Syphilitic warts and condylomata, when of small size, are to be treated by constitutional remedies, and by the application to their surface of powdered calomel and boric or salicylic acid. Touching them with carbolic acid, strong liquor plumbi, or chromic acid is an excellent plan; and I have found removal with the galvano-cautery a good method in the small venereal warts of the prepuce in men.

Satisfactory treatment of the hairy mole of the face is always very difficult, and often impossible. When the growth is of moderate size and suitable incisions can be planned, I have no doubt that excision is the best treatment. The skin, being afterwards well detached subcutaneously, can be brought together by hair sutures, small lateral incisions being made to take off tension. I have lately treated a case of this kind, in the malar region, by excision and extensive detachment of the integument. A free incision was made in the hairy scalp, to allow the skin to slide forwards and the wound to be accurately united; the scar being thus as it were transposed to the scalp, where it was hidden from view. The moles have also been transposed to the arm, a flap of skin from the arm taking the place of the mole. Even when very extensive these growths may be excised, the angles of the wound brought together, and the centre, when it granulates well, covered with skin grafts. The tissue of the prepuce is excellent for this purpose. I must confess my preference for this method over that of Thiersch, for the large portions of skin engrafted by his proceeding may long remain white, œdematous, protuberant, and very unsightly.

Other methods in vogue.—The surface of the growth may be shaved off with a very fine razor, a process which may be repeated several times. Some cases I saw treated in this way by Mr. Morrant Baker were undoubtedly improved. Stiff hairs may be removed by electrolysis; but usually the hairs are too many and downy for much success by this means. Or the surface of the growth may be destroyed by flat electrodes, but for these methods the works on Medical Electricity must be consulted. It need hardly be pointed out that destruction of hairy moles may be brought about by many of the common disintegrating and caustic applications. A scar, however, may be as disfiguring as the original growth; and the results by excision, sliding skin flaps, and careful grafting are certainly, in my judgment, superior in the ultimate results to all other methods. The principle of sliding skin after extensive subcutaneous detachment is perhaps scarcely enough practised, or even known.

The subject of warts is scarcely complete without reference to the curious disorder, found in the Peruvian Andes, in which a severe febrile disease of an intermittent nature is associated with an external eruption of warty growths; these may attain to a large size and cause death by

hæmorrhage and sloughing. The warts begin as small red spots or vesicles associated with pruritus; under the influence of heat and irritation they become engorged, and may even suggest the structure and appearance of angioma. Subcutaneous nodules are also found. In structure the growths have been found strikingly to resemble sarcoma. The affection is a severe and dangerous one, being associated with hæmorrhage, sloughing, and profound anæmia. In cases which end in recovery the growths undergo spontaneous atrophy and retrogression. The disease is endemic, and prompt removal from the infected districts seems to be the best treatment.

FIBROMA.—*Molluscum fibrosum; Myoma.*—**General description.**—Small pendulous fibromata, composed of connective tissue and fat, are exceedingly common on the skin; as little, pedunculated, soft, insignificant tumours they have no clinical significance, and often pass unnoticed by their host. Occasionally, however, these growths, from their size, weight, and locality, become matters of serious annoyance. This is especially the case near the nipple, about the labia, or on the inner side of the thigh. A pendulous growth, having attained to the size of a hen's egg, may ulcerate on the surface, when a profuse and very offensive discharge, issuing from the hypertrophied glands, stains the linen. The general health is seldom affected, and there is never any inclination to malignant degeneration.

Firm fibromata are rarer, and are often really subcutaneous. They have the usual structure of fine fibrous tissue arranged concentrically round the vessels, and mingled with spindle cells. Amongst this class may be mentioned the fibro-myoma and the fibro-neuroma. Most instances of so-called neuroma of the skin are really small hard fibromata having nerve filaments stretched over them, or originating in the perineurium itself. In some cases the tumours are composed of medullated and non-medullated nerve-fibres mingled with connective tissue. True myoma of the skin is described, and is said to contract under the influence of cold. It is exceedingly rare, and without the microscope their diagnosis is impossible or very difficult. I have seen a unique case of psammoma of the tissues of the scrotum; its true nature was indubitably proved after removal. These tumours are nearly always mixed with fibrous tissue, and sometimes with dilated plexiform vessels.

As regards the *diagnosis* of these tumours, their hardness, mobility, and chronicity are sufficiently characteristic. The fibro-neuroma may be exceedingly small, not larger indeed than a barley-corn; and severe neuralgic pains thus arising may well have their true nature overlooked. The sharp pain, like an electric shock, on touching them is very characteristic. These little formations are common in the skin of the upper arm and over the mammary region, where they may frighten women with the pains of imaginary cancer. They are often multiple, generally subcutaneous rather than cutaneous, and have been found on tendon sheaths, and the perineurium of nerve-trunks. Fibro-neuromata

are occasionally pink or bluish in colour, from the association of dilated vessels in their structure.

Treatment.—Excision is the ordinary treatment of fibromatous tumours of the skin. In some of the larger and more pendulous growths a small artery can be felt pulsating in the "stalk" of the tumour; it should be carefully ligatured. In timid patients the elastic ligature is a very convenient method of treating pendulous tumours; ordinary fine elastic is tied round the stalk of the tumour, which then sphacelates and drops off.

Molluscum fibrosum.—In this remarkable disorder, which seems to affect all races, the skin becomes covered with numerous rounded tumours, varying from the size of a No. 1 shot to a walnut or pear. The growths are generally pedunculated, sometimes flattened or sessile, usually originating in the deeper layers of the cutis. In exceptional cases they affect the mucous membranes. The disease varies remarkably in severity, being sometimes slight; or the growths by their size, numbers, and situation render the patient a remarkable and hideous object, exhibited for gain to the gaze of the vulgar, or necessitating his life-long seclusion. Very various accounts have been given of the origin of molluscous tumours, some investigators asserting that they start in a hypertrophic condition of the connective tissue round the hair follicles or glands, others in overgrowth of the corium. The growths are composed of loose fibro-areolar tissue. The centre is indistinctly encapsuled, and may be juicy or distinctly myxomatous. As they enlarge more and more the skin becomes incorporated with them and is expanded over them. The huge pendulous masses of skin are due to obliteration of the pedicle and atrophy of the tumour substance proper (Jamieson). It is unfortunate that the name "molluscum" is applied to this disease. It commonly happens in bad cases that some of these growths take on excessive action, forming huge hypertrophic masses, soft, fringe-like, and pendulous, resembling the "dew-laps" on the neck of a bull. I have seen such formations on the scalp, neck, rib of the chest, about the labia, and in the buttocks; and have personally treated a case where a huge tumour of the gluteal region hung as low as the popliteal space, thus completely incapacitating the patient. From friction and congestion these masses may ulcerate, bleed, and discharge profusely. Moreover, such extraordinary excrescences are sometimes associated with nævoid growth, large formations of hairy moles, and with hypertrophic deformities of the bones of the face and skull. In a few cases multiple neuromata of various sizes have also been found on the nerve-trunks.

In exceptional instances the cystic formations of adenoma sebaceum are mingled with molluscous tumours. The subjects of molluscum fibrosum have been said to be mentally deficient, but this is a questionable statement.

Treatment.—No internal remedies seem of the least avail in this disorder. About the face the little tumours may from time to time be

removed for appearance sake. This is especially needful when they grow upon the eyelids and seriously affect vision. Excision may be practised, or the little growths shrivelled by electrolysis. The treatment of the larger masses rather belongs to the domain of surgery. These huge tumours differ much in vascularity. Any indication of nævoid tissue of congenital origin, especially in growths of the scalp or neck, should render the surgeon particularly cautious. The various methods of operating upon huge molluscous tumours cannot be described here; but the resources of modern surgery enable me to state that these growths can be safely removed by the combined aid of elastic compression to their base, and the use of "forci-pressure" instruments rapidly applied by a dexterous operator.

LIPOMA.—Fatty tumours are rarely if ever found in the skin itself. They are subcutaneous formations, though the skin may become intricately incorporated and adherent to them, especially if inflammation occur. Their consideration belongs more properly to the domain of surgery. Their softness, lobulation, mobility, and chronic progress make the diagnosis easy.

ADENOMA.—It is difficult clinically to distinguish these rare tumours from fibroma. They form smooth rounded growths of the size of a pea or cherry, the skin over them being marked by abnormal vessels. They originate in the sweat-glands, and are usually found about the forehead or skin of the scalp (sudoriparous adenoma). Benign in their origin, it is easy to understand how a rapid transgression of epithelium beyond its normal limits might occur, and malignancy thus become established. The analogy of these growths to those described as "benign cystic epithelioma" (p. 840) will not escape attention.

NEUROMA.—It has been mentioned already (p. 823) that most of the so-called neuromata of the skin are really fibrous in structure. True nerve tumours are exceedingly rare, and confined to those cases where multiple neuromata form on the cutaneous nerves in association with congenital moles, or molluscum fibrosum (plexiform neuromata).

ANGIOMA.—**General remarks.**—Vascular growths of the skin present great variations in structure, and their classification is not easy. They are all essentially composed of a congeries of dilated vessels, freely communicating and intertwining, held together by connective tissue, either encapsuled or ill defined, and fading away into the surrounding tissue. The vessels are generally thin-walled, pouched and varicose. The distinction between arteries and veins is very indefinite. Occasionally the vessels communicate with connective tissue spaces, which then become sinuses lined with endothelium, and the structure of the tumour becomes like that of normal erectile tissue. In these cases definite arteries usually carry blood to the growth, which may pulsate, and be associated with

thrill and bruit. The angiomata of the skin and subcutaneous tissue comprise the different forms of nævi and erectile tumours, aneurysm by anastomosis, and cirsoid aneurysm.

NÆVUS.—**Definition, varieties, and distribution.**—A nævus is a new growth consisting of a congeries of dilated, freely communicating vessels held together by connective tissue. The vessels may be all veins (venous nævus), capillaries (capillary nævus), or, very commonly, a mixture of both. *Capillary nævus*, often very extensive, is confined to the superficial layers of the skin; *venous nævus* to the subcutaneous tissues: *mixed nævus*, which is the common variety, affects both structures. Nævi consisting of cavernous tissue (*erectile tumours*) are principally subcutaneous, and are generally found in the scalp, parotid region, neck, breast, perinæum, lip, tongue, or in internal parts—as the liver. It has already been pointed out that nævus is often associated with such growths as hairy moles, or molluscum. The well-known "vascular growth" of the female urethra is a mixture of nævoid with papillomatous structures. Any part of the skin of the body may be affected with nævus, yet the scalp, neck, and face are especially prone to the disease. In some extraordinary cases a whole limb may form an enormous mixed nævus, the vascular tissue affecting even the bones. I have seen several cases of this exaggerated form of the disease, both in the upper and lower limbs. In the case of large nævus of the scalp, I have known the veins of the diploe affected, the tumour being reducible on continued pressure, and closely resembling an encephalocele.

The pure capillary nævus (port-wine stain) may vary from a spot the size of a shot to an unsightly affection covering the whole of one side of the face, or even of one side of the body. A common variety, found on the face of children, is a small central red spot with a leash of vessels running to it (spider nævus).

It may truly be said that nævi are always congenital in origin; yet it is curious that small bright capillary nævi are apt to arise, apparently anew, on the skins of the aged. This is the case with warts and moles also. Again, the venules on the skin of the nose and cheeks of old people are apt to form defined tufts of red or bluish vessels. Such forms of telangiectasis are common in persons much exposed to the weather, in drunkards with hepatic cirrhosis, and on the noses of those who suffer from acne rosacea.

Bright red capillary nævi on the skins of old people have long been noted in association with cancer in the liver, œsophagus, breast, or elsewhere; but, considering the extreme frequency of these spots, I cannot look upon the association as more than mere coincidence. *Aneurysm by anastomosis*, which may with propriety be named arterial nævus, may be originated by an injury; on the other hand, it may arise quite spontaneously. It is an affection of adult life, and when instances of this rare malady come before the notice of the surgeon, he will find the vessels of the auricle, scalp, or orbit almost invariably at fault. The disease

consists in an increasing tumour, doughy, compressible, warm, bluish in colour, which can be seen and felt to pulsate, and is associated with a distinct thrill and bruit. The treatment of it belongs to the domain of surgery, and such affections had better be left alone than treated by caustics or inefficient remedies. Any ulceration thus induced may be associated with frequent and uncontrollable hæmorrhage.

The **diagnosis** of nævus is generally made at a glance ; but when purely subcutaneous nævi degenerate, and are mixed with fat, the recognition of them is not always easy. Subcutaneous nævi are always of congenital origin. They are bluish in colour, and are apt to swell with expiratory efforts, such as crying or coughing. I may repeat that nævoid tissue is sometimes mixed with diffuse fibromatous growths of the skin.

Course and Terminations.—If nævi are left alone, they seldom do harm, except by their unsightly appearance. Capillary nævi may remain stationary, or spread widely as life advances, making a most unsightly mark. They are especially apt to take on rapid growth at puberty. Subcutaneous nævi, on the other hand, are prone to degeneration, brought about by thrombosis of the vessels, and consequent formation of a growth of composed connective tissue, cysts, and fat (nævoid lipoma). Large nævi, especially of the erectile variety, may inflame, ulcerate and bleed, exhausting the patient by repeated small hæmorrhages. Should he survive this, spontaneous cure by cicatricial contraction will ultimately ensue.

Nævi of such parts as the rectum or bladder, generally mingled with villous growth, are prone to cause serious bleedings, especially when interfered with. Capillary nævi on the lower limbs, when blood stasis and congestion are prominent features, may be replaced by extensive areas of deeply pigmented skin. It may finally be mentioned that large inflamed and thrombotic nævoid tumours in infants sometimes assume so curious an appearance that more than once I have known them to be diagnosed by very competent surgeons as sarcomatous disease.

Treatment.—*Capillary nævus.*—This affection may be satisfactorily removed when small ; when extensive, covering large areas of skin as in the "port-wine" mark, adequate treatment has yet to be invented. It is a very remarkable fact, and one generally true of nævoid structures, that if but a small portion of the growth be left, such a part is only too apt to take on active growth and to reproduce the disease. This, however, need not be considered as an evidence of the infectivity of the disease, for the same tendency is observed in other innocent growths. Evidence of the infective nature of nævus is, I believe, entirely wanting. Hence, unless large areas of skin are destroyed, complete obliteration of all the nævoid tissue is impossible, and the resulting unsightly scar, probably on the face or neck, is almost as disfiguring as the original malady. The following modes of treatment are in vogue for capillary nævi :—

(i.) The application of astringent and caustic remedies.—Amongst remedies of this numerous class are such agents as collodion, ethylate of sodium, nitric acid, acid nitrate of mercury, acetic acid, pure carbolic acid,

potassa fusa. Such agents must be used with caution, the nævoid growth being just touched with a fine probe or piece of pointed wood dipped in the acid. Ethylate of sodium, regularly and carefully applied, will cure many small capillary nævi; but it is often tedious and uncertain in action. All caustic applications should be used with great caution in the neighbourhood of the eyelids.

(ii.) Electrolysis.—The electrolysis of nævoid growths is a somewhat complicated subject, and the following remarks are for general guidance only. The method is of peculiar value, especially in nævus of the eyelids; and the only drawback to its use is that, if the nævus be at all extensive, many applications are needful. Children need anæsthetics, and, for a small matter, parents will seldom allow the needful repetition of operations. The employment of electrolysis requires great care. Actual burning of the tissue is to be avoided. The operator should aim at the production of thrombosis and blocking of the vessels, and thus imitate the natural process of cure. The needles should not touch one another, or shocks are produced, very harmful to young infants. It is well to include a galvanometer in the circuit, and to raise the current from zero up to 40, 60, or 100 milliampères (Lewis Jones). The following practical hints are useful. When the needles, which had best be covered with platinum, are introduced, some slight frothing of hydrogen gas occurs about the negative needle, and the tissues about the positive needle turn white. The positive needle should be held in position, and the negative needle passed in various directions through the nævoid tissue, but without withdrawal, and parallel, if possible, to the positive needle. As soon as the least sign of lividity or blackness is observed, another part of the nævus is attacked. The needles should be introduced and withdrawn when the current is shut off.

The greatest care should be exercised to prevent sloughing of the skin. Small nævi may be obliterated at one or two sittings, but in extensive nævi, partly subcutaneous, infiltrating the tissue of the lips or eyelid, no limit can be put to the number of operations required. In very superficial nævi, as in the "port wine" mark, a 20 per cent solution of cocaine soaked for half an hour upon the parts will form a partial anæsthetic. Great improvement can be effected in many cases of "port wine" mark by attacking small areas from time to time by electrolysis. From my experience of the electrolysis of nævi, I should say that operators do not devote sufficient time to each operation. Thirty minutes may be looked upon as a mean length of sitting, but I have seen this time exceeded with benefit.

(iii.) The use of the cautery.—This is an excellent method of treating capillary nævi. The point must be exceedingly minute. The operator may employ a fine galvano-cautery, or, still better, the actual cautery in the form of a fine needle-point projecting from a bulb. In young children the application should be made under nitrous oxide gas. The operator must be most careful not to do too much; and, if the nævus is at all extensive, he had better do several operations, allowing some

months to elapse between each proceeding. The centre of the growth should always be attacked, for when it is obliterated many of the prominent vessels of supply will dwindle and disappear. The fine cautery may also be used for the telangiectasis of old people, if such a condition ever needs treatment.

(iv.) Cutting operations.—Capillary nævi may be excised, but this is seldom so efficient as careful treatment by the fine cautery. Scarification has been much vaunted, especially in the "port wine" mark. I have tried this method on several cases, and have been, on the whole, disappointed with the results. In cases associated with acne rosacea, however, good results have been obtained. An excellent method of treating small nævi in the face is as follows. A fine knife is introduced into the skin close to the nævus and carried beneath it; through the opening thus made a minute and very sharp curette is introduced and the nævoid tissue well scraped beneath the skin; pressure is then employed with a small soft sponge, and when the resulting swelling and induration have disappeared the nævoid mark is usually obliterated.

Vaccination should never be performed upon nævi of the face. There is no objection to this practice upon nævi of the limbs or trunk; but it is a very uncertain treatment and one which I do not recommend.

Mixed nævi.—The above methods are applicable to purely cutaneous nævus. A large number of nævoid growths are, however, mixed in structure, and are partly subcutaneous; with these the greatest difficulties in practice may sometimes arise. If the tumour be large, increasing, and with evidence of cavernous tissue in it, the case is one of considerable gravity. Should the patient be a young infant the surgical measures taken to cure a large nævus of this nature may unfortunately destroy its life. Unless treatment be forced upon the surgeon by rapid increase, or especially by ulceration and bleeding, he will do well, in the large erectile nævi of young infants, who ill bear loss of blood or severe illness, to postpone operation as long as possible. These tumours, if merely treated by pressure with a soft Turkey sponge, or left entirely alone, will often spontaneously inflame, and then undergo a kind of obliteration which is very remarkable, and which renders them far more amenable to subsequent surgical treatment by excision.

Many of the mixed nævi found in practice are small, circumscribed, and quite easily dealt with. Some of the methods mentioned for capillary nævus are applicable to those growths; electrolysis is best when the nævus occupies tissue which cannot be removed, such as the eyelids or lips.

The application of caustics, such as nitric acid, to a mixed nævus causes ulceration and consequent troublesome bleeding. Some of the principal modes of dealing with mixed nævi will now be described, for on the proper selection of treatment the satisfactory management of these cases entirely depends. The operator should accordingly well consider the case in all its aspects before undertaking any operative proceedings.

Excision.—This is a most excellent treatment for mixed nævi, which

form distinct tumours ; and the hæmorrhage is not very formidable if the operator keep clear of the growth itself. The vessels of supply are few in number, and may be tied, twisted, seized in pressure forceps, or included in the deep sutures used to close the wound.

Many nævi are enclosed in a capsule of connective tissue, and come away quite easily on dissection. The operation must be rapidly and dexterously done, and a handy assistant must keep up sponge pressure as soon as the growth is removed. Hare-lip pins or deep sutures are quickly passed, the edges of the wound are brought together, and the bleeding ceases. A most useful method of excising nævi is mentioned by Ball of Dublin. A number of curved needles bearing sterilised silk are passed well under the nævus, entering and emerging in healthy skin on each side ; the growth is then rapidly excised with a sharp knife, the needles are drawn through, and the ligatures tied. Whatever method be employed, the operator must be careful to leave no nævoid tissue behind, or recurrence is certain. He must also bear in mind that infants may soon die if they lose much blood, and, unless confident in his own powers, he had better resort to some of the more bloodless methods.

Removal by the ligature.—This is an ancient but excellent method of removing large and vascular nævi, and the safety from hæmorrhage renders it a trustworthy and favourite remedy. The various modes of applying the ligature are many, and must vary so widely with the nature and size of the growth, that complete description would here be out of place. The main points for the operator to bear in mind are as follows :—

(*a*) No healthy skin is to be included, if avoidable, in the ligatures, but they must be passed very deeply, so as to include the whole of the morbid tissue.

(*b*) The size of the silk must be proportionate to the bulk of tissue to be included. The silk must be exceedingly strong, and tied very tightly. The nævus must be allowed to separate spontaneously, the edges of the resulting wound being brought together, by strapping, as far as possible.

(*c*) In very extensive and ill-defined growths the ligatures may be employed as setons to set up areas of inflammation.

The cautery.—In extensive mixed nævi obliteration of large areas can sometimes be brought about by passing into the growth very finely pointed cauteries at a dull heat. Paquelin's apparatus, or preferably a fine galvano-cautery, can thus be used. Some operators enclose areas of nævoid material in the wire loop of the galvanic écraseur, which slowly burns through the tissue. Such methods as these are commonly employed in the dangerous erectile nævoid tumours of infants, and their drawbacks are apparent. Thus ulceration and bleeding may occur, or, if the tumour should inflame and septic thrombosis of the vessels ensue, a severe illness occurs, with perhaps secondary abscess in the lungs or joints. I strongly incline to the bold use of the ligature in these cases, as being safer than any other measure.

Injection.—I only mention this method to condemn it. Death has occurred from pulmonary embolism after injection of a few drops of solution of perchloride of iron into a small nævus of the face. Injections can only be justifiable when the mass injected is safely shut off from the general circulation; thus, for example, in erectile tumours, when large areas are enclosed in a subcutaneous ligature, injections of iodine, tannin, or even perchloride of iron, are advised by many surgeons. Yet all such measures must be used with the greatest caution, and it is wiser to pass through the growth threads which have been soaked in solutions of iron than to inject the coagulating agent.

Such are the principal methods of treating nævi. It is obvious that in a class of affections differing so widely in structure and situation no one mode of treatment will suffice, and success and ultimate benefit will depend upon the selection of appropriate remedial measures for the particular case.

ANGIOKERATOMA (see p. 833).

INFECTIVE NÆVI.—ANGIOMA CIRCUMSCRIPTUM.—Under this heading has been described a variety of angioma marked by reddish punctate dots and circles. The affection slowly increases by fresh points in outlying districts, which also assume a concentric arrangement, forming rings and circles. There is supposed to be clotting as well as dilatation in the vessels; pressure therefore does not cause complete obliteration of the marks. The affection has been seen in adolescence and childhood. It has already been stated that the infectivity of nævoid tissue is not generally accepted.

NÆVUS LYMPHATICUS (*Lymphangiectasis, Lymphoma, Lupus lymphaticus*). —Further knowledge is needed before we can classify these ill-understood formations.

The lymphatic vessels in rare instances become nævoid. These cases are generally congenital, and are sometimes mixed with vascular nævoid tissue. While the skin itself is generally affected, the subcutaneous tissue may also be involved, a distinct cavernous structure having been described (Lymphangioma cavernosum). Such tumours are "doughy" and compressible like lipoma, and, if wounded or ulcerated, clear lymph flows from them copiously. Several cases of cavernous lymphangioma have been described in the tongue. True nævus lymphaticus must not be confused with those cavernous lymphatic tumours found about the thighs or genitals of dwellers in Eastern countries, which are due to obstruction of the lymph-channels by filaria (vol. ii. p. 1076). Neither must this affection be confounded with the peculiar cavernous growths of young infants, known as congenital cystic hygroma. In the few cases I have seen of true lymphangioma, the growths were either congenital or occurred in early life. In one case the axilla was affected, in another the neck, in a third the side of the chest. The affection presents itself

as clusters of thick-walled vesicles in the skin, of a pale yellow colour, exactly resembling warts, for which they are generally mistaken. On close examination faint leashes of blood-vessels may be seen coursing over them (Lymphangioma circumscriptum). On being pricked they exude a clear alkaline fluid. The malady increases, with great chronicity, by the development of fresh groups of vesicles. Nothing certain is known of the origin of such cases, but it must be due to some obstruction and dilatation of the lymphatic channels of the skin. They affect the patient but little. The name *lupus lymphaticus* is a misleading one, and not generally received by dermatologists.

The association with vascular nævus has several times been noted, and, in one case at least, angioma seemed to be a precursor of the disease. Though vesicular formation is usually present, the tubercles are sometimes markedly fibrous and resistant, and it has been well remarked that the formations rather resemble cavities in the skin than true vesicles.

Treatment.—I have had the opportunity of treating two cases of nævus lymphaticus. In one the patch was excised, in the other the vesicles, which covered an extensive area, were destroyed with a finely-pointed Paquelin's cautery. Both cases did well. Electrolysis and the application of a 30 per cent resorcin paste are likewise good remedial measures. Further points of interest regarding this rare disease may thus be summarised. Although usually congenital, it is not always so; a few cases occurring in adults have been described. Though most common about the upper part of the body, yet its distribution is wide, and several cases have been observed about the fold of the buttocks. Curious inflammatory attacks have been noted, somewhat resembling erysipelas, in which the patches swell and become red, and the patient ill and feverish.

Mixture of nævoid tissue with other growths.—This is so common that the vascular tissue may overshadow the more prominent features of the disease it complicates. Thus nævoid marks and stains are seen in all varieties of warts and "moles," and also in adenoma of the sebaceous and sweat glands.

M. Sheild.

ANGIOKERATOMA

(ἀγγεῖον, a vessel; κέρας, a horn.)

SYN.—*Angeio-keratoma* (Anderson); *Telangiectatic warts* (Dubreuilh); *Acro-tele-angiectasia* (Thibierge).

Definition.—A rare affection of the skin, characterised by warty growths over dilated blood-vessels, generally situated on the hands and feet, and almost invariably preceded by chilblains.

Historical.—The first case of angiokeratoma was reported by Mr. Wyndham Cottle in 1877, in the St. George's Hospital *Reports;* but the disease did not receive general recognition until Mibelli published his observations in 1889. Some cases were, however, recorded as examples of lymphangiectasis by Dr. Colcott Fox in 1886; and one, as a form of verruca, by Dr. Radcliffe Crocker in 1888. Since the publication of Mibelli's article—to whom we owe the nomenclature and most of our knowledge of the disease—examples have been reported by Thibierge, Crocker, Tommasoli, Dubreuilh, Zeisler, Max Joseph, Audry, Brocq, Fordyce, Anderson, and myself. Although the number of cases published is thus few, I have reason to believe that the disease is by no means a very rare one, as I have noticed several examples of it for which no medical advice had ever been sought.

Symptoms.—The appearance of the characteristic lesions is almost invariably preceded by chilblains, recurring on the hands and feet year after year during cold weather, the attacks differing in no way from ordinary chilblains. After a variable period, as the chilblains subside, the dorsal surfaces of the phalanges of the fingers and toes are found to be studded with minute, scattered telangiectases, showing themselves as blood-red puncta which at first disappear on moderate pressure. In process of time, as the blood-vessels enlarge, and fresh ones undergo dilatation, these red points become more and more difficult of obliteration, and finally are unaltered by pressure, although the surrounding tissue is rendered exsanguine thereby. The telangiectases range themselves in little groups, over which the epidermis becomes thickened, horny and opaque, so as to constitute dry, gray, wart-like patches, often of considerable hardness. On stretching the skin of the part, or on exerting pressure with a piece of glass ("diascopy"), the elemental telangiectases can generally be detected; and there are usually—even in the most extreme cases—scattered vascular puncta, accompanied by little or no keratosis, which give a clue to the nature of the case. In the majority of cases all the stages of the morbid process can be observed simultaneously. The palms and soles sometimes become involved, but always to a less degree than the dorsa of the hands and feet; and in a small number of cases an

exactly similar series of phenomena has been observed in the pinnæ of the ears. Occasionally, after accidental injury to these areas, bleeding may be extremely difficult to control. The lesions are always bilateral, but never accurately symmetrical. No subjective symptoms are complained of, as a rule, but occasionally some burning or itching is caused by congestive attacks of "chilblainy" character. The disease first begins in childhood or adolescence, usually in persons of weakly constitution; and during the first few years crops of lesions succeed chilblains every spring, or may—as in one of the six cases I have observed—appear independently of congestive lesions. Generally speaking, the condition becomes stationary and indefinitely persistent at adult life, or even earlier. Spontaneous disappearance both of warty and telangiectatic elements has been reported by Dr. Colcott Fox in tuberculous patients.

Variants.—Dubreuilh describes cases typical in every respect as to seat, relationship to chilblains, and so forth, but in which the keratoma element was entirely absent. Fordyce, Zeisler, and Anderson report, as cases of this disease, some which are anomalous as to distribution and other features. In Fordyce's case the lesions (in a man aged 60) were confined to the scrotum; in Zeisler's (a man aged 54, affected for only four years), in addition to typical lesions on the hands and feet, numerous angiomata and wart-like tumours were present over the arms and legs; while in both Fordyce's and Zeisler's cases many patches of vitiligo were present in various situations over the body. In Anderson's case the affection began over the knees at eleven years of age, and spread over nearly the entire trunk and upper limbs; the hands and feet being almost completely free. In all these anomalous cases, not only was the distribution of the disease aberrant, but the chilblain element was absent, and the keratoma of very low degree. For further details reference must be made to the authors' papers.

Causes.—The disease is one of childhood, or of early adult life; and in a considerable majority of cases occurs in the female sex. Several members of a family are often affected, but no instances of heredity have been reported. Its subjects are generally liable to chilblains, cold, puffy, clammy hands and feet, local asphyxias, and other evidence of disordered peripheral circulation. Vidal has shown that a condition practically identical may follow an attack of urticaria. The immediate cause is often exposure to unusual cold. The relation of the disease to tuberculosis is curious and interesting. Cases reported by Colcott Fox, Galloway, Leredde, and others, were associated with various tuberculous phenomena (phthisis pulmonalis, erythema induratum scrofulosorum, cervical adenitis, etc.), and Leredde regards the disease as a "toxi-tuberculide" standing in the same relation to the bacilli of tuberculosis as L. erythematosus.

Pathology.—As the result of repeated congestion, the capillaries in the papillary layer become permanently dilated, compressing the neighbouring epithelial ridges. Ultimately the papillæ are transformed into cavernous blood-spaces, which may extend through the rete Malpighii as far as the horny layer. In my own cases there were considerable

inflammatory infiltrations of the papillary layer, and downward hypertrophy of the prickle layer; and the sweat-pores were obviously narrowed by pressure. The lymph-spaces also are often filled with extravasated blood. Acanthosis is never well marked (Unna), but the stratum corneum is enormously hypertrophied, its basal layer being rich in eleidin. The condition thus shows marked differences from true warts. That the keratoma element is secondary to the essential vascular changes, and in some sense accidental, is obvious from Dubreuilh's and other aberrant cases already referred to.

The prognosis may be inferred from the foregoing sketch.

Diagnosis.—If the condition be familiar to the observer no difficulty can arise. Possibly true or tuberculous warts might be mistaken for angiokeratoma, or more probably lymphangiectases of the extremities. These latter may, indeed, complicate the condition to a greater or less extent.

Treatment.—In two cases under my care successful results were obtained by electrolysis; a needle was connected with the negative pole of the battery, and a current of 3 to 5 milliampères passed into dilated vessels until coagulation ensued. The number of lesions to be treated at a sitting depends mainly on the courage and endurance of the patient. In some cases an anæsthetic may be required. The micro-cautery has been used also with fair results, but necessarily causes considerable scarring. In some cases excision may be advisable. All measures calculated to prevent the occurrence of chilblains and allied conditions must, of course, be taken.

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J. J. P.

B. Malignant Growths

Epithelioma.—*Minute characters.*—The microscopical characters of this common disease are so well known as not to need mention here; but I may say that the circumferential (bird's-nest) arrangement of the epidermal cells is not always pathognomonic. A downgrowth of epithelium has been found also in certain chronic inflammatory affections, especially of the tongue and mucous membranes. Transverse sections of the sebaceous glands have been mistaken for "cell-nests." On the continent, especially in Germany, the name epithelioma is applied to many conditions associated with dense growth of epithelium, which we should hardly recognise as such here. In this article the name will be restricted to conditions associated with definite cell-growth, which can be recognised clinically as well as microscopically, and which tends to molecular disintegration and ulceration, and to infection of the glands. The great evidence of cancerous change in the skin is the proliferation of cells, and their advance, as a small-celled growth, into the deeper layers of the corium and subcutaneous tissue. In some cases the growth is distinctly tubular in form, and the papillary processes may be club-shaped, branched, or acuminate (tubular epithelioma). This variety is said to originate in the sweat or sebaceous glands. The alleged presence of psorosperms (encapsuled coccidia) in epithelioma is not yet proved; but although some of the cell-forms found and described are undoubtedly histological, and due to peculiar varieties of endogenous cell-proliferation, there can be no doubt that in other cases coccidia have been sufficiently demonstrated. The relationship of these to the disease is, however, very doubtful as yet, and the crucial test, namely, cultivation of the organism and production of the disease by inoculation, has not been achieved.

It is exceedingly difficult to decide when epithelioma of the skin actually begins; it usually comes under the notice of the surgeon as a nodule or ulcer of considerable size. I prefer to take the view that this affection begins in the epidermis, and rodent ulcer in the dermal appendages. Senile warts may be described as potential epithelioma. The cells are in a state of morbid proliferation penetrating into the rete. It is difficult, if not impossible, to say where epithelioma begins and chronic inflammatory changes end.

The earliest symptom observed upon the skin of the face is the presence of one or more pale glistening papules, the size of a buck-shot or a pea. These are common towards the decline of life, and by no means always ulcerate or become cancerous. As the result of scratching or other irritation a scab forms, and this, when detached, leaves a characteristic ulcer beneath. The appearance of these papules is very peculiar; they are quite unlike real warts, in which, however, this disease may undoubtedly begin. In very rare cases epithelioma of the skin has originated in a nævus, or in an ulcerating sebaceous cyst on the forehead or scalp.

Causation.—Any long-continued irritation of the skin may produce

epithelioma, especially in elderly persons. The muco-cutaneous junctions are the parts usually affected—the lips from the rubbing of a clay pipe, the penis from the irritation of retained smegma beneath a phimosed prepuce, the margins of the vagina or clitoris, or the orifice of the anus. On the skin surface proper the malady is rarer, but plenty of instances of the influence of irritation in producing it can be afforded. The contact of soot in causing epithelioma of the scrotum and thighs, the skin cancers of those who work in tar and paraffin, and the cancerous degeneration of the scars of old burns and of chronic ulcers are well known. A most remarkable case where multiple epithelioma of the face was caused by exposure to the sun, was narrated by myself in the *Lancet* for Jan. 7, 1899. By far the most important class of cases of epithelioma which come under the notice of the dermatologist are those due to degeneration of warts on the skins of the aged. The majority of them are found upon the face, especially about the margins of the orbit, the malar region, or the sides of the nose. I have seen several cases of epithelioma in old people, beginning in warts upon the dorsum of the hand or foot, or on the external genitals. Among the exceptional varieties of epithelioma of the skin are those upon the scars of old lupus, and in ulcerating sebaceous cysts. In both of these conditions horny growths, broad and infiltrated with cancer at the base and projecting some inches above the cutaneous surface, may be observed. Although epithelioma of the skin is looked upon as a senile disease, yet cases are not wanting in early adult life. This, in my experience, is sometimes well exemplified in epithelioma at the muco-cutaneous junction of the penis in comparatively young men; and especially in the ulcers of burns which have remained unhealed for years. In speaking of the proximate causes of epithelioma mention must be made of the improper cutting of warts in the aged, or the rubbing them with caustics or powerful acids. Many an old person has had reason to deplore such injudicious practice. In exceptional cases epithelioma originates in a pigmented wart, and the cells of the secondary growths contain pigment. As will be afterwards explained, most growths of a melanotic kind are really sarcoma.

Clinical characters and Diagnosis.—When epithelioma begins in a wart in an old person, some warning signs of the advent of danger are generally to be found. These are enlargement of the wart, and an itching or tingling which induces the patient to pick or scratch the part. Slight bleeding or exudation of serum occurs, and this dries and forms a superficial scale which, when detached, leaves a shallow ulcer the size of a shirt-button with well-defined edges, hard and indurated to the touch. It is especially to be observed that a wart may remain in this state for years, covered with a little scab and hardly noticed by the patient; it is an epithelioma nevertheless, and at any time may cause serious and unsuspected infiltration of the glands in the neighbourhood. The fully-formed ulcer has the following characters:—It is round or oval, the size of a threepenny or sixpenny piece; the edges are raised and definitely infiltrated; they are hard to the touch, and the induration may extend

to the tissues beneath. The margins of the sore are pinkish in colour, and often marked by dilated capillaries (crater-like ulcer). The base is covered with ill-formed granulations, and the discharge is watery, and filled with the decomposing products of cellular debris, so that if the ulcer be extensive the odour is peculiar and offensive. In other cases, especially in the multiple epithelioma of the hands and feet, the surface of the sore is covered with wart-like projections (papillary epithelioma). As the disease progresses the soft parts in the immediate vicinity become involved, swelling considerably and becoming livid, congested, and dusky. In this stage some lancinating pains are complained of, the patient rapidly emaciates, and becomes haggard and cachectic.

The enlargement of the neighbouring group of lymphatic glands is a matter of great interest and importance in the diagnosis of epithelioma. Every practical surgeon knows that extraordinary differences, hard to explain, are observed in this respect. So far as I have seen, glandular implication in epithelioma is in direct proportion to the youth and vigour of the subject, and the consequent succulence and rapid extension of the growth. As a rule epithelioma of the muco-cutaneous functions affects the glands early and markedly; thus we are all familiar with the sub-maxillary enlargements which so early accompany epithelioma of the lip. On the other hand, those very chronic forms of epithelial cancer, with deep central excavations and raised edges, which are found about the face in old persons, may never infect the glands at all. Such growths extend very slowly, and scarcely give pain to the patient, or affect his general health. So in the extensive warty epitheliomata of ulcers, and in the scars of old burns, the lymph-glands may be quite free from marked epithelial deposit; though indeed they may be enlarged and even suppurate on the absorption of pyogenetic organisms from the foul and open wound.

Enlargement of glands, with stony hardness and fixation, is then sufficiently common in epithelioma of the skin to be of great diagnostic import. Although the glands may not be palpably involved, a deposit may have occurred in them; and, many months perhaps after removal of a small wart from the foot or hand, thought far too slightly of by patient or surgeon, large, hard, fixed tumours may be observed in the groin or axilla.

The diagnosis of epithelioma of the cutaneous structures, especially on the penis, from syphilis is a matter of the first clinical importance to every medical man. Syphilis simulates this disease in its two forms—(*a*) as the initial lesion, the so-called hard chancre; (*b*) as the breaking down of gummatous deposit into ulceration.

It may be pointed out at once that the history is seldom obtainable or trustworthy in these cases, and the surgeon will do well to rely more upon his powers of observation than upon any negative testimony. I have published striking proofs of this statement; very lately indeed I have seen a chancre exactly simulating epithelial cancer on the cheek of a middle-aged woman of undoubted respectability. The lesions

of tertiary syphilis may appear upon the face years after the primary manifestations of the disease, which are often quite forgotten, or never understood by the patient. Only surgeons familiar with these somewhat rare cases are able to appreciate or to credit the extraordinary appearances presented by chancre of the skin, and its close resemblance to epithelioma. Thus confusion between chancre and epithelioma has led to deplorable operative errors; yet the edges of the sore lack the characteristic hardness of epithelial cancer, and the development of the chancre is far quicker than is ever the case in the former affection. The glandular enlargement is far more rapid and extensive in chancre than in epithelioma, and the glands are firm and "plump" rather than hard and fixed. Above all, when the sore is fully established the throat becomes congested and sore, and a rose-coloured syphilide soon makes its appearance upon the chest. Frequently a facial chancre takes on very active growth, becomes raised above the surface, and attains a great size. Such a manifestation is very peculiar and puzzling; but the tumour is always comparatively soft, and there is no induration at the base.

The ulcerating gummatous lesion is dusky or coppery in hue at its periphery; and the edges, though raised and thickened, are always soft, and tend to be serpiginous. Above all, its progress, as compared with epithelioma, is comparatively rapid. An ulcer which rapidly extends upon the skin of the face should always raise the suspicion of syphilis. Other signs of old syphilis may be present, such as scars upon the throat or tongue, old iritis, or chronic enlargement of the testis. Frequently white depressed scars of former ulcers may be seen upon the forehead near the junction of the hairy scalp, or upon the side of the nose.

Lastly, epithelioma may attack old syphilitic sores or scars. The characters of carcinoma are then so strongly marked that there is seldom any difficulty in making a diagnosis.

Treatment and Prognosis.—Most surgeons agree that epithelioma of the skin is primarily local; and there is no form of malignant disease in which early treatment is more satisfactory. It may be laid down as a safe surgical canon that any wart or scar in an old person that shows signs of increase, of itching, of ulceration, or the like should be removed at once, and freely. It is in this stage, well named the precancerous, that the most trustworthy and favourable prognosis can be given. But even in later cases good results are common. In the chronic oval or round epithelioma on the cheek or forehead of old people, with raised edges and deeply depressed centre, removal is often followed by complete cure. In the cancer of sweeps it is well known that the disease may return even several times, not in the scar, not in the neighbouring glands, but in a fresh spot, these being really new outbreaks of the disease; and complete cure has been effected even after many operations. In epithelioma occurring upon the scars of burns on a limb amputation usually effects a permanent cure, and the glands are seldom affected. Turning to a more gloomy side of the picture, when epithelioma, as is too often

the case, is injudiciously treated, when operation is delayed, and the sore is irritated by a timid surgeon with inefficient caustics, such as nitrate of silver, and the patient, instead of adopting the counsel of sound surgery, betakes himself to the perilous resources of quackery, then the glands become affected, and the disease too extensive for more than temporary relief. Removal of epithelioma of the skin must be very thorough, the incisions being carried well into healthy tissues. The resulting wound must be treated by skin-grafting, and as much approximation of the edges by "skin-sliding" as the case will permit. Should caustics be employed, they must be sufficiently powerful to destroy utterly the morbid tissue and the soft parts adjoining; and the undoubted success which some irregular practitioners have had in the cure of cancer of the skin has been due to the extensive destruction wrought by the powerful caustics used by them. Caustic agents are peculiarly valuable where bone is affected, as at the margins of the orbit, or in the mastoid region. The chloride of zinc paste, mixed with laudanum, has given excellent results. All caustics may be combined with excision, or scraping with a sharp spoon. Jamieson speaks well of the pure chromic acid used as a fused bead upon a probe. It may be pointed out, however, that the actual or galvano-cautery is equally efficacious, and it is certainly more easily regulated and managed than most caustics.

Rare varieties of epithelial cancer.—In the article treating of Kaposi's disease reference will be made to the occurrence of epithelioma in connection with it (p. 851). Here special mention will be made of a rare affection, described by Mr. Hutchinson, where epithelial cancer arises in the neighbourhood of the eyelids. The patients are usually elderly women who have long suffered from crops of freckles about this region: finally one of the freckles becomes warty and tuberculated, and an epithelioma is engendered (p. 844). The analogy to Kaposi's disease will not escape notice. The same author has also drawn attention to epithelioma of the skin in the course of the long-continued use of arsenic.

An eruption has been described, by Dr. Brooke and others, which is characterised by the formation of small pale or pinkish tumours varying in size from a pin's head to a buck-shot. They are much like milium. Many members of one family have been affected with this exceptional disease. It has received the most varied names. Some authors have named it adenoma of the sweat-glands, others (Brooke) "benign cystic epithelioma." Typical "cell-nests" are found and proliferating cells round the hair follicles. Some authors maintain that these curious little tumours originate in misplaced epithelial cells. The areas of the face and neck are principally affected, and in the recorded cases there is no history of glandular implication. Personally, I should hesitate to class this disorder as epithelioma (see pathology of Adenoma sudoriparum, p. 738).

A peculiar form of superficial epithelioma is sometimes seen on the lip. I have observed it principally on the lips of country-folk much exposed to the weather, who smoke short hot clay pipes and strong tobacco.

The surface of the lip is covered with extensive whitish or yellowish scales, glutinous, adhesive, detached with difficulty, often leaving a bleeding surface beneath. These are undoubtedly due to epithelial proliferation, and sooner or later a nodule of definite epithelioma may form at one part. The thickening and infiltration may be so superficial and extensive that the surgeon may doubt how much of the lip he ought to treat or remove. There is a close analogy between this affection and the condition of the tongue found in excessive smokers (leucoplakia) which is a precursor of epithelioma, and to which the term "Psoriasis linguæ" was formerly applied.

CANCER EN CUIRASSE.—*Discoid cancer.*—Practically these two forms of disease are found in the integument of the thorax, associated with, or secondary to, carcinoma of the female mamma. In the first the integument becomes hard and board-like, thickened, shining, smooth, and marked by arborescent pinkish vessels. The resemblance to sclerodermia is very close. In the second the integument is covered with innumerable round or oval nodules, which are hard but strangely mobile. Their centre may be depressed, and small vessels are frequently seen on the skin over them. These kinds of cancer may be associated, and they may originate in a small nodule, forming in an accessory mamma in the axilla or thorax. There are recorded cases of this disease occurring without the breast being affected primarily.

RODENT ULCER.—*Histological characters.*—The same difficulties arise regarding the origin of rodent ulcers as of epithelioma. Various observers have described the affection as originating about the hair follicles, as a proliferation of the cells of the sweat or sebaceous glands, or as a small-celled epithelioma originating in the cells of the rete. I should be disposed to seek the origin of this disease in a formation of tubular masses of small cells about a dermal appendage; as, for example, in the sebaceous glands or rudimentary skin glands. It is usually stated that a microscopical examination of rodent ulcer shows it to be devoid of the well-arranged circumferential arrangement of epithelial cells which is so common in epithelioma. While this may be true in some cases, it is certainly not so in others; having personally examined a number of sections, I am able to assert positively that the microscopical characters of what is clinically known as rodent ulcer are very uncertain. The small-celled "irritative" growth is an essential feature of both epithelioma and rodent ulcer; its amount is far greater in the former. Consequently the more solid growth there is at the margin of an ulcer, the more likely is the case to be one of true epithelioma. If an ulcer, say of the face, is associated with sufficient cell-growth to make a definite raised margin on an indurated base, I prefer to apply the name "epithelioma" to it.

Clinical characters and Diagnosis.—Sufficient has been said to point out that, in a given ulcer on the face of an old person, equally competent

observers may differ as to whether the malady should be classified as epithelioma or rodent ulcer. The rate of growth and the amount of solid deposit in the edge of the sore, as evident to sight and touch, are my principal guides. Incipient rodent ulcer is a flattened tubercle or papule, which ulcerates on the surface, and becomes covered with a scab, just as epithelioma; and in this early stage differential diagnosis may be impossible. It has been stated that what may be called the preliminary tubercle of rodent ulcer is of a brownish colour, but I am not sure that this is universally the case. The following considerations are of importance in the diagnosis of rodent ulcer.

(*a*) Situation. The favourite site is the inner canthus of the eye, upon the nasal integument. The malar region is another well-known situation; and in the vast majority of cases it will be found somewhere upon the integument of the upper part of the face or scalp. Rodent ulcers may be multiple. I have seen reputed rodent ulcers upon the dorsum of the hand and foot, over the sternum, and on the scrotum. They have also been demonstrated in the groin, on the forearm, and at the umbilicus. From time to time undoubted instances of peculiarity in position are noted and reported.

(*b*) Age. Rodent ulcer is held to be rare under forty years of age, and the liability to it increases as age advances. Exceptions occur to this rule, and, at the Dermatological Society of London, I have seen well-marked examples of this affection under the age of twenty. Cases in quite young people are, however, extremely rare.

(*c*) Appearance and progress. Beginning as a small brownish papule in the skin, a flattened nodule forms, which long remains stationary and slowly ulcerates centrally. The chronicity of the affection is one of its most striking characteristics. The ulcer is shallow, and the granulations scanty and feeble. The discharge is slight and the edges of the sore in a definite case are devoid of distinct infiltration or solid deposit, being of a pale, waxy, pink hue which, when once seen, cannot be mistaken. An important characteristic of some rodent ulcers is to heal over at certain periods of the year. Thus an old man may present himself who will assure us that for many years he has had an ulcer in the malar region which troubles him, and becomes raw in the frosty days of winter, but which "skins over" with a feeble bluish pellicle in the summer season. As the disease advances year by year, slow but definite destruction of the soft parts ensues. No structure seems to resist the ravages of the disease, and most of our museums contain evidences of the hideous results of rodent ulcer upon the face, destroying the contents of the orbit and the bones of the nose, and laying bare the naso-pharynx. Bands of fibrous tissue long resist the ulceration, and, although the vessels may be dissected out, they are seldom if ever laid open. All this time the general health is not affected; there is little or no pain unless the eyeball or nerve-trunks are involved; and the lymphatic glands remain quite unimplicated. All this is in striking contrast to epithelioma. The great chronicity of the affection, the absence of a dusky margin, and a serpi-

ginous outline at once distinguish rodent ulcer from the ravages of tertiary syphilis. It must be remembered, however, that the superficial resemblance between these two affections is very close; and in practice they are often most difficult to discriminate. A rodent ulcer in a syphilitic person is curiously modified.

Treatment.—Inefficient and irritating treatment is injurious to rodent ulcer, and stimulates its progress. In certain cases it is doubtful whether active treatment of any kind is admissible. In old and withered persons, where spontaneous healing takes place in the summer season, and destruction of soft parts is not active, it is questionable whether the surgeon will not best consult the interests of his patient by merely protecting the part from the weather and applying a calamine lotion, or some bland unirritating preparation such as lanoline. As in the case of its near relative epithelioma, very early and free removal gives the best result in rodent ulcer. A very wide margin of healthy skin must be sacrificed without compunction. Should the surgeon prefer scraping or caustics, or the actual cautery, the same principle must be borne in mind, and wide destruction of the tissues aimed at. The treatment is essentially the same as advised in epithelioma. The immediate results are often exceedingly good. The wound, aided by skin-grafting, heals over soundly. It is especially important to attack this disease by bold and active measures in its incipient stage. I have found a remarkable tendency in rodent ulcer to recur in the same spot—far more indeed than is the case with epithelioma—a recurrence certainly not due to inefficiency of removal. As an additional distinguishing sign from epithelioma, it may be mentioned that after operation epithelioma may recur in the glands, while rodent ulcer, when it returns, always recurs at the site of operation.

SARCOMA OF THE SKIN.—**Acute melanosis.**—Putting aside such affections as mycosis fungoides, which is dealt with elsewhere (p. 884), the majority of cases of cutaneous sarcoma originate in moles (p. 820). There is nothing more peculiar and inexplicable in the whole of pathology than this. A small bluish pigmented spot, not larger than a No. 5 shot, will form the starting-point for a general outburst of sarcomatous disease. The microscope shows nothing in these cases beyond great proliferation of the cells of the mole, which infiltrate the surrounding tissue. The cells are usually oval or spindle-shaped, and stuffed with granules of pigment. The lymphatic glands in the neighbourhood are affected very early, forming considerable tumours; and visceral deposits, especially in the liver, lungs, and mediastinal lymphatics, soon occur, the deposits being soft and exactly resembling soot. The patient becomes weak and sallow; he emaciates and sinks. Frequently towards the end of this fatal disorder innumerable small nodules are found scattered through the skin, of a bluish tinge, which are really deposits of melanotic material in the lymphatics. The secondary growths are not of necessity pigmented. In the majority of these cases the disease is sarcomatous. This was so in

six consecutive examples examined by myself. Melanotic carcinoma is, however, described by some authors.

Clinical character and Diagnosis.—The cases of melanosis of the skin which most often give rise to diagnostic errors are those where large glandular and secondary nodules occur by infection from an insignificant primary focus—a bluish or black spot, perhaps quite overlooked. In a large number of cases, after a blow or the application of caustics or burning or rubbing against the clothes, a mole or pigmented wart takes on active growth, ulcerates, and bleeds. It may attain to the size of a shilling or florin, of a mushroom shape, but with a distinct infiltration at the base of the pedicle. The deep blue or blackish tint of the pigment is obvious. Such growths may be found in any situation, as, for example, the eyelid, the skin of the face, abdomen, back, or thighs, or the sides of the nails of the fingers or toes (melanotic whitlow). They give rise to but little diagnostic difficulty, as the appearance has very definite characters. The infiltration at the base, the dark colour, and the neighbouring glandular affection are sufficient to distinguish them from simple fungating warts. Some observers have declared these cases to be of a carcinomatous nature. Although I will not deny the possibility of melanotic cancer of the skin, I must say that it has only come once under my own observation.

In advanced cases of melanosis the diagnosis is only too easy. The patient is pale and emaciates rapidly. The skin is covered with hundreds of small tumours varying from the size of a buck-shot to a horse-chestnut. The lungs are usually implicated, and there are signs of mediastinal growths. Some of the tumours, if carefully inspected, will present a dark blue or blackish tint. Melanotic sarcoma of the skin usually attacks adults or old people. I have seen virulent instances of this affection, however, before the age of twenty, but this is quite exceptional. In exceptional cases, towards the end of the disease, the skin becomes quite deeply bronzed, and the blood is loaded with pigment, which is passed by the urine (melanuria).

Treatment. — This may be summed up in a few words — early and free removal of any pigmented wart or mole which threatens to degenerate, before the glands are affected. As the surgeon seldom gets the opportunity to do this, he must be prepared to remove the neighbouring glands also. The prognosis of such cases is extremely gloomy, and their course is generally rapid. Cases are, however, recorded of long immunity from recurrence, and in so desperate a malady attempts should generally be made to arrest or stay its progress.

Chronic melanosis of the skin is a malady to which hitherto little attention has been drawn; it is rare, but very important. The patient, usually an elderly person, notices a brownish patch upon the skin, which deepens in colour and slowly extends, irregularly and circumferentially, as if by a gradual encroachment of infective cells. Sooner or later a nodule of carcinoma or sarcoma appears, and the glands may get infected. The eyelids, malar region, and integument of the foot and hand may

thus suffer. From what little is known of these cases they are not immediately dangerous to life, like the "mole" melanosis. Sooner or later, however, the sarcomatous nodules appear, and hence the free excision of the discoloured patches, while still small, is very desirable, and should be strongly urged.

I recently exhibited a striking case of this nature at the Dermatological Society of London. An elderly woman had a brownish patch upon the cheek, which slowly extended for fourteen years. In twelve months a bleeding growth the size of a cherry arose from the centre. The whole was freely removed, and the growth was a round-celled sarcoma. Similar cases have been shown by Mr. Carless and Dr. Galloway, but growths actually malignant had not arisen in their cases.

Hæmorrhagic sarcoma of the skin.—This rare affection was excellently described by the late Hilton Fagge in the Guy's Hospital Reports. Its principal characteristics are as follows :—A patient, usually a young adult, becomes exceedingly weak, sallow, and emaciated. There is high fever, with sour sweating, vague aches, and pains. Most of the cases are at first diagnosed as acute rheumatism, but there are no articular symptoms. Small hæmorrhagic spots, not fading on pressure, appear on the skin ; and bleedings may occur from the nose, gums, rectum, and other mucous surfaces. The affection thus closely resembles, and is generally taken for, hæmorrhagic purpura. In one case I have seen of this most rare malady there was a primary focus of sarcomatous growth in the shape of a soft-hæmorrhagic fungating tumour of the nasal fossæ ; in another the primary growth was in the fascia of the thigh. I opine that careful pathological investigation would usually show that in these cases a primary growth exists. Moreover, a few definite subcutaneous tumours can usually be felt mingled with the hæmorrhagic spots, and these should at once raise suspicion of the true nature of the case. On microscopical examination of the spots, round-celled sarcoma, broken down and mixed with blood, will be found ; and this distinguishes the affection from scurvy or purpura.

Primary sarcoma of the skin, other than melanotic.—In rare cases sarcoma, usually of the small spindle-celled variety, occurs primarily in the skin. It is difficult to be sure that the disease does not really originate in the subcutaneous fascia, and affect the dermal structures secondarily ; but many cases undoubtedly originate in the fibrous layers of the true skin. This affection shows a marked contrast to the last, in that it is exceedingly chronic, and may not affect the glands or give rise to metastatic deposits. It presents itself as firm nodules or tumours of a livid hue, often "cupped in the centre," varying in size from a hazel-nut to a hen's egg, marked with arborescent vessels which coalesce and spread over a considerable area. A favourite situation is the integument over the outer aspect of the thigh. Indeed, the affection somewhat resembles keloid, excepting that there are no scars to originate it.

A curious and marked characteristic of this malady is the tendency towards spontaneous withering or retrogression of certain of the tumours.

This has been observed especially in the skin of the scalp. Such growths are plainly identical with the recurrent fibroid tumours of the older pathologists.

It may here be remarked that the subject of primary sarcoma of the skin is not yet fully elaborated, and a rigorous classification is hardly justifiable. At the Dermatological Society of London several cases have been shown which may be described as patches of pigmented infiltration of the skin, rather than as distinct tumours, yet which were taken by the majority of the members to be sarcomatous. The great rarity of these cases is a sufficient apology for their not being well understood. It may also be mentioned that, in very rare instances, certain growths, clinically almost indistinguishable from sarcoma, may form in the skin and subcutaneous tissue of persons taking iodide of potassium. The tubers are livid in colour, form very rapidly, and have a marked tendency to ulcerate and bleed.

Treatment.—The treatment of spindle-celled sarcoma of the skin is not easy to formulate. In five cases that have come under my own notice free excision was followed by speedy recurrence of the disease in a far more malignant form, and every operation was succeeded by a like result. While some surgeons in these cases advise wide destruction with powerful caustics, or repeated operations with the idea of "wearing out" the disease, others have followed an opposite plan. Instances are not wanting where cases of the kind have remained under observation for many years, the attendant surgeon merely removing those tubers of growth which ulcerate and bleed, and protecting the parts in the meanwhile from friction and injury. So unsatisfactory have been the results of operation in cases of this affection which I have seen in the skin of the back, thigh, and abdomen, that I certainly should be disposed to adopt a more expectant method of treatment than is usually advised. Several instances have been recorded of the disappearance of these tumours under parenchymatous injections of arsenic. Certainly there can be no objection to trial of this remedy. Fowler's solution may be employed, in three or four minim doses mixed with equal parts of water.

Idiopathic pigmented sarcoma.—The main features of the rare disease named Idiopathic multiple pigmented sarcoma, by Koebner and Hebra, may thus be summarised. (Kaposi described five cases, which were all fatal.)

Nodules of various sizes, of a reddish or bluish colour, appear on the sole and dorsum of the foot, and afterwards upon the hands. The skin of the limbs is slowly invaded. The growths may be isolated or form groups; and, according to Hebra, are sometimes expansile like an erectile tumour (angio-sarcoma). They are especially prone to atrophy in the centre, giving rise to a pigmented depression. The skin of the hands and feet becomes enormously puffy and swollen, from a diffuse hypertrophy. The lymphatic glands remain unaffected, and nodules do not appear on the limbs or trunk till late in the disease. Gangrenous ulceration is a late and final phenomenon. Similar nodules are found in the intestine, liver, and air-

passages, the large intestine being especially implicated. The disease almost invariably attacks males over forty years of age, and is usually fatal in two or three years.

Under the microscope the affection is an angio-sarcoma of the spindle-celled variety. Hæmorrhages rather than true pigmentation are prominent characteristics. Bacilli have been described by Pringle in the small vessels and sweat-glands. It seems to me that several of the recorded cases may have been true melanosis.

Congenital sarcoma of skin.—This extremely rare condition needs only mention here. A child is born with a primary sarcomatous tumour, and numerous metastases soon appear in the skin, subcutaneous tissue, and viscera. Neuhaus collated six cases of this affection. In all the skin was primarily and principally affected. Other authors (Jacobi) point out that the tumours originate not in the true skin but in the subcutaneous tissue. The nodules are often very red and nævoid in appearance. The only case I have seen was secondary to sarcoma in the kidney, and there was a marked family history. Before pronouncing that such changes have originated in the skin a very careful examination of the viscera should be made.

Secondary carcinoma of the skin.—In late cases of cancer, more especially of the breast, liver, and rectum, numerous hard nodules, round or disc-shaped, may be found scattered through the skin, varying in size from a pea to a walnut. As the tubercles enlarge, they become livid in colour, and marked with faint arborescent vessels. Their principal importance is as a diagnostic aid to the physician in cases of mysterious internal malignant disease. These secondary nodules are of course often deceptively movable. The deposits are obviously in the lymphatics of the skin, and are evidence of widespread dissemination. Sometimes cancerous deposits may form at the sites of the needle punctures after removal of cancerous mammæ; and indeed I look upon a nodule of cancer in the breast, perhaps quite unsuspected, as being the usual primary source of secondary carcinomatous disease of the skin. In very rare cases lymphadenoma may be associated with cutaneous nodules of a like nature.

Paget's disease.—*Malignant dermatitis.*—The main points of interest in this disease, which generally attacks the nipple and areola of the mamma, are as follows:—

(*a*) It consists essentially of a dermatitis of the deeper layers of the skin, with great cell proliferation. Various authors have described the disease as originating in cell-proliferation of the sebaceous glands, of the sweat-glands, or of the deeper layers of the skin. It is certain that the pathological appearances vary somewhat in different cases, especially as modified by concomitant inflammation. In the breast there are many recorded cases to show that the disease begins in the galactophorous ducts. The superficial epidermis is destroyed, leaving a vivid red, raw surface. In the case of the breast, after a varying time, the ducts become stuffed with

proliferating cells, and columnar or spheroidal carcinoma is originated. The bodies called psorosperms are found in these cases, but it is doubtful if they are really more than forms of cell-growth with cell-inclusion.

(*b*) The disease is a chronic one, and found near the nipples of elderly women. Exceptional instances have been seen on the scrotum and penis, where nodules of epithelioma have subsequently arisen. In the year 1897 I showed, at the Dermatological Society of London, a remarkable example of this affection above the pubes of an old man. The patch of disease was as large as the palm of the hand, and several epitheliomatous nodules were developed upon it. I also saw an instance of this disease occurring beneath the prepuce of an elderly man, a patient of Dr. Walker of Peterborough in 1897. In this truly extraordinary case a horn had developed upon a thickened epithelial patch situated on the glans penis.

(*c*) The diagnosis of the disease depends upon its situation and the peculiar raw-red appearance of the diseased patch, which exudes a clear or yellow viscid exudation, and is covered by whitish small islets of epithelium. On pinching a fold of the part between the fingers, marked induration is generally perceptible. This is an important diagnostic point. The border is brownish in colour and sharply defined ; a feature which distinguishes the disease at once from true eczema. In several cases I have seen there have been irregular patches of brownish eczema at some distance from the original disease. The appearances to the naked eye are quite definite, and so unlike anything else that the temptation to assume a peculiar cause, such as a parasite, is very strong.

(*d*) In dermatitis thus undoubtedly malignant, which persists and extends, free removal by knife, cautery, or strong caustic should be advised.

Toxin treatment of inoperable sarcoma.—No account of the treatment of sarcoma of the skin and fascia would be complete without a short allusion to this method. In spindle-celled sarcoma, such as might invade the cutis and fascia in any part of the body, its efficacy is said to be well marked. The treatment is based upon the clinical fact that after accidental attacks of erysipelas sarcomatous growths have been known to wither and disappear. The fluid employed is a mixed toxin of the streptococcus (streptococcus pyogenes) of erysipelas and bacillus prodigiosus. It is employed in different strengths, the preparation being much reduced in virulence by passing the culture through rabbits. As a rule, it may be stated that the virulent culture has the most marked effect upon tumours, the attenuated virus being not so often employed. The toxins were probably first employed, instead of living cultures, by Lassar and Spronk, in 1891 and 1892. The combination of toxins, and much of the further elaboration of the treatment, is due to Coley of New York, who claims some remarkable successes. I have had some personal experience of the treatment, and consider its value still undecided ; it is dangerous, moreover, and must be employed with elaborate caution. The following is a sketch of the method :—In the first place, the diagnosis of sarcoma should be indubitable ; yet the difficulty of this part of the subject is not

fully recognised, and it is suspected that many growths which have disappeared under the toxin treatment may have been merely inflammatory. The skin must be rendered quite aseptic, and the needle employed must also be purified. Should the growth have ulcerated, additional precautions must be observed to secure asepsis. Should the virulent fluids be used the rule is to begin with a minimum dose, probably ½ minim or 1 minim at the outside, injected into the tumour each day, slowly increasing as the symptoms indicate. Within fifteen minutes a rise of temperature may be observed; the patient feels ill, and complains of pains in the head and back. The temperature may reach 101° or 102°, but soon falls. If the reaction be severe, great prostration ensues; nausea and vomiting are severe, and the temperature may mount to 104° or 105°. Such patients may only be rescued from death by full doses of brandy and strychnine, but such symptoms generally mean that an overdose has been administered. The tumour or tumours become red and painful, and a peculiar roseate blush is observed in the skin over them. As a general rule, diminution in size is to be observed within three weeks; and if this be not the case, little benefit is to be hoped for. Very slight reactions should be especially aimed at. If evidence of diminution be obtained, it is hard to say how long the treatment should be kept up. As the decrease of size continues, pain is lessened, and the vascularity of the skin is diminished, the integument becoming glossy and wrinkled. Some of Coley's patients were injected for four or more months. As regards the advisability of the treatment, it undoubtedly affords hope to patients whose state is otherwise very hopeless; and it is a mistake to put it off until the growth is sloughing, ulcerating, or on the point of bursting the thinned integument. For a full account of the method, with illustrative cases, Coley's work may be consulted. It will be gathered from these brief remarks, and from the fuller records in other works, that the fluids are prepared of very different strengths and kinds—the pure cultures being very virulent. Those wherein the organisms are killed or removed are less potent. In the above remarks I refer to a culture fluid from the streptococcus pyogenes and bacillus prodigiosus, the organisms being removed and the toxins remaining. In several cases where I have employed this method the fluid was cultivated and found to be sterile.

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XERODERMIA PIGMENTOSA

Syn.—*Atrophoderma pigmentosum; Angioma pigmentosum atrophicum; Dermatosis Kaposi; Liodermia essentialis cum melanosi et telangiectasia; Melanosis lenticularis progressiva.*

This is a very rare affection, but easily recognised by its striking characters and the comparative constancy of its symptoms. In the great majority of the cases there are five different lesions present. These are:—1. Freckle-like pigmentation, thickly covering the face, and the neck to just below the clavicles in front and to the shoulders behind. In the upper limbs, on the extensor aspect, it extends from the tips of the fingers to the lower third of the arm extending upwards as far as the insertion of the deltoid; on the flexor aspect, the pigmentation slopes downwards from the back to just above the elbow, while the whole of the flexor surface of the forearm is thickly covered, except on the ulnar side where it is less dense. The legs below the knee are affected, both back and front, but much less than the arms; the thighs are rarely involved. These limits are seldom exceeded, but as seldom is the pigmentation less extensive; it varies in tint from a pale yellow fawn to a deep sepia; and the size of the pigment spots ranges from a pin's head to a bean, the larger spots being irregular in outline. 2. Small white atrophic spots in comparatively small numbers are interspersed among the pigment spots, but on the cheek, near the orbit, the atrophic spots may coalesce, forming larger areas of white shining thin scars. 3. Bright red spots, flat or slightly convex, are interspersed over the white areas, and,

though not numerous, stand out by contrast on the white ground. These spots are made up of dilated vessels, and stellate and striate red lines are also interspersed amongst the pigment, both of face and limbs. 4. Small warts, often resembling senile warts, are scattered irregularly among the pigment spots; and from these at a later period tumours may arise. 5. Sooner or later there are superficial ulcerations with yellowish or greenish crusts scattered about the face, and ultimately, either from these or from the warts, tumours arise which, at first papillomatous, eventually may become epitheliomatous, and destroy the life of the patient. Some of the sores appear to be derived from the purulent discharge from the eyes in which conjunctivitis and vascular pterygium are very frequently present. The cicatricial contraction which ensues on the healing of the sores, whether this come about spontaneously or from treatment, leads to considerable disfigurement, and to some extent resembles that of lupus scarring. 6. Papillomatous and epitheliomatous lesions ultimately set in.

The disease usually begins in the first or second year of life; but a few have begun much later, one or two at eighteen years, and one at forty-three. The order in which the symptoms manifest themselves would appear from the records not to be constant, indeed our records depend for the most part on statements of patients' friends: according to some, the freckles are the first lesions, then the telangiectases, and then the white atrophic spots; but Brayton of Indianopolis saw a case begin in the sixth month of life with small white atrophic spots upon the face; some months later there was erythematous redness of the face and hands, and pigmentation rapidly followed. The pigmentation, the vascular and the atrophic spots are the most common features; the ulcerations, probably due to pus inoculation from the discharges of the eye, do not begin for some years subsequently; the warts are later still, and begin on the pigment spots; and the tumours, which may start either from the warts or from the sores, if benign at first, ultimately become malignant. The skin is dry and thin, but not xerodermatous in the ordinary sense of the word, therefore the disease has no relation whatever to a slight form of ichthyosis. A few of the cases are of a milder character, when the symptoms are almost limited to freckle-like pigmentation, without much atrophy or telangiectasis.

The *causation* of this affection is obscure, indeed little is known beyond the fact that there is a congenital disposition to it. On account of its distribution on the parts which in infancy are uncovered, and of the freckled character of the pigmentation, exposure to the sun is supposed by many to be an exciting factor; but, except in one case, the evidence in this direction is not conclusive, nor is the pigmentation limited to the parts exposed. The disease, although apparently of congenital origin, is not hereditary; it shows, however, a strong family prevalence. In a large family it is often limited to one sex, but on the whole the incidence upon the sexes is about equal.

Pathogeny.—The most probable hypothesis is that the disease is an atrophic degeneration of the skin dependent upon a defective innervation

to which the patient is congenitally disposed. Most of the symptoms are of the same class as those associated with senile degenerations of the skin. White atrophy, telangiectatic tufts, freckle-like pigmentation, flat warts and epitheliomatous growths are all familiar incidents in the senile skin; and even the vascular pterygium of the eye is more common in the elderly.

The *diagnosis* will seldom be at fault if the existence of this disease be borne in mind, and the distribution of the freckle-like pigmentation and of the white atrophic and red vascular spots duly noted. The presence of these symptoms would distinguish it at once from lupus vulgaris, to which it bears a superficial resemblance in the cicatricial deformities of the later stage.

Although no known treatment has any positive curative effect upon the disease, much relief can be afforded by treatment of the superficial ulcerations, and by the removal of the tumours, before they take on a malignant character; the inflammatory conditions of the eye can be alleviated and kept in abeyance, and thus not only is the comfort of the patient promoted, but the removal of the purulent discharges, produced by the conjunctivitis, is also an important means of preventing many of the superficial ulcers. The eyes, therefore, should be diligently bathed with boracic acid lotion; the superficial ulcers should be scraped with a curette and strong carbolic acid freely applied; all growths appearing either on the sores or the warts should be promptly and thoroughly removed, after which they are not likely to recur on the site of their previous growth. If this treatment be diligently and carefully followed up, the patient's comfort will be much promoted, and his life prolonged. If epitheliomatous growths have occurred they should be promptly removed. In one case, that of Stern, a course of arsenic in the form of Asiatic pills was given—to the extent of nine milligrammes daily—to a boy of twelve; and in four months three ulcerating tumours had disappeared, glandular enlargements had diminished, there was a general improvement, and the growths were apparently kept in abeyance for two years, during which time no fresh tumours arose. On the other hand, arsenic and other drugs have had a most thorough trial in many cases, without any benefit as regards the disease itself.

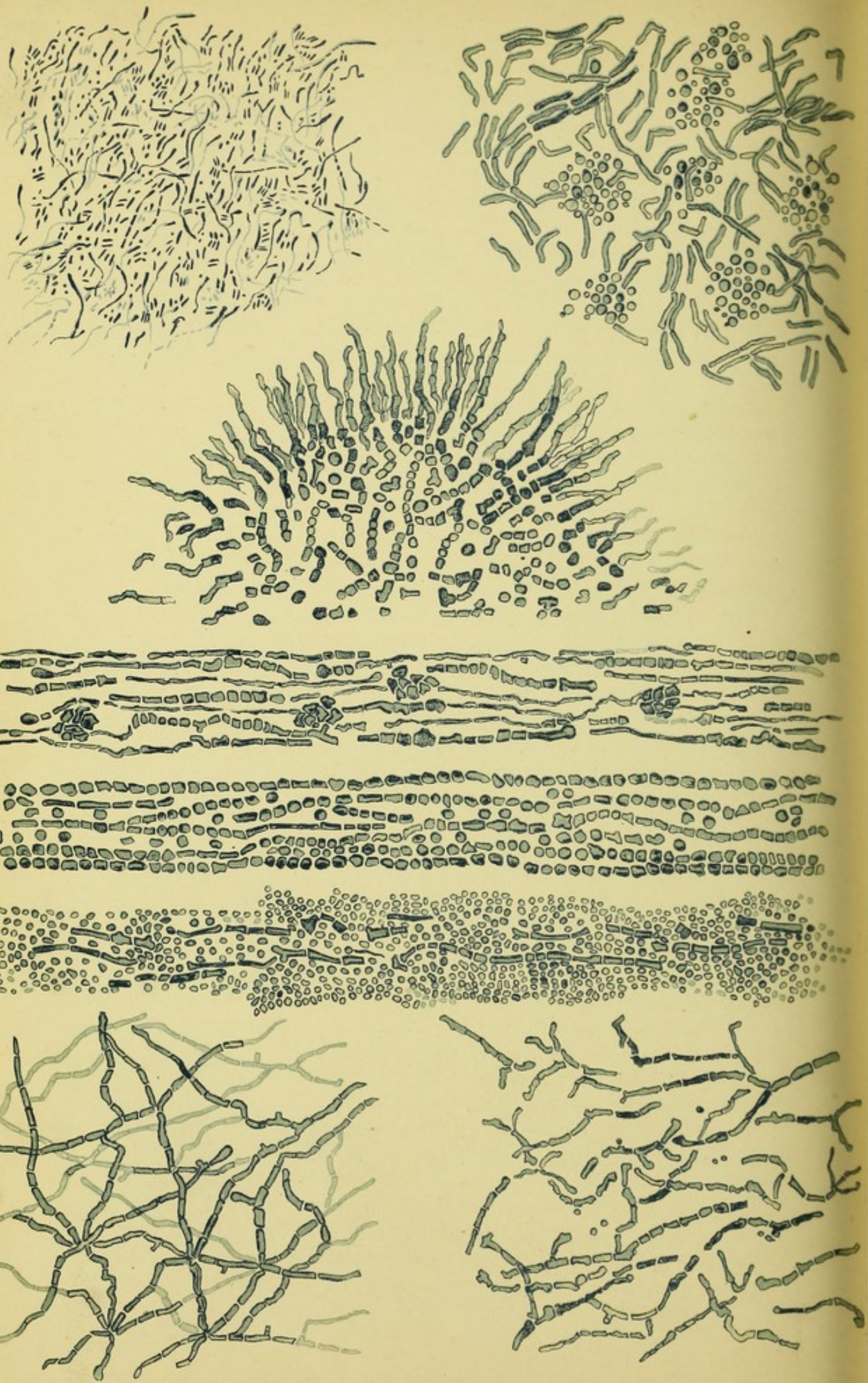
H. Radcliffe Crocker.

REFERENCES

Kaposi was the first to describe the disease, but in 1884 the author of this article, in the *Medico-Chirurgical Transactions*, published the first three English cases, and gave the bibliography of 31 other cases to date. In 1890, Elsenberg, *Archiv f. Derm. und Syph.* vol. xxii. 1890, gave references to the subsequently published cases, bringing them up to 52, and many others have been recorded since.—Schütte gives references to several of these late cases in *Dermatolog. Zeitschrift*, vol. i. 1894, p. 429, adding 3 of his own.

Z. Falcao of Lisbon related at Third Internat. Cong. Dermatology in London, in 1896, 4 cases at advanced ages, previous cases having generally been in early life.

H. R. C.



PARASITIC DISEASES OF THE SKIN

THE cutaneous affections caused by bacterial parasites are described in other articles; this article deals solely with the diseases produced by fungi and by insects. These larger parasites, vegetable and animal, by their growth in the epidermis set up an irritation which manifests itself in characteristic lesions. The diseases induced by them are all transmitted by contact; they are indefinite in duration, and are purely local; giving rise to little constitutional disturbance, however extensively the skin may be invaded.

VEGETABLE PARASITES

The diseases caused by vegetable parasites are *ringworm*, *favus*, *tinea versicolor*, *erythrasma*, *tinea imbricata*, *actinomycosis*, and *mycetoma*. *Pinta* also, the "spotted sickness" of tropical America, probably belongs to this class. Actinomycosis attacks the skin but seldom, and then only secondarily; the same statement holds good of mycetoma, which is caused by a closely allied fungus. Neither of these affections, therefore, properly finds a place here (*vide* vol. ii. pp. 85 and 91).

RINGWORM.—Ringworm may attack the hairy or the glabrous parts of the skin, the nails or the mucous membrane. Ringworm of the hairy skin presents two natural subdivisions according as it affects the scalp (*tinea tonsurans*) or the beard (*tinea barbæ* or *tinea sycosis*). Ringworm of the glabrous skin comprises ringworm of the body (*tinea circinata*), ringworm of the nails (*onychomycosis*), and ringworm of the mucous membrane (mouth, vulva). In addition to these, there is a form of the affection, having special features, which occurs for the most part in tropical climates (*eczema marginatum*).

Etiology.—The cause of ringworm is the growth of a vegetable fungus on the hair and in the epidermis. Recent research has shown that all forms of ringworm are not caused, as was till lately believed, by a single fungus, namely, the *trichophyton tonsurans*, discovered independently by Gruby and by Malmsten in 1844. Sabouraud, whose investigations have shed a new light on this subject, holds that under the common designation of *tinea tonsurans* two distinct diseases have

hitherto been confounded: one of these is caused by a cryptogamic fungus belonging to the trichophyton class, the other by the Microsporon Audouini. The former disease is divided by Sabouraud into two main groups, which he names T. megalosporon, endothrix and ectothrix, respectively, according to the position of the fungus within the hair or outside it. In addition to these there is a class of trichophyta which not only form a parasitic bark around the hair-root, but penetrate more or less deeply through the cortical layer; to these the term "endo-ectothrix" is applied. In Sabouraud's experience it is rare to find the same species of large-spored fungus in any two cases of trichophytic ringworm, unless they originate from the same source—a circumstance which explains the great diversity of lesions. He has also cultivated fungi from the horse on decaying wood, grain, and other media; and thinks it possible they may have an independent existence as saprophytes. Bodin has found on the horse a microsporon closely allied to the small-spored fungus described by Sabouraud; this parasite is inoculable on man. My own investigations have led me to the conclusion that there are at least two distinct fungi which may cause ringworm—one distinguishable by the smallness, the other by the relatively large size, of its spores. In the former the spores are irregularly scattered about like the stones in a mosaic, and, as far as can be seen, they are disunited; interwoven with them is a felting of branching mycelium, the whole forming a sheath round the hair. The parasite eats its way into the hair, and grows downwards towards the root; the hair becomes brittle, and after a time breaks off, leaving a short stump. The microsporon attacks the scalp chiefly, and in children almost exclusively. The disease produced by the microsporon is often refractory to treatment, and indefinite in duration. The large-spored fungus first attacks the root of the hair and grows upwards. The spores are arranged in regular chains intermingled with short, regularly jointed mycelium; they lie around the hair, sometimes inside it, sometimes both inside and outside. The ringworm caused by this fungus yields more readily to treatment. The large-spored fungus attacks the body (*tinea circinata*), the beard region (*sycosis*), the nails (*onychomycosis*), and occasionally the scalp.

In my cases the small-spored fungus was found in 92 per cent, a proportion which closely agrees with the estimates of Colcott Fox and of Jamieson. In the United States the proportion is about the same (C. J. White). In France it is not so high; Sabouraud estimates that the M. Audouini is responsible for only 60 to 65 per cent of all ringworms met with in Paris. In Germany it appears to be still less frequent, while in Italy it has so far been found in one case only (Mibelli). There is a like diversity in the geographical distribution of the trichophyta. Hence the observations made in one country must not be taken as holding good for another. The great preponderance of the small-spored fungus probably accounts for the greater severity of ringworm as met with in this country.

The botanical character of the ringworm fungi is uncertain. Sabouraud classes the large-spored fungus, to which alone he allows the name

of trichophyton, among the sporotricha, a species of the genus Mucedo; the Microsporon Audouini is as yet "unattached." Dr. Colcott Fox believes that the microspores and trichophytes all belong to the same family. The origin of the fungi is also uncertain. Sabouraud thinks it probable that the trichophytes, or some of them, may exist independently as saprophytes. The "ectothrix" variety of the large-spored fungus is believed to be exclusively of animal origin (horse, ass, dog, cat, calf, birds). The small-spored fungus is likewise believed to be occasionally derived from the horse, cat, or dog.

Ringworm passes by direct contagion from one human being to another, or from an animal to man; possibly, sometimes, by inoculation with a vegetable mould in its saprophytic state. It is also transmitted by indirect contagion through infected brushes, caps, and the like.

Symptoms.—*Ringworm of the scalp* is almost peculiar to childhood. In more than twenty years of dermatological practice I have seen only six cases in adults. Liability to attack continues up to puberty; but the period of greatest incidence is the second half of the first decade of life. The sexes are equally liable. The incubation period may be reckoned as under a fortnight. The initial lesion is generally a small red papule, sometimes a minute scaly spot; this spreads into a round or oval slightly raised patch, and becomes scaly. Similar patches are formed from other centres of infection. The patches vary in diameter from half an inch to several inches, and in colour from dirty gray or slaty blue to reddish brown; in fair children the tint is generally yellowish. The typical patch has a distinct margin, which is often marked by a narrow zone of erythematous redness. It is studded with stumps of broken hairs, sometimes with black dots which plug the mouths of the follicles. The affected hairs are inelastic, thickened, lustreless, and have a frosted appearance produced by the parasitic growth which surrounds them like a sheath; they are twisted and crumpled like cornstalks beaten down by storm, and so loose that they can be pulled out without pain. The thickening of the hair is due to its being stuffed with fungus, and the destructive action of the parasite makes it so brittle that it is easily crushed between the slide and the cover-glass.

Tinea tonsurans presents a great variety of clinical appearances. There may be no discoloration, there may be no scaliness, there may be no distinct patch. There is, however, always a broken hair somewhere. In "disseminated ringworm" isolated foci are scattered over the scalp, which is generally quite healthy-looking. Another aberrant form is "bald ringworm" (*tinea decalvans*), in which the hair falls out here and there, leaving smooth bald spots. This resembles alopecia areata, and, indeed, some hold that the conditions are identical.

Inflammatory processes—vesicular, eczematoid, or impetiginous—not infrequently occur as complications of T. tonsurans. Sometimes diffuse suppuration arises from secondary infection, by scratching or accidental inoculation, or is set up by over-active treatment. The most severe complication of the kind is *kerion*, in which the red glistening skin is

raised into a dome-like surface thickly dotted with the dilated mouths of follicles, some of which are plugged with muco-purulent matter, producing the appearance of a carbuncle. The swollen part is boggy, but does not fluctuate; and little or no pus escapes on incision. Sloughing never occurs, but in some rare cases the necrosis is sufficiently intense to destroy the roots of the hairs. Kerion is seldom seen in adults. The only subjective symptom in uncomplicated ringworm is itching, and even this is by no means constant. The disease may go on spreading till the whole scalp is laid waste, its surface being covered by a thick layer of dry scales. While ringworm has no bad effect on the constitution it is of considerable social importance, inasmuch as it entails exclusion from school for months, or even years.

Ringworm of the scalp is, as a rule, easily recognisable by the characteristic stubbly patches. There may, however, be but one or two broken hairs in a thick head of hair; therefore a suspected scalp should always be examined thoroughly with a lens in a good light. Conclusive proof is obtainable by the use of the microscope. The suspected hair should be freed from any extraneous material by soaking it, for half an hour or so, in liquor potassæ (B.P. 7-10 per cent). A diseased hair is bent like a green stick, and its free end is frayed. With a power of from two to three hundred diameters spores and mycelium can be seen lying around and within the hair, according to the species of the fungus. When, as the result of irritation or secondary infection by micro-organisms, a condition resembling eczema or impetigo has been set up, the characteristic broken stumps will still indicate the true nature of the disease. Alopecia areata is distinguished by the billiard-ball smoothness of its patches, while the short hairs occasionally found at the edge of these are unbroken, and are shaped like a note of exclamation (!).

Ringworm of the scalp, if left to itself, may last for years; but, as a general law to which there are but few exceptions, the disease wears itself out as adult life is reached. There is no permanent loss of hair, except when the inflammation has been severe enough to destroy the hair follicles. In tinea decalvans spontaneous cure often takes place within a few weeks; it is in this form that the marvellous cures wrongly credited to quack remedies are heard of.

Ringworm of the body may occur at any time of life, but is rare after middle age. The parts chiefly affected are the hands and forearms, the face and the neck. The first visible lesion is a small red slightly raised spot which soon increases in size, and becomes scaly. The redness fades away at the centre, and thus a circle with a scaly centre and a narrow border crowned with papules, vesicles, and occasionally pustules is formed, which for a time continues to expand like the fairy rings of the mushroom. The rings are scattered about irregularly, and neighbouring rings often intersect, forming broken curves. Frequently involution does not take place in the centre, and the lesion appears not as a ring, but as a patch. A rarer form is an arrangement of one ring

within another; there may be three or more such concentric rings. Sometimes secondary lesions, in the form of rings, scaly patches, or spots, are seen on the parts adjoining the head when this part is the seat of ringworm ("Trichophytie accessoire des teigneux" of Besnier).

The lesions, as the result of scratching, may be infected with micro-organisms.

The only subjective symptoms are tingling and itching.

The lesions are so characteristic that there is seldom room for doubt as to the nature of the disease. When there is any difficulty in diagnosis the microscope will remove it.

Ringworm of the nails may be an independent condition, or may coexist with ringworm in other parts. The nail becomes thickened, dull, uneven, and brittle. Exfoliation occurs, and under the free border a mass of disintegrated nail structure is seen; in this the fungus will be found. The diagnosis can be made only by microscopic examination.

Eczema marginatum is a form of ringworm affecting the groin, perineum, axillæ, and other parts where skin surfaces are in contact. The affection is more common in tropical climates than in Europe. The characteristic feature is the broad, bluff margin, which is scaly and mostly rough with papules. The process often assumes an eczematoid character.

Tinea of mucous membrane.—The mucous membrane of the vulva may be attacked secondarily in cases of eczema marginatum; and that of the mouth by extension of tinea circinata from the face.

Ringworm of the beard (T. sycosis) occurs most frequently in early manhood, and is rare after middle age. The immediate source of contagion is generally the barber's brush. The initial lesion is a red scaly spot, which quickly extends and forms rings or patches in the same way as in T. circinata. Pustules spring up around the hairs in these rings and patches, thus each pustule has a hair growing out of it. The hairs are often withered-looking, and can be pulled out without pain. In rare cases the affection assumes a kerion-like form, when there is brawny infiltration of the skin of the chin and sides of the face; the surface is red and glistening, thrown up here and there into irregular lumps, thickly studded with hair-pierced pustules, and presenting the dilated mouths of follicles from which a yellowish viscid fluid exudes.

Treatment.—*Ringworm of the scalp.*—The treatment of ringworm of the scalp consists in the destruction of the fungus and the removal of the diseased hairs. The first thing to be done is to get a clear field of action. The hair, over as large an area as may be necessary, must be cut short, and kept so. Unless the disease be strictly confined to one or two small spots, and very superficial, epilation will be required. All visibly diseased hairs should be picked out with forceps, and a ring of sound hair around the seat of disease should also be removed, so as to isolate the affected area. In very young children, however, epilation is not generally advisable.

In a recent case the application of iodine, pure carbonic acid, or blistering fluid may effect a cure, the fungus being brought away in the

detached epidermis; but in a more advanced stage, when the orifice of the follicle is blocked with epithelial debris, and when the hair itself is further protected by a dense sheath of scales and fungous elements, the agent does not reach the parasite. A way into the follicles must then be opened by clearing away fat and epithelial debris. This may be done by washing with a lotion consisting of salicylic acid dissolved in chloroform or ether (gr. v. ad ℥j.); this dissolves the fat, dehydrates, loosens the hairs, and directly attacks the fungus. By the use of salicylic acid in this form, if applied sufficiently early, before the fungus has penetrated deeply, a rapid cure may be effected. No fatty substances should be used, and the parts should not be washed with water, which helps the growth of the fungus.

The only remedies that can be credited with anything like a specific curative action in ringworm are chrysarobin, sulphur, and mercury. These agents are parasiticides; but they also in some way make the soil unsuitable for the growth of the fungus. Chrysarobin in my hands has proved by far the most effective agent. It may be applied in the form of an ointment, containing from ten grains to two drachms of chrysarobin to the ounce; the strength best adapted for ordinary use being twenty grains to the ounce. I generally begin with a strength of ten grains to the ounce. Chrysarobin can also be used in plaster-mulls. It may advantageously be combined with salicylic acid and other agents. A small amount of the ointment must be well rubbed in with a bit of cloth or a mop. Yet chrysarobin undoubtedly has certain drawbacks: it causes a peculiar erythematous swelling of the eyelids and face, which however passes quickly away; it also dyes the hair yellow and stains linen and clothing indelibly.

Sulphur is particularly useful in the case of young children; it may be applied in the following form:—℞ Sulphuris, ℥j.; acidi carbolici, ℥ss.; lanolini c. oleo ℥j. Sulphur may also be used in combination with mercury, salicylic acid, etc., in an ointment with a lanolin base.

Mercury, in the form of the perchloride, the biniodide, the oleate, the nitrate, the red oxide, or the red iodide, is used in lotions, ointments, or plasters; in whatever form it be applied the strength of the preparation must be adapted to the tolerance of the patient, and its effect must be carefully watched. In very young children, or in persons with a delicate skin, it should never be employed. The perchloride of mercury may be applied in alcoholic or ethereal solution in strengths varying from ½ to 2 per cent; or with weak acetic acid, as in the following prescription:—℞ Hydr. perchlor. gr. vj.; glycerini, ℥iss.; acidi acetici dil. ℥iiss. The oleate of mercury may be applied diluted in oil, in ether, or in an ointment base, such as lanolin, in a strength of 2·5 to 20 per cent. Dr. Aldersmith, who first drew attention to the use of this preparation in the treatment of ringworm, has sometimes seen it "cure the most inveterate and extensive cases." He admits, however, that a few children have seemed to decline in general health while undergoing the treatment.

Among other substances which are useful in certain cases are the following:—Copper, which I rarely use myself, Dr. Crocker finds is generally useful; a drachm of the pure oleate to one ounce being applied in the form of an ointment; and, when the application is well borne, the strength may be increased gradually up to ʒiv. to the ounce, and occasionally to equal parts.

Formalin, which has been highly spoken of by some, I have employed in several cases; the results, however, have been in no way superior to those obtained by many other methods, while the application has caused very severe pain.

Iodine, as already said, in the form of the tincture or the liniment (B.P.), not infrequently cures early cases. "Coster's paste," which is often effective, contains iodine; and is composed as follows:—℞ Iodine, ʒij.; light oil of wood or tar to ℥j. The application causes the formation of a scab; when this separates, the remedy can be applied again if necessary.

Sodium chloride, which has lately been recommended, almost as a specific, is useless in obstinate forms of the disease.

Sodium hyposulphite, which was strongly recommended by Sir William Jenner, has sometimes given excellent results in my hands. It may be applied as a lotion (ʒij. in ℥j. of water) on lint, and covered with oiled silk. It is chiefly useful in cases of young children.

Tar is sometimes of service. It may be combined with iodine, as in Coster's paste.

Thymol may be used in an ointment (ʒiij.-v. in ℥j.) Dissolved in turpentine (ʒss.-j. in ℥j.) it is sometimes an effective application. In very recent cases, after the scalp has been cleared of diseased hairs, I sometimes use thymol or menthol (ʒss.) with chloroform (ʒij.) and olive oil (ʒvj.)

My general plan of treatment in chronic cases is as follows:—After removal of the hair the scalp is washed once with soft soap and spirits of wine, or with spirits of wine and carbolic acid or perchloride of mercury. When the surface is dry, chrysarobin is rubbed in for ten minutes, care being taken that none gets into the eye. The ointment should be applied on subsequent days till the part becomes tender, or till a red halo is visible. The chrysarobin should then be discontinued, and an ointment, either of boric acid or oleate of zinc, applied. As soon as the tenderness has disappeared, the chrysarobin should again be used. This time inflammatory reaction is longer in showing itself. In order to obtain a rapid cure, however, it is essential to produce the "chrysarobin crisis." If after three such "crises" a very marked improvement has not been effected, sulphur should be tried instead of chrysarobin; if this does not answer, recourse should be had to mercury, and this failing to iodine.

Vidal and others have reported brilliant successes by methods based on the exclusion of air from the fungus, which is aerobic. After rubbing the whole scalp with essence of turpentine, and applying iodine

to the affected spots, a coating of vaseline is spread over the scalp, which is then covered with an india-rubber cap or gutta-percha tissue. Over this is put a tight-fitting cap tied down with string. The dressing is changed every day. In ringworm caused by the M. Audouini, Sabouraud finds the following method the best: — Each night the diseased area is entirely covered with a cotton tampon wet with this solution—℞ Calcium chloride, ʒiiiss.; water, ℥x. Cover with a piece of rubber tissue. The next morning wash with soap, and cover with diachylon plaster. Twice a week apply tincture of iodine to all the diseased spots. The use of croton oil, as recommended by Aldersmith, with the production of an artificial kerion whereby the fungus may be destroyed together with the tissues in which it is implanted, may be useful occasionally. I do not, however, employ it, on account of the extreme difficulty of controlling the inflammation and the consequent risk of spreading the disease.

A case of ringworm of the scalp cannot be said to be cured till the most minute inspection reveals no broken or diseased hair, and till the absence of any trace of the fungus is confirmed by microscopic examination, which for greater safety may be supplemented by culture experiments. My own rule is, after a careful examination, to leave the case untreated for a month; at the end of that time, if no short hairs can be found, if the part is free from scaliness, and the new hair sufficiently grown to cover the patch, I look upon the patient as cured.

Ringworm of the body.—The most effectual treatment is the mechanical removal of the superficial layers of the epidermis by means of iodine, liquor epispasticus, or other blistering fluid. If some fungus be left in the deeper layers of the rete, chrysarobin should be used. It may be applied as an ointment composed of 20 grs. of the drug to ʒj. of lanolin; or in the form of Unna's ung. chrysarobin co., which consists of 5 parts of chrysarobin, 2 parts of salicylic acid, 5 parts of ichthyol, and 100 parts of unguentum simplex. Other useful applications are ointments composed of oleate of copper, or oleate of mercury, 3 grs.; lanolini cum oleo, ʒj.:—or sublimed sulphur, 3 grs.; ac. carbol. ♏xx.; lanolini, ʒij.; ol. oliv. ʒij.—rubbed in thrice daily. For young children a milder application, such as hydr. ammon. 3 grs.; lanolin or lard, ʒj., is advisable.

Eczema marginatum.—This condition is more difficult to deal with than tinea circinata. Chrysarobin may be used as an ointment (ʒss. of the drug to ʒj. of lanolin). This failing, an application of a 1 per cent solution of naphthol in alcohol, or a 5 per cent naphthol ointment, may be tried. Another mode of treatment, which is said by Dr. Jamieson to be the most efficacious of all, is to apply a freshly prepared solution of sulphurous acid freely to the parts several times a day.

Ringworm of the beard should be treated on the same general principles as ringworm of the scalp. In the early stage, when the only visible lesions are erythematous rings, the hairs should be cut close, and the affected parts rubbed vigorously with tincture of iodine; the friction

is to be repeated till thorough desquamation has taken place. In more advanced cases epilation will give issue to the pus; when chrysarobin, in the form of an ointment (grs. x. to ʒss. of the drug to ℥j. of lanolin or lard), should be applied. Corrosive sublimate in an ointment (1 in in 100) is also effective. Neither incision nor scarification is ever required.

Ringworm of the nails can be radically treated by evulsion. It will generally be sufficient, however, to scrape the nail thin, and then, after softening it with potash soap, to apply chrysarobin or some other parasiticide. Harrison of Bristol uses two solutions: No. 1, composed of liquor potassæ and distilled water (āā ℥ss.) and iodide of potassium (ʒss.); and No. 2, consisting of perchloride of mercury (gr. iv.), spirits of wine and distilled water (āā ℥ss.) The nail having been scraped, No. 1 is applied on lint under oiled silk for fifteen minutes; No. 2 is immediately applied in the same way, and kept on for twenty-four hours. The nail is then scraped again, and the applications are repeated as often as may be necessary.

Prophylaxis.—Ringworm could be stamped out if every case were properly isolated, and if doctors were more careful in giving certificates of cure. No certificate should be given until the complete and permanent disappearance of the fungus has been proved in the manner already described. All children should be carefully examined by a competent observer before admission to school, public or private; and this inspection should be repeated each time the school reassembles after holidays of any length. For children suffering from obstinate forms of the disease special schools might with advantage be established, as I suggested in a paper read at the International Congress of Hygiene and Demography held in London in 1891. In Paris such a school has been in existence for some years, and the results have been highly satisfactory.

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TINEA IMBRICATA, or *Tokelau ringworm*, which is met with principally in the Straits of Malacca and the islands of the Malay Archipelago, or as an importation from these regions, is caused by a fungus which is regarded by Sabouraud as a large-spored trichophyton differing little from the species found on animals in Europe. The characteristic lesion is a circular patch having a surface like watered silk. It is formed of scales resembling tissue-paper, arranged in concentric rings, the edging of which spreads inwards as well as outwards. The scales, which are loose towards the centre, overlap each other like tiles. After a time the scales fall off, leaving curved lines more or less concentric, of a dark fawn colour. The eruption may cover the whole body, but generally avoids hairy parts. It is accompanied by great itching, but there is no disorder of health. On examination large quantities of mycelium and conidia are found on the under surface of the scales. The treatment consists in the use of parasiticides, such as iodine or sulphur. For a full description of the disease the reader is referred to a paper by Dr. Patrick Manson in the *British Journal of Dermatology*, 1892, p. 5.

FAVUS is rare in England, more common in Scotland, and comparatively frequent in some parts of France, and in Russia and in Poland. The special seat of disease is the scalp; but sometimes it spreads from the head to the body, and even attacks mucous membrane. The characteristic lesion is a small sulphur-yellow disc or *scutulum*, with a cup-like depression in the centre, which is pierced by a hair. In colour and shape it resembles a honeycomb, whence the name *favus* applied to the disease. The scutulum, which is dry, can be lifted out of the epidermis, when a pimply, smooth, greasy surface is exposed. As they grow the scutula often run together, individual discs being pressed into a more or less hexagonal shape. Later, rough mortar-like crusts are formed, which after a time fall off, leaving pale atrophic scars. No new growth of hair takes place. In a given case the various stages of the process, marked by scutula, rugged crusts and scars, are usually visible; on hairless parts the lesions somewhat resemble those of tinea circinata. A pathognomonic symptom is a peculiar mousy smell, which, as observed in experimental cultures, is caused by the fungus itself. There is generally much itching; but this may be due to pediculi which

are an almost invariable accompaniment of favus. The affection, if untreated, is indefinite in duration, lasting as long as there are any hair follicles left to be attacked.

Favus is communicated by contagion, and it is often taken from animals (cats, mice, rabbits, fowls, and dogs). The fungus finds its most congenial soil in filthy and unwholesome persons. Till recently the specific parasite was believed to be the Achorion Schönleini. There is now, however, reason to believe that (as first suggested by Quincke) there may be in favus, as in ringworm, more than one species of parasite. Unna and Frank found three varieties, two of which, inoculated on healthy human skin, produced scutula. Bodin has found five—A. Schönleini, the A. enthytrix, the A. atakton of Unna, and two previously undescribed. On the other hand, Biro, as the result of his own researches, maintains the unity of the fungus, holding that the differences on which the plurality hypothesis is founded are due to differences of the nutrient media employed in culture. Bodin has called attention to certain fungi which he looks upon as intermediate forms between the achorions and the trichophytons. These include, on the one hand, mucedineæ, having the mycological characters of the achorions which, in men as well as in animals, produce lesions of trichophytic appearance; and on the other, parasites which morphologically and biologically are trichophytes, but cause favus-like lesions. Bodin's results have been confirmed by Sabrazès; and Sabouraud has also met with cases in which lesions having the circinate form, which he holds to be characteristic of trichophytosis, have been produced by the fungus having the mycological characters of the favus parasite. Before I was aware of the researches of Bodin and Sabrazès, my own clinical observation, supplemented by microscopical research and cultural experiments, had brought me to the same conclusion; namely, that the boundary line between the favus fungus and the trichophyton is by no means clearly marked. Except in cases on the borderland, such as those just cited, plurality of species in the favus fungus does not give rise to any marked diversity in the clinical appearances. Sabrazès has proved that the spores of the favus fungus may retain their vitality for years; he produced the disease in a mouse by the inoculation of cultures of scutula taken from a girl three years previously.

Diagnosis.—In well-marked cases the nature of the disease is at once recognised by the cup-like, sulphur-coloured scabs and the mousy odour. In old scabs the scutula are lost, but they can generally be found about the edge. When the characteristic lesions have become obscured by the impetigo and other secondary lesions due to pediculosis, the microscope will be required.

Treatment consists in removal of the crusts by soaking with carbolised oil. After epilation, parasiticides of the kind used for the destruction of the ringworm fungus should be rubbed in vigorously. In view of the extraordinary vitality of the spores, it is well to burn all crusts and hairs removed. Zinsen has found the application of heat,

by means of Leiter's tubes, very effective. Water at a temperature of 52°-55° C. was passed through tubes placed over sublimate compresses. Hodara has succeeded in implanting healthy hairs taken from the patients in the scars left by favus. After making several incisions on the scar close together, and crossing each other, and washing till bleeding had completely ceased, he planted fragments of hair from 1 to 4 millimetres in length; these were cut quite clear of the bulb and the epidermic cells, and trimmed with scissors so that their ends were perfectly level; the part was then covered with paper and plaster. In a month the dressing was removed; and though most of the implanted hairs came away with it, enough remained to form the starting-point of a growth sufficient to cover a large patch.

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Tinea versicolor is due to the growth of a vegetable fungus, the microsporon furfur, in the superficial layers of the epidermis. It leaves the hair untouched, and is generally limited to the trunk; but it may attack the limbs, and more rarely the face. The lesions are slightly raised scaly patches, scattered like islands, or massed together like irregular continents, and contrasting sharply in colour with the natural skin. This staining, which varies according to the complexion of the patient from fawn to "liver," is superficial and can easily be scraped off; it will be found to consist of spores, grouped like bunches of currants amidst interlacing threads of mycelium. A few cultures have been obtained by T. Spielschka, who has produced the disease by inoculation of these cultures. The patches spread very slowly, and cause moderate itching. The disease is contagious, but prolonged contact is required. Profuse sweating favours its occurrence; hence perhaps the special liability of consumptive persons. The disease can easily be cured by washing with soft soap and warm water, followed by the application of iodine; or of a strong solution of hyposulphite of soda, or sulphurous acid, diluted to one-fourth with water; or of equal parts of benzene and lavender water.

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ERYTHRASMA is a rare disease caused by the Microsporon minutissimum, and characterised by brownish patches and slight itching. The treatment is the same as for tinea versicolor. Dr. Payne appears inclined to regard the parasite as an involution form of a bacillus.

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ANIMAL PARASITES

Among the animal parasites that infest the human skin, some, such as the itch mite, the louse and the flea, are "familiar beasts to man"; others, such as the bug, and various species of flies and worms, quarter themselves upon him when they have the chance; others again, such as the harvest bug, are accidental visitors. It would serve no useful purpose, even if it were possible, to describe here the results of the irritation caused by the multitudinous vermin which may find a happy hunting-ground on the skin. The only affections which need be considered are scabies and pediculosis.

SCABIES is due to the presence in the epidermis of the acarus, or Sarcoptes scabiei, an insect belonging to the tracheal order of the Arachnidæ. The female, when impregnated, penetrates the horny layer, and then wriggles through the rete, depositing her ova in the deeper epidermic structures. The mouth of the burrow, which is the characteristic lesion of scabies, is usually marked by a vesicle; and its direction by a small rough ridge on the skin. The acarus is always at the blind end of the burrow, but the ova are laid as she goes along. She lives generally some two months, during which time she deposits about fifty ova. The burrows will generally be found in the webs between the fingers and toes, on the fronts of the wrists, on the genitals, and wherever the skin is thin. The head and face are never attacked, except in children in arms. In the imperfectly washed a trail of dirt marks the course of the burrow; in cleanly people the little vesicle at its mouth is the best landmark. Soon secondary lesions are caused by scratching and inoculation of pus cocci; and burrows, vesicles, bullæ, pustules are mingled with marks of finger-nails on all accessible parts, and with ecthymatous or impetiginous eruptions. Itching is usually very troublesome, especially at night; and reflex irritation is often felt in distant parts, where it may even give rise to a sympathetic eruption. Scabies is communicated by close and prolonged contact. The "note" of scabies is the burrow; and in this the parasite must be sought. A pin laid flat on the surface should be pushed with a rotatory movement into the epidermis at the end of the burrow away from the vesicle, care being

taken not to draw blood; the acarus appears as a small pearly object on the end of the pin. When no burrows are to be seen the diagnosis must chiefly rest on the distribution and irregularity of the lesions. A pustular eruption on the hands should always excite suspicion. The treatment must be directed to ridding the patient of the parasite. The burrows should be laid open by soaking with hot water and vigorous scrubbing with soft soap. Simple sulphur ointment (℥ss. to ℥j.) should then be rubbed in every few hours for two or three days, and finally a cleansing bath should be given. The patient's clothes should be boiled or fumigated with sulphur. For infants and persons with a delicate skin, stavesacre or weak balsam of Peru ointment may be substituted for the sulphur; and in all cases care should be taken not to cause irritation by over-active treatment. Calamine lotion, or alkaline baths with carbolic or menthol soap, will relieve the itching. Secondary lesions should be treated by boracic acid lotion with or without liquor picis carbonis.

PEDICULOSIS affects the head, the body—or rather the clothes, and the pubic hairs. The insects in these several situations present slight differences of shape and colour, for details of which reference must be made to special treatises. The ova, or nits, are deposited on the hairs—one being attached to a single hair, to the side of which it is firmly bound by a glutinous material. Pediculi multiply very rapidly, especially in wasting conditions. The parasite feeds by sucking blood through a membranous tube which it thrusts into the opening of a sweat-duct. When the sucker is taken out a tiny bloodmark appears on the surface. This hæmorrhagic speck is the characteristic lesion of pediculosis. Excoriations, wheals, and pustules are produced by scratching, which, if long continued, may produce a brown, leather-like condition—the so-called "vagabond's skin" seen in tramps.

The **pediculus capitis** is chiefly found in children, but is common enough in adults; and it may with advantage be borne in mind that social position is not in itself any protection. Pediculi are always communicated either by direct contact or by brushes, towels, and the like. In "verminous persons" the hair is sometimes matted together by pus, nits, scales and scabs (*Plica polonica*). When itching of the scalp is complained of, especially if *impetigo contagiosa* be present, and there are enlarged glands in the neck, the occipital region should be carefully explored for nits. The parasites are exterminated by the application of white precipitate ointment, or a mixture of ether ℥j. and oleate of mercury (5 per cent) ℥j.; and the nits can be got rid of by careful combing after the cement fixing them to the hairs has been dissolved with acetic acid. The impetigo contagiosa may be treated with weak mercurial or strong boracic acid lotions.

Pediculus corporis is mostly seen in dirty old people. The parasites will be seen in the clothes, particularly the folds of the under-linen, and the inner surface of the shirt collar. When no parasites are visible,

their existence may safely be inferred from the presence of hæmorrhagic specks on the shoulders, the back, and the extensor surfaces of the limbs. The absence of lesions on the hands and wrists at once distinguishes pediculosis from scabies. The clothes should be baked in an oven at a temperature of 212° or more; and a hot bath for the patient, with the free use of some medicated antiseptic soap, will complete the cure.

Pediculus pubis has its habitat among the pubic hairs, but may stray to the abdomen, thorax, axilla, occasionally even to the eyelashes, whiskers, and beard. It causes itching and a papular eruption sometimes complicated by eczematoid inflammation. The parasite is usually communicated in sexual intercourse, sometimes by clothes. Itching in the pubic region should always excite suspicion of the presence of crab lice. White precipitate ointment should be applied without cutting the hair. Oleate of mercury (5 per cent) ℥vj., ether sulph. ℥ij. is also an effective application.

Miscellaneous parasites.—The *flea* marks its presence by a small red spot with a central darker point. Flea bites are important only because in febrile patients they may be mistaken for the exanthem of typhoid or measles, or for purpura. Flea marks on the linen and the dark centre in the spots will show the true nature of the lesion.

The *bug* produces a wheal with a whitish centre and a central point. The application of linen soaked in eau de Cologne, toilet vinegar, or lead lotion, relieves the irritation and hyperæmia caused by the bites of these insects.

The bites and stings of *gnats*, *mosquitoes*, *harvest bugs*, and similar pests, cause lesions of much the same kind, which may be treated in the same way. Eruptions are sometimes caused by the larvæ of arachnida, œstridian diptera, pigeon lice, etc., but they present nothing characteristic except the insects themselves.

In tropical countries the *chigoe* (*Pulex penetrans*) frequently bores through the skin from the outside, while the *guinea worm* (*Dracunculus medinensis*), having gained admission to the body in water, forces its way out through the skin.

Echinococcus hydatid, *embryos* of the *Distomum hepaticum*, and ova of *Belharzia hæmatobia*, have also been found in rare instances in the human skin. *Cysticercus cellulosæ cutis* is sometimes present in the subcutaneous tissue. For an account of these parasites and their effects the reader is referred to the second volume of this work.

MALCOLM MORRIS.

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M. M.

CRAW-CRAW

CRAW-CRAW or kra-kra is a negro word which has been adopted by Europeans on the West Coast of Africa as a name for several ill-defined skin diseases characterised by much local irritation. It seems to take the place in West Africa of the expression "Dhobie Itch" in use among Europeans in India and the Far East. It probably covers scabies and forms of skin disease included under such names as lichen, prurigo, eczema, dermatitis herpetiformis, impetigo, and various epiphytic affections.

In English literature Winterbottom appears to have been the first to speak of "kra-kra"; although he gives no detailed description of the condition, he mentions certain drugs reputed to cure it.

Dr. John O'Neil gives a somewhat detailed description of a craw-craw frequently met with among the negroes in the neighbourhood of Fort Addah, Clover Expedition. In many respects this craw-craw resembled scabies. He states, however, that it subsided in a cool climate to recur again in warm weather, and that it resisted treatment with sulphur. It was said to be very contagious, the characteristic eruption appearing three days after exposure to infection. The eruption consisted of papules, sometimes occurring singly, sometimes in rings; it was scattered irregularly over trunk and limbs. Two days after their first appearance the papules became vesicles; two days later, pustules. When, says O'Neil, the tops of the papules were shaved off, teased up in water, and placed under the microscope, a number of minute nematode worms were seen wriggling about with great activity. The movement rapidly slowed down, and the parasites died. When outstretched they were found to measure $\frac{1}{100}$ by $\frac{1}{2000}$ of an inch. It is difficult to make out, either from O'Neil's drawings or from his description, the exact zoological characters of these parasites. They resembled Filaria nocturna. He speaks of two black marks near the head end of the worm, an appearance which does not quite conform to anything recognisable in the better known species of African blood-worms. It is quite possible, however, that these worms were either F. nocturna, F. diurna, or F. perstans, seeing that in many places on the West Coast one or more of these blood-worms are present in quite fifty per cent of the native Africans. In shaving off the top of a papule a certain amount of blood must necessarily get into the preparation; thus should the patient happen to be the subject of some form of filariasis blood-worms would almost certainly be present in the preparation. It seems to me that this is a possible explanation of the presence of the filariform parasites in O'Neil's craw-craw; that is to say, the worms were simply in accidental association with the eruption.

However, the possibility of O'Neil's parasite being a new species, and of its having a direct etiological bearing upon the associated

skin eruption, must not be too readily dismissed. Papular eruptions of the skin produced by nematodes occur in the lower animals, and have been frequently described in dogs and horses. Moreover, there is a well-authenticated and carefully recorded example of such a disease in man. The case was observed by Professor Nielly, and described by him under the name *Dermatose parasitaire*. A French lad, who had never left his own country, was attacked with a skin disease having the usual clinical features of ordinary scabies. In the pustules an immature nematode, resembling, according to Nielly, that described by O'Neil in African craw-craw, was found. The worm had certain peculiar cephalic markings, two dark lines in the position of the pharynx, and a well-developed alimentary canal, besides rudimentary organs of generation. Embryo nematodes, resembling F. nocturna, were also found in the blood of the patient. From this latter circumstance, and from the fact that the parasites found in the papules exhibited advanced developmental changes, we are justified in inferring that the embryos in the patient's circulation were the young of a mature nematode lodged somewhere in the tissues, and that these embryos escaped from the host by way of the skin.

Silva Araujo described a case of what he calls craw-craw, in which he found a nematode embryo in the discharges. The case was evidently one of lymph scrotum complicated with chyluria, and the parasite F. nocturna.

Recently, under the name craw-craw, Emily describes a papulo-pustular skin affection, apparently very common in parts of tropical Africa, which, from its persistency, its painful nature, and its proneness to attack travellers, is a disease of some importance. Similar skin affections I have frequently seen in Europeans in China. They are probably caused by some form of pyogenetic micro-organism, and owe their persistency to auto-inoculation from the scratching provoked by the attendant irritation. According to Emily, the disease may originate in a mosquito or sand-fly bite. This, when scratched, is infected with the specific micro-organism, and a papule or pustule is formed. Further scratching spreads the disease from one part to another. In tropical countries pustular or even ulcerating eruptions of this character, and affecting principally the hands and feet, are common. Unless their infective nature be borne in mind, and the local lesions treated antiseptically, they may lame the patient for months; if, on the contrary, they are treated antiseptically and actively, as a rule they are easily cured. A treatment I found very effective consisted in opening all pustules as soon as they formed, washing discharge away with sublimate solution (1 in 1000), ordering prolonged foot baths, of 1 in 20 warm carbolic lotion, for half an hour, once or twice a day, followed by free dusting of the feet with powdered boric acid, and dressing all sores with boric acid or weak nitrate of mercury ointment. The stockings and shoes should also be dusted with the boric acid powder; old shoes and stockings, which are presumably infective, should be destroyed. Emily obtained very satis-

factory results from opening the pustules, removing incrustations, and scraping the base of any ulcers that had formed till they bled; the parts were then disinfected with sublimate lotion (1 in 1000), the sores filled with boric acid and covered with boricated vaseline; finally the limb was swathed in absorbent cotton, over which a bandage was firmly applied. The dressings were not removed for a week, when the parts were soundly healed.

In view of the liability to these infective pustular diseases, travellers in hot countries should pay great attention to the hygiene of the feet; it is a good plan after washing the feet to powder them, and the stockings also, with boric acid, and when on a journey to do this daily. The slightest appearance of pustulation or blistering should be promptly and energetically treated on antiseptic lines.

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P. M.

DISEASES OF UNCERTAIN CLASSIFICATION

MOLLUSCUM CONTAGIOSUM (BATEMAN)

Syn.—*Epithelioma contagiosum* (Virchow, Neisser).

Molluscum contagiosum is a cutaneous disease characterised by the growth of small tumours from the epidermis. Clinical and experimental evidence has now proved that these small tumours are contagious.

Description.—The tumours, which are the characteristic feature of this disease, vary in size from the smallest visible spot to that of a pea. In rare cases larger tumours may be formed by the grouping together and confluence of the smaller. They project in a distinctly hemispherical shape from the surface of the skin, and have a peculiar firm, elastic consistence. Their colour varies—partly with the position of the surface which they happen to occupy—from shades of yellowish brown to a peculiar white "mother-of-pearl" tint. They are often semi-translucent, a characteristic which increases their resemblance to a small mother-of-pearl button, to which they have been compared by Mr. Hutchinson. Very early in the course of their growth they show a depression on the summit, which becomes more obvious as the tumours increase in size. This depression at length forms the orifice of a narrow passage to the centre of the tumour, which soon becomes occupied with epithelial debris, the result of a peculiar and characteristic degeneration which the epithelial cells composing the tumour undergo. From the orifice of this channel the degenerated epithelial cells escape, or can be readily expressed as grayish white caseous material. The channel thus described closely resembles the duct of a gland, of which the softened central area of the tumour simulates the distended acinus. Occasionally more than one orifice and channel leading to the softened centre of the tumour may be distinguished.

These tumours may arise on any part of the skin, but are most frequently observed on parts exposed to contagion. Thus the face is perhaps one of the commonest sites of the disease, especially in the case of children; in adults the genital organs and surrounding parts are not

infrequently affected; the breasts in the case of nursing women may become inoculated; the upper part of the trunk, forearms, and hands also are favourite sites. In rare cases the characteristic tumours may be scattered over the whole surface of the body.

Course.—The tumours increase slowly, frequently taking months to attain their full size; and, if uninterfered with, remain in a passive condition for an indefinite period. Slight injuries, however, cause their destruction; they may be easily torn out of the skin when mature, or they may become the seats of pus inoculation, and then suppurate, in the latter case much pain and inconvenience may be caused. The general tendency of the tumours, after reaching a fair size, is towards retrogression, or disappearance by some accidental cause. On disappearing they do not leave scars except when they suppurate, and then disfiguring cicatrisation may result, especially if the face is affected.

Contagion.—The disease is now proved to be inoculable, and therefore contagious. From very early times this was suspected, and the name which it has retained ever since Bateman's time bears the opinion of this physician. But for long the evidence as to its inoculability was purely clinical.

Clinical evidence.—Many observations of the communication of the disease from one individual to another are on record. These observations date from the time of Bateman, and have been added to by Thomson, Paterson, Henderson, and Cotton among older observers, and by Duckworth and many others among recent observers. This evidence may be grouped under the following heads (Stelwagon):—

1. Communicability from one to several members of a household, and from family to family.—Numerous instances are recorded of one child after another in a family becoming affected: of nurses communicating the disease to the children under their charge; of mothers and wet-nurses, suffering from the disease on the nipple and breast, infecting their nurslings on the face, and of the converse; and of husband and wife presenting the disease simultaneously on the genitalia. One of the most interesting examples of conveyance of the disease from one individual to another is given by Neumann: a group of cases consisted of a mother and twins—infants at the breast; the disease began in one of the infants, who communicated it to the mother's breast, and by this means the other child became infected. In reference to its occurrence on the genitalia, it is noteworthy that there has been a tendency among some observers, especially on the continent of Europe, to regard the disease as a communicable venereal affection.

2. Spread of the disease in schools, hospitals, and various other public institutions.—Numerous examples of outbreaks of the disease in the children's wards of hospitals and schools are on record, and no doubt many more might be brought in evidence. I remember that at one time the skin clinic in the Aberdeen Royal Infirmary could be kept supplied, session after session, with recent examples of the disease from a reformatory school for boys in the vicinity of the city.

3. Accidental inoculation.—Several instances are recorded of physicians and others concerned in the treatment of the disease accidentally inoculating themselves. Dr. Brocq is quoted by Stelwagon as follows :— "I inoculated myself involuntarily with molluscum, with my nails, after having pressed out with the nails of the two thumbs the contents of a lesion of molluscum in a patient. Soon afterward I inadvertently scratched my face. About a month and a half later several lesions of molluscum developed in this region."

4. Experimental evidence. — The most important evidence of the contagious nature of the malady is that afforded by the considerable number of successful experimental inoculations which have been made. Instances are recorded by Retzius, Paterson, Vidal, Stanziale, Pick, Haab, and Nobel. From the records of these successful results it must be concluded that the disease is not inoculated very easily ; for many unsuccessful efforts were made by these writers. Great care was taken by some to keep the substance of the molluscum in contact with the sound skin ; occasionally the inoculations were successful after rubbing the infective material into the skin, others found it necessary to inoculate material obtained from the tumours after puncturing the healthy integument. The " incubation " period seems to be very variable, and, judging by the result of these experimental inoculations, occasionally very long ; it varied from perhaps four weeks in Nobel's case to six months in the case of Haab, the usual period being from six weeks to three months. So far as can be judged from clinical records, the natural methods of contagion may require a somewhat shorter period of incubation, varying perhaps from three weeks onwards. It is also noteworthy that at first the rate of growth of the tumours is very slow, so that they are readily overlooked. Thus Allen states, in reference to the case of accidental inoculation in which he was himself the sufferer— " After they (the lesions) were big enough to attract my attention (mere specks), it took them six weeks to attain a size from which a clinical diagnosis could be made."

The large number of unsuccessful inoculations which have been made from time to time by many observers must not be permitted to weigh against the positive results which are now on record. We do not know the parasite concerned in the disease, and far less do we know anything of its existence external to its host. We cannot say whether it is directly inoculable, or whether, like many animal parasites, it has to pass through changes external to the host to fit it for reinoculation ; and, till some information is obtained on these points, the reasons for the failure of so many experimental inoculations can only be guessed at. It is worthy of remark in this connection that it has long been known that certain animals, especially birds (pigeons, domestic fowls, etc.), suffer from a disease affecting the head, beak and neighbouring parts, and also the claws, very similar in appearance to molluscum contagiosum, which has frequently been described as epithelioma contagiosum of birds (Bollinger, L. Pfeiffer, etc.) ; cases have been described

of persons handling birds who became affected with what appeared to be molluscum contagiosum (Salzer).

Histology. — The amount of discussion which has occurred with regard to molluscum contagiosum is far in excess of its actual clinical significance; and the greater part of it has arisen on account of the difficult pathological problems presented by the tumours. For a long time after the identification of the lesions, and after the contagious nature of the disease had received almost complete clinical proof, the tumours were considered to take origin from the sebaceous glands,—to be a form of hypertrophy of these structures. The aspect of the tumours, their peculiar curdy contents, and especially the appearance they present on careful dissection, or on microscopic examination, lent a considerable amount of support to this opinion. But as methods of microscopic examination became more perfect the error of this view was gradually corrected; and the observations of Bizzozero and Manfredi in Italy, Retzius in Stockholm, Boeck of Christiania, Lukomsky in Kieff, and Sangster and Thin in this country, did much to present the histology of this subject in its proper light. It is worthy of notice that two observers so accomplished as Drs. Tilbury and Colcott Fox wrote a vigorous defence of the hypothesis of the sebaceous gland origin of these tumours in 1879. But the observations of recent authors—Neisser, Unna, and many others—have served to confirm the opinion that molluscum contagiosum does not arise from the sebaceous glands.

The following account attempts to give the present view of the growth of the molluscum tumours—

The increase in cells takes place in the rete Malpighii, and may originate at one point or at several points in close vicinity to each other. In some cases a certain amount of evidence is in favour of this multiplication occurring at first in the walls of a hair follicle.

The result of the rapid multiplication of the cells in this region is to flatten the underlying papillæ so that the little tumour presses out for itself a depression, which varies in depth according to the size of the tumour; but the cutis is always thinned to some extent below it. As a rule, all the papillæ of the area disappear, although some of them may remain, and give rise to certain of the more substantial of the thin fibrous partitions which are very obvious at the lower part of the tumour, dividing off the groups of lobules from each other. The cells of the interpapillary epithelium undergo increase, as well as the cells of the rest of the rete; and these, at first being under the lateral pressure of the papillæ, form lobulated masses owing to their increase in number, and form a very good imitation of the lobules of a sebaceous gland. Gradually, as already suggested, the papillary processes of the cutis become flattened out, or atrophied, by lateral pressure, and the lobules of the tumour come to lie very close together. Probably some of the short fibrous trabeculæ of the lower part of the tumour may be produced by infolding of portions of the cutis between the rapidly-increasing masses of epithelium in the rete mucosum. It is noteworthy that these rapidly-

growing areas or masses of epithelium always retain a rounded or blunted

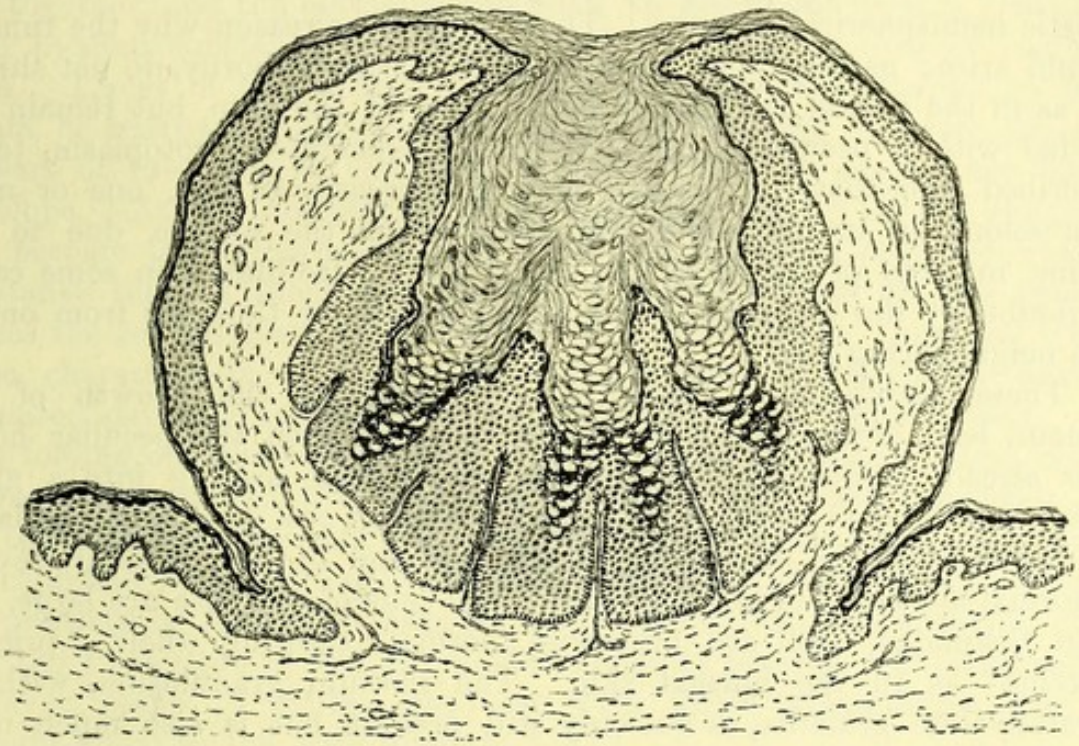


FIG. 10.—A section of a tumour, showing the general microscopic structure of Molluscum contagiosum.

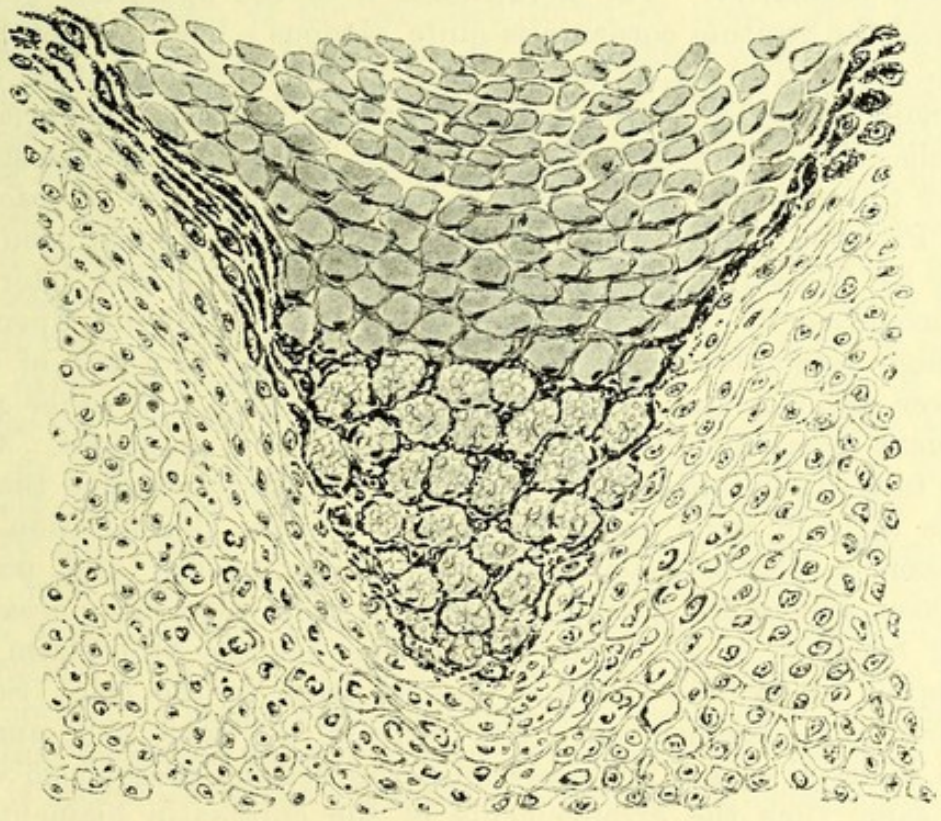


FIG. 11.—An area of epithelium from above section (Fig. 10) further magnified to show the characteristic epithelial degeneration leading to the appearance of the "molluscum body."

outline, and do not shoot downwards the root-like processes so characteristic of epithelioma of the "malignant" type.

For the same reason, the rapidly-dividing epithelium presses upwards, and raises the overlying layers of epithelium in the form of the characteristic hemispherical tumour. There is another reason why the tumour should arise; namely, that the cells, as they become horny, do not shrivel up, as in the case of the normal horny layer of the skin, but remain distended with a peculiar hyaline form of degenerated protoplasm, to be described immediately. As the tumour increases in size, one or more depressions, or umbilications, are observed on the surface, due to the falling inwards of the most projecting point; facilitated in some cases, no doubt, by the advance of the multiplication of the cells from one or two neighbouring foci.

These umbilications, later in the course of the growth of the tumour, lead downwards into the cavity filled with the peculiar horny cells already mentioned; and in this way a duct leading into a gland which has become transformed into a retention cyst is closely simulated. On examining the histology of the interior of the tumour several abnormal appearances are observed. The cells of the rete are large, and even distended, but are otherwise normal, showing their "prickle-systems" as in the normal skin. The stratum granulosum, with its keratohyaline granules, is not only still present, but is also much more obvious than usual. Its cells are large and regularly arranged till the tumour undergoes softening, when slight injury will readily interfere with their regularity. The keratinisation of the epidermis goes on as usual, and the stratum corneum is quite obvious; but it is noted that its cells do not shrivel up, as do the cells of the normal stratum corneum, but remain distended with a peculiar hyaline or colloid material. It is these cells which have been recognised for so long as peculiar structures, to which the name of "molluscum bodies" was given so far back as the time of Paterson, and to which so much attention has again been directed recently by Neisser, Darier, Bollinger, and others. These later authors have recognised in them a species of protozoon, relying upon certain very rough resemblances in them to the parasitic protozoa of many of the lower animals, and to the coccidium oviforme, and other protozoa, which have been recently recognised as parasitic in mammals. On staining the tumours by appropriate methods it is observed that the cells of the rete early in their existence show a peculiar degeneration of their protoplasm, a degeneration seen in both the nuclear and perinuclear protoplasm, and in the inability of the spherical degenerate areas to take staining reagents in the same way as the healthy protoplasm, so that they appear as hyaline rounded or oval areas in the cell. Several of these points of degeneration may occur in the same cell, and as the hyaline material makes its appearance the healthy protoplasm vanishes; at the same time the arrangements of the chromatin filaments in the cell are disturbed, and the nuclear chromatin is apt to be pressed to one side of the cell. This process of degeneration is obvious through the stratum granulosum. On passing upwards more of the hyaline material is seen, frequently causing the protoplasm of the cell to assume

a reticulate appearance, and arranging itself in a botryoid form. As the stratum corneum is reached the globules of hyaline material have run together, and the epithelial cell with its horny envelope is distended with hyaline substance, the whole "body" having an oval or rounded form. Traces of the nuclear chromatin may still be discerned as fragments, or narrow borders, reacting to nuclear staining reagents attached to part of the walls of the cells, or pressed tightly against the horny envelope. As the horny cells form they lose their "prickle-systems," and become less adherent to each other; at the same time the hyaline substance renders them soft, so that a little pressure on the tumour causes the central mass to be forced out as the "curdy" material which is so characteristic. The contents of the tumour frequently have a lobulated structure corresponding to the lobes of the tumour itself. On thus forcing out the central area of the tumour it collapses, and it can be readily perceived that the process closely simulates squeezing out the contents of a retention cyst. At or near the surface of the tumour, intermingled with the molluscum cells, it is not difficult to demonstrate the presence of bacteria; these are usually cocci and short bacilli, probably the B. asciformis, and are only accidentally present. Their presence, however, seems to explain the ease with which suppuration may be brought about in the little tumours.

The cells filled to varying extents with hyaline material are the protozoa which have been described, and many of them have a slight resemblance to certain of the encysted forms of these lowly organisms. But it must be stated that none of the authors upholding protozoal parasitism in molluscum contagiosum has ever demonstrated changes in any degree resembling the cell divisions of other protozoa, such as the coccidium oviforme or the hæmatozoon of malaria; not one has succeeded in growing them outside the body, and therefore there has been no successful inoculation of a pure culture. In the case of these protozoa vital processes of division can be readily demonstrated, and in the case of C. oviforme it is easy to cause the animal to undergo its alternate cycle of existence outside the body of its host. A. Neisser of Breslau is perhaps the observer whose name is associated most closely with the attempt to explain the origin of the molluscum body as a protozoal form; but the observations of Török and Tommasoli, and later of Kuznitzky and others, have rendered Neisser's position, which he expounded with great industry and care, no longer tenable. Greatly as protozoal parasitism in molluscum contagiosum would illuminate epithelial multiplication in other tumours, we must admit that up to the present there is nothing to warrant us in holding that the molluscum bodies have any relation whatever to any form of protozoon; yet that some form of parasite is concerned in the production of molluscum contagiosum cannot be doubted, and the discovery of the parasite must be an event of the highest pathological moment, on account of its relations to other forms of epithelial overgrowth.

Treatment.—The treatment of the malady is fortunately simple and

effectual. The pathogenetic material is not of very great vitality nor virulence; and any method of treatment which diminishes its amount, or lowers its vitality, is sufficient to interfere with the production of epithelial growth. Thus it is frequently sufficient to express the contents of the growth, when the small tumour will collapse, and in a few days shrivel up and vanish, leaving no appreciable scar. So also, the introduction of a drop of pure phenol, or of the solution of the acid nitrate of mercury, will cause the tumour to disappear. But the most satisfactory method of treatment is to split the small tumours to their bases with a suitable sharp knife, emptying them of their contents, if necessary, by means of a small curette. If the incision has passed beyond the limits of the tumour, as is probable, the small amount of hæmorrhage will be readily controlled by means of pressure with a pad of lint. Care must be taken to prevent suppuration, which is occasionally troublesome; especially as the disease occurs most frequently among the children of the poor, whose hygienic precautions are not of the most complete character. Occasionally it is wise to excise the tumour by means of a knife or scissors curved on the flat, and this is especially the case when the growth occurs near the edge of the eyelid. A clean cut is obtained, and thus suppuration is more easily avoided; and this is of importance, as troublesome purulent conjunctivitis is apt to occur as the result of suppurating molluscum contagiosum of the eyelids. Electrolysis, carefully used, is of considerable service in destroying the small tumours, when they occur in situations where incision is inadvisable. In the case of large numbers of small tumours closely aggregated on the trunk or extremities, it is advisable to attempt their removal by means of collodion, or plaster-muslins, containing from 2 per cent to 10 per cent of salicylic acid.

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DARIER'S DISEASE

SYN.—*Acne sebacea cornea* (E. Wilson) ; *Keratosis follicularis* (White) ; *Psorospermosis follicularis vegetans* (Darier).

Definition. — A very rare disease of the skin characterised by the existence of papules covered with horny scales which, when removed, are found to be plugs embedded in the dilated pilo-sebaceous ducts, and are attributed by some authors to the agency of psorosperms.

Historical.—A paper by Darier, in the *Annales de dermatologie* for July 1889, drew attention to the disease which had previously been described, by White of Boston, under the name of Keratosis follicularis, but of which only a few cases had been recorded. Darier described the clinical history and microscopical appearances of two cases, and stated that the disease was a cutaneous psorospermosis, due to the presence of coccidia. Leuckart first described the class of unicellular organisms, called sporozoa, to which the coccidia belong ; and Balbiani states that the coccidia differ from other members of the group, and especially from the gregarinidæ, in their immobility throughout their development, in their intracellular localisation, and in the comparatively small number of spores which they form endogenously. Among the better known coccidia is the oviform coccidium of the rabbit's liver, which produces the disease called psorospermosis (vol. ii. p. 1003), where the parasite is situate within the bile ducts in the interior of epithelial cells, giving rise to the formation of cystic growths which vary in size from a millet-seed to a pea. The oviform coccidium, or psorosperm, is surrounded with a thick capsule which is very resistant to chemical reagents, and is built up of granular protoplasmic material which, under certain conditions, may contract away from the capsule, leaving a clear space within the thickened wall. As regards the presence of coccidia in man, very little is at present accurately known ; but Gubler and Leuckart have described three exceptional cases of cystic psorospermosis of the liver ; and Kunstler and Pitres have found

psorosperms in one specimen of pus taken from a case of empyema. Hadden, Cobbold, and Eve have also described the presence of psorosperms in the kidneys and ureters. Other skin diseases have also been ascribed to the presence of psorosperms, notably molluscum contagiosum and Paget's disease; but this view of their pathology now receives little or no support. Whether carcinoma be due to psorosperms is at this moment a matter of warm discussion, and the parasitic origin of "cancer" has received very cogent support from the recent researches of Mr. Plimmer, who has not only isolated and cultivated certain intra-cellular bodies in cancer of various organs, including the skin, but has succeeded in inoculating these into certain animals (guinea-pigs), and in producing death with the formation of tumours of endothelial origin.

Symptoms.—This cutaneous eruption may be found on any part of the body, but there are certain regions in which its presence is most frequent. In the hypogastric and inguinal regions it spreads most extensively, and its occurrence is especially common upon the scalp and face, præsternal region, and hairy parts generally. It begins with the appearance of solid papules about the size of a pin's head, which do not differ much in colour from the surrounding skin, but are readily appreciated by the touch. These papules become pinkish as they enlarge, and are capped by brownish hard crusts of horny consistence, each of which, on forcible removal, is found to have been filling up a small depression in the surface of the skin. These are, in fact, the orifices of the pilo-sebaceous glands; and, when the plugs have been removed, sebaceous matter may at times be made to exude on pressure. These papules or nodules may run together and form tumours, which are covered with more or less greasy, brownish dark scales, increasing in places into definite spine-like protrusions, and even forming small horns as much as half an inch long. The lesions are especially well marked in the regions of the hypogastrium, perinæum and anus, where they sometimes increase into large papillomatous tumours which ulcerate and discharge. Such tumours arise from hypertrophy of the papillæ and of the epithelial masses which have grown at the necks of the follicles.

The horny masses may, in certain positions, as on the dorsa of the feet, change into smooth brownish plates raised above the surrounding skin. The palms and soles, and even more exceptionally the backs of the hands, may likewise become covered with horny plates formed by the coalescence of several wart-like masses with a horny translucent covering. Darier described the corneous layer as becoming thickened over the papillæ, and forming numerous yellowish points. The nails almost always present longitudinal furrows, and their edges are irregular, jagged, and broken; and Boeck has stated that this condition of the nails may be present even when the disease has not attacked the surrounding skin. The horny characters of the lesions on the dorsa of the hands and feet contrasts with the soft greasy feel of the scales covering the papillomatous growths on moist covered parts, such as the axillæ, where the sweat macerates the horny masses, which may easily be rubbed off, exposing a

moist, red, warty surface. These greasy scales are also seen sometimes on the scalp, where yellowish crusts form, and the lesions resemble an eczema. Subjective sensations consist chiefly of itching, whereupon the lesions become complicated with those of scratching. In certain situations acute pain may result from the ulceration, and may interfere with the patient's general health.

Causes.—It is not improbable that the disease may be contagious, since of Boeck's four cases three belonged to the same family; and the two cases which White has recorded were also members of the same family—father and daughter, but they had not lived together for some years.

The disease occurs chiefly among young persons; in a series of fifteen cases, collected by Hartzell, twelve began before 25 years of age, and ten before 20 years. Of these fifteen cases twelve were males.

Prognosis.—The progress of the disease is slow, and may last for years; the older lesions growing gradually larger and new foci springing up from time to time. Acute exacerbations are marked by the presence of papules scattered over large surfaces; and, finally, either in this manner or by the steady growth of the primary lesions, the greater part of the cutaneous surface becomes affected. The general health is, as a rule, but little impaired.

Diagnosis.—The fully developed disease presents no difficulties in diagnosis, and it is rarely that the initial papules are mistaken for other diseases such as L. planus or L. (keratosis) pilaris. In some cases a possible confusion with hyperkeratosis of the sweat-pores due to other causes—or porokeratosis, according to Unna's nomenclature—may arise; but the clinical features of the case and a histological examination will always determine the diagnosis.

Morbid anatomy.—Microscopic examination of sections through the growths show that the lesions are situated chiefly, but not exclusively, at the neck of the pilo-sebaceous follicles. The neck of the normal follicle, which is really an invagination of the epidermis, is lined by epithelium similar to that of the surface of the skin; so that the Malpighian layer, the stratum granulosum and horny layer are in contact with the hair. In Darier's disease the neck of the follicle is dilated, and the crater-like orifice is filled with a coherent peg of horny material through which the hair generally passes. This horny mass corresponds to the adherent plate, and to the horny plug which fills up the duct. There is also a papillomatous proliferation of the lateral walls of the follicle, the cells undergoing a change into horny material which forms masses which may press upon the rete mucosum and cause its atrophy. The cells of the deeper layers of the rete mucosum often show karyokinetic changes, and are in a condition of active proliferation, so that the rete mucosum, as a whole, is considerably thickened. The prickle cells, in the neighbourhood of the lacunæ, which are found here and there over the papillæ, have lost their characteristic prickles and are scattered about irregularly, their nuclei staining feebly or not at all; elsewhere the prickle cells are

normal. In positions such as the hypogastric region, where the lesions attain a greater size, the pathological changes are still more marked. The dilatation of the upper parts of the sebaceous ducts is so great as to give rise to the formation of cysts, from the sides of which ramifications project into the corium, so that an appearance more or less closely resembling an epithelioma is obtained. Darier states that in his cases the hair follicle below the opening of the sebaceous gland, and also the sebaceous gland itself, presented no abnormal characters; no signs of retention of secretion were to be seen, nor was there the least trace of perifollicular cellular exudation marking a certain degree of irritation under the influence of the plug which blocked the orifice of the follicle. Since the horny plugs are found in the absence of papillomatous proliferation, it is evident that this latter process is secondary. The follicular keratoses—such as icthyosis follicularis, lichen pilaris and pityriasis rubra pilaris—in which the hair follicle is blocked by horny material, do not show any similar appearance.

Hence some special cause had to be sought for, and Darier found this special cause in the peculiar round or oval bodies which are found at the base of the horny plugs. These alleged psorosperms are present within the epithelial cells, swelling them out and pressing the nucleus against the walls of the cell. They are larger than the epithelial cells, are sharply defined, and contain a granular material surrounding a nucleus and nucleolus. They stain well with Lugol's solution of iodine in potassium iodide, with hæmatoxylin, congo-red, or acid nigrosin. Psorosperms have been grown by Delépine in interlamellar films on serum and nutrient gelatine, at a temperature of 20° C.; and he finds that in less than a week they show partial or complete subdivision of their protoplasm into four or more round or oval bodies, similar to those described by Kauffmann. Ballance and Shattock have tried to inoculate animals with psorosperms, but have not been successful; it is probable that coccidia can be inoculated only in the stage of sporulation.

How far such organisms are the cause of Darier's disease is still a matter of doubt; though Wickham, Brocq, and others support Darier's contention that the disease is a true psorospermosis, and due essentially to the presence of coccidia. The analogy of these bodies to similar structures found in Paget's disease, and in epithelioma, has led many observers to regard them merely as altered epithelial cells; and the assertion that eleidin granules can be demonstrated within them lends colour to the view that they have an epithelial origin. Boeck and Miethke, relying on preparations of their own taken from cases of Darier's disease, incline to the latter view, and look upon the disease as a hyperkeratosis due to causes other than coccidia. Unna agrees with Boeck in the main as to the origin of the "round bodies," and regards them as hyalin-degenerated epithelia. Bowen, from his later researches on a case limited to the head and hands, regards the disease as a parakeratosis as well as a hyperkeratosis, and maintains that it is not caused by psorosperms. Indeed, until more is known about the life-history of these

bodies, and inoculations have been successfully performed on man, it would be rash to assume that they are the active and essential agents in the production of Darier's disease.

Krösing has recently described, from Eichhoff's clinic, a case of Darier's dermatosis, in which the inflammatory infiltration was very marked but the hyalin degeneration of the epithelium very scanty, and unaccompanied by the conditions seen in the true cases.

Treatment.—No method of treatment, up to the present time, has been found to give satisfactory results in this affection. The disease steadily progresses in spite of treatment, though some amelioration of the discomfort may be obtained. The crusts and scales must be got rid of by soaking in boracic or alkaline baths, and softening with applications of carbolic oil. Crocker recommends inunctions of soft soap, followed by baths of potassium sulphide. Boeck, to freely discharging lesions, applies an ointment containing starch and subacetate of lead ; or, to those parts where the disease is less advanced, an application of Lassar's paste. The patches on the dorsa of the feet and the backs of the hands may be painted with salicylic collodion or, according to Jarisch, with salicylic soap plaster. In view of the possibly parasitic origin of the disease, antiseptic applications should be applied. In some cases an ointment similar to the following may be of service: Ichthyol, ac. salicyl., terebinthinæ, āā ʒiij. ; camphoræ, ʒj. ; ung. diach. ℥vj.

Schwimmer has made use of the thermo-cautery to clear away the growths.

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YAWS (FRAMBŒSIA). See vol. ii. p. 501.

ALEPPO BOIL. See "Oriental Sore," vol. ii. p. 486.

MYCOSIS FUNGOIDES

SYN.—*Granuloma fungoides* (Auspitz and others); *Fibroma fungoides* (T. Fox); *Eczema hypertrophicum tuberculatum* (E. Wilson); *Lymphadénie cutanée* (French authors); *Inflammatory fungoid neoplasm* (Geber and Duhring); *Beerschwammähnliche multiple Papillargeschwülste* (Köbner); *Multiple sarcoma of skin* (Nevins Hyde).

History.—This disease was first described by Alibert in 1814, who regarded it as a form of yaws, and gave it the name of Pian fongoïde, or Framboesia mycoïdes; but he changed this name afterwards for that now used. It is a very rare disease, but many cases have now been described on the Continent, in this country, and in America; and the literature on the subject is very considerable.

Description.—The *course* of the disease may be divided into three stages: (i.) In the first stage patches of superficial inflammation are seen on various parts of the body. The inflammation concerns the epidermis only, as in eczema, or the upper layer of the corium; and may be after the type of erythema, of moist eczema, or of dry eczema. Urticarial wheals also occur sometimes. The most usual appearance is that of red patches, bright at first, but becoming dusky and ultimately brownish, covered usually with thin scales, sometimes with imperfect vesicles and crusts. In form they vary, and may be continuous, circinate, or gyrate. The patches, although separate, may be so numerous as to cover a great part of the surface of the body. They are usually very irritable, but sometimes painful, or extremely hyperæsthetic.

This stage may last for months or even several years, some of the

patches often fading, and being followed by new ones, with great variety of appearance. Generally such cases are diagnosed as eczema or persistent erythema; but instances of correct diagnosis in this stage have been recorded by Besnier and Morrow.

In the second stage, called by French writers the lichenoid stage, the inflammation invades deeper layers of the skin, the patches becoming infiltrated, swollen, and marked by papules or nodular prominences; though covered with smooth epidermis. A general thickening of the skin has also been described. The duration of this stage is very variable.

The third or final stage is that in which tumours appear. These at first generally occupy a portion only of the inflamed patches on which they arise. They may reach the size of one, two, or several inches in diameter with a variable amount of elevation above the surface, so as to be flattish, hemispherical, or even nearly globular. Sometimes the base becomes contracted so that the tumours are almost pedunculated, or resemble a mushroom, from which appearance the original name Mycosis of Alibert was derived. They are at first covered with epidermis, which falls off, leaving a moist surface exuding some serous discharge. The consistence is firm and somewhat elastic. The colour is pale or bright red, sometimes scarlet, so as to suggest a comparison with the tomato.

They may be extremely numerous. I have counted more than fifty in one case, and even larger numbers have been observed. Tumours may disappear spontaneously and rapidly; but more often they are persistent, and may remain with little change, except increase in size, till death. Many soften into ulcers, or undergo general necrosis, leaving a sloughing surface. When complicated, as sometimes happens, with diffuse swelling of the subcutaneous tissue, terrible deformity results, especially when affecting the head and face.

It is to be noted that in rare cases the tumours may arise at once —"d'emblée"—without previous inflammation of the skin, but usually in smaller number; though the general course of the disease is the same.

As a rule the lymphatic glands are unaffected, or show only a transitory inflammatory enlargement; but cases have been recorded in which there was a chronic infiltration of many glands which resembled the original tumours.

General course.—Even in the earlier stages some wasting and cachexia are observed, which ultimately reach a high degree, and may alone lead to a fatal result. Death may also be caused by diffuse cellulitis, septicæmia, some intercurrent inflammation of internal organs, or exhausting diarrhœa. The disease is probably always fatal, though cases of partial recovery have been observed. Fever is absent as a rule, but may be considerable when there are inflammatory complications.

The blood shows no constant changes, though sometimes a certain amount of leucocytosis is observed, the corpuscles sometimes showing a preponderance of the eosinophilous variety (Morrow).

Morbid anatomy.—The tumours appear to the naked eye like a rather firm sarcoma. The minute structure has been variously interpreted; some call the growth a round-celled sarcoma, others lymphadenoma or lympho-sarcoma; others, again, a chronic inflammatory tumour or granuloma.

There is a general agreement that the growth begins with a small-celled infiltration, starting from the corium. The tumours themselves consist of masses of lymphoid leucocytes (chiefly uninucleated), and also of polymorphous cells having the appearance of connective tissue cells, especially surrounding the blood-vessels. The tissue cells (especially in specimens removed during life) are in large proportion *basophil granular corpuscles* or "*mast-zellen*," the granules of which, being stained by Gram's method, have been mistaken for cocci. Ranvier and other French observers describe a reticulum enclosing the round cells, and hence have called the growth lymphadenoma or "Lymphadénie cutanée." With all respect for Ranvier's authority, it must be said that this reticulum is not constantly present. Very little or no fibrous tissue can be observed, but there are numerous thin-celled blood-vessels.

Against the denomination sarcoma are the facts that the cells do not depart from the inflammatory type, their nuclei are small, and there is no tendency to produce any special form of connective tissue: also that the clinical course is different; the tumours sometimes disappear spontaneously, and grow very rapidly. I must say I have seen a case, clinically like mycosis fungoides, in which tumours were formed of a "spindle-celled sarcoma" character. Against the name lymphadenoma it is to be urged that the lymphatic reticulum is not always present; and that the connection with general "adénie" is not constant.

It seems best, therefore, to regard the growth, provisionally, as a chronic inflammatory neoplasm, or granuloma, dependent upon some local irritant as yet undiscovered. Yet this view is not free from difficulties; it might be well then, with Kaposi, to adopt none of these hypotheses, but to regard the disease as a special clinical group, the relations of which are not yet clear; an "entité morbide distincte" (Vidal and Brocq)—a disease *sui generis*.

It may be remarked that they present also a certain resemblance to the large inflammatory lumps sometimes produced by bromide or iodide of potassium.

Causes.—The causation of this disease is quite unknown. The personal or family history of the patients, who are nearly always adults without any special constitutional taint, throws no light on it. It is neither contagious nor hereditary. It is natural, especially on the granuloma view, to suppose that some pathogenetic microbe may be the proximate cause; but the search has not been successful. Micrococci have indeed been isolated which belong to well-known saprophytic or pyogenetic forms; and quite recently M'Veil, Murray, and Atkinson (Glasgow Hospital Reports, vol. i. 1898) have isolated a bacillus which in rabbits produced some pathological changes, followed by death. This requires confirmation; but it seems very probable that a microbic cause will one day be

discovered. On the other hand, it cannot be said that the hypothesis of a diffuse, non-living cause is inadmissible.

Diagnosis.—In the early stage it is difficult, or perhaps impossible, to recognise this disease; as the eruption may present the appearance of ordinary erythema, eczema, or even of urticaria. In certain cases a suspicion that such an eruption is going to develop into M. fungoides may be aroused, but generally turns out to be groundless. I am not acquainted with any case which was accurately diagnosed in this so-called "pre-fungoidal" stage, but Besnier and Morrow speak of this as possible. The tumours, when present, can hardly be mistaken for anything else, except cutaneous sarcoma; generally, however, they are less vascular than sarcoma, and show no injection of surrounding blood-vessels. Sarcoma also arises as a primary growth without antecedent diffuse inflammation of the skin. Confusion has arisen through the disease being mistaken for leprosy, which, in its macular stage, has some resemblance to the early stage of this. In later stages the predominance of local acute inflammation in mycosis fungoides makes a marked difference. Single tumours might be mistaken for a syphilitic gumma, but the general course of the disease and the result of treatment are totally different. The disease has a closer resemblance to the *Lymphodermia perniciosa* of Kaposi, which is, perhaps, a species of the same genus.

Treatment.—No therapeutical measures have proved successful in this disease. Some authors think that improvement has been produced by the internal use of arsenic; others have recommended quinine, but these drugs at best are no more than palliative. The local treatment must be adapted to the varying phases of the eruption. Antiseptics will be necessary to prevent decomposition of the exudation. Protective applications, such as zinc-gelatine or the least irritating of the metallic ointments, bring some alleviation.

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RHINOSCLEROMA

SYN.—*Scleroma nasi; Scleroma; Infective scleroma of the respiratory passages.*

Definition.—A new growth composed of very hard fibrous and granulomatous tissue, occurring on the upper lip and margin of the nostrils; more rarely in the pharynx, or larynx and trachea.

Description.—This disease was first described by Hebra and Kaposi, in the year 1870.

The growth usually appears first at the junction of the nose and upper lip, where it forms flat or somewhat raised masses, sharply limited from the adjacent skin and to a certain extent movable on the subjacent tissue. It may spread downwards over the upper lip, or upwards into the nose, involving the mucous membrane of one or both nostrils and the septum nasi; and may spread along the naso-pharynx, and affect the soft palate and the mouth. In some cases the palate or fauces may be the primary seat of the growth. The appearance of rhinoscleroma is very characteristic; the circumscribed lumps of new growth—which sometimes are covered with epidermis, sometimes present an excoriated surface, dark red in colour, and marked by congested vessels—are unlike any other disease. In time the nostrils become expanded by the growth, so that the nose becomes broad and stumpy; while, as Kaposi says, the parts feel as hard and immovable as if they were cast in plaster. The nasal passages become narrowed, and ultimately quite blocked. This condition may exist for a long time, even many years, without any sign of the ulceration, necrosis, or degeneration which are common in new growths, except some superficial excoriation. If an incision be made the wound heals rapidly and completely. Even when completely excised the disease is apt to return.

When the growth begins on the mucous surface of the fauces swelling and vascular congestion are first seen; but ultimately the tissue becomes converted into a hard white substance, resembling a scar, by which the parts are rendered immovable. The uvula becomes shortened

or quite destroyed, and the contraction of the surrounding parts produces excessive deformity, with stenosis of the fauces and pharynx.

A similar process may affect the epiglottis and the mucous surface of the larynx, producing rigidity and obstruction of the glottis, and leading to aphonia or suffocation. According to Kaposi, even the larynx may be the primary seat of the disease, whence it may extend to the trachea. Hence the name rhinoscleroma is not strictly correct, and some authors, as Paltauf, speak of scleroma simply. The disease causes little pain, and has no effect on the general health; but the stoppage of the nose, and sometimes of the larynx, constitutes a serious impediment to respiration; and in some cases swallowing is interfered with.

Morbid anatomy.—The histology of rhinoscleroma shows, in the first place, chronic inflammation in the form of a dense, small-celled infiltration of the corium and papillæ, which passes into a new formation of fibrous tissue. This tissue is so hard as to resemble cartilage, but has generally no resemblance to it, though in one case Kaposi demonstrated a definite new formation of cartilage. The most remarkable histological feature is the occurrence of large cells having three or four times the diameter of an ordinary leucocyte, but not, like giant cells, containing multiple nuclei. These cells are of colloid translucent appearance, and often contain bacilli. Frequently, also, there is a downgrowth of the interpapillary processes of epidermis.

Micro-organisms.—A characteristic bacillus was first discovered in rhinoscleroma by Frisch in 1882, and cultivated by Paltauf. It appears in the tissues as a short bacillus, 2-3 μ in length, sometimes ovoid, sometimes indistinguishable in shape from a micrococcus. These are seen in groups, sometimes within the large cells, sometimes in spaces which are either degenerated cells or sections of lymphatics. They grow readily in ordinary media in twelve to twenty-four hours. When completely stained, or in a pure culture, they show a distinct capsule; but in sections the capsule is not easily stained. Morphologically, or by cultural characters, this organism can hardly be distinguished from Friedländer's pneumonia bacillus; and it closely resembles also a capsulated bacillus found in ozæna and in nasal catarrhs. But some observers contend that its cultural characters are different.

Inoculation experiments show that the bacillus possesses pathogenetic properties, but is less virulent than the pneumococcus. The actual lesion of rhinoscleroma has not been reproduced in animals by the bacillus, nor by inoculation of the morbid tissue itself, in experiments by Kaposi and others; but Stepanow, by inoculation into the eyes of rabbits, produced granulomatous tumours having some of the histological characters of rhinoscleroma. While, therefore, there is no doubt of the constant presence of this bacillus, it has not yet been proved beyond dispute to be the cause of the disease.

Geographical distribution.—The endemic occurrence of this disease is very remarkable, and this alone would establish its specific character. It has been observed in Austria and other parts of the Austrian Empire,

in Italy and Southern Europe, in Switzerland and Russia; but not in Northern or Central Germany, in France, or in this country. The only case I have seen in England was in a patient from South America, where, as well as in Central America, the disease seems widely spread. This young man, a Guatemalan, came to London from Paris in 1884. His case was described by Sir Felix Semon, under whose care he was, and myself; and it had been previously studied by MM. Besnier, Cornil, and others in Paris. Subsequently he was under the care of Sir Morell Mackenzie. My description is, therefore, largely taken from Kaposi, Paltauf, and others. I have also seen typical specimens from India; and others have been reported from Egypt. One or two cases have been described as originating in this country, but they are open to some question.

Kaposi has seen nearly fifty cases, nearly all from the Austrian Empire. They were about equally common in the two sexes, and in persons between 15 and 40 years old, of various social position.

No constitutional state or dyscrasia is associated with the disease, nor does it affect the general health. On the whole, it seems to be a perfect example of what is called a specific disease.

The **prognosis** is very unfavourable, as the disease has no spontaneous termination, and treatment does not, according to Kaposi, effect a permanent cure.

Treatment.—The only therapeutical measure is the most complete possible extirpation by the knife, or destruction by caustics; but a more or less rapid recurrence is the rule.

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Other references may be found in the successive volumes of Baumgarten's *Jahresbericht.*

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ACANTHOSIS NIGRICANS

ACANTHOSIS NIGRICANS is an extremely rare disease characterised by roughening of the skin with wart-like growths and a peculiar discoloration. It appears to be connected with abdominal cancer, which, in all recorded cases, either existed when the patient first came under observation, or appeared later. Of the score or so of cases so far reported, three-fourths were in women, most of them between 35 and 45 years of age. The first thing that attracts the patient's attention is harshness and bronzing of the skin about the neck and front part of the body generally. Soon patches of deeper discoloration appear here and there. In the axilla and umbilicus, on and about the breasts, and around the anus and genitals, there spring up masses of wart-like vegetations, generally blackish in hue, except where excoriation or fissure has produced a red raw surface. From the depths of the fissures there sometimes oozes a viscid discharge. On the back of the neck, the chest, the abdomen, perineum, inner parts of the thighs, and in the bends of the elbows and knees are seen areas of staining on which the shade varies, according to the natural colour of the skin, from dirty brown to ebony black. The natural lines of cleavage are deepened owing to thickening of the skin, which is dry and harsh to the touch, and thickly dotted, in many cases "peppered," with warts, both sessile and pedunculated; which are seen on the face, in the ears, and on the limbs and body in places where there is no definite staining, as well as on many of the discoloured patches. The hands and feet exhibit similar changes, though as a rule less marked. The nails become thickened, dull, striated, and brittle; and the finger-ends are often deeply cracked. The hair becomes dry and wiry, and sometimes turns gray; as the disease goes on it falls out, not only on the head, but over the whole body also. In a woman, aged 35, under my own care, while the hair on the head was falling out, a thick growth of white hair took place on the face, and to a less extent on the chest and abdomen. The mucous membrane of the mouth becomes dry and wrinkled, and warts form on the palate, gums, tongue, and inside the cheeks. The tongue is swollen and fissured, and the thickness of the mucous membrane covering the interior of the mouth causes discomfort and slight difficulty in the movements of the tongue and lips. The mucous membrane of the vagina in my case, and in some of the others that have been recorded, was covered with warty growths similar to those seen in the mouth. The mucous membranes, however, do not present the characteristic staining seen on the skin.

The skin gives, to the touch, the sensation of morocco leather; and, on pinching it up between the thumb and forefinger, it is palpably

thickened and the folds cannot be obliterated by stretching. On close inspection the discoloration is seen to be due to the presence in the superficial layers of the epidermis of numerous black granules. There is no constant relation between the warty masses and the staining; some warts not being discoloured, and some black patches not being warty. The distribution of the lesions is roughly symmetrical, and the pigmentation generally follows the lines of cleavage and flexure. As a general rule the patches are seen on flat surfaces of skin; and the warty masses are found in hollows, such as the armpit, where warmth and moisture favour their vegetation. Other lesions—nævi, seborrhœic warts, molluscum pendulum—are not infrequently found coexisting with those just described; but the association seems to be merely accidental.

There is generally no pain referable to the condition of the skin, except occasionally in the fissures; in one case itching was troublesome. The patient is, however, generally in a bad state of health when the skin affection first shows itself; the symptoms pointing either to serious disease of the stomach (obstinate dyspepsia, frequent vomiting—often "coffee ground" in character, pain), or of the uterus (leucorrhœa, pain). In the great majority of recorded cases there was positive evidence of cancer, either in the abdomen or the pelvis. If such symptoms do not exist when the changes in the skin are first noticed, they are pretty sure to manifest themselves later. In my own case the patient, though rather neurotic, had no symptom pointing definitely to internal disease. Read in the light of after-events a vaginal discharge which had existed for a year before she came under my observation, and some pain in the pubic region and the thighs, may perhaps have been early indications of cancer of the uterus. The woman left St. Mary's Hospital, but I have reason to believe that, after a period of apparent improvement, she died of an "internal tumour."

The cutaneous affection progresses slowly with occasional remissions. The warty growths become more luxuriant, and spring up in fresh places; the patches of hypertrophied skin come to resemble that of the scrotum when fully contracted, and may even assume the gnarled appearance of the bark of an old oak.

Diagnosis.—Acanthosis nigricans, once seen, can hardly be mistaken for anything else. The only conditions which in any way resemble it are Addison's disease, Darier's Psorospermose folliculaire végétante, and arsenical pigmentation. In Addison's disease, however, the skin, though bronzed, is not rough or warty; the discoloration has not the peculiar distribution seen in A. nigricans, and in particular the mucous membranes are pigmented, which is not the case in the disease under consideration. In Darier's disease the lesions consist of closely aggregated papules covered with crusts, and the characteristic round bodies and granules can be seen with the microscope. Moreover, there is no associated abdominal cancer. Arsenical pigmentation is more diffuse than the staining of acanthosis, and there is a history of arsenical medication. The correct diagnosis of A. nigricans is of special im-

portance on account of its connection with grave internal disease. In any case presenting the symptoms I have described the most careful examination of the abdomen and pelvic organs should be made; even if nothing be found, the skin affection must be looked upon as the forerunner of internal cancer.

The **pathology** of A. nigricans is still very imperfectly understood. In structure the warty growths have the ordinary characters of papilloma. Mr. Jackson Clarke, who made microscopic examinations of scrapings of stained skin from the patient under my care, found in them (i.) epidermal scales, yellowish in colour, with hyphæ of fungi, spores, etc.; (ii.) a large number of black, opaque, angular and irregular particles, (iii.) a few brown translucent granules resembling amorphous hæmatoidin. He came to the conclusion that the brown masses probably consisted of hæmatoidin from minute intra-epidermal hæmorrhages, while the black masses were certainly adventitious, chiefly coal. The name "acanthosis" was applied to the condition by Unna, who regarded it as belonging to Auspitz's group of Acanthomata. Darier, who prefers the name "papillary and pigmentary dystrophy," holds that the cutaneous affection is always secondary to gastric or peritoneal cancer; though he is unable to explain the mechanism of the process. He throws out the surmise that it is due to the action of a malignant growth on the abdominal sympathetic. In one (Darier's) of the only two cases in which there is record of a necropsy the supra-renal capsules were to all appearance healthy; but the nerves going to the capsule on each side were in contact, close to the gland, with cancerous growth. In the other (Kuznitzky's) the supra-renals were rather large, smooth, and red; there was a cavity in the right, the medullary substance was red, and there was a thin grayish yellow cortex. In a case recently recorded by Jacquet and Delotte, the patient was a peasant lad of 18, without any symptoms of cancer. He had suffered, however, in childhood from some disease which had caused great wasting, and had left a protuberance of the upper part of the belly which led the observers to suspect some glandular enlargement, or inflammatory neoplasm, pressing on one of the nervous plexuses in the abdomen.

In the way of **treatment** there is practically nothing to be done. If the warty growths become inconvenient from their size, about the umbilicus, for instance, they may be removed with the knife; or, if too diffuse to be thus dealt with, by the application of salicylic acid. It has been suggested that supra-renal extract might be beneficial, but this proposal is based on an assumption which there is at present nothing to warrant. The constitutional treatment must be conducted on general principles. If there be positive evidence of abdominal cancer the case may pass into the domain of surgery.

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XANTHOMA

Xanthoma, or Xanthelasma, is a rare affection, characterised by growths of yellowish colour in the skin. The growths occur either as thin flat plates (X. planum), or as nodules or lumps (X. tuberosum). In respect of distribution the disease presents two main varieties; in certain cases it is limited to the eyelids (X. palpebrarum), while in others the lesions are scattered about, not over the cutaneous surface only, but also on the mucous and serous membranes (X. multiplex).

On the eyelid the lesions are almost invariably of the flat form. Beginning as a rule on the upper lid, near the internal canthus, the growth spreads, and, becoming fused with others starting from neighbouring centres, forms an irregular plate, which has the appearance of a piece of wash-leather let into the skin. The lower lid is often invaded likewise, and the process is always bilateral. The plates vary in size from a mere speck to a patch as large as the finger-nail; they are so soft that they cannot be felt when the finger is passed over them, and the skin in which they are embedded has its natural wrinkles, and is not scaly on the surface. The plates extend slowly for a time, then remain unchanged, as a rule, for the remainder of the patient's life.

Xanthoma multiplex is widespread and symmetrical in distribution. Beginning generally on the eyelids, the lesions may appear on any part of the body, especially on the limbs. The favourite points of attack are the joints, the palms and soles, the fold of the nates, and the ano-genital region. The mucous membrane of the mouth, pharynx, respiratory passages, œsophagus, and bile-duct, and the peritoneum may be affected.

The lesions are both of the flat and the nodular varieties, the former mostly affecting the flexor and the latter the extensor surfaces, particularly the knuckles, elbows, and knees. On the knuckles the growths have sometimes been found connected with the underlying tendons; in some cases they have been attached to the periosteum or the bone. The nodules vary in size from a pin's head to a pea; occasionally they are large enough to be called tumours. Striæ, papules, and macules are sometimes seen; these are elementary forms of the typical plates and nodules. The lesions are occasionally grouped along the lines of flexion. In colour they vary through every shade of yellow; sometimes a mixture of blackish pigment with the yellow has been observed. A peculiarity of the affection as seen in children is that the eyelids always escape.

Xanthoma is unsightly, and on certain parts inconvenient. Sometimes there is a sensation of itching or burning in the patches, and if nodules are exposed to friction there may be some pain.

In regard to **etiology** there is little to be said. Xanthoma of the eyelids is more common in women than in men. It generally begins after forty. It is hereditary, but may skip a generation. Persons in whom any habitual indisposition, particularly headache, is accompanied by darkening of the eyelids, appear to be more liable than others. Liver disorder coexists in a certain proportion of cases. X. multiplex in adults is in some way associated with chronic jaundice, which is a frequent though not a constant accompaniment; in children the hepatic factor does not come into play. The affection seems to be hereditary, and is sometimes congenital.

Some years ago I described a variety of xanthoma associated with glycosuria (X. diabeticorum). It is much rarer than the forms that have been described. Besides the condition of the urine, the affection presents certain special features which distinguish it from ordinary xanthoma. The yellow spots are conical in shape, and are surrounded by a dull red zone. They may be mistaken for acne pustules, but on puncture are found to be solid. They come out first on the extensor surfaces of the limbs, particularly on the elbows, then on the lower part of the back and belly, and on the buttocks. They are also seen on the genitals, on the palms of the hands, the face, the scalp, and, exceptionally, on the eyelids. The only subjective symptom is itching, which is more marked when the eruption is on the wane. The mucous membrane of the mouth is occasionally affected; lesions appear rapidly, and disappear in a few weeks, but fresh crops are produced for some time. The patients are mostly young or middle-aged men, apparently in good health but inclined to stoutness. As regards the constitutional state, it may be stated as a general law that there is, has been, or will be, sugar in the urine. The affection is probably a toxæmic condition due to the glycosuria.

Pathologically, xanthoma, whether of the eyelids or of the multiplex or "diabetic" variety, is generally looked upon as an inflammatory

neoplastic process. There is an aggregation of cells resembling those met with in the atheroma of arteries, which are formed partly from leucocytes, partly from connective tissue corpuscles, and become filled with fat drops. S. Pollitzer, who has made an exhaustive study of thirteen cases (five of X. planum palpebrarum, four of X. tuberosum, and four of X. diabeticorum), has been led to the conclusion that eyelid xanthoma differs essentially in structure from the multiplex variety. The former, he says, is not a new growth, but a degeneration of pre-existing embryonally misplaced muscle tissue. The so-called "xanthoma cell" is, according to him, a fragmented muscle fibre in a state of granulo-fatty degeneration, with proliferation of the muscle-cell nuclei. The colour is due to the yellow pigment which is always present in muscles undergoing fatty degeneration. X. multiplex, on the other hand, is, according to Pollitzer, an irritative hyperplastic growth of connective tissue whose cells produce fibrous tissue, or undergo degeneration. In X. diabeticorum the process is more diffuse, and the tendency to fatty degeneration more marked than in the multiplex variety.

Diagnosis.—Xanthoma of the eyelids is at once recognisable by the characteristic appearance of the yellow plates, embedded in the corium, and almost imperceptible to the touch. X. multiplex may be mistaken for urticaria pigmentosa, from which it can be distinguished by the little or no itching, and by the absence of wheals past or present. In X. diabeticorum the appearance and solidity of the yellow spots serve to distinguish the affection.

Prognosis.—The presence of the eruption should lead to an immediate examination of the urine. Xanthoma of the eyelids, when it has reached its acme, persists through life. In X. multiplex spontaneous disappearance of the lesions has been known to occur, but this is extremely rare. In X. diabeticorum the eruption usually soon disappears; but in forming a prognosis the constitutional state must be taken into account.

In ordinary xanthoma no treatment is effectual, nor as a rule is any required. If a mass of growths interfere with vision, or otherwise cause inconvenience, excision may be necessary. In X. diabeticorum treatment directed to the constitutional state is of course indicated.

Xanthoma of Balzer is an excessively rare disease affecting the elastic tissue of the skin in certain parts. The lesions, which somewhat resemble those of ordinary xanthoma, are slightly raised patches, soft to the touch, and pinkish yellow in colour but without any red halo. On microscopic examination the elastic fibres are seen to be thickened and deformed. Beyond the disfigurement, when the lesions are on a part of the skin exposed to view, the condition gives rise to no symptoms. No treatment, so far as I know, has been successful.

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AINHUM

Ainhum (from the Nagos word signifying *to saw*) is the name applied to an affection of the toes, particularly of the little toe, peculiar to the dark-skinned races. It is characterised by the formation of a deep groove, as if from the action of a slowly tightened ligature, around the base of the toe; this groove, gradually deepening, ends in the loss of the part.

The groove always begins as a shallow transverse crack, or rut, at the inner angle of the digito-plantar fold. As it deepens, the ends of the rut slowly extend upwards and outwards until they meet on the dorsum, or outer surface of the toe. The process is usually a very slow one, and may take years to complete. The deepening of the groove is not effected directly by ulceration, but by some process of constriction going on in or about the derma. After a time the toe becomes enlarged to two or three times the natural size, so that ultimately the rounded and bulbous distal portion presents the appearance of a small potato or cherry attached to the foot by a narrow and more or less limp pedicle. The skin of the strangled portion is not materially altered in appearance, although to the

touch the tissues have a somewhat soft and lipomatous consistence. When in process of time, and in consequence of the pressure of the constricting band, the bone or ligaments included in the pedicle become absorbed and lose their rigidity, the toe becomes everted, so that the nail, which may have become more or less deformed, faces outwards, or outwards and downwards. The constriction usually corresponds with the first interphalangeal articulation; occasionally it passes through the shaft of the first phalanx. Gongora relates a case in which, after the casting off of the two distal phalanges, the process was repeated in the stump. The narrow limp pedicle now permits the swollen toe to double under the foot in walking, thereby often occasioning much pain and inconvenience; for this reason, and as the toe is incessantly injured by catching on various objects, the patient, if this be not effected spontaneously or by accident, severs the pedicle. The slight resulting wound usually heals readily; occasionally, however, a small ulcer, in which exposed bone may be detected, may remain open for a time.

In some instances a certain amount of ulceration may be present in the depths of the constricting groove, particularly at the inner angle of the plantar fold; it is probably induced by injury or dirt. Although at times the toe itself may become inflamed and even gangrenous, active inflammatory manifestations appear not to be a necessary part of the process. When ulcerated or inflamed there is generally a good deal of suffering in the part; feelings of constriction are also complained of sometimes. One observer (Dupouy) states that in his cases the onset of the disease was preceded by pains in the loin so severe that the patients were unable to stand. Other writers do not confirm this observation.

Both little toes may be attacked simultaneously, or one after the other; it may be after a long interval (30 years, Duhring). The little toe is that most frequently affected (45 out of 50 cases, Da Silva Lima); more rarely it is the fourth toe (5 out of 50 cases, *ibid.*) The disease has also been seen in the fourth and little toes of the same foot (Pereira Guimares), and also in the second toe (Gongora). Guyot records a case of the same, or a similar disease, in a native of the Isle of Pines, in whom not only the toes but the fingers were attacked; and it is said that the leg itself has been the subject of a similar amputating linear constriction.

Ainhum occurs much more frequently in males than in females. It has been seen in children even as young as six weeks (Guyot); but the vast majority of instances occur in adults. According to Da Silva Lima it tends to run in families; he states that he knew certain negro families in which every male member had ainhum. Duhring also describes a case in a negro whose father and mother were both affected, and Dupouy relates an instance in which grandfather, father, and two children were all the subjects of this disease. Certain negro races are more prone to ainhum than others, notably the Kroomen on the west coast of Africa. It occurs also in India, in the Pacific Islands, and among the negroes in North and South America, especially, it is believed, in Brazil.

On longitudinal section of the amputated toe the derma and deeper tissues at the site of the constriction will be found blended together into a dense fibrous ring, the superficial epithelium being much hypertrophied. In the distal portion the cutaneous structures are slightly thickened; the adipose tissue is much increased in some instances, not so in others; the bones are partly absorbed, the trabeculæ being thinned and filled with an oily material; the joints may be anchylosed, and their cartilages fibrous. Round-cell infiltration of the corium and obliterative endarteritis have been observed. According to Unna, there is in this disease "a primary degeneration of the skin, a sort of ring-formed sclerodermia, with callous formation of the epidermis, which by its seat at the base of a limb leads to a secondary, total stagnatory necrosis, which has a close resemblance to the artificial snaring of tumours. In spite of numerous histological investigations the nature of the whole process is still unexplained, largely because it is not clear from the descriptions which changes are primary and which secondary."

There has been much speculation concerning the causes of this curious disease. It has been attributed to self-mutilation, or to such causes as the wearing of metal rings on the toes; but neither of these suggestions is borne out by the facts. Again, ainhum has been regarded as a trophoneurosis; the evidence for this is no less insufficient. It has nothing to do with leprosy, although, like any other disease, it may occur in a leper. My own impression is that the process is started by irritation or ulceration at the angle of the digito-plantar fold; in this situation in the negro the epidermis is often very thick, dry, and even fissured. It is intelligible that a chronic irritation or ulceration with a contracting hyperplasia of the derma may be set up and maintained under such circumstances by the lodgment of dirt in this part, or by injury of it; owing to the direction of the folds of the skin this must tend to a linear and circular direction. The deeper the rut the more likely is it to contain irritating matters, and thus the process tends to perpetuation.

Treatment.—In the earlier stages it has been suggested that the progress of strangulation might be arrested by division of the constricting ring. When the affected toe becomes useless, and is the source of pain or inconvenience, it should be amputated.

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P. M.

BACTERIA OF THE SKIN

On account of its position and liability to contact, not only with harmless external media but also with infected material, the skin may bear upon its surface almost any species of micro-organism. Thus it is that the dermatological flora is very extensive and difficult to study; indeed a description of the bacteria of the skin would probably involve notes of all the species of bacteria at present identified by bacteriologists; a study of the subject has, however, rendered it possible to recognise certain micro-organisms as having their special habitat on the skin. To some of these, which are associated with well-defined skin diseases, attention is chiefly attracted. Many of the micro-organisms described in connection with the skin have been found there accidentally, and are probably unable to lead a continuous existence on the surface. For many species of bacteria the horny epithelium is a very unsuitable soil, and serves to protect the underlying tissues from their noxious effects. For certain other organisms the skin provides a nutrient medium in which they can subsist, at any rate for a time; others, again, find their normal habitat there. For the latter the desquamating epithelium and the secretions in the skin appear to afford suitable pabulum. The organisms which grow on the surface are found less commonly on the parts exposed to constant friction, more often in regions where they are less disturbed, or where the exceptional development of the sebaceous glands, and other skin appendages, provides at once shelter and a good supply of nourishment. Such regions, then, as the scalp, the armpits, the groins, and the clefts between the fingers and toes, are situations in which the largest number of micro-organisms exists,—a fact which is important not only from the point of view of the bacteriology of the skin, but also from the clinical aspect; as many diseases which appear clinically to be of infective character originate in these situations. Cracks in the surface, fissures, and wounds afford accidental but suitable nurseries for many varieties of micro-organisms. As an indication of the numbers of organisms found on the surface, and of the consequent difficulty in their separation and identification, it may be mentioned that one observer (Hohein), in the course of an investigation of the bacteria on the surface of the body, found that from a quarter of a centimetre square of woollen raiment 6799 colonies developed in a plate culture by the end of two days, and by the end of four days the colonies were innumerable. A reference may also be made to the earlier investigations of Unna, who, while attempting to define the bacteria with definitely pathogenetic influences on the skin, differentiated many species of hyphomycetes and schizomycetes.

The bacteria of the surface arrange themselves, then, into certain groups: (i.) organisms which find an accidental lodging upon the skin;

(ii.) organisms which are capable of leading a saprophytic existence on the surface, but which do not produce definite pathological results; (iii.) organisms known to be definitely pathogenetic.

In addition to these three groups certain very important organisms are parasitic on the skin, and lead usually a saprophytic existence, but are capable, under certain influences at present not well understood, of taking to themselves pathogenetic properties and producing definite forms of lesion. The best examples of such organisms probably belong to the pus-producing streptococci and staphylococci. It is well known that under various methods of culture these organisms are capable of great alterations in virulence. They may be found with so low a degree of virulence as to be almost incapable of producing any pathological result on susceptible animals; and the descendants of these same organisms, when grown on suitable media, or after repeated inoculation and recovery from susceptible animals, may have their virulence so much intensified as to produce the severest forms of pyæmia. The Staphylococcus pyogenes albus in its virulent form is well known to be capable of setting up well-marked suppuration; it grows rapidly, and produces rapid liquefaction in gelatine cultures. The same organism, however, while still retaining its power of rapid growth, may be capable of producing only slow liquefaction in gelatine, and very slight pathological effects. A white coccus of this description is well known to exist as an apparently constant denizen of the human skin, and has given rise to many errors in bacteriological diagnosis. The observations of Professor Welch of Baltimore serve to bring out the relations of this organism with great distinctness; he calls it the "Staphylococcus epidermidis albus," and states that it is constantly found on the skin, even after sterilisation of the surface by means of appropriate antiseptics. He was able to obtain cultures of this white coccus, from threads passed through the deeper layers of the epidermis, after the skin had been cleansed with the utmost care, and with antiseptic precautions. He describes how slowly the organism liquefies gelatine, and how closely in many of its characteristics it resembles the Staphylococcus pyogenes albus. There can be but little doubt that this coccus, producing white colonies, is the pus-producing organism, but so modified as to have very slight pathogenetic powers, and its virulence latent. Bacteriological evidence goes to show that a similar state of affairs occurs in the case of the Staphylococcus pyogenes aureus and the Streptococcus pyogenes. Probably yet other organisms, capable at times of showing great virulence, undergo similar transformation from a pathogenetic condition to one in which their noxious properties are latent.

It must also be remarked that it is a very difficult matter to draw a distinct line between slightly pathogenetic organisms and those which produce no recognisable effect. To the so-called saprophytic organisms of the skin which multiply on the surface a parasitic part must be conceded, and it is a very doubtful thing to assert that an organism which multiplies freely has no influence on the soil on which it grows. The probability

seems to be that these organisms, by the production of certain substances, have pernicious influences on the skin, the results of which are difficult to define; but which may perhaps be included in such a complex series of lesions as those which occur, for example, in cases of ordinary eczema.

Perhaps the best view of the subject may be obtained by studying the bacteria which have been found on the skin. At any rate, the complexity of the subject will thus become apparent; and the enumeration of the organisms, and the references to their descriptions, may be of assistance to others engaged on the same subject. The following list does not pretend to be complete, but it contains notes of many organisms which have claimed attention of recent years; it is convenient to group the organisms under the names of the conditions or diseases in which they have been identified.

The normal epidermis.—*Bacterium graveolens* (Bordoni-Uffredezzi).—Isolated from the epidermis from between the toes; 0·8 μ long and broad. Aerobic, liquefying colonies with a powerful fœtid odour like that arising from the feet, or of trimethylamin; a greenish yellow colour develops late. Non-pathogenetic (6).

Bacillus epidermidis (Bordoni-Uffredezzi); (Leptothrix epidermidis, Bizzozero).—Isolated from the skin and epidermic scales, and from the exfoliated particles from between the toes.

Bacilli, 2·8 μ to 6·3 μ in length, and 0·3 μ in breadth. Growth on media slow; does not liquefy gelatine; aerobic. Non-pathogenetic (7).

Bacillus of Scheurlen.—Found in cancerous tissues by Scheurlen; upon the skin of healthy persons by Bordoni-Uffredezzi (Bacillus epidermidis); in scales of epidermis from the nipple and mammæ of healthy women by Rosenthal.

Bacilli, 1·5 μ long, 0·5 μ broad; aerobic, liquefying, motile. Non-pathogenetic.

Bacillus Havaniensis liquefaciens.—Obtained in cultures from the surface of the bodies of patients in the Charity Hospital of Havana.

Bacilli: rounded ends; 0·8 μ broad, varying in length from 1·2 μ to 5 μ; solitary, in pairs, or filaments. Aerobic, liquefying, motile. Non-pathogenetic (54).

Micrococcus tetragenus versatilis (Sternberg); *Micrococcus febris flavæ* (Finlay).—From the surface of the body of patients in hospital in Havana, and from the air; from the excrement of mosquitoes allowed to draw blood from the yellow-fever patients (Finlay).

Micrococci in tetrads, or in irregular groups containing three or more united elements; size, 0·5 μ to 1·5 μ; great variations in size and grouping. Aerobic, liquefying gelatine, chromogenetic, pale to lemon-yellow colonies. Non-pathogenetic (55).

Bacillus epidermidis capsulatus.—Obtained from scrapings of the skin between the toes, after washing the skin.

Bacilli: large, motile, rounded ends; mostly in pairs, some forming long rods, "involution forms"; capsule forms in gelatine cultures;

chromogenetic, blue colour at hilus of kidney-shaped colonies and periphery; forms gas abundantly. Peculiar odour evolved (12).

Bacillus gelatinosus.—Obtained from the skin between the toes, after washing.

Bacilli: fine, slender, actively motile threads; capsule in cultures; leptothrix forms in old cultures. On microscopic examination colonies rusty-brown in colour; to the naked eye colonies yellowish; on potato orange-yellow (12).

Bacillus fluorescens epidermidis.—Obtained from the tip of the finger, after thorough washing with absolute alcohol.

Bacilli: actively motile, straight or curved rods, singly or in pairs; liquefies gelatine; fluorescence rapidly produced; white flocculent precipitate at bottom of liquefied gelatine. The liquefied gelatine shows an upper green layer, a lower colourless one, greenish pellicle on the top, fluid sooner or later assumes a yellowish tint; on agar pea-green. Resembles B. pyocyaneus β (Ernst); B. fluorescens liquefaciens (Flugge); B. fluorescens liquefaciens minutissimus (Unna). *Cf.* Bacillus viridans (Symmers) (12).

Bacillus luteus liquefaciens.—Obtained from inner surface of the prepuce.

Bacilli: short, thick rods, rounded ends, usually constricted in the middle; occasionally short chains or longer unjointed rods: gelatine cultures as yellowish points, increasing with yellow colour; liquefying; doubtful sporulation (12).

Staphylococcus flavescens.—Obtained from toes, cruro-scrotal region, and prepuce (? M. flavescens, Cornil and Babes).

Micrococci: round or oval, varying size, arranged irregularly in groups. Liquefies gelatine, forms yellowish colonies (12).

Micrococcus flavescens subsidens.—Micrococci: medium-sized, arranged irregularly in groups, occasionally in short chains of four or six elements.

Gelatine: pale, creamy-yellow growth; sink in the gelatine without distinct liquefaction (12).

Staphylococcus epidermidis albus.—Is a constant denizen of the human epidermis, even after the skin has been cleansed by antiseptic methods.

Cocci resembling in many respects the Staphylococcus pyogenes albus; liquefy gelatine, and coagulate milk much more slowly than the pyogenetic staphylococci.

Found in wounds healing by primary union without suppuration; may be a form of S. pyogenes albus deprived of virulence and pathogenetic properties (73).

Acne-Comedo—*Bacilli.*—Found in the deeper part of the comedo, remote from the surface, covered over by the horny layers of the upper part of the comedo; $1\frac{1}{4}$ μ to $1\frac{1}{2}$ μ long, $\frac{1}{3}$ μ to $\frac{1}{2}$ μ broad; in threads of three or four bacilli; occasionally in loosely packed bundles; often an unstained or faintly stained zone may be observed across the bacillus, with the two stained ends embedded in a mucoid mass,—"mucus-producing" bacillus.

In the mouths of the follicles are found the *bottle-bacillus* and the *diplococcus* of seborrhœic eczema (26, 62).

Acne vulgaris.—I. In the pustules or inflamed comedones.

(i.) A micrococcus arranged in the form of staphylococci (*S. pyogenes albus*), in great numbers; gives a white culture; at first non-pathogenetic to rabbits, but, by passing through animals, rapidly increased in toxic power till it becomes virulent. The more virulent the more rapidly it liquefies gelatine; it also becomes pigmented of a yellow colour, characteristic of Staphylococcus pyogenes aureus. Lomry is inclined to classify it as a form of Staphylococcus pyogenes albus. (ii.) *Bacillus subtilis.* (iii.) *Torulæ* of different species.

II. In the uninflamed comedos.

(i.) Micrococci arranged as staphylococci, capable of being rendered virulent by cultivation and inoculation in animals, finally developing yellow pigmentation, and giving the characters of *Staphylococcus pyogenes albus* and *aureus.* (ii.) The *microbacillus of Unna*, which Lomry regards as a variety of the B. coli communis. (iii.) *Cocci large*, liquefying gelatine. (iv.) *Cocci small*, which do not liquefy gelatine. (v.) *Coccus* producing *rose-red* cultures. (vi.) Numerous other micro-organisms (33). *Vide* B. asciformis, p. 905.

Actinomycosis.—See vol. ii. p. 81.

Streptothrix infections of the skin, *vide* A. G. R. Foulerton, *Brit. Jour. of Dermatology*, November 1899.

Alopecia areata.—Sabouraud has cultivated and studied fifteen species of micro-organisms from the scalp in cases of A. areata, all of which he has proved to be casual denizens, and to have no etiological relation to the disease.

Of the organisms found in the diseased follicles and hairs with some constancy he mentions especially six. 1. *A white yeast-fungus.* 2. *A yellow yeast-fungus.*

3. *Bacillus subtiliformis* (*mesentericus ?*).

Bacillus: motile, 5 μ in length, 2 μ in breadth; sporulates rapidly; liquefies gelatine; rapid growth on peptonised agar; colour, yellowish white. The culture is not destroyed after half-hour exposure to a temperature of 90° C.; the spore is killed in five minutes at a temperature of 100° C.

Action: no result on inoculation by scratching or rubbing into the skin of guinea-pigs. Hypodermic injections produce sloughs of varying size; injection of more than 10 cc. of an eight-day culture kills a guinea-pig of ordinary size, producing generalised œdema and a local slough. If the animal survive, the slough separates and the skin cicatrises.

4. *Shuttle-shaped bacillus.*—Found in the healthy scalp in A. areata, in A. syphilitica, in psoriasis, etc.

Bacillus: shuttle-shaped, blunt extremities; 2 μ in length, 1 μ in breadth; stains with difficulty by basic aniline dyes, outline of bacillus only obtained; grows readily, producing yellowish white colonies; a similar species produces brown colonies.

5. *Micrococcus cutis communis* (Sabouraud).—Found in all cases of seborrhœa capitis with pityriasis, in flannel eczema (Bodin), and probably has important relations with all varieties of seborrhœa.

Arranged as staphylococci, somewhat smaller than the Staphylococcus aureus or albus; grows readily on neutral or slightly acid media; produces the odour of butyric acid; does not liquefy gelatine; stains by all ordinary methods and by Gram's method; produces small white colonies, whiter but otherwise similar to those of Streptococcus pyogenes. Inoculation by scarifications occasionally produces a furfuraceous desquamation on fair guinea-pigs; from these lesions it can be recovered. Hypodermic and intravenous inoculations in guinea-pigs have produced no result.

6. *Bacillus asciformis.*—"Spore" of Malassez, "Flaschen bacillen" of Unna, "Flask-shaped and balloon bacillus" of Hodara. Microbe described by Audrain (2).

Found frequently in A. areata, especially in the patent orifices of follicles from which the hair has fallen out, and in the diseased hairs of A. areata; constant in the orifices of comedones (Hodara), in seborrhœa, and in eczema seborrhoicum. Found under so many different conditions that it cannot be the cause of A. areata; may have close relations with E. seborrhoicum and seborrhœa.

Form variable; small rods, spherical, ovoid, bottle or balloon-shaped, "with buds," "involution forms"; from $\frac{1}{2}$ μ or 1 μ to 2 μ or 5 μ in size in cultures. Culture difficult, forms a deposit like fine sand in fluid media; on solid media small radiate colonies obtained by Unna, Engelmann, and Hodara, also on a special medium by Sabouraud.

The inoculation—hypodermic—of the cultures or its toxins produces in guinea-pigs diffuse alopecia (49).

Microbacillus of the "peladic utricle" in A. areata.—Found in the ampulliform dilatation of the hair follicles in A. areata—"l'utricule péladique"—in enormous numbers.

Bacilli: excessively small, as diplobacilli, or in chains (streptobacilli); $\frac{1}{3}$ μ to $\frac{1}{5}$ μ in earliest stage, increasing to $\frac{1}{4}$ μ and to 1 μ; often slightly swollen at the centre, blunt extremities; best stain is thionine; gentian violet stains the capsule; it stains also with other colours and by Gram's method.

This microbacillus resembles most closely the bacillus described by Unna, Engelmann, and Hodara in comedo and acne; there are certain slight differences in size, shape, and ease of decoloration, but not sufficient to distinguish the two bacilli mentioned from each other; yet, very similar as they are, they may be of different species, producing different results; it is stated by Sabouraud to have the specific effect of causing A. areata (50).

Anthrax.—See vol. ii. p. 525.

Blastomycetic dermatitis. — Budding-fungi have been observed recently in forms of cutaneous disease, in their clinical features resembling lupus verrucosus. These fungi have been isolated, cultivated, and found to possess pathogenetic properties. One variety has been named

"Blastomyces dermatitidis" by Gilchrist and Stokes. For recent observations of the disease, and the fungi present, refer to papers by Buschke, Nevins Hyde, Hektoen, and Bevan (27, 10, 23).

Carbunculus.—Cf. Pyodermia.

Chancroid.—*Ulcus molle.*—Bacilli: found in the lymph spaces, between the cells; never in the leucocytes or blood-vessels (Unna) of the inflammatory exudation; also in the consequently enlarged lymphatic glands. The bacilli are 1·25 μ to 2 μ in length, 0·3 μ to 1 μ in breadth, arranged in chains of four to ten elements (streptobacillus). Cultures (32). Definite evidence of its specific character is still absent (16, 17, 67, 47, 31).

Cheiro-pompholyx.—Bacilli in the upper part of the vesicles of the disease, in the overlying epithelium, and in the exudation. Size of tubercle bacilli $2\frac{1}{2}$ μ to $3\frac{1}{2}$ μ in length, $\frac{1}{2}$ μ to $\frac{2}{3}$ μ in breadth; in bundles of two or three or zigzag threads 6 μ to 8 μ long. In the exudation singly, but in the loosened horny cells of the overlying stratum corneum in groups of four to six bacilli. Few, but almost constant (63).

Comedo, *v.* Acne.

Dysidrosis, *v.* Cheiro-pompholyx.

Ecthyma, *v.* Pyodermia.

Eczema marginatum.—Pathogenetic moulds are found on the skin in this form of disease (72).

Eczema seborrhoicum.—*Ascobacillus citreus.*—Found upon the surface of the body of persons suffering from E. seborrhoicum.

Bacilli: straight or curved; solitary, in pairs, or irregular groups; 1·3 μ long and 0·3 μ broad; aerobic, liquefying, motile, chromogenetic; produces a lemon-yellow pigment; non-pathogenetic (71, 56).

Flaschenbacillen (Unna).—Found in the epidermis of E. seborrhoicum on the normal skin, especially of the scalp.

Bacilli: with a characteristic tendency to swell at one end and to become club- or flask-shaped; vary in shape to round or oval forms (64, 24).

Bacillus ovatus minutissimus.—Found on the skin in cases of E. seborrhoicum.

Bacilli: short, oval with pointed ends; 0·6 μ to 0·8 μ long and 0·4 μ broad; irregular groups. Aerobic, facultative anaerobic, non-liquefying, non-pathogenetic (71).

Bacillus fluorescens liquefaciens minutissimus.—Found on the surface of the body in cases of E. seborrhoicum.

Bacilli: round ends, usually constricted in the middle; 1·5 μ to 2 μ long and 0·3 μ broad; often forming filaments. Aerobic, facultative anaerobic, liquefying, motile, chromogenetic; forms a greenish yellow, slightly fluorescent pigment. Non-pathogenetic (71).

Bacillus aureus.—Found on the surface of the body in cases of E. seborrhoicum.

Bacilli: slender, straight or slightly curved; 1·5 μ to 4 μ long and 0·5 μ broad; in pairs, groups, or filaments. Aerobic, non-liquefying,

slightly motile; chromogenetic, forms golden-yellow pigment. Non-pathogenetic (71).

Bacillus albicans pateriformis.—Found on the surface of the body in cases of E. seborrhoicum.

Bacilli: 1 μ to 3 μ in length, and 0·5 μ in breadth; grouped in pairs and chains. Forms grayish white colonies of slow growth; rounded moist surface on agar; does not liquefy gelatine (71).

Bacillus spiniferus.—Bacilli: straight or slightly curved; 2 μ long and 0·8 μ to 1 μ broad; solitary, in pairs, irregular groups, or bundles. Aerobic, non-liquefying, chromogenetic; forms a grayish yellow pigment; colonies on gelatine radiating, porcupine-like. Non-pathogenetic (71).

Bacillus (?).—The fine bacilli of Unna's *Histo-pathology.* Found in the epidermis in cases of E. seborrhoicum, and in acne; possibly identical with the microbacilli found by Sabouraud in A. areata.

Bacilli: small and arranged in the tissues as diplobacilli in lines radiating from a focus (62, 25).

Diplococcus albicans tardus.—Diplococci: two oval elements; 0·7 μ and 0·6 μ broad; often associated in short chains or in irregular groups. Aerobic, non-liquefying; on gelatine plates the deep colonies are dark yellow, superficial colonies grayish yellow. Non-pathogenetic (71).

Diplococcus citreus liquefaciens.—Cocci: small, oval; in pairs or tetrads, irregular groups or short chains; each organism 0·4 μ to 1 μ in diameter. Aerobic, liquefying, chromogenetic; eight days, colonies on gelatine gray-yellow; two weeks, colonies lemon-yellow; liquefy and darken in colour. Non-pathogenetic (71).

Diplococcus flavus liquefaciens tardus.—Found upon the skin of persons suffering from E. seborrhoicum.

Diplococci: biscuit-shaped; in pairs, resembling the "gonococcus"; each organism from 0·5 μ to 0·8 μ in diameter. Aerobic, facultative anaerobic, liquefying, chromogenetic micrococcus; on gelatine in three weeks colonies as large as a hemp-seed, chrome-yellow, becoming greenish yellow and liquefying. Non-pathogenetic (71).

Morococcus (Unna).—Cocci: arranged at first as single cocci or diplococci, when, with their flattened surfaces of contact, a resemblance to the "gonococcus" is noticeable; increasing by division to form angular or mulberry-like masses.

Found chiefly in the upper layers of the epidermis in cases of seborrhœic and other forms of eczema; distinguished by their resemblance to the gonococci from other species of cocci present; their resemblance is increased by their tendency to adhere to the leucocytes or to be found inside them. Culture grayish white, sharply limited; smooth lines, and numerous isolated translucent droplets; very slow and incomplete liquefaction of gelatine; on potato produces a sharply bordered margin.

When implanted on a rabbit produces lesions analogous to alopecia pityrodes; has produced seborrhœic spots when inoculated on the human subject.

Eczema and Impetigo.

TABLE of comparisons in respect of their distinctive organisms between the lesion of eczema and the initial lesion of impetigo.

ECZEMA.	IMPETIGO.
1. The vesicle contains sero-pus.	1. The vesicle contains pus.
2. The contents are thin and fluid. The cocci distribute themselves very regularly throughout the vesicle, from the beginning.	2. The contents very firm. The large pus-cells invading the lesion retain the cocci firmly under the epithelial roof of the vesicle.
3. The horny layer is softened in parts.	3. The horny layer covering the vesicle unaltered.
4. The covering of the vesicle, especially in the central part, melts insensibly into the contents.	4. The covering of the vesicle is sharply differentiated from its contents.
5. Both in and under the covering the cocci are found *in pairs* and *mulberry-like masses.*	5. Both in and under the covering the cocci are found *in rows* and *grape-like bunches.*
6. The cocci are freely distributed in groups throughout the vesicle, and also round its periphery.	6. The cocci are distributed in a flat layer between the covering and the contents of the vesicle, and pass thence in radiating rows throughout its structure.
7. The *morococci* of eczema lie sometimes free, sometimes within the leucocytes, like gonococci.	7. The *staphylococci* lie distinctly outside the leucocytes.
8. The size of the morococci is very variable, between $\frac{1}{2}\ \mu$ and $1\frac{1}{2}\ \mu$. Even two divisions of a diplococcus may present a marked difference.	8. The staphylococci are all of about the same size; their diameter varies between $\frac{2}{3}\ \mu$ and $1\ \mu$.
9. The morococci lie separated from each other by a distinct border, so that the bunches have a regular dotted appearance (66).	9. The staphylococci are packed very closely together in masses, which do not present a regular, stippled appearance.

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Morococcus, observations on the.—UNNA. *Mon. f. prakt. Dermat.* Bd. xxix. 1899, p. 106.

Erysipelas.—*Streptococcus pyogenes; Streptococcus erysipelatis* (Fehleisen). *Vide* "Pyodermia," p. 911; and article "Erysipelas" (vol. i. p. 614).

Erythema.—Bacteria have been described in various forms of erythema by many observers, especially in E. multiforme of the vesicular or bullous type. They are usually cocci, and are in all probability simply the white epidermic staphylococci, and stand in no causal relation with any of the forms of the disease.

Erythema nodosum (*Bacillus of Demme*).—Isolated by Demme from the fluid obtained from the lesions and from the blood in cases of erythema nodosum.

Bacilli: round ends; from 2·2 μ to 2·5 in length, 0·5 μ to 0·7 μ broad. Stain with the usual aniline colours, and by Gram's method.

When injected into guinea-pigs, or rubbed into the scarified skin, produce an eruption resembling E. nodosum, which is followed by gangrene of the skin. Rabbits, dogs, and goats proved refractory in like experiments (13).

Erythrasma.—*Hyphomyces* (*Microsporon minutissimum*).—Found in the epidermic scales of the diseased areas of skin. Hyphæ very fine, winding, rarely distinctly septate, and non-branched; spores irregularly scattered between the hyphæ. (Text-books: v. Ziemssen (Weyl-Geber), Unna, Crocker, Besnier-Doyon, Payne) (44).

Favus.—*Hyphomyces* (*Achorion Schönleini*).—Found in the epidermis and forms the scutula of the disease. Certain observers recognise several species capable of causing the disease (*vide* article "Favus," p. 862) (68).

Frambœsia.—See vol. ii. p. 501. (Powell, *Brit. Journ. of Dermatology*, vol. vii. 1896, p. 457.)

Furunculus.—See "Pyodermia," p. 911.

Glanders.—See vol. ii. p. 513.

Herpes labialis.—*Bacillus viridans.*—Found in great numbers in the lymph of herpetic vesicles on the lip of a boy suffering from typical acute croupous pneumonia.

Bacilli: rods or filaments; aerobic, facultative anaerobic; sporulates; chromogenetic, beautiful green pigment which permeates the culture medium, colonies themselves grayish-white; liquefies gelatine. To be distinguished from B. virescens (Frick) and the B. fluorescens liquefaciens.

Pathogenetic to rabbits and white rats; when inoculated subcutaneously produces patches of alopecia and ulcerations (58).

Impetigo.—See "Pyodermia," p. 911.

Leptothrix.—*Bacilli or Hyphomycetes.*—Embedded in the hard glœa, forming the nodules on the shafts of the lustreless, characteristic hairs (3).

Leprosy.—See vol. ii. p. 41 (61).

Madura Foot.—*Mycetoma.* (See "Actinomycosis," vol. ii. p. 90.)

Measles.—Bacilli and other bacteria have been found in the blood and tissues; but their causal relation to the disease has not been established. (See article "Measles," vol. ii. p. 101.)

Mycosis (*vel* Granuloma) fungoides.—Bacilli: found in the fluid drawn from the deeper parts of a nodule of the growth; a plump rod, rounded ends; 1 μ to 2·5 μ in length, 0·75 μ in thickness; in the fluid and in sections seen singly or in pairs; in preparations from cultures it occurs as long threads; aerobic, with difficulty anaerobic; sluggishly motile; forms spores; grows on ordinary media at room temperature; grows more rapidly in the incubator. On culture in gelatine produces in twenty-four hours round, creamy-white colonies; produces fine, hair-like radiations in the depth of gelatine; liquefaction appears in 7 to 10 days. This micro-organism stains readily with ordinary aniline dyes, and is not decolorised by Gram's method; flagella are present.

Pathogenetic to rabbits; no effect if the culture be rubbed into the surface; local inflammation with enlargement of neighbouring lymph-glands on subcutaneous injection; death in 12 to 16 days, the bacilli found in enlarged lymph-glands; death in 48 hours after intraperitoneal injection; localised peritonitis and lymphadenitis; organism not found in the blood.

Numerous cocci and bacilli have been found in the diseased tissues, but in all probability these have no causative relation to the disease (35, 65).

Oriental Sore.—See vol. ii. p. 486.

Pemphigus acutus.—*Diplococcus of Demme, Bulloch, etc.*—Isolated in the fluid from vesicles and bullæ, both in acute and chronic pemphigus; in skin and conjunctiva.

Cocci: arranged as diplococci; the two opposing surfaces are somewhat flattened; these microbes resemble gonococci, but are somewhat larger. These cocci stain well by Gram's method and by ordinary aniline stains. On gelatine they form small whitish colonies; there is no marked liquefaction of gelatine.

Pathogenetic: inoculation into pleural cavity of guinea-pigs produces death (pleurisy, broncho-pneumonia); subcutaneous inoculation no positive result resembling pemphigus, but necrosis of the skin occurs (14, 45, 48, 74).

Pemphigus neonatorum.—In all probability there is no specific organism of this disease; various organisms may produce it. In the contents of bullæ and blood of a child eight days old, born of a mother suffering from puerperal fever, the Staphylococcus pyogenes aureus, the Staphylococcus pyogenes albus, and a diplococcus were found (46). See "Pyodermia."

Piedra.—Hyphomyces: found in the characteristic stony-hard concretions on the affected hairs. Forms hyphæ and spores (5, 59).

Pinta.—Hyphomyces: found in the epithelial scales of the diseased areas (36).

Purpura hæmorrhagica.—Bacilli: found in the blood and various organs; rounded ends, oval or pear-shaped: 0·75 μ to 1·5 μ long; 0·2 μ to 0·8 μ broad. Stain well by ordinary methods, feebly or not at all by Gram's method. Aerobic, facultative anaerobic; spore-formation has not

been observed. The organism is pathogenetic for dogs, rabbits, or guinea-pigs when injected subcutaneously; or injected intraperitoneally produces hæmorrhages, purpura, and other severe constitutional disturbances.

For bacilli of hæmorrhagic infection (60, 3, 30), see "Purpura," vol. v. p. 569.

Staphylococcus hæmorrhagicus.—Under this name E. Klein describes a coccus pathogenetic to man and animals, and found in erythematous, hæmorrhagic, and bullous eruptions in the human subject. The disease appears to be acquired from sheep who have suffered from "gargle," a very fatal infectious fever which occurs after lambing, and runs a course like puerperal fever.

Cocci: 0·4 μ to 0·6 μ in diameter; occurring as dumb-bells or in small masses. Colonies, yellowish, brownish, or grayish, with certain characteristics differentiating them from colonies of staphylococci; liquefy gelatine. Show resemblances and distinctions from Nocard's coccus of gangrenous mastitis in the sheep; pathogenetic on reinoculation, producing œdematous hæmorrhagic lesions (29).

Cases of purpura are sometimes produced as the result of virulent septic infections. See action of the B. septicæmiæ hæmorrhagicæ.

Pyodermia.—The organisms concerned in the production of purulent diseases of the skin are the same bacteria which produce pus elsewhere. Many of these purulent affections are secondary; that is, they are produced by the action of pus-forming bacteria on skin rendered vulnerable by forerunning disease. Such are the purulent forms of eczema, the purulent dermatitis so frequently complicating the lesions of tuberculosis, syphilis, and other specific infections. Some of these forms, however, appear to be primary, and attributable to the direct implantation of the pus-organisms on the skin. Of these the most characteristic is—

Impetigo—a disease which presents the lesions produced by pus-producing bacteria in a very characteristic form. Various adjectives are used in conjunction with this name to signify the qualities of the disease; for example, I. vulgaris, contagiosa, circinata, figurata, staphylogenes, etc. (*vide* p. 526).

Certain other clinical forms of pyodermia have received special names; for example, ecthyma, pemphigus neonatorum: other names are applied clinically, according to the portion and extent of the skin affected; for example, carbunculus, furunculus, etc. In certain degrees of virulence some of these bacteria produce special effects, giving rise, as in erysipelas, to distinct clinical types of disease.

The following bacteria are specially concerned in pus-production on the skin:—Staphylococcus pyogenes aureus, S. citreus, S. albus, S. cereus albus, S. cereus flavus? Streptococcus pyogenes (erysipelatis?).

See the Bacteriological and Dermatological text-books; and this *System*, vol. i. pp. 504 and 587 (62, 69, 70, 11, 8, 18).

Bacillus pyocyaneus, found in a case of cutaneous ulceration, with a tendency to hæmorrhages (9).

Rhinophyma.—In the acneiform lesions of this disease Dohi agrees with Unna in declaring the absence of Staphylococcus pyogenes. In acne Dohi finds a very varied bacteriological flora (15).

Rhinoscleroma.—Bacillus: found in the tubercles. The bacilli are short—length two or three times greater than their breadth, ends rounded, usually united in pairs, and surrounded by a gelatinous capsule. Stains by usual aniline colours, partially decolorised by Gram's method. Non-liquefying. Cultures, as well as the organism itself, resemble Friedländer's pneumobacillus (p. 888).

Pathogenetic: causing pleurisy, abscesses, and death when inoculated into guinea-pigs or mice; less so in the case of rabbits (22, 43).

Scarlet fever.—Streptococci frequently found; also diplococci in the blood, various organs, etc.; probably S. pyogenes. Primary infectious element of the disease unknown. See text-books; and also article "Scarlet Fever" in this *System*, vol. ii. p. 162.

Scorbutus.—Bacillus: found in the necrotic margin of the mucous membranes of the gums. Slender, pointed, and bent bacillus, resembling the tubercle bacillus; does not stain by Gram's method. Pathogenetic to rabbits, causing hæmorrhagic septicæmia and death (57).

Syphilis.—*Bacillus of Lustgarten.*—Found by Lustgarten in syphilitic lesions and secretions of syphilitic ulcers. No satisfactory evidence yet obtained of its specific character. Bacilli, straight or curved, ends often clubbed; 3·5 μ to 4·5 μ in length, and 0·25 μ to 0·3 μ in breadth; seen enclosed in cells about double the size of a white blood corpuscle, not free in the tissues; special staining method used by Lustgarten. Other organisms stain by same method, especially B. tuberculosis and the B. smegmæ preputii. Has not been cultivated, nor inoculated (34).

Other organisms—bacilli by Eve and Lingard (19), and by Golasz, cocci by Disse and Taguchi—have been described in syphilis; but the observations have not been sufficient to establish any etiological relation between the disease and the organisms found. See text-books.

Tinea *seu* **Pityriasis versicolor.**—*Hyphomyces* (*Microsporon furfur*).—Found in the epidermis of affected regions. Fungus forming hyphæ and spores; the hyphæ are apt to bend, the spores to collect in groups. See text-books (53).

Tinea *or* **Ringworm.**—Hyphomyces: found in the epidermis, hairs, hair follicles, etc., of affected regions. Microsporon Audouini; Trichophyton megalosporon ectothrix; T. m. endothrix; and possibly other forms (51, 52, 1, 21, 40).

Tinea imbricata.—Hyphomyces: forms hyphæ, spores; somewhat resembling the microsporon furfur (38, 39, 37).

Trichorrhexis nodosa.—Bacilli: found in the nodules on the hairs in a form of the disease prevalent in Constantinople among women; cultivations are found to produce the nodules on infecting normal hairs (26).

Tuberculosis cutis.—The Bacillus tuberculosis; found in the tissues of Lupus vulgaris and certain other cutaneous affections (see article "Tuberculosis," vol. ii. p. 3).

Vaccinia, Varicella, Variola.—The reader is referred to articles on "Chicken Pox," vol. ii. p. 182; on "Small-Pox," vol. ii. p. 224; on "Vaccinia" (bacteriology of vaccinia and variola), vol. ii. p. 642.

Bacteria, especially cocci, have been described in connection with these diseases by many observers, but have not been found to stand in any causal relation to them. See text-books (28).

Verruga.—Bacilli are found in the lesions: very similar to the B. tuberculosis of Koch in appearance and staining reactions; but are chiefly found in the intercellular spaces, and do not give rise to giant cells, or to circumscribed nodules of infiltrating cells (41, 42, 20).

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J. G.

AFFECTIONS OF THE SKIN PRODUCED BY OCCUPATIONS (TRADE ERUPTIONS)

CUTANEOUS eruptions are very commonly seen as the result of direct mechanical injury, or of contact with noxious substances encountered in various occupations. The clinical character of these affections do not in most cases differ from ordinary forms of inflammation of the skin; some of the peculiar forms will be mentioned later. But it is necessary to bear in mind that certain peculiarities of the skin predispose to the several eruptions now under consideration. This observation is of special importance in the treatment of the forms of skin disease which may ensue, and in many cases enables us to warn patients thus vulnerable against certain occupations.

Of these peculiarities the following are the most common :—

Ichthyosis and allied exfoliating conditions.—This affection of the skin, which is of congenital origin, occurs in all degrees of severity (p. 661). In the most severe cases the skin is so liable to external injury, and responds by inflammation of such long duration, that persons so affected are quite unable to undertake any form of mechanical work. Cases such

as these are exemplified by that of G. C., described by Dr. Sangster, who has been under my own observation for several years.

But, short of this severe condition, almost all degrees of ichthyosis render the patient liable to irritation and inflammation of the skin. In the mildest variety the skin of the palms and soles is often most affected, and in such cases manual labour is often performed with difficulty and indeed must be avoided.

Epidermolysis bullosa.—This is another congenital affection, and may be taken as an example of an easily injured skin. In the most severe cases the injuries which produce the characteristic bullous lesions are so trifling as to pass unnoticed altogether, so that the eruption appears to occur spontaneously. Such patients are precluded from almost all forms of manual occupation, and lead a comfortable life only when guarded with the extremest care. Even in slight cases the ready occurrence of bullous lesions on exposed parts often precludes the possibility of any occupation requiring active exertion (2).

The effect of certain other diseases is sometimes to render the skin exceedingly liable to injury—a condition frequently seen in urticaria pigmentosa and dermatitis herpetiformis.

Special liability to atmospheric influences and to light.—Exposure to light, heat, and cold has the effect in susceptible persons of producing various forms of painful dermatosis. Xerodermia pigmentosa, and possibly certain forms of epithelioma of the skin, the class of summer or winter eruptions exemplified by the well-known hydroa æstivale, various forms of congestions of the extremities after the type of Raynaud's disease, though less severe in degree, and possibly also lupus erythematosus, are examples of these eruptions.

Over and above the conditions already noted, which are of congenital or developmental origin, certain conditions of the skin which may be developed at various periods of life dispose to occupation eruptions.

Seborrhœa (p. 759) is perhaps the most important of these. The many forms of dermatitis which appear to be akin to this affection are very easily excited by exposure, mechanical irritation, and over-activity of the glands of the skin. It underlies especially many of the forms of eczema-like inflammation, which, in persons suffering from seborrhœa, may be determined by almost any form of external irritant.

Dysidrosis (p. 748) is characterised by a vesicular eruption on the hands and feet, which renders the skin not only painful, but also very easily infected; and thus leads to forms of septic dermatitis of the limbs, especially occurring in those who lead an active life. In labourers the disease is very troublesome, and not infrequently brings on glandular abscesses in the groins or axillæ, and severe septicæmia. Even in its milder degrees the pain of the eruption often forbids manual occupation.

Diseases of the nervous system, especially those characterised by changes in sensation and by trophic disturbances of the skin, are also remote causes of certain occupation dermatoses. Syringomyelia may be taken as an example of the nervous diseases in question. The liability to vesicular

and bullous eruptions of the limbs, the extreme facility with which the skin may be injured, on account of the loss of the sensations of heat, cold, and pain while ordinary contact sensation remains, often render these patients incapable of laborious occupation, and necessitate precautions against ordinary risk of injury even when the symptoms of the disease itself are not sufficiently advanced to interfere with the general health (*vide* art. "Trophoneuroses," vol. vi. p. 545).

Bearing in mind these special proclivities, I shall now mention certain forms of skin disease produced by occupation.

Hyperkeratosis. — Mechanical pressure, especially if intermittent, produces an increase of the epidermis. This increase shows itself in various forms of hyperkeratosis, such as callus, corns, and similar lesions, and in the thickened epithelium on the hands of handicraftsmen. The nature of the occupation is sometimes indicated by the position of the callus; thus carpenters have areas of greater hyperkeratosis where their tools press on the palms of the hands, or on the thenar eminences. Performers on stringed instruments — such as the violin, guitar, and harp — have similar thickenings at the points of their fingers; oarsmen, tennis-players, and cricketers have callus on slightly different positions of the hand. True verruca is not produced under such circumstances; some other factor must be concerned in the production of this form of growth.

Increase of pigmentation.—Pigmentary changes are not infrequently seen as the result of occupation. These changes are nearly always in the direction of local increase of the normal pigment. Many varieties of chronic trade dermatitis leave local increase of pigment; certain individuals show a special idiosyncrasy in this direction; and not infrequently a past attack of chronic eczematous inflammation of the face may be betrayed by the remaining pigment. Pressure produces dermatitis, and, more rarely, may cause local pigmentation, a phenomenon of special importance in the etiology of pigment-bearing new growth. The more common forms of increase of pigmentation occur in persons whose occupations expose them to the direct rays of the sun. The ordinary pigmentation of sunburn is well known, the tendency to the partial pigmentation of the freckle is a matter of daily observation, but it is specially interesting that in certain cases such pigmented areas precede degenerative changes of the cutis and epidermis. The destructive changes which follow this kind of pigmentation is seen in the well-known xerodermia pigmentosa (p. 850). Possibly other forms of epithelioma may originate in the same way (7).

Erythemata and bullous eruptions.—Many occupations render those following them liable to eruptions of this class, and, as the degree of irritation necessarily varies, it is often difficult to say whether an eruption beginning as an erythema will advance to vesicles or bullæ, or not. Those occupied in handling substances containing volatile oils, or giving off noxious vapours, suffer much in this way; and the descriptions of many of the varieties of dermatitis venenata are applicable to this group of eruptions (12). Examples are common among workers in turpentine,

varnish, chemicals, aniline dyes, and the like. The handling of tar products, or resins, and of such drugs as chrysarobin, usually leads to some degree of erythema, which may readily become severe or even produce vesication. Workmen who handle aromatic substances, such as the volatile oils obtained from flowers and other parts of plants, and fruits, such as oranges, suffer from eruptions not unlike erythema bullosum (3).

Dermatitis of eczematous character.—By far the greatest proportion of diseases of the skin produced by occupations resemble eczema at some part of their course. Indeed, if we consider eczema as the ordinary reaction of the cutis and epidermis to any irritant, there is no reason why these forms of trade dermatitis should not be called eczema. The mineral dust arising in manufactures is a frequent cause of dermatitis; examples of which are seen in the case of stone-cutters, sandpaper makers, steel grinders, and others. The dust of vegetable or animal materials acts in most cases not only mechanically but also in virtue of chemically active contents. Examples of this form of dermatitis are frequently noticed in workers in jute and hemp, in flax and cotton dressers, fur trimmers, plasterers, hairdressers, workers in rags or wool. A very definite form of eruption, characterised by erythema, papules, vesicles, and even pustules and ulcers, occurs in persons concerned in the manufacture of the more volatile metals, especially arsenic, antimony, lead, and mercury; examples are seen in the case of artificial flower makers, mirror manufacturers, painters, dyers, tanners, and taxidermists. Certain special forms of eruption, such as the general erythema and exfoliative dermatitis following the absorption of mercury, are produced by the absorption of these elements. Other occupations in which definite chemical substances produce dermatitis are the handling of chromic acid, the manufacture of alkalies and acids, and printing; the printers come in contact not only with their ink, but also with the alkalies and turpentine used to clean the types. A well-known form of eczematous eruption is met with in workmen who handle cinchona bark in the manufacture of quinine. As in the case of most eruptions of the class, it is found that certain workmen are especially prone to "cinchona dermatitis"; and the slightest contact or even the neighbourhood of the bark seems to be sufficient in them to produce the eruption. The eruption is usually accompanied with much itching, and most commonly affects the face, hands, and forearms. A very remarkable example of the extraordinary liability of certain persons to the dermatitis of volatile chemical substances is recorded by Dr. Hall as the result of the use of phenyl hydrazin hydrochloride (4). Many other irritating chemical substances are apt to produce this form of dermatitis; of these, bisulphide of carbon, phosphorus, chlorine, camphor, and the fumes of the smelting of various ores, such as those of copper or zinc, may be mentioned as examples.

Diseases of the skin appendages.—Certain occupations produce skin eruptions due to changes in the hair follicles, sebaceous and sweat glands. It is frequently suggested that persons who lead sedentary occupations are more likely to suffer from seborrhœa, and especially from acne; but

persons who lead sedentary lives—such as seamstresses, clerks, cigar and cigarette makers, and compositors—are exposed to anything but wholesome conditions. Too often such persons are so crowded together in ill-lighted, badly ventilated apartments, that their personal health deteriorates; while their unhealthy proximity and frequent lack of cleanliness render transmission of contagious elements easy. In this way the micro-organisms which produce folliculitis, impetiginous and other pyodermic disorders, and possibly also seborrhœa, are readily transmitted. Few of these persons are in so perfect a condition of health that the infective influences are kept in check.

Oily, greasy, or tarry materials tend to produce eruptions, first of all by the blocking up of the orifices of the skin glands, and subsequently by inflammation. Workers in paraffin, who are brought in contact with the crude oils obtained from the shale, frequently suffer from dermatitis of this character. Reddened papules round the mouths of the hair follicles appear on the backs of the hands, the forearms, and other hairy parts; the mouth of the follicle becomes distended, and is usually filled with a black plug composed of epithelium and foreign material. Distension of the duct and sebaceous gland takes place below the plug. Suppuration may occur in such follicles, and all degrees of inflammation may result. If the disease become chronic, cracks, fissures, and thickening of the skin are so troublesome that the workmen are obliged to give up their occupation. A form of eruption very similar to this occurs in workers in creasote and tar—"tar acne." Tar produces first of all a superficial erythema which may be of great intensity, leaving dark purple congestion and pigmentation behind it. Moreover, it tends to block the follicles, producing very characteristic black spots at their orifices, followed by the production of papules and nodules due to retention of secretions. These nodules are apt to suppurate, and sometimes to produce ulcers. The eruption is sometimes very profuse on the backs of the forearms and hands, and on the surface of the thighs (1). Occasionally it has been followed by epithelioma.

The affection now recognised as hidrocystoma seems to occur most readily in women, either during warm weather, or as a result of their occupation, as in washerwomen. Small cystic tumours of irregular volume, usually not larger than a split pea, are symmetrically disposed on each side of the face, more especially on the central portions. These tumours are cysts connected with the sweat apparatus (9, 10, 11).

Contagious diseases.—Many diseases of infectious origin are associated with occupation. Grooms and persons in charge of horses and cattle frequently suffer from forms of ringworm produced by large-spored trichophyta which very often produce suppuration. Similarly the forms of pox,—horse-pox, cow-pox, and the corresponding disease of sheep, are not uncommonly transmitted to those in charge of these animals, and the eruptions so produced are frequently very severe. The contagious diseases of the human subject are found commonly in persons brought into direct contact with each other, so that the venereal diseases are specially prevalent

among prostitutes; while other diseases—such as molluscum contagiosum, scabies, ringworm, and especially the infectious fevers—too often attack the nurses and other attendants upon the sick. Tanners and wool-sorters frequently suffer from anthrax and other effects of the B. anthracis. The peculiar erythema of the hands known as E. serpens or erysipeloid is doubtless a disease of infectious character produced by the handling of poultry, game, and other forms of animal food. Rosenbach mentions that a species of cladothrix is the infective element.

Butchers, those engaged in making necropsies, and dissectors are liable to suffer from verruca necrogenica, probably in most cases a peculiarly chronic form of cutaneous tuberculosis. Persons who have to travel, especially commercial travellers, are, and in the past were more particularly, liable to suffer from scabies, pediculosis, and parasitic varieties of sycosis. Liability to these parasitic diseases is, however, now most common amongst vagrants and the occupants of poor lodging-houses. Chronic pediculosis in debilitated persons gives rise to the well-known "maculæ cæruleæ," or "the vagabonds' disease."

Besides the various forms of dermatitis from exposure to cold, heat, and sunlight, which are common amongst agricultural labourers and others exposed to the atmosphere, those engaged in husbandry are liable to suffer from peculiar eruptions due to the irritation produced by the harvest mite and some other parasites. Recently certain curious serpiginous eruptions have been described, which are caused by the burrowing of the larval forms of certain acari (8).

It is scarcely necessary to say in conclusion that the descriptions contained in this article are to be read in connection with the articles on the several eruptions respectively.

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DRUG ERUPTIONS

General considerations.—In this matter the idiosyncrasy of the patient is of great importance. Minute doses of a drug which most people can take with impunity will in certain individuals bring out an eruption, or reveal other toxic effects. Nor does perseverance in the drug always lead to immunity from these effects. Thus, in one case, a patient under Dr. Allen of New York, quinine, even in doses as small as $\frac{1}{16}$ grain, invariably produced an erythematous or bullous eruption. This susceptibility to certain drugs, like that to toxic effects from articles of food which are quite harmless to most people (eggs, for example), may be a matter of inheritance, and affect many members of one family.

It must be remembered that individual susceptibility to a drug may hold in cases where outward applications are alone concerned. Thus acute general erythema has been known to follow the use of a lotion of quinine (ten grains to the ounce) to the head. In the case of a lady under my observation, the application of a small belladonna plaster to the chest was shortly followed by an extensive erythema, accompanied by dryness of throat, dilatation of pupils, etc. It has been found that the patient who is susceptible to one drug (in respect of cutaneous eruption) may present a similar susceptibility to another. This has been observed with quinine and atropine, morphia and copaiba (13). I have said that, as a rule, the susceptibility to a particular drug does not wear off with the repetition of the latter; and no more striking example can be cited than a case, recorded by Hagan, in which a child for three years suffered from a papular or erythematous eruption which desquamated. It was ultimately discovered that this was solely due to quinine administered from time to time by the mother, the rash ceasing shortly after the cause was stopped.

It will be convenient here to tabulate the various forms of eruption which may be produced by drugs, omitting some which are of extreme rarity. Under each heading the most common are mentioned first:—

1. An **Erythema** (sometimes papular in part) may be produced by—
   Antipyrin.
   The antitoxins (for example, the diphtheria antitoxin).
   Copaiba, *cubebs*, and other similar drugs, such as *turpentine*.
   Belladonna and atropine.
   Quinine.
   Salicylic acid and salicylate of soda. *Chloroform* (by inhalation).
   Boracic acid, *iodoform*, *carbolic acid*, and other irritating antiseptics—by local application and absorption through a wound surface or through the unbroken skin. Much rarer internal causes are *mercury*, *arsenic*, *chloralamide*, *pilocarpine*, a list which might be greatly extended.

2. **Urticaria**—
   Quinine. *Santonin.*
   Copaiba. Certain *mineral waters.*
   Turpentine. *Salicylate of soda.*
   Valerian. *Benzoic, salicylic,* and *tannic acids.*

3. An **erysipelatoid eruption** (erythema with infiltration or œdema of the skin).
   Iodide and bromide of potassium.
   Aconite, chrysarobin, oil of cade, carbolic acid, etc., applied externally.

4. A **vesicular or bullous eruption**—
   Bromide and iodide of potassium.
   Quinine.
   Iodoform, boracic and carbolic acids, arnica, etc., applied externally.

5. **Herpes** (true, arranged in the distribution of sensory nerves).
   Arsenic.

6. **Pustular eruption**—
   Bromide and iodide of potassium.
   Sulphide of calcium.
   Antimony and arsenic (both from internal and external use).
   Rarely *nitric acid* and *salicylic acid.*
   Rhubarb.

7. **Purpura**—
   Chlorate of potash, iodide of potassium.
   Chloral hydrate, chloroform, copaiba.

8. **Pigmentation of the skin**—
   Nitrate of Silver.
   Arsenic.
   Antifebrin (temporary staining only).

9. **Epidermic thickening** (keratosis) or warty growth.
   Arsenic, *Borax* } both from long-continued administration.

It will be noticed that in several instances the same drug is responsible for several kinds of eruption, and with regard to the first three forms (erythema, urticaria, and the erysipelatoid eruption) no sharp lines can be drawn. Again, an erythema due to a given drug, to copaiba, for example, may (if the administration of the latter be persisted in) pass into a purpuric eruption. It is frequent for a drug-erythema to be in part papular; and in many cases from scratching, and otherwise, a vesicular eruption may become scab-covered or eczematous. Nevertheless the enumeration and rough classification of drug eruptions, as given above, is of use; and with regard to three, at least, of the forms of skin-eruption named, if due to drugs they can only be due to certain definite ones. Thus arsenic alone amongst drugs is capable of bringing out an attack of herpes zoster; only arsenic and nitrate of silver can cause permanent pigmentation of the skin, and the epidermic thickening and warty

growth known as keratosis is never due to drugs other than arsenic and (much more rarely and to a slighter degree) borax.

The mode of production.—Whilst still in the dark about many points, and especially as to the problem of individual susceptibility, we may safely affirm certain principles with regard to drug eruptions. A broad division may be made into (i.) those due to the direct action of the drug on the skin by absorption from outside (for example, iodoform or chrysarobin eruptions); (ii.) those due to a similar direct action, the drug being brought to the affected region of the skin through the blood (for example, acne and bullous eruptions from taking iodides and bromides); and (iii.) those produced, in all probability, through the central nervous or vaso-motor system. It may be noted that occasionally the eruption is a mixed one, and produced in two of the above methods. Of the very large class included under (iii.), we may note that the resulting eruption, although due to any one of a host of different drugs, is roughly of one type—an erythema or erythema-urticaria which is in the main symmetrical. Whether the active poison be the drug itself (more or less altered by digestion), or, as suggested by Behrend, some toxin produced during its absorption and excretion, we do not know; but the fact that the various "antitoxins," hydatid fluid, and many other organic compounds may lead to similar eruptions (p. 935), is in favour of Behrend's view.

Class I. Eruptions due to the irritant effects of medicinal application to the unbroken surface of the skin, or to wounds, ulcers, and the like.—These are mostly of the erythematous or vesicular type, they tend to become eczematous, usually cause much itching or irritation, and (although they may spread very widely) have their greatest intensity round the part to which the medicament is applied. Examples are most common from the use of antiseptics in surgical practice. Of these perhaps the most irritating is salicylic acid; bichloride of mercury is almost as bad, and carbolic gauze and iodoform disagree most markedly with certain skins. Bicyanide of mercury and zinc, as used to impregnate gauze and wool, is perhaps of all the efficient antiseptics the least liable to cause irritation. Boracic acid is also very safe—but in certain individuals either it or the bicyanide may cause a severe erythema, or other eruption (*vide* p. 468). Regions in which the skin is thin or delicate, such as the scrotum and neck, are particularly apt to inflame if exposed to these irritating antiseptics, and the greatest care has to be exercised in their use on children. Ointments containing mercurial salts, iodoform, and so forth, may readily produce spreading erythema; and a host of other medicinal substances apt to irritate the skin might be named. Chrysarobin or chrysophanic acid (often used in the treatment of ringworm or psoriasis) and tincture of arnica are noteworthy from the erysipelas-like eruption which they may produce. Both ammonio-chloride of mercury and sulphur, if employed in strong preparations, may cause eczema, or a pustular dermatitis; and this list might be extended almost indefinitely. Very much depends on the strength of

the preparation employed, and on the vehicle with which it is used. Thus, for instance, a mixture of three parts of boracic acid with one of iodoform is an efficient antiseptic, and almost wholly free from the risk of irritation.

It is impracticable to distinguish the different varieties of dermatitis produced by this class of external medicaments; it is important to remember, however, that individual idiosyncrasy plays a large part, that the effects may reach far beyond the immediate area exposed to the drug, and that erythematous, vesicular, or occasionally papular lesions are present in the great majority. Absorption through the skin accounts both for appearance of the eruption at a distance from the main patch, and for the presence of general toxic symptoms at the same time (for example, vomiting or morbid changes in the urine). In several cases of dermatitis, due to the local use of iodoform, the presence of iodine in the urine or saliva has been proved; with mercurial eruptions the same holds true with regard to mercurial salts.

Although, perhaps, not coming strictly under the head of medicinal eruptions, it is worthy of note that many cases of erythema and allied skin lesions are due to the action of chemical substances in the air, or other conditions, of workshops; and that persons engaged in certain occupations are particularly liable to dermatitis from handling substances used therein. The following examples will suffice:—French-polishers and others having to do with bichromate of potash are liable to severe pustular or gangrenous eruptions; vanilla-workers sometimes manifest lichen-erythema of the face and hands (8); and the aniline dyes, turpentine, tar, creasote, and a large number of other substances employed in manufactures, are frequently responsible for eczema, erythema, and other outbreaks (*vide* p. 917).

Class II. Eruptions due to certain drugs carried in the blood acting directly on the skin or its appendages.—Of these the best examples are perhaps the confluent pustular or bullous eruptions due to iodide and bromide of potassium. In the fluid obtained from the individual lesion the salts named have been proved to exist; and the inference is strong that the eruption is due mainly to the excretory organs of the skin being specially concerned in their elimination, and being exposed, so to speak, to a concentrated solution of the irritant. It is curious that we cannot with certainty extend the list of drugs, causing dermatitis in this manner, much beyond iodides and bromides; and noteworthy that, as Dr. Crocker observes, "whilst there are many forms of eruption due to drugs, only two, iodine and bromine and their salts, are capable of exciting lesions which are special and peculiar" (2). There can be little doubt, however, that arsenic keratosis is due to a direct action on the epithelial layers by the drug; or that purpura due to chlorate of potash is caused by the direct action of some poison (either the drug itself or a modification of it from changes in digestion) on the capillary walls. The following drawing (Fig. 12) illustrates a mild case of eruption due to iodide of potassium (mild because the cause was

early recognised and removed) under my care at the London Hospital. The raised circular patches studded with yellowish points are seen on the face, and there were a few similar lesions on the trunk. Had the use of the drug been continued no doubt the eruption would have appeared on many other parts. The limbs are frequently affected.

Iodide of potassium has the distinction of occasionally producing a peculiar skin eruption which is, or appears at one stage to be, bullous in character (hydroa). In some cases the lesions are true bullæ, in others (probably the majority) the elevations are semi-solid or even papillomatous. They have been compared to condyloma, to exaggerated molluscum contagiosum, or to mycosis fungoides. It is undoubtedly rare, but of great importance; since it is apt to cause grave error in diagnosis. It may be met with at all ages, many cases having been observed in infants or young children; and some of the most severe cases have followed the administration of quite small doses of the drug. On any part of the body (especially, perhaps, the face and regions exposed to pressure, such as the buttocks) the eruption may appear as large vesicular swellings with congested bases; or as a collection of yellowish white points in an inflamed elevation of the skin. It often happens that the apparent vesicles or bullæ when pinched are found to contain only a small quantity of viscid semi-purulent fluid, being mainly occupied by granulation tissues. Ulceration and scabbing may take place, but the amount of discharge will probably here again be disproportionate to the size of the swelling. Sometimes, however, the eruption is frankly bullous in character, and several observers have proved by chemical tests the presence of iodine in the contained fluid. When the vesicles are insignificant, or absent, the fleshy rounded lumps may suggest multiple gumma or sarcoma; and the former point is of particular interest, since it may lead the physician to push the very drug that is responsible for the mischief. Should this error be unfortunately made, there is hardly any limit to the size which the individual lesions may attain; and there is no doubt that the profound cachexia produced has led more than once to a fatal issue. Great sloughy sores may form, which confirm the erroneous interpretation of the original tumours as gummatous.

Bromide and iodide eruptions may occur only on certain defined regions of the skin, of which the face and neck form the most favourite one. In the New Sydenham Society's plate of hydroa from iodide of potassium, the vesicles occur in hundreds on the forearms, hands, face, and neck, but cease abruptly at the level of the clavicles.

Iodide of potassium has sometimes a remarkable effect upon the secretory glands of the skin and mucous membranes, witness the profuse coryza and secretion of pharyngeal mucus in those with whom the drug disagrees; profuse leucorrhœa has also been observed as a symptom.

No doubt many of the cutaneous lesions of iodide poisoning (furuncular or bullous) are due primarily to irritation of the sebaceous and sudoriparous glands, the transformation into skin abscesses being due to the invasion of the ever-present cutaneous micro-organisms. I have

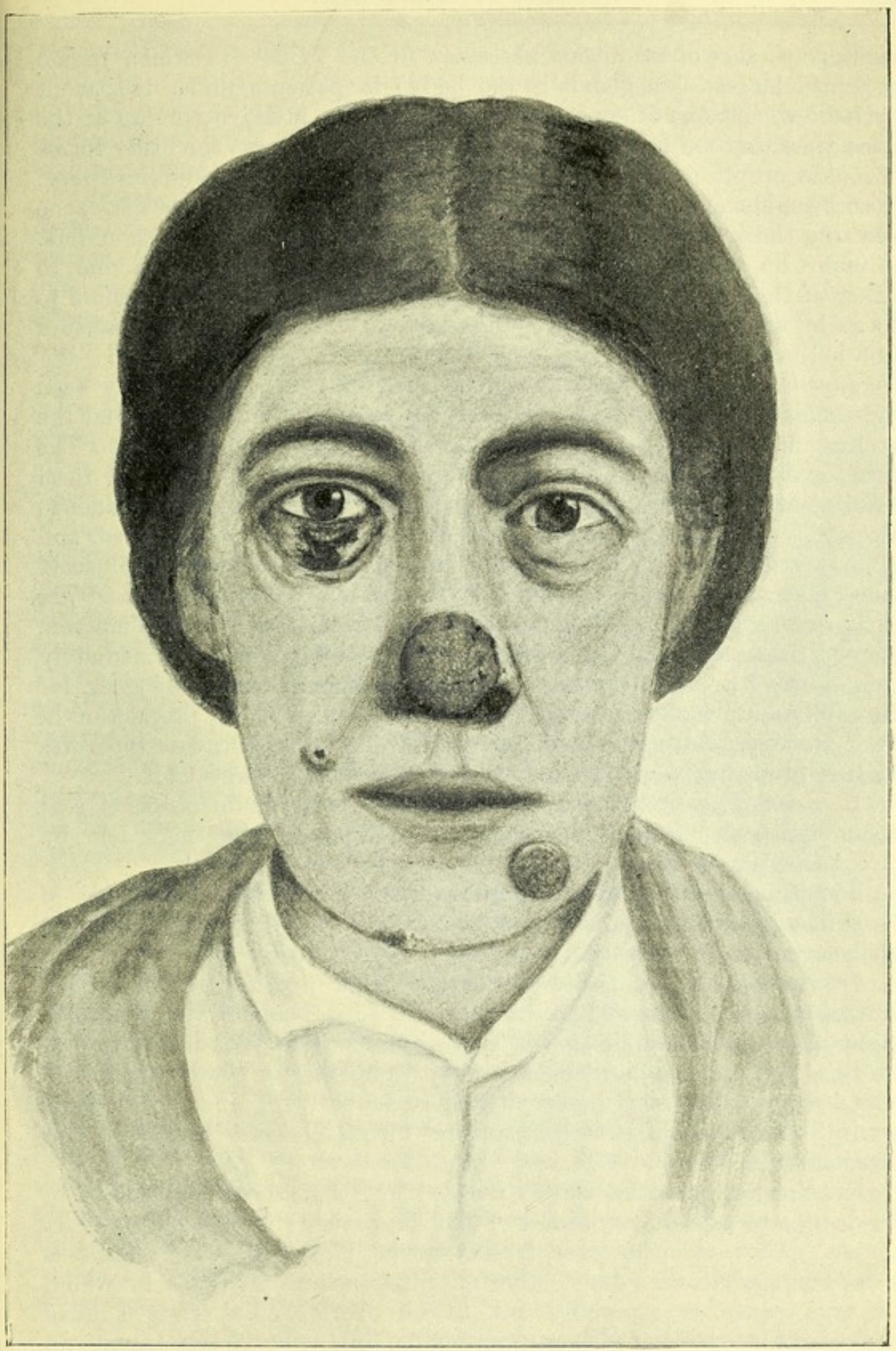


FIG. 12.—Scattered raised nodular lesions on the face caused by iodide of potassium. Each nodule was studded with yellow points from which a thick puriform fluid could be extracted. The right lower eyelid was affected with an eczematous ulcer, also due to the drug, which had been given only in five-grain doses. The eruption quickly disappeared on the discontinuance of the iodide.

seen many cases of cutaneous abscesses in the axillæ (in which region occur the largest skin glands in the body) in patients under treatment by iodides, and one of suppurative mastitis (in a male), occurring at the same time that axillary furuncles developed. Amongst the other forms of iodide eruptions may be mentioned purpura[1] and a nodular variety. Both bromide and iodide of potassium often produce a pustular acne affecting the ordinary sites of that disease—the face, neck, and shoulders. It is by no means easy to distinguish between the eruptions due to either of these two drugs, and in some cases it is probably impossible to do so by an inspection alone. Bromides, however, very rarely cause a true bullous form.

Bromide eruptions.—The prevalent sites of these have already been mentioned; it may be noted also that the margin of the nostril and the eyelids are often affected, sometimes the hairy scalp also. The individual lesions are in the main pustular, and, if confluent, may form large rounded patches which tend to become covered with crust and to ulcerate. They are usually slightly soft to the touch, well raised, and at first studded with little yellow points. The names "molluscoid acne" and "anthracoid eruption" have been applied to these, and are fairly expressive. Histological examination (R. Crocker, Neumann, Stephen Mackenzie, C. Fox) has shown that the glands immediately around the hair-bulbs are the chief sites, though not the only ones, for the cellular infiltration around them which goes on to the production of small abscesses and granulation tissue. The stratum corneum separates readily, producing vesicles and pustules immediately beneath it.

It is a curious fact that in several cases of bromide eruption scar tissue has been especially attacked; for example, the scars left by vaccination on the arms.

Sometimes bromide of potassium causes either a diffuse erythema of the skin or a circumscribed form attended with infiltration, and somewhat suggestive of erythema nodosum.

To recapitulate; bromides or iodides may produce the following skin eruptions: (i.) a simple acne (especially in persons with a natural tendency to that complaint); (ii.) a patchy erythema with infiltration of the cutis; (iii.) a true bullous eruption or hydroa; (iv.) confluent furuncular lesions which may appear at first to be bullous; and (v.) nodular swellings in the skin, which may pass ultimately into the form just mentioned (2).

Dr. Crocker and others have pointed out that these bad effects of the drugs are especially prone to occur in patients with renal or heart disease. They may, however, break out in persons in whom there is no evidence whatever of defective elimination, and in those in whom the true cause is especially apt to be overlooked. Thus I have known a copious bromide eruption in an infant who was taking no medicine except that conveyed through the medium of its mother's milk (the woman having been for a long time under treatment for epilepsy).

[1] Very severe and ultimately fatal in a case recorded by Dr. Stephen Mackenzie.

Again, "Clarke's Blood Mixture" has been responsible for many cases of iodide eruption. There is good reason to believe that the addition of small doses of liquor arsenicalis to a solution of bromide or of iodide of potassium tends to check the development of skin eruptions due to each of these drugs.

Arsenic.—We have to distinguish between (i.) an acute form of dermatitis due to this drug, occurring very soon after its first administration, or due to a rapid increase in the dose given; (ii.) wholly different lesions produced by long courses of arsenic, whilst (iii.) the effects of local arsenical poisoning on the skin are important and frequent enough to require special notice.

(i.) Under the first heading comes an erythema (with or without œdema) affecting especially the face and eyelids, and strongly suggesting erysipelas. In a case of psoriasis, for instance, let liquor arsenicalis be given for the first time, and within a day or two an acute dermatitis may appear on the face, neck, and other parts. There is great congestion of the conjunctivæ, swelling of the eyelids, and a burning or itching sensation in all the affected parts of the skin. The cervical lymphatic glands may be somewhat swollen, and there are usually digestive disturbance and gastrodynia. As subsidence of the erythema takes place some desquamation usually occurs, or eczematous excoriations may be found. A similar acute erythema and œdema of the face have been observed after the use of a great variety of drugs, some merely applied externally. Thus atropine drops have been known to bring it on; and tincture of arnica, in former days when it was a favourite application for bruises, was a frequent cause of very severe facial erythema.

The internal use of arsenic may lead to several forms of bullous or vesicular eruptions.

(*a*) It may bring on an attack of herpes zoster. Although for a long time disputed by some authors, this sequence is now generally admitted (12). The herpes may arise in the distribution of a spinal or cranial sensory nerve; but in either case exactly resembles in appearance and course the ordinary herpes zoster, and, like it, may take on occasionally an ulcerating or gangrenous process. It is probable that in all these cases a definite neuritis is produced by the arsenic.

(*b*) Multiple vesicles may appear on the hands and feet, not distributed according to nerve-distribution, but determined mainly by the delicacy and moisture of the parts of the skin affected (for example, the digital clefts). Groups of vesicles may also break out on the arms, scrotum, and other parts; and both herpes labialis and preputialis are stated to be due occasionally to this drug.

(*c*) Large bullæ are sometimes seen, usually in association with severe arsenical erythema.

(ii.) Skin affections, the result of long-continued courses of arsenic.

(*a*) Arsenic keratosis.—This disease is a most interesting proof of the effect of the drug upon the nutrition of the skin, and particularly that of its epidermic layer. The hands and feet on both aspects are the

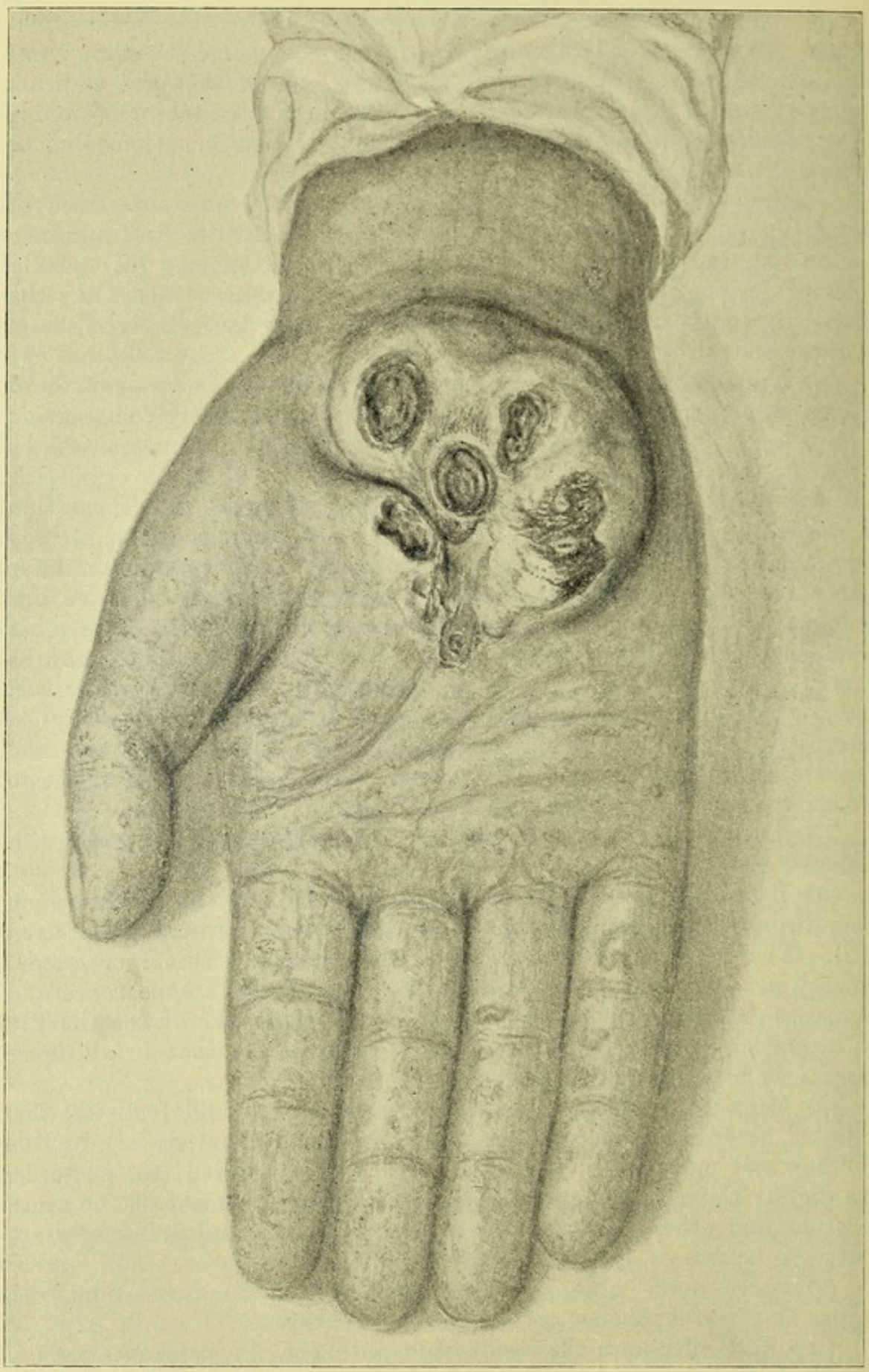


FIG. 13.—Illustration of arsenic keratosis and supervening epithelial cancer. The patient had taken arsenic for many years. The hands (both palmar and dorsal aspects) became hard, dry, and studded with fissures and small warty growths and callosities. Ultimately epithelial cancer supervened on both hands.

favourite regions to be affected; little callosities or hard, dry warts forming here and there, whilst the intervening patches of skin are abnormally dry, rough and leathery. The knuckles often show the largest callosities, and on similar areas over larger joints (such as the extensor surfaces of elbows and knees) dry, thickened patches of considerable extent may form, which very strongly resemble psoriasis. Their chief difference consists in the absence of that profuse peeling-off of epidermic flakes which is so common in psoriasis. The keratosis due to arsenic, and the epithelial cancer which may supervene on it, are shown in the accompanying illustration (Fig. 13). To these peculiar effects of arsenic attention was first drawn by Sir Erasmus Wilson and Mr. Hutchinson.

(*b*) Redness and excessive sweating of certain parts of the body (and especially of the hands) have been noticed several times in persons under long courses of arsenic.

(*c*) Pigmentation of the skin, occurring in dirty-looking, mottled patches, is also an undoubted though rare result; and is of particular interest as contrasting with the brilliant clearness produced by a more moderate use of the drug both in man and some animals. Arsenical pigmentation usually occurs in persons naturally of a dark complexion, and it especially affects the neck and chest. The colour is some shade of sepia-brown, and in cases of psoriasis which have been long submitted to arsenic it is often seen, picking out the sites of the cured eruption.

(iii.) Local application.—The effects of arsenical applications upon the skin and its appendages are too important to be passed over. Some of them are well known by personal experience to medical students, as arsenic is very often used as a preservative injection for anatomical purposes. One of the commonest results in those engaged in dissecting bodies preserved with arsenic is congestion and extreme tenderness of the nail-bed of the digits. Sometimes this goes on to ulceration around the nails, with perhaps shedding of the latter. Another form of arsenical irritation occurs as a vesicular dermatitis or eczema, especially affecting the delicate skin at the sides of the digits, and by its appearance suggesting scabies. Here again, if the exposure to the irritant is persisted in, troublesome ulcers may form. Similar effects are seen in workmen exposed to the use of arsenical pigment or powders in their employment, as in sheep-washing; and occasionally definite sloughing occurs from handling hides which have been prepared with strong arsenical compounds. I have seen such a case (sloughing of the upper eyelid), which was for some time supposed to be malignant pustule, in a workman who was engaged in currying horse-hides. It is important to remember that arsenical eczema, erythema, or even bullous eruptions have been proved to result from living in a room hung with wall-paper charged with arsenical pigments. Naturally the local effects of arsenical applications are most severe where the skin is thin and delicate, as in young children; or, in certain parts of the body in adults (for example, the eyelids, as in the case just mentioned, or the genital



FIG. 14.—Rounded patches of deep erythema with small vesicles, due to the internal use of chloral hydrate. The eruption was symmetrical.

regions). In Brighton, in 1878, no less than twenty-nine infants and children were attacked with erythema, ulceration, or gangrene of the skin, from the use of a dusting powder containing 50 per cent of white arsenic. Thirteen of these cases proved fatal; and many instances of death from absorption in adults have occurred after application of strong arsenical preparations to cancerous sores, and the like. Arsenic is used in the manufacture of such a host of articles, such as wall-paper, hat-linings, and so forth, and is so often used to fix aniline or other dyes, that it is necessary for the physician constantly to bear the drug in mind as a possible cause of the most varied forms of dermatitis.

Treatment.—It is of the first importance, whether the skin lesions result from internal administration or exposure to arsenical vapour or powder, to remove the cause. This done, in the acute cases the use of lead lotion in ointment will hasten the cure. In the chronic cases of arsenic keratosis, salicylic acid (in plaister or collodion preparation), followed by friction with pumice-stone or sand soap, will soften and remove the horny patches. The danger of epithelioma supervening on the keratosis should emphasise the necessity of leaving off the drug. In the case of vesicular or pustular eruptions, and of ulceration from local exposure, careful protection of the part with some mild antiseptic dressing is of importance, and sometimes the ulcers are very slow indeed to heal. Complete change of air is advisable.

Eruptions due to Copaiba, Cubebs, or other Balsamic drugs.—A very severe case is like no other skin eruption. The large deep-red patches, —purpuric especially on the legs and feet, and yet attended with much more erythema than true purpura,—the itching and burning pain which accompany it, and the marked local heat, together with the special localisation, form a group of symptoms which belong to no other malady.

It cannot, however, be said that every case conforms to rule, either as regards the part affected or as to the severity of the disease; thus, for instance, there may be hardly any pain or itching.

Sometimes the face and neck are covered with the eruption, in other cases they escape entirely. The fronts of the thighs, the ankles and lower thirds of the legs, the region of each olecranon and the forearms (especially about the wrists) are perhaps the prevalent sites, and those in which the most pronounced patches occur.

The type of the eruption is a confluent erythema, the individual patches of which may be very large, and their colour a vivid red, sometimes compared to that of a boiled lobster. But usually there is a purplish tint, especially towards the centre of the patches, and this in the lower limbs may deepen even to a purplish black.

All the toes, the skin over the extensor tendons at the ankle, that along the tendo Achillis, and over the two malleoli, may be of a deep purplish red.

Here and there, standing out from the deep purple-red patches, minute white elevations may be seen, which are really pustules, as proved by pricking them. If left alone they dry up and rarely attain

any considerable size, indeed they would be easily overlooked. They are most common on the trunk. The copaiba erythema is usually somewhat raised, and may often be papular in parts. When very deep in colour there is probably always some escape of blood from the capillaries, and it may indeed be definitely purpuric. Vesicular and bullous forms have occasionally been met with. Fortunately the erythema is so striking, and attended with so much discomfort, that the cause is promptly detected and removed in the early stages of the eruption.

The administration of cubebs may produce an eruption almost identical with that caused by copaiba, with the same tendency to affect the hands and ankles. It is, however, much rarer than the form due to copaiba.

Turpentine also may have the same result; but oil of santal wood very rarely causes even a slight erythema. Hence it is by far the safest of the three balsamic remedies given for gonorrhœa, besides the advantage of being usually well tolerated in reasonable doses by the stomach. It must not be supposed that the first doses of copaiba or cubebs bring out the eruption in susceptible persons, for one often finds it produced only after the patient has taken the drug steadily for some few weeks. The varieties of the copaiba or balsamic eruption are not many, and the type is so well defined that any physician who has seen one case will probably have little difficulty in recognising a second example. Occasionally the eruption is rather urticarial than simply erythematous; and in a few cases the occurrence of bullæ has been noticed.

In spite of what has just been said it must be admitted that errors of diagnosis are not uncommon. The balsamic eruption may be mistaken for measles, scarlet fever, secondary syphilis, and so on. The soreness of the throat and febrile reaction attending severe cases may favour the suggestion of scarlet fever; on the other hand, a patient with copaiba-rash may very possibly have an indurated chancre at the same time. In fact I have known cases in which a secondary syphilide and a balsamic eruption coexisted on the same patient.

Complications.—There are generally decided febrile reaction, nausea, thirst, and a feeling of general depression; if the temperature be taken it will be found slightly raised, especially at night-time. The throat may escape, but general erythema of the palate and fauces is not very infrequent. If the eruption is severe on the face there may be conjunctival congestion, or slight œdema of the lids. The tongue is often furred, and there is other evidence of gastro-intestinal disturbance. Those lymphatic glands which drain the areas most affected are commonly enlarged, though I have never known the patient draw attention to this symptom.

The urine of a patient with copaiba-rash may present peculiar features: (*a*) a peculiar balsamic odour, especially noticed on evaporating it down; (*b*) a cloudy opacity on floating the urine on nitric acid (this

is of obvious importance in connection with the diagnosis from scarlet fever); and (*c*) a temporary lilac colour when nitric acid is dropped slowly into a thin layer of the urine. Neither of these reactions, however, is constant, and certainly in many cases nothing abnormal is to be noticed in the urine. The colour indicated (which is sometimes a deep blood-red) may be best obtained by floating the urine on nitric acid and allowing it to stand, when perhaps for days the supernatant urine will retain the peculiar hue.

Having now considered three of the most important groups of drugs apt to produce skin disease I can but briefly allude to a few of the remainder.

Chloral.—The eruption due to this drug may be taken as fairly typical of a large class of cases due probably to some poisonous action on the vaso-motor system. A transitory, patchy erythema, bright pink to red-brown in colour, confluent in parts such as the face, roughly or exactly symmetrical, subsiding without leaving any trace behind; such are the chief features of the chloral eruption (*see* Fig. 14). The mucous membranes are often affected as well as the skin, the throat being congested and painful; and there may be distinct febrile reaction. Papules, pustules, or vesicles are but rarely met with; occasionally there is distinct exudation into the skin, which may be hæmorrhagic.

Mercury taken internally may produce similar effects, but there is perhaps more tendency for the eruption to become eczematous. However, an eruption caused directly by the internal use of mercury is rare, although those due to its external use are very common.

Opium and its alkaloids (especially *morphia*) may cause very similar eruptions to those produced by chloral; the same may be said of *antipyrin* and its allies. Rashes due to antipyrin are of common occurrence; they consist mainly in a symmetrical erythema on the chest, abdomen, and back, attended with itching and free perspiration, and occasionally followed after a few days by desquamation. Papular, urticarial, or purpuric forms may be met with. Care is required in the diagnosis of the erythema from either measles or scarlet fever; the antipyrin-rash is of a brighter colour than the former, of a more diffuse form than the latter, and is not accompanied by marked fever or throat-lesions.

Quinine.—If quinine causes a cutaneous eruption, the latter is usually of a patchy, erythematous nature, or urticarial; occasionally bullous and eczematous. It may affect the whole body, but is more often restricted to certain regions such as the head and neck, or both lower limbs. In one case (12*a*) a purpuric erythema appeared on the inner aspect of the thighs and on the abdomen; months later a single five-grain dose of quinine brought out a repetition of the eruption in the same regions.

Diagnosis.—The majority of drug eruptions take the form of an erythema or urticaria, or a mixture of the two. In some cases the suspicion of scarlet fever arises, and the possibility of an erroneous diagnosis is

favoured by the fact that the eruption may ultimately desquamate, its appearance may be attended with soreness of the throat, and (when due to copaiba, turpentine, etc.) the patient's urine, if floated on nitric acid, may give a reaction suggesting the presence of albumin. But it is quite exceptional for any drug eruption to be attended with such a rise of general temperature as would be expected in the case of scarlet fever. Measles may be closely simulated by certain drug eruptions. It must be remembered that the patient himself rarely suspects the cause, and sometimes only careful cross-examination will elicit the truth.

Treatment.—Of course the most important thing is to make a correct diagnosis, and to stop the administration of the offending drug immediately. As a general rule, the cause being removed the effects quickly come to an end, but this is not invariably the case; for instance, eruptions due to quinine or bromide of potassium may persist several weeks after the complete discontinuance of the drug.

Sometimes a change in the method of administration may be followed by cessation of the bad effects, if it be very desirable that the drug should be persisted in. Thus in the case of such drugs as arsenic or iodide of potassium free dilution may prevent toxic effects. The very frequent cases of copaiba-eruption are undoubtedly due in part to the reckless way in which large doses are taken at short intervals by patients with gonorrhœa. Any drug apt to cause gastric or cutaneous disturbance is best taken on a full rather than on an empty stomach. The statement that to increase the doses of a drug will sometimes succeed in overcoming the liability to toxic effects of an individual rests on a slender foundation. Individual susceptibility here is so important that of many people it is true that no dose, large or small, of a drug that has ever been proved to irritate them can be taken without a similar result. In the case of a man with syphilis under my care his susceptibility to iodide of potassium was so great that a glass of Woodhall Spa Water was followed in him by the same symptoms as those produced by a drachm dose of the drug.

JONATHAN HUTCHINSON, JUN.

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The bibliography of drug eruptions is too large to be given here. At the end of Dr. Prince Morrow's work on the subject (republished in England by the New Sydenham Society, 1893) will be found a very complete list arranged according to subjects, and occupying thirty pages. In the New Sydenham Society's *Atlas of Skin Diseases*, in Dr. Radcliffe Crocker's more recent *Atlas*, and in Chatelain's work, there are excellent plates of most of the drug eruptions. Various cases of special interest are given in Mr. Hutchinson's *Archives of Surgery*, and in the *Catalogue of the Musée St. Louis*, Paris. A few of the most important references are given below :—

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J. H., JUN.

ANTITOXIN RASHES

The subcutaneous administration of antitoxic serum in the treatment, remedial or prophylactic, of various diseases of bacterial origin, is in many instances followed by certain effects, the most common of which is a rash. This rash is invariably of an erythematous nature, and takes the form either of one of the varieties of erythema multiforme, of urticaria, or of E. multiforme and urticaria combined.

Erythema multiforme.—The most common variety consists in discrete bright red papules or small macules, usually numerous, occurring on the trunk and limbs, but most abundantly upon the extensor surfaces of the latter. The papules and macules may fade away without any further development; but more often they become fused together to form either rings and serpentine figures (E. annulatum and E. gyratum) or, especially about the joints, large blotches of irregular shape with well-defined edges. This rash seldom affects the face. In rare instances it becomes petechial.

Another common variety assumes the form of large, irregular patches, from two to four or five inches across, having an ill-defined edge. The patches are sometimes of a bright colour, at other times of a dull red. They have no special distribution, and are very transient. They are often preceded by urticaria. Very much less common are E. morbilliforme and E. scarlatiniforme. These rashes are very much like those of the specific diseases whose name they bear; but, excepting pyrexia and the fact that in the morbilliform variety the face may be affected and the conjunctivæ injected, there is no symptom of measles or scarlet fever. In the scarlatiniform variety the rash is often patchy.

Urticaria is common. Wheals of all shapes and sizes come out on the trunk in successive crops, first in one place, then in another; but often also upon the limbs and head. They come and go quickly, and frequently give rise to the erythematous patches already described.

Any one of these rashes may be attended with more or less itching; in the urticarial variety, indeed, this symptom is always present. There may also be œdema of the skin and subcutaneous cellular tissue, especially of the eyelids, lips, and scrotum. In rare cases the skin of the whole body is thus invaded, and the patient has a bloated appearance.

The duration of the rash is very variable, from a few hours to

fourteen or fifteen days; but in the vast majority of cases it is less than five days, and in many less than two. In about half the cases there is an elevation of temperature to 100° or 102° F., occasionally to a higher degree. The duration of the pyrexia varies with that of the rash. In about 20 per cent of the cases the rash begins at the site of injection, and in a few it is confined to this region. The rash most frequently makes its appearance on the seventh to the eleventh day after injection; but it may come out within a few minutes, or be delayed till the third week. One injection may give rise to more than one kind of rash, each kind appearing at different intervals of time after the injection. Probably this is due to the fact that to obtain a serum of a certain antitoxic value, the serums from two or more horses are mixed.

The proportion of cases in which a rash appears is very variable. Taking several large series of cases a rash has been found to occur in from 30 to 45 per cent.

The rash is occasionally accompanied by other symptoms; of these the most frequent are pains in and about some of the joints, which are met with in about 15 per cent of the cases of rash (*vide* Report of Antitoxin Committee of the Clinical Society, p. 22). Usually there is pain only, but sometimes the joints are swollen. The larger rather than the smaller joints are affected. Other rare conditions found with the rash are enlargement of lymphatic glands, especially of the cervical, and marked acceleration of the heart's action, followed by prostration. I have also observed five cases of rigors—in one of which there were convulsions—occurring immediately after an injection of serum, and followed by a rash in a few minutes or hours. Curiously enough these cases, together with several others in which a rash alone rapidly followed an injection, all happened in patients who were injected for a relapse of diphtheria; the primary attack, in which antitoxin had also been used, having occurred some weeks or months previously.

The rashes and arthritis are due to the serum and not to the antitoxic principle it contains; for the serum of a normal horse (the animal most frequently employed) which has not been immunised will produce the same effects. Different specimens of serum vary greatly in their rash-producing capacity, but usually the same specimen gives rise to the same kind of rash. The larger the volume of serum injected the more likely is a rash to follow; and rashes are certainly more common after multiple than after single injections. In my experience the rashes and other phenomena due to the serum are less severe with the concentrated serums now in use than with the weak serums employed in the early days of the treatment, when, to get the due antitoxic effect, large volumes had to be injected. The supposition that the rashes are due to carbolic acid or other preservative substance mixed with the serum is quite unfounded.

Treatment.—Fortunately most of the cases are so slight as to require no treatment. The itching is relieved by sponging with tepid water, or by the application of lead or spirit lotion. In the more persistent cases relief may be obtained also by the internal administration of calcium

chloride in full doses (10-15 grains ter die). For the arthritis the best treatment is lead and opium lotion externally, and laudanum or some other sedative internally.

E. W. GOODALL.

FEIGNED DISEASES OF THE SKIN

AFFECTIONS of the skin are purposely produced by impostors and malingerers to obtain alms, and to excite sympathy; and by hysterical young women, whose object is not infrequently to obtain charity, or to avoid work or irksome duty; but very often in them the act springs from some less intelligible morbid impulse.

The diseases thus to be simulated are necessarily few. The means employed are nearly always of the nature of mechanical or chemical irritation of the skin, and the lesions simulated are inflammatory in character; thus we see various forms of erythema, vesicular and bullous lesions, ulceration of the skin, and occasionally pigmentary disturbances, purpuric lesions, or even local gangrene, in persons of peculiar constitution, or as the result of special injuries. On the other hand, it is clear that such special conditions as molluscum contagiosum, epithelioma, and the like, cannot be simulated.

As a rule these lesions can be interpreted readily. The sex or condition of the patient, the presence of other morbid mental phenomena, the difficulty or impossibility of obtaining a connected and intelligible history of the case will all be of service. But the physician will depend mainly on the character of the lesions. Thus erythema multiforme, herpes, urticaria, pemphigus, and dermatitis herpetiformis are from time to time simulated, yet to the trained eye the artificial lesions have always some suspicious differences from the natural disease.

The distribution of the lesions is frequently of assistance in the diagnosis, for in factitious disease they are most commonly on the face or extremities, and predominantly on the left side—that is to say, on the readily accessible portions of the body. In other cases the lesions display a "pattern," as if the irritant had been applied by a bandage, or, conversely, had been used where the skin was left uncovered. Again, if a fluid irritant has been employed, outlying spots or streaks may be observed where the fluid has "run" during its application.

In the case of some injuries, especially in those of an ulcerative character, points which are often of service in diagnosis are the recognition of the healthiness of the patient, and of the ulcer itself, its rapidity in healing and facility of recurrence, as well as the presence and character of old scars. The colour and shape of the lesions, or scars, and the odour, which may sometimes be noted, are also of assistance.

Such points as these strike the experienced observer at once, and go far in forming the diagnosis. But cases occur from time to time which succeed for a time in deceiving even the most skilled. This is especially the case with women of whom it is said, "But she can have no motive for doing this." It is very instructive to look over the transactions of dermatological societies, and to observe how every now and then a patient suffering from some peculiar form of erythema or pemphigus is brought forward, of whom usually the exhibitor has his suspicions, and in a few weeks reports accordingly that, in the matter of the peculiar case of pemphigus exhibited by him, further observation showed that the eruption was undoubtedly factitious, and the patient a malingerer. A trained nurse with a good record, who has acquired the trick of so manipulating the clinical thermometer as to show "temperatures," has great possibilities before her as a producer of factitious skin diseases. The diagnosis of such cases is rendered much more difficult if the patient be liable to certain forms of disease; thus a feigned urticaria would be exceedingly difficult to detect in a person who is liable to factitious urticaria of the ordinary kind, especially if the tendency be strong. Similarly, in those rare cases in which factitious urticaria seems to pass into factitious purpura, the production of a hæmorrhagic eruption would be extremely difficult to interpret; and so again in hæmophilia. Occasionally also the administration of certain drugs will produce some form of dermatitis; thus, iodide of potassium produces a characteristic vesicular or pustular and bullous eruption, and this may even become hæmorrhagic. Such drugs are rarely taken for the purpose of deception, but if they happen to be in use at the time when a feigned eruption is being produced, the diagnosis may become very difficult. Perhaps some of the so-called neurotic hæmorrhagic eruptions may have this origin.

When suspicion is once excited complete discovery usually follows soon; but there are cases which serve to exercise the skill of the most observant practitioner.

If the practitioner declare his opinion promptly he may incur the enmity, not of the patient only, but, in many cases, of the whole circle of relations and acquaintance also. The diagnosis must first be made so clear that the most partial relative must admit the truth of it. Particularly must we remember in consultation that care should be taken to avoid sensational disclosures.

Instances of such eruptions are many, and occur in the experience of every practitioner; each one has its own peculiar interest; a list of some of the records on the subject is appended.

The substances used in the production of these eruptions are many. The most usual are fluids containing acids or alkalies; and among them those most readily obtained—for example, vinegar, acetic acid, carbolic acid, nitric acid, sodium carbonate, common salt; solutions of cantharides, turpentine, nitrate of silver, and indeed many other substances. Mechanical injury, as by means of pins or needles, binding a copper coin tightly on the skin, or even rubbing the skin with a moistened

finger, may set up a dermatitis. The skin may be burnt with matches, or coloured by black lead and other pigments; indeed, the ingenuity of the determined malingerer may lay almost every known irritant under contribution.

It is well to recollect that various occupations may produce dermatoses, usually of an inflammatory character (*vide* p. 914). Such lesions are naturally aggravated if the individual be disposed to certain forms of dermatosis. Thus the subject of severe epidermolysis bullosa, or certain hæmophilics, can scarcely do any sort of manual work without the production of vesicles, bullæ, or hæmorrhages. A dock-labourer, who is the subject of hyperidrosis with the tendency to pompholyx, is much more liable to septic inflammation of the feet and hands than his neighbour who is free from this disposition. Ichthyosis, eczema seborrhoicum, and other such diseases dispose all those who are affected by them and have to perform manual labour, to sundry forms of dermatitis; simple manual labour may aggravate the pre-existing disease. Yet there are occupations which produce various forms of dermatitis in the most healthy; such are working in cinchona bark, the manufacture of bromine, iodine, the acids, alkalies and other chemicals, or the preparation of timber with tar or creasote; but the lesions so produced are either of the nature of an ordinary dermatitis, or have special features of their own, or on other grounds can be distinguished from feigned eruptions.

The treatment as a rule is dictated by the diagnosis, and consists in preventing the patient from using the particular means of irritation. Frequently the application of an impermeable and irremovable dressing for a few days proves the diagnosis and is the best method of treatment.

JAMES GALLOWAY.

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J. G.

APPENDIX

MALARIAL FEVER

[It is impossible by means of supplements to keep a work of this kind abreast with advancing years, for new matter of importance is rarely a mere appendage, but, entering into the main subject, transforms it in great part, or even revolutionises it. Yet the recent discoveries in the life-history of the parasite of malaria, made since the publication of Professor Osler's article in vol. ii. p. 721, are of such interest that the present Appendix seems more than justifiable.—Ed.]

When Professor Osler wrote the article "Malarial Fever," in the second volume of this work, nothing was known of the life of the malaria parasite outside its human host. Since that time important advances have been made; it may now be confidently affirmed that the leading features of one phase at least of this extra-corporeal life have been ascertained.

In an editorial note to the article referred to (vol. ii. p. 728) it was pointed out that the "flagellated body" probably represents the first step in the extra-corporeal life of the malaria parasite, and that the mosquito is an important agent both in liberating and in transmitting it. That this insect is somehow concerned in the production of malarial disease had long been conjectured. Its association with swamps, with high atmospheric temperatures, its geographical distribution, its nocturnal habits and other circumstances, had forced this conjecture on many minds. Certain savages even have recognised the connection, and, believing that malarial fever is caused by mosquitoes, give the disease and the insect the same name. In 1848 Nott, and, again, in 1883 King, formulated such a hypothesis, more or less definitely. In 1891 Laveran (9) suggested that possibly the mosquito might subserve the malaria parasite much in the same way that it had been shown to subserve Filaria nocturna. In the same year Flügge enunciated a similar idea; and, in the following year, Koch and Pfeiffer (15) suggested that, as in the case of certain coccidia, the malaria parasite might have a double cycle—one cycle being

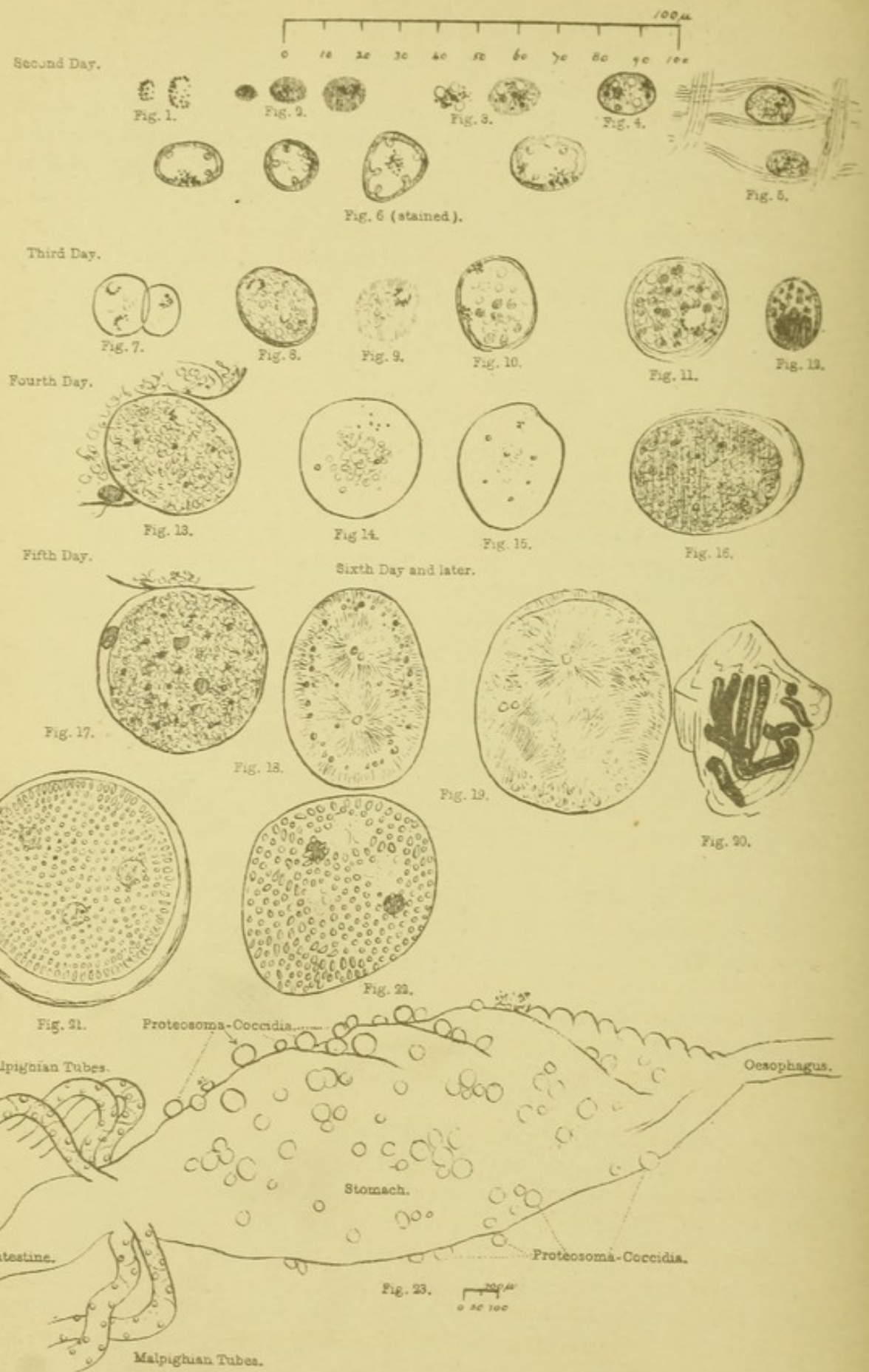
intended for life inside the human body, the other for life outside the human body, the latter cycle being accomplished possibly in some suctorial animal.

In 1894 (11), and again in 1896 (11), I ventured to interpret the well-known fact that it is not until the crescent body of the æstivo-autumnal, and certain full-grown forms of the tertian and quartan infections have left the human body that they proceed to exflagellation, as signifying that this phase, which is common alike to the malaria parasite of man and to the malaria-like parasites of birds, is intended to subserve the extra-corporeal life of the parasites concerned; in other words, that this is the first step in their extra-corporeal existence. Further, basing my argument on the close parallel subsisting between F. nocturna and the malaria parasite as regards their anatomical position as blood parasites, their biological necessities, their geographical distributions, and their development at a later stage of distinct evidences of locomotive and penetrating faculties, I concluded that it is with the malaria parasite as with the filaria; that some extraneous agency is required to remove it from the human blood-vessels; that this agency is the mosquito; that, after ingestion, it assumes locomotive characters and penetrates the tissues of the mosquito; that it becomes parasitic for a time in this insect; and, just as with the filaria, that only particular species of mosquito are effective hosts. Major Ronald Ross, I.M.S. (16), embraced these ideas, and, in a series of brilliant observations and experiments characterised by a sagacity, a resourcefulness, and a perseverance rarely excelled, has thoroughly established their correctness, in part as regards the malaria parasites of man, and completely as regards one of the malaria-like parasites (proteosoma) of birds. Important supplementary observations have been made by Dr. MacCallum. Ross's work has been fully confirmed by Grassi, Bignami, Bastianelli (1), Celli, Koch, and Daniels. Working on the lines so plainly indicated by Ross, the Italian observers have filled in the details which circumstances compelled him to leave undescribed in his human malaria work; they have also determined some of the species of mosquito concerned in the propagation of the malaria parasites.

Such is a brief summary of the history of a discovery pregnant with important practical results to mankind. For a fuller account, and for a complete bibliography, the reader is referred to Dr. Nuttall's recent essays (14).

Ross, in his earlier observations, made out the significant fact that when a mosquito ingests the blood of a malarious subject in whom the crescent parasite was present, practically all the ingested crescents rapidly become spheres, and a large proportion of them proceeds to exflagellation. MacCallum subsequently showed that in halteridium (a malaria-like intracorpuscular parasite of crows, pigeons, and other birds) the bodies corresponding to the crescent-derived spheres of human malaria are of two kinds, alike in size and shape, but different in function and somewhat in appearance, one type of sphere being hyaline, the other granular. He found that it is the hyaline spheres only which produce

Plate I.



Proteosoma in Culex pipiens. After Ross.

flagella, representing, as it were, the male element. He also found that when the flagella break away they congregate around the granular spheres and energetically attempt to enter them. At one point of the periphery of the granular sphere a minute papilla is protruded, and at this point a single flagellum effects an entrance. The granular sphere may therefore be regarded as the female element; the entry of the flagellum as an act of impregnation. After the entry of the flagellum the contents of the sphere are agitated for a short time, apparently by the movements of the invading flagellum. No second flagellum can effect an entrance. The agitation of the contents of the sphere quickly subsides, and for a space the little body remains apparently unchanged. After some minutes, however, it begins to undergo changes. It gradually becomes elongated and sharply-pointed or beaked at one end, ultimately assuming a shape something like that of the blade of a broad-headed spear. The pigment also undergoes a change of position, accumulating in the broad or posterior end. The little body now begins to move, at first slowly then more rapidly, with a wriggling motion; the pointed and now hyaline end being in front. When this metamorphosed body, which may be very appropriately termed "travelling vermicule," encounters a blood corpuscle, white or red, it passes through it.

MacCallum has also seen the impregnation by the flagellum of the crescent-derived sphere of human æstivo-autumnal malaria, but he has not seen the formation of any body corresponding to the travelling vermicule of halteridium, nor has any similar observation been made as yet in the case of the corresponding bodies of quartan and benign tertian malaria. As, however, in the human æstivo-autumnal parasite, the crescent-derived spheres are of two kinds—hyaline and granular; and as it is the hyaline spheres alone that produce flagella, just as in halteridium, analogy leads us to conclude that in the former, under natural conditions, there is a corresponding or travelling vermicule stage also. The same remarks doubtless hold good for proteosoma, and for the quartan and tertian parasites.

There can be little doubt that the travelling vermicule is endowed with locomotory and penetrating properties in order that it may pass from the blood filling the stomach (middle intestine) of the mosquito into the tissues, constituting the wall of this organ. The intermediate stages have not been observed; but if a mosquito which has fed on blood containing proteosoma be examined, about the second day after feeding, certain pigmented oval cells, 8 to 10 μ in diameter (Pl. figs. 1-4), will be found lying in the interstices of, and to a certain extent disassociating (Pl. fig. 5), the longitudinal and transverse muscular fibres of the stomach. The characters of the pigment and the fact, abundantly proved by Ross, that they occur only in mosquitoes fed on proteosoma-containing blood, make it certain that these bodies are the metamorphosed blood parasites. These cells are readily recognised by their sharp outline and by the black pigment grains, arranged in groups or lines or scattered about irregularly, they contain. If similarly infected mosquitoes be examined at serial

intervals it will be found that these pigmented oval bodies increase rapidly in size, acquire a capsule (Pl. figs. 6-22), and, ultimately, project like warts into the body cavity of the insect (Pl. fig. 23). During this increase in size a number of minute spheres are formed in the interior of the capsule, and on the surface of each of these spheres a vast number of spindle-shaped filaments, sporozoites, flagellulæ, or, as Ross called them, germinal rods, are developed, each spindle being attached by one extremity to its corresponding sphere (Pl. figs. 18, 19). As maturity is approached the grains of pigment, which hitherto were easily visible, tend to disappear; the spheres also vanish; so that ultimately only the capsule, now some 60 μ in diameter, packed with spindle-shaped filaments, 12 to 16 μ in length, remains. After from six days to three weeks, earlier if

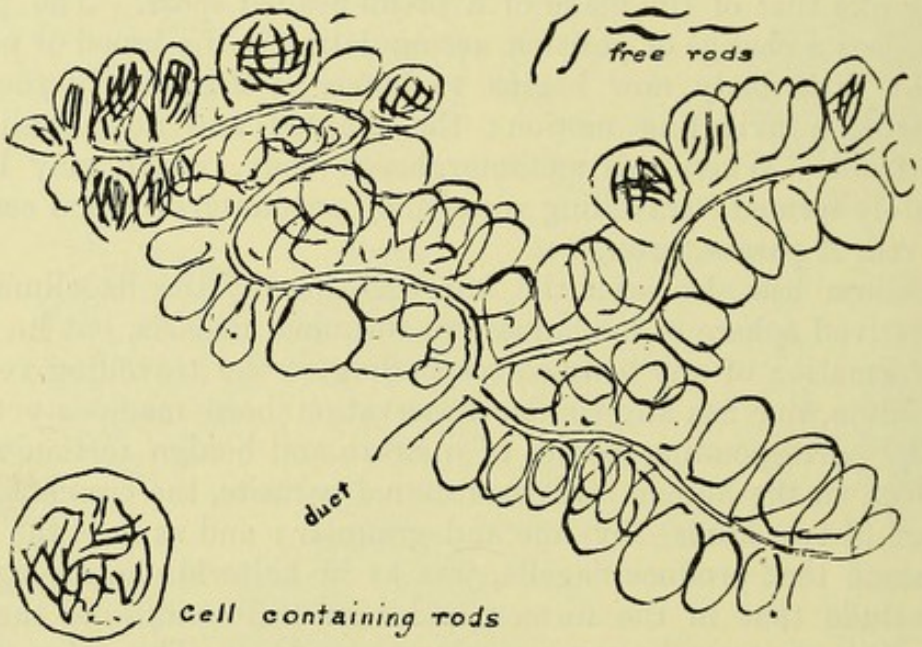


FIG. 15.—Germinal rods and cells of the malarial parasite.

atmospheric temperature is high, later if temperature is low, the capsule ruptures and collapses, pouring its contents into the body cavity and so into the insect's blood. It is doubtful if the spindle-shaped bodies possess movement. By the blood they are carried to all parts of the body. They finally find their way into the large grape-like cells and ducts of the three-lobed veneno-salivary gland, especially into the cells of the small middle lobe.

This veneno-salivary gland is situated in the head of the mosquito, communicating by means of a long duct with the base of the middle stylet, or lingula. Should the infected insect, after its salivary gland has been invaded in the manner described, feed on an appropriate vertebrate host (a sparrow, for instance, in the case of proteosoma, man in the case of the malaria parasite), the spindle-shaped flagellulæ, or germinal rods, are during haustellation injected into the tissues of the bitten animal. Later, if after a week or ten days the blood be

examined, it will be found that this animal has become infected with the special parasite, and will exhibit corresponding clinical symptoms.

We can now, therefore, describe two complete cycles, intra-corporeal and extra-corporeal, of the malaria parasites. In zoological terms, adopting those employed by Ross, Celli, and others, the youngest parasites occur as *amœbulæ*, or *myxopods*, within the red-blood corpuscles of vertebrates. They increase in size, acquire pigment, and, at the end of a definite time, become either (*a*) *sporocytes* or (*b*) *gametocytes*.

(*a*) The *sporocytes*, when mature, divide into spores which escape into the liquor sanguinis, invade fresh red-blood corpuscles, and repeat the cycle. In this way the parasite is propagated indefinitely in the vertebrate host.

(*b*) The *gametocytes*, which in some species assume a crescentic form while in other species they resemble the mature sporocytes, continue to circulate for a time (as yet undetermined) in the blood of the vertebrate, or until transferred to the stomach of particular species of mosquito. On being so transferred they escape from the enclosing red-blood corpuscle, and can then be recognised as being of two kinds—hyaline and granular. The hyaline, or *male*, gametocyte emits a number of *microgametes* (flagella) which, on becoming free in the blood plasma, seek out the granular or *female gametocyte*. The female gametocyte, consisting of a single *macrogamete*, is then fertilised by the entrance into it of a microgamete. A *zygote* is the result. The zygote acquires locomotory and penetrating properties in virtue of which it transfers itself to the interstices of the muscular layer of the middle intestine of the mosquito. It now grows rapidly, acquires a capsule, and ultimately projects into the body cavity of the insect. During this rapid growth nucleus and protoplasm divide into a number of *zygotomeres*, which become *blastophores*, each bearing on its surface, attached by one end, a large number of filamentous *zygotoblasts* or *sporozoites*. Finally the blastophores disappear, the capsule of the zygote ruptures, and the zygotoblasts are poured into the body cavity of the mosquito. They are then taken up by the blood of the insect, ultimately becoming lodged in the cells and ducts of the veneno-salivary gland, whence they are emitted into the blood of a vertebrate when the mosquito next proceeds to haustellation. In this way an extra-corporeal cycle of the parasite is completed ; and in this way the parasite may be transferred from one vertebrate to another of the same or, possibly, of a different species.

That this constitutes one chapter, and that an important one, in the life-history of the malaria and analogous parasites is certain ; but that it is the complete story is by no means so sure. In the case of the malaria parasite, it may be asked if this alternating intervention of man and mosquito is necessary and invariable? Are we to conclude that, if there be no human host from whom to abstract the parasite, there can be no infection of the mosquito ; and no bite by an infected mosquito, no introduction of malaria parasite into man? There are facts, facts apparently

well established, which seem to indicate that the story narrated above is not all, that this constant intervention of man is not always necessary, and that there is an additional chapter, or chapters, in a life-history already sufficiently complicated.

There are certain places which are practically uninhabitable in consequence of the extreme prevalence of malaria. In such places there are few human inhabitants, if any. How, if man be a necessary factor in the malaria cycle, are we to account for the malaria in such districts?

We know that in the case of avian malaria, whether proteosoma or halteridium, the same species of parasite occurs in several distinct species of bird. It may be, therefore, that in the insalubrious localities referred to some other vertebrate takes the place of man in keeping up the malaria cycle; or it may be that the intervention of a vertebrate is not indispensable, the malaria parasite passing without vertebrate intervention from one generation of mosquitoes to another. In support of the former hypothesis is the fact that Dionisi (5) has found in bats in the Roman Campagna parasites closely resembling the malaria parasites of man. In support of the latter hypothesis we have the facts of the transmission of the sporozoal parasite, *Pyrosoma bigeminum*, of Texas cattle fever from the parent tick, *Oophilus bovis*, to its offspring, and of the sporozoa of pebrine from the silkworm moth to its eggs and caterpillar.

It appears to be well established that in malarious districts disturbance of the soil is specially apt to be followed by malarial infection of those engaged in the work, and of the inhabitants of the locality. It is difficult to understand, if the bite of the mosquito be the only means by which man is infected, in what way mosquito activity can be specially affected by the turning over of a few feet of earth. The facts suggest, rather, that the malaria germ, previously deposited in some way in the soil, is shaken out and perhaps inhaled during the attendant digging operations.

Major Ross has made certain observations on mosquitoes fed on proteosoma-containing blood—observations corroborated in Italy and found there to apply to human as well as to bird malaria—which are highly suggestive of yet another extra-corporeal phase of these parasites. It is possible that when the facts as regards this phase are fully ascertained many points in regard to the acquisition of malarial infection, at present difficult of explanation, will be cleared up. In a proportion of his proteosoma-fed mosquitoes Ross found in the capsulated zygotes certain relatively large, black, sausage-shaped bodies whose presence and destiny he and others have failed to elucidate. These bodies have been found only in insects fed on infected blood; never in non-infected controls. They are, therefore, a phase of the parasite. The *black spores*, as Ross called them, are highly resistant, remaining unchanged in water for months, and passing unaltered through the alimentary canal of mosquito larvæ. It has been suggested that these bodies are degenerated, dying forms; and, again, that they are a fungous disease of the malarial zygote. It seems to me that both suggestions are highly improbable. In those

connected with malaria, which are lighter in colour than those appertaining to proteosoma, nuclear elements have been detected; this evidence of vitality, together with the faculty for resistance they display, suggests that the "black spores" function as resting spores which, on the occurrence of appropriate conditions, can start into activity; and that, pending these conditions, they can remain dormant in some unascertained medium for an indefinite time.

Again, we can conceive that while some of the zygoto-blasts (sporozoites) pass into the cells of the veneno-salivary glands, others may enter the eggs of the mosquito, and so carry the parasite from one to successive generations of insects. The Italian observers have found protozoal parasites of some kind in the eggs of the mosquito; they have failed, however, to convey malaria to man by means of mosquitoes reared from the eggs of malaria-infected insects.

Ross has shown that the development of proteosoma in mosquito is much influenced by temperature, being retarded or checked by low temperatures. During winter mosquitoes remain in a dormant condition in caves, houses, and other sheltered places. Apart, therefore, from the possibility of mosquitoes at the beginning of the malarial season in subtropical countries becoming charged with the parasites from the subjects of malarial relapses, it is probable that malarial germs are carried through the cold season in a dormant condition in the tissues of hybernating mosquitoes, and may thus be successfully transferred to man when the atmospheric temperature rises in the spring.

In view of the foregoing considerations it becomes a matter of the highest importance, from the standpoint of prophylaxis as well as etiology, to ascertain the species, the zoological characters, and the habits of the malaria-subserving mosquito.

The European *Cuticidæ* are divided by Ficalbi into three genera—*Anopheles*, *Culex* and *Aedes*. The length of the palpi is a useful feature in determining the genus to which any particular species belongs. In *Anopheles* these organs are in both sexes equal in length to the proboscis; in *Culex* the palpi in the male are of the same length as the proboscis, in the female they are considerably shorter; in *Aedes* the palpi in both sexes are much shorter than the proboscis.

Hitherto the malaria parasite has been found only in species belonging to the genus *Anopheles*—*A. claviger* (*maculipennis*), *A. pictus*, and *A. bifurcatus*. These, according to Ficalbi, are the only species of the genus to be found in Europe, *A. nigripes* and *A. villosus* being regarded, both by Ficalbi and Grassi, merely as varieties of *A. bifurcatus*. The species of "dapple-winged" mosquito (*A. Rossii*, Giles) (17) in which Ross originally found the malaria parasite in India, as well as the malaria-bearing mosquito which he has recently discovered in Sierra Leone, probably belongs to the same genus, representatives of which are widely distributed throughout the world, including England (*A. claviger*, *A. bifurcatus*, Stephens, 1885). In Italy *A. claviger* seems, as regards malaria, to be the most important species.

Culex fatigans (Wiedemann) (17), Ross's gray mosquito, is not an efficient host of the malaria parasite; it subserves proteosoma, however. According to Ross, the various species of *Anopheles* are more especially rural insects. They rarely breed in water-tubs or similar artificial collec-

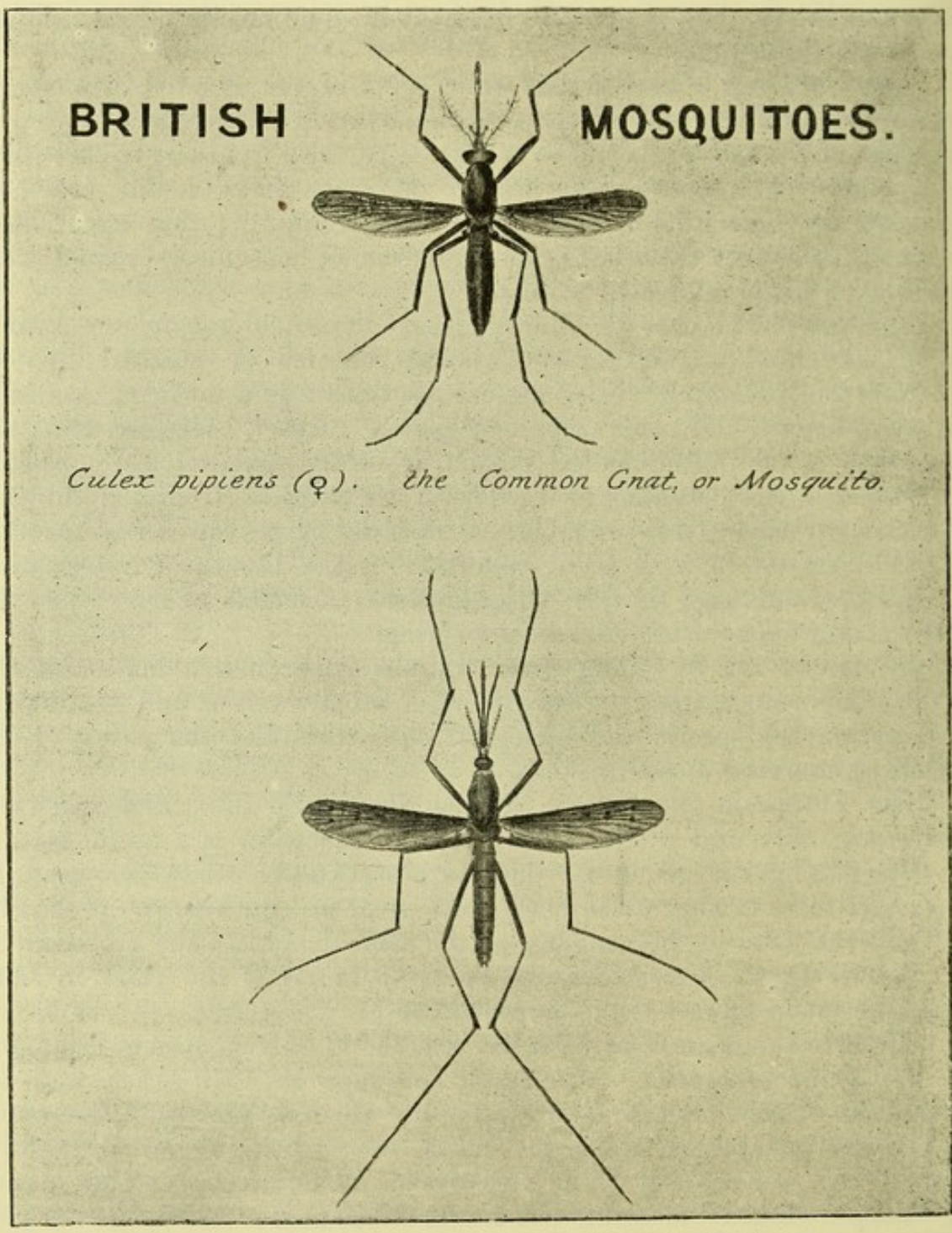


FIG. 16.—*Anopheles maculipennis clavigar* (♀). (After Austen.)

tions of water such as occur about houses; their favourite breeding-spots seem to be small puddles in the ground, so small that fish, which prey on mosquito larvæ, do not occur in them, but big enough not to be quickly dried up. According to the same author, the larvæ of *Anopheles* and *Culex*

can be readily distinguished. The young of *Culex* in breathing hang with the head downwards at right angles to the surface of the water, the breathing organ being situated at the tail; those of *Anopheles* float flat on the surface of the water owing to the absence of a caudal breathing-tube. Ross further points out that when resting on a wall or other surface the body of *Culex* is parallel to the surface it is resting on, whereas that of *Anopheles* is at right angles. These are features by which the genera can be readily recognised, even by the unskilled.

Practical measures for the prevention of malaria must depend in great part on a knowledge of the habits, requirements, and haunts of the particular kinds of mosquito concerned, that is, of *Anopheles*. It is manifest that important preventive measures are the filling up or draining of all collections of stagnant water, no matter how small, in the vicinity of human habitations; and the use of mosquito curtains both in the case of persons already infected, and of those who desire to avoid infection or re-infection. Both before and since the discovery of the part played by the mosquito in malaria many suggestions have been made as to the best methods of ridding a locality of this insect pest. So far, besides the introduction of fish, the best and most feasible of these suggestions is the pouring of a small quantity of crude petroleum on the surface of such ponds or small collections of stagnant water as for any good reason cannot be dealt with by drainage and filling in. The petroleum, gradually spreading on the surface of the water, asphyxiates the larvæ already present, and prevents the mosquito from depositing her eggs.

It may be useful to add a scheme of classification and nomenclature for the various known species of human and avian malaria parasites. Ross divides them into two genera, as follows :—

Family : HÆMAMŒBIDÆ, Wasielewski.

Genus I. : *Hæmamœba*, Grassi and Feletti. *The mature gametocytes are similar in form to the mature sporocytes before the spores have been differentiated.*

Species 1 : *Hæmamœba Danilewskii*, Grassi and Feletti. Syn. : *Laverania Danilewskii*, Grassi and Feletti, in part ; *Halteridium Danilewskii*, Labbé ; etc. Several varieties—possibly distinct species. Parasite of pigeons, jays, crows, etc.

Species 2 : *Hæmamœba relicta*, Grassi and Feletti. Syn. : *Hæmamœba relicta* + *H. subpræcox* + *H. subimmaculata*, Grassi and Feletti ; *Proteosoma Grassii*, Labbé ; etc. Parasite of sparrows, larks, etc.

Species 3 : *Hæmamœba malariæ*, Grassi and Feletti. Syn. : *Hæmamœba Laverani*, Labbé, in part. Parasite of quartan fever of man.

Species 4 : *Hæmamœba vivax*, Grassi and Feletti. Syn. : *Hæmamœba Laverani*, Labbé, in part. Parasite of tertian fever of man.

Genus II. : *Hæmomenas*, gen. nov. Syn. : *Laverania*, in part + *Hæmamœba*, in part, Grassi and Feletti. *The gametocytes have a special crescentic form.*

Species : *Hæmomenas præcox*, Grassi and Feletti. Syn. : *Hæmamœba præcox* + *H. immaculata* + *Laverania malariæ*, Grassi and Feletti ; *Hæmamœba Laverani*, Labbé, in part, etc. Several varieties—possibly distinct species. Parasite of the irregular, remittent, pernicious or æstivo-autumnal fever of man.

The two species lately discovered by Dionisi in bats appear to belong, one to one genus, and one to the other. Two species described in frogs do not contain pigment, and require further study. Grassi and Feletti's arrangement is very confused, chiefly on account of their combining *H. Danilewskii* with the crescentic gametocytes of *H. præcox* in a separate genus, *Laverania*. Labbé admits only one human species, and yet erects two genera for the avian species. The double spore-clusters of *H. Danilewskii*, on which he lays much stress, are not always found, and are at the best due, Ross thinks, merely to the presence of the nucleus compressing so large a parasite. There is little to justify a generic distinction between the four species of *Hæmamœba*. On the other hand, the single species of the genus *Hæmomenas*, *Hæmomenas præcox*, is sharply distinguished from those by differences which justify the division of the family *Hæmamœbidæ* into two genera.

PATRICK MANSON.

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