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THE PRACTITIONER'S

HANDBOOK OF TREATMENT;

OR,

THE PRINCIPLES OF THERAPEUTICS.



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THE PRACTITIONER'S HANDBOOK OF TREATMENT;

OR,

THE PRINCIPLES OF THERAPEUTICS.

BY

J. MILNER FOTHERGILL, M.D.,

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TO

J. M. DACOSTA, M.D.,

PROFESSOR OF PRACTICE OF MEDICINE, JEFFERSON COLLEGE,

PHILADELPHIA,

WHOSE REPUTATION EXTENDS OVER TWO CONTINENTS,

This Work is Dedicated

BY

THE AUTHOR.

PREFACE.

This work is not an imperfect Practice of Physic, but an attempt of original character to explain the *rationale* of our therapeutic measures. First the physiology of each subject is given, then the pathology is reviewed, so far as they bear upon the treatment; next the action of remedies is examined; after which their practical application in concrete prescriptions is furnished.

It is not essayed to give prominence to new remedies or new therapeutic measures, so much as to analyze and elucidate the *modus operandi* of the measures in common use. It is designed to furnish to the practitioner reasons for the faith that is in him; and is

a work on medical tactics for the bedside rather than the examination table.

For nine years the writer has been labouring with the definite design of producing the present work. In consequence of its original character much difficulty has been felt from want of some guide to indicate—not so much what to insert, as what to leave out and where to stop. A certain amount of repetition has been found unavoidable; but the plan of Sections has been adopted to reduce this to a minimum. It is perhaps impossible to generalize broadly, and yet to be accurate in minutiæ: nevertheless the writer trusts that general principles have here been demonstrated without any violence to facts.

For advice and suggestions how to improve the work in future editions the writer will look to his critics, adverse as well as friendly—each alike valuable to him whose aim is strictly to advance knowledge.

The writer must here express his thanks to the Journal Committee of the British Medical Association

for their kind permission to reprint such portions of this work as have appeared as leaders in the *British Medical Journal.*

He must also acknowledge his indebtedness to Dr. Lauder Brunton, F.R.S., for much friendly counsel; to Sir Joseph Fayrer, K.C.S.I., and to Surgeon-Major A. R. Hall for information on matters more especially connected with India; and lastly to Mr. Herbert Page for revision of the manuscript, and to Mr. E. O. Bark for his co-operation in the correction of the proof-sheets.

22, Lower Seymour Street, Portman Square, W.
October 10, 1876.

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APPENDIX 571

ERRATUM.

Page 433, *for* "anhydrotics," *read* "anhidrotics."

THE

PRACTITIONER'S HANDBOOK OF TREATMENT.

CHAPTER I.

INTRODUCTION.

§ 1. The ultimate aim of all medical research is the treatment of disease. It is eminently desirable that a medical man be generally well-informed; but what is to be still more devoutly wished for is that he shall be a skilful practitioner. It is quite possible to be the one without being the other. The combination is what we hope to see commonly accomplished. The tendency of recent teaching has been rather to produce the first, leaving the second quality to develop itself or to remain in a condition of imperfect evolution, as might fall out. This is not an individual opinion, in which case it would have little weight, but a general comment. We constantly hear it asserted that the highly-educated medical men of the present generation are not more successful in practice than their less accomplished but more practical predecessors. Even members of the profession are to be found who assert that the man under whose treatment they would place themselves, if seriously ill, is the old-fashioned general practitioner. This is a very serious reproach to all our recent advances in scientific medicine; to our modern instruments of precision in diagnosis; and even to our progress in rational therapeutics, with the remedies added to our armamentarium in late years.

§ 2. In order to understand how progress in one direction may

exist without corresponding advances in other directions, indeed with a certain amount of retrograding in some respects, we must clearly distinguish betwixt medicine as an art and medicine as a science. At present, the aspect usually presented to us by medicine is that of it as a science. We are beginning to have precise notions about the rational consequences of valvular disease of the heart, and to see why one set of consequences results from a defect in one valve, and why a totally different series of results follows from imperfection in another valve. We are learning to distinguish the locality of disease in the brain from the various disturbances produced in it, according to the functions of the part affected. We have learnt the lesson that much of the disease of advanced life is due to imperfect elimination of nitrogenized waste. The relation of mental conditions to bodily derangements is just dawning upon us in the ordinary diseases of the sane. Physiological inquiries are moreover pointing out to us the right direction of our therapeutic measures, and lighting up areas never to be successfully illumined by empiricism. For instance, the treatment of angina pectoris by nitrite of amyl was the logical outcome of certain physiological inquiries as to the action of this drug, together with some very exact observations as to the actual condition of the circulation during the attack. The synthesis, thus erected by Dr. Lauder Brunton, and successfully applied in the wards of the Edinburgh Royal Infirmary, is an excellent illustration of the power of well-conducted physiological inquiry to aid us in practical medicine. The experiments of Oscar Liebreich have given us chloral hydrate, an hypnotic of the greatest value. The stethoscope, the laryngoscope, the ophthalmoscope, the sphygmograph, the thermometer, the urinometer and cognate diagnostic aids have done much for us in the recognition of disease. The microscope has rendered services to medicine as an art as well as a science. It has cleared up the nature of a whole class of skin diseases hitherto shrouded in mystery; while in the recognition of certain internal affections it is simply invaluable. Such are some of the important steps recently taken in that division known as the science of medicine.

In the art of medicine we cannot boast of such magnificent advance. As our instruments of precision have become more

numerous, as well as more exact and trustworthy, we have insensibly come to regard the information thus furnished to us as of primary importance; until the information derived from a careful collection of rational symptoms, from a cautious consideration of the general condition, has been awarded a subordinate position. In fact, we attach an exaggerated importance to one series of facts and under-estimate the value of others. At present physical signs preponderate in the mind of the practitioner over rational symptoms, to the detriment of the patient, and possibly to the discredit of the profession. The public cannot be expected to estimate us by any other measure than that of our usefulness. It is all very well for a patient to feel that his medical man is a gentleman; that he is carefully trained in physical examination, and capable of constructing a skilful diagnosis; who has added a residence abroad, and the observation of foreign schools, to his home-acquired attainments; but the essential thing after all is confidence in his power to aid him when stricken and prostrated by disease or accident. The latter is our actual business and occupation in life; and it is here that success is most to be desired. We can now perform the longest and most excruciating operations without the patient feeling one pang of suffering: we can give relief by hypodermic injections of morphia more speedily, efficiently, and with less of those undesirable after-effects of morphia, than we could ere this invention; to say nothing of its value in intractable vomiting. We can enable an injured heart to develop compensatory growth, and so, in many cases, preserve for years valuable lives, which until recently must have soon been lost to us. By our improvements in facilitating nutrition we can rear successfully myriads of children who but a generation ago would have swelled the death-rate of those who die under five years of age. By a carefully-selected diet the diabetic patient can be preserved for years.

The widespread use of antiseptics and disinfectants is already working much-needed reform in relation to the arrest of the spread of disease, and in rendering our refuse less harmful. Indeed there is much to render this century memorable in the annals of medicine as an Art as well as a Science.

§ 3. On the minds of some, both in the profession and out

of it, there is a firmly established fear that there is something dangerous and unsafe in too much understanding of the nature of things, including the nature of disease. To such it seems much better and safer to rest contented; that it is the best thing to do certain things under certain circumstances without being too inquisitive or curious as to the how and the why: in fact they rather avoid being able to give a reason for the faith that is in them. To those who search into the nature of things they affix the term unpractical. If research has yielded positive information, and a law has been established, they call its elucidator a theorist. A theory, no matter how well-founded, has to them something dangerous about it, and indicates unsoundness in the enunciator of it. Such leanings have done much to retard the progress of medicine and have decidedly crippled its usefulness. The carefully-acquired knowledge of one man, however useful to himself and his patients, gave little or no additions to the general stock of information, because it remained individual knowledge derived from experience, which died with its possessor because he could not formulate it—could not so arrange it as to bring it within the sphere of the cognizance of others. He could treat one complex case admirably from his previous experience of like cases, but he could not enable another to treat such, or similar cases. The knowledge existed —but not in a communicable form. It has always appeared to the writer that if such experience could only be rendered available to others, a great step would be secured. Much of the advance of knowledge lies in the capacity of one generation to benefit by the experience of its predecessor, in the power to appropriate the information gathered by those who have gone before us,—knowledge which we in our time should leave elaborated and enlarged to those who shall come after us. Medicine is no exception to this rule. A man should not only learn for himself, but he should gather and garner for his successors. The circumstances of having undergone an apprenticeship, of being brought up in a surgery, of being from childhood in the society of medical men, together with some personal fervour, and a firm confidence in the future of medicine, may form some excuse for the writer's attempting a task which is felt to be difficult, though it is hoped not insurmountable.

In carrying into execution the scheme as it now presents itself, no attempt will be made to gather together all the facts of medicine, to collect all the information possible, nor indeed to enumerate all the members of the pharmacopœia. Such aim would tend to make this work encyclopædic instead of a treatise rather inciting and suggestive. The aim of the writer, if it can but be accomplished, is to supply a digest of the general principles of therapeutics, to arrange well-known facts of practice, together with the explanations furnished by pathological research and physiological inquiry, in such array and form, that the treatment of each individual case shall become a fairly intelligent and rational procedure, rather than a groping empirical guess. Failure even may indicate to some one else a line worthy of pursuit. Especially is some such work indicated for the use of those who receive a scientific education without anything like a corresponding acquaintance with actual practice; and who pass into the ranks of the profession, and are brought face to face with the care and responsibility of grave and complex cases, without that aid and supervision from teachers or seniors to which they have hitherto been accustomed. It is a serious matter, both for patient and medical man, this abrupt introduction to practical medicine, with all its difficulties and anxieties.

Practice differs essentially from the examination-table. An examiner may temper the wind to the shorn lamb, and remember that a diploma only guarantees the possession of a certain minimum of knowledge; but in practice the most complicated affections are presented to the tyro. Further too there is this difference; in the hospital the patient is merely a case of Bright's disease, or some other disease; in actual practice the patient is to a certain extent a patron, and the management of the case may exercise a distinct and powerful influence over the professional reputation and prospects of his medical attendant. Such a consideration alone is often sufficient to produce in the young practitioner a certain disturbance of the intellectual equilibrium, and to interfere with that serenity so desirable for calm investigation and decision; to induce in fact perturbation of a nature militating against perfect self-possession.

§ 4 It is soon apparent that a patient is not merely a subject of interest as the victim of some morbid process, nor even as

furnishing an opportunity for individual advancement merely; he is an elaborate and interesting organism possessing certain definite qualities. In fact he is a Man. He is a Being who possesses the attributes of humanity collectively; together with some variations which form individual peculiarities. In relation to the first he is an organism which has possessed the power of growth, of evolution until a certain point is reached. After that point is attained growth ceases, and a condition of perfect functional activity is established. In time, however, the system is no longer equal to maintaining its integrity, and certain modifications of nutrition are produced, which we recognise as evidence that the system is becoming old. Such changes are often prematurely induced and are then termed degenerations.

One thing especially strikes the observer in relation to disease, and that is the capacity of the organism to maintain its existence for several days without supplies of either food or drink. Yet the excretions are going on. It is also found that during this time of fasting there is a loss of body weight. In fact it becomes evident, as we shall see in another chapter (XXIII.) that the body possesses a reserve fund within itself; and that for some time it can exist solely upon this reserve fund. This possession becomes a specially valuable matter in disease. The fund takes its origin in the food we consume. After each meal so much is stored up; every day so much is withdrawn from this body bank. If each day's food had to furnish each day's supply of force, we should have a most uneven existence; and anything like a normal state would be impracticable. By this system of storage man saves up under favourable circumstances, and ekes out his daily needs under less favourable circumstances. There exists a species of capital, or physiological fund, into which he can pay or from which he can draw according to his necessities. This store of force will keep man alive, when deprived of food, for about ten days. With slight daily subsidies it will maintain life for a much longer period. Thus in acute disease this reserve fund enables the system to tide over the time of trial. If this period be survived the system is left weak, enfeebled and reduced in bulk and weight. After the active disease is over there comes a period of convalescence, when the body capital is being restored and a new fund of

force accumulated. This period is not without its dangers. The treatment of the disease by stimulants is alone rendered possible by the presence of this reserve fund. Stimulants enable the system to unlock some of its reserve stores. Alcohol too is, as we shall subsequently see, a readily oxidisable form of hydro-carbon, and as such is easily converted into force by the system. Often indeed it is the only food practically available. But it also enables the system to borrow from itself much more than it furnishes. When the person dies exhausted, the real state of matters is this—the reserve fund has been reduced below the point compatible with survival. This is death by exhaustion. This reserve fund of force exists in every individual. In some it exists in highly-marked condition, and these persons are said to possess great "stamina." Others possess it in a less degree, they are said to have little resisting power. Systems broken by disease, or wrecked by evil habits, possess but a small reserve fund. It is a matter of vital importance in the treatment of disease to be able to estimate fairly and correctly the extent and amount of this reserve fund in each and every case.

§ 5. Then come certain other matters which gravely modify the significance of objective phenomena of a more personal or individual character, which are not to be overlooked. First among these is the diathesis. The diathesis is the form or type of constitution inherited from the parents. Five such forms are described (see Chapter XII.): the strumous, the gouty, the nervous, the bilious, and the lymphatic. Each constitution carries with it certain tendencies and leanings, of the greatest possible practical importance. In each there is a distinct inclination to institute certain symptoms, and to present certain complications. The strumous are very often lacking in vital force, and are the objects of much care during convalescence from acute disease; especially if it be of a zymotic character. The gouty are very liable to ailments in advanced life, often of the most varied and even Protean character, but in each the imperfect elimination of nitrogenized waste forms the basis. In the nervous there is a distinct leaning towards complicated diseases connected with the nervous system, requiring special care and watchfulness. The bilious are always more or less troubled with an accumulation of bile-products in their portal circulation, and, with them, attention to

the liver is indicated in the treatment of all acute no less than of chronic affections. In those of a lymphatic diathesis there is always a feebleness of resisting power, and the unenergetic system requires much whipping up with stimulants, alcoholic and other, to enable it to tide over attacks of acute disease. In addition to these points of diathesis the family history is often most instructive. The long duration of life in one family often whispers hope under conditions of gloom. The history of the family will often put the practitioner upon his guard when there is nothing apparently in the case itself to arouse his apprehensions. Amongst personal characteristics too is the possession of endurance. In one system repeated attacks of disease may have shaken it to its very foundations, and the organism is already tottering, waiting for the last and perchance minute disturbance which will result in total overthrow. In another repeated perturbations seem but to have educated the system to seek a new equilibrium under disquieting circumstances, and this education enables it to recover from rude oscillations which would be utterly destructive to most systems. There is also the greatest possible difference in individual organisms as to the amount of food, wine, &c., required to compass a certain effort, or to evolve a given amount of manifested energy. Locomotives apparently identical vary much in the amounts of fuel they consume in performing a certain amount of work. Horses notoriously differ in the amount of food they require; the labour executed being apparently the same. All these different factors must be included in the correct appreciation of each case, and are quite as important matters as the objective facts ascertained by stethoscope and urinometer.

In certain combinations, varying widely in different systems, these individual characteristics just enumerated are so pronounced as to form what are called idiosyncrasies. Often quite unintelligible as to the why of them, these idiosyncrasies are most important matters in the treatment of disease. Thus one person cannot take milk, while others cannot eat an egg. Such peculiarities will always receive attention from the wary and farseeing practitioner. Then others cannot take quinine, or can tolerate some forms of iron only. To one few tonics are endurable, while another seems only to be the worse for every

conceivable form of neurotic. The intolerance of opium and mercury by certain persons is well known. It is often found combined in the same person, and especially in the subjects of chronic Bright's disease. In fact such intolerance should always furnish a strong hint to investigate the conditions of the kidney. Chloral hydrate, hyoscyamus, and other neurotics are well or ill borne by different individuals in a curious and almost inexplicable manner. In an aged couple recently under my care, both of whom were subject to attacks of suppressed gout, chloral was simply a poison to the lady, while her husband's praise of it amounted to eulogy.

§ 6. There are other points, associated with individual characteristics, of much importance in practical medicine, directing the prognosis and guiding the line of treatment. One is the general deterioration of physique, not always giving outward visible indications, which is found in persons who have undergone much privation, or who have lived under unfavourable circumstances for some space of time. Bad or insufficient food, impure and tainted water, and foul, polluted air, singly, but more potently when combined, in time produce a deterioration which readily reveals itself in the course of epidemics. The different areas of individual water companies have been found to give widely-varying results in the proportion of deaths occurring during epidemics. The high death-rate clings to the impure water-supply. Persons thus influenced, or unfortunately so placed, sink under disease much more speedily than others who live under more favourable circumstances. They possess little resistive force, and what they have is quickly exhausted by serious disease. In such persons it is necessary to commence a plan of stimulation, combined with nutritive food, in anticipation of the hour of trial. If this treatment be delayed till the indications present themselves, it will usually be found inoperative and unsuccessful; it has been too long deferred. In such cases the medical man must learn to see his evils far ahead and prepare to meet them.

On the other hand there is a large class of people not quite coming under the head of invalids, and yet not perfectly healthy, for whom a directly opposite line of treatment is indicated. They are persons who have established an ideal of health to aim

at, quite irrespective of their capacities. They do not possess a normal amount of health and strength, or age is commencing to lay upon them its enervating hand, yet they are loath to acknowledge either. They aspire to the habits and practices of perfect health, or of a by-past time, and bend all their energies to the attainment of these aspirations. Instead of reducing their self-imposed demands to the capacities of their system, they endeavour to whip themselves up to their ideal by large supplies of stimulating food and liberal draughts of alcohol. It is of no avail, however; and then a complete breakdown, followed by protracted convalescence, is the result achieved. If they can be prevailed upon by any means to moderate their aspirations, or be compelled to limit their demands upon themselves to their capacities, much better health, and even length of days would be practicable. They form a large and important class of chronic patients; with whose peculiarities and individual necessities the prudent practitioner will do well to make himself familiar. There is another class of persons who are chronic invalids of a different description, with whom more acquaintance on the part of the profession is desirable. They usually occur in the more affluent classes; indeed, their existence is scarcely compatible with hardship and penury. They have not yet found a biographer in the ranks of medicine: and the best sketch of such a person is the brief one by George Eliot in *Adam Bede*, where she describes Miss Anne Irwine, the Rector's invalid sister. A poor wretched spinster, with a small wan face, worn and sallow; with chronic headaches, necessitating rest in bed with a darkened room; the prey of neuralgia, and depression; utterly unacquainted with the sensations of buoyant health and possessing but a minimum of energy; bare existence under the most favourable circumstances is all to which such a system is equal. Great and tender consideration, a low voice whose tones vibrate with sympathy, and a noiseless step, are more desirable here than extensive acquaintance with remedial measures. Such cases do not furnish brilliant cures, as do the hysterical; but they furnish grateful, attached patients, susceptible and thankful for your consideration. It is the height of cruelty to demand manifestations of energy from such poor creatures,—they are simply not equal to them.

§ 7. Then again there is still another and larger class of patients—the chronic invalid, suffering from some incurable malady. It may be chronic gastritis, cirrhosis of the liver, a tuberculous lung, a weak heart, or granular kidneys which constitute the weak spot of the otherwise fairly healthy organism. If the injured or defective organ could but be restored to its pristine integrity, a return to something like perfect health would be feasible. But such restoration is simply impossible. "Health consists of a balance betwixt the various parts of the organism in power as well as in function." Consequently if the disease in one part be incurable, the sooner a new balance is struck the better. A general lowering or levelling down is alone calculated to preserve the organism in such cases; and attempts to improve the general condition too far by any process of levelling up is but too commonly followed by disastrous results. An improvement in the general condition is not rarely productive of a still further disturbance of balance betwixt the weak part and the rest of the body; and then usually a new accession of disease in the injured part follows as a consequence. For instance, if the kidneys are injured, a comparatively high state of general health, with good assimilation and much nitrogenized waste, is not uncommonly the cause of an attack of suppressed gout, may be as bronchitis or even pneumonia, the consequence of renal inadequacy; or an attack of acute nephritis may imperil the existence of the individual—which attack might have been avoided if the general condition had not differed so remarkably from the condition of the kidneys. Or, again, a person has a weak heart or an aneurism. Here the condition of chronic invalidism is more consonant with the continuation of existence, than is that of a capacity for exertion, which would test too severely these injured structures. It is a great point in practice to distinguish clearly when to cease our efforts to improve the injured part by measures directed towards the general condition, and when to inaugurate a line of treatment which shall bring the condition nearer to that of the incurable organ. Constantly in actual practice such modification of our therapeutic measures will be clearly indicated.

Such are several of the most important variations from the norm which will present themselves in daily practice. They present problems not always easy of solution. Sometimes we

are scarcely thanked for their solution: at other times they furnish us much credit. They all need careful recognition, and give much valuable material for the elaboration of a line of treatment. Practically the clear appreciation of these rational indications often outweighs the information afforded by instruments of diagnostic precision.

Very frequently the information thus afforded will put the youthful practitioner upon his guard in seemingly trivial cases, and prompt him to leave no stone unturned in cases where the physical signs are far from alarming; at other times it will whisper hope and encouragement where all seems dark and untoward; in either case it will exercise a most pronounced effect upon the line of treatment. In order that our therapeutics may be successful, a distinct recognition of the case in its entirety, in its subjective as well as its objective phenomena, is most necessary; and a thorough appreciation of what is to be dealt with must, or ought, to precede our measures for dealing with it, otherwise much valuable time may be lost, or opportunities have passed away—never to return; and an unavailing regret be left where a more guarded attitude at first might have changed the whole aspect. The view presented to the medical man after his examination of the case should be such that it will include the past history of the case; nay, more than that, it should embrace the family history on both sides, and should also furnish useful forecasts as to the probable future. This is a genuine diagnosis, and is as widely different from the mere physical diagnosis—now so fashionable—no matter how exact, as is a fertilized from an unfertilized ovum; the one is, too often, a mere series of barren facts, the other is pregnant with potential hypotheses.

§ 8. Having decided upon the ailment and formed a careful diagnosis, having satisfied the patient's friends as to the prognosis—it is perhaps not always desirable to tell the patient what is the matter or the gravity of the position, but never leave the friends in ignorance—the practitioner must proceed to construct his plan of treatment. It is a golden rule never to prescribe in an off-hand slip-shod manner; whoever does so will sooner or later trip. It is well always to construct, as far as possible, a distinct scheme and a definite plan of treatment. No matter how slight

or trivial the case, it is desirable always to act on an intelligible and intelligent plan. Always as far as practicable, we should prescribe with knowledge as to what we expect our remedies to do. It is certainly fortunate that the agents are not influenced in their action by any theories or hypotheses on which they are administered. If such were the case our therapeutics would indeed be chaos. Nevertheless it is always agreeable to give medicines with a lively expectation as to what they will do. Such prescribing always gives a greater sense of satisfaction than when one is driven to prescribe *secundem artem*, or according to an unilluminated empiricism. Often indeed it is necessary to sketch out a scheme which will not only include the immediate present, but which will map out a line stretching far into the future. It may be desirable to give, at first, sedative or diaphoretic remedies; to be followed in a day or two by mineral acids and bark, and ultimately by steel and cod-liver oil. Or a case of suppressed gout may require eliminant measures with alteratives and a restricted diet for a time; after which tonics, good food, and wine are desirable. These arrangements are not contradictory, nor even inconsistent; each has its turn of usefulness and then gives way to another. Such alternations do not indicate changes of opinion or caprice: they demonstrate a clear-sighted view of the case. As wheat is sown, grows, and ripens ere it is cut; so complex plans of treatment have their several stages. For instance, in an acute catarrh it is well to give depressant diaphoretics, as opium, antimony and iodide of potassium, first; and then, when the skin has been roused into free action, syrup of squills and phosphoric acid follow rationally in their turn. It is desirable first to throw the skin into action and lower the temperature, measures which relieve both the catarrh and the pyrexia; and then to give well-chosen tonics, and especially tonic expectorants, when the catarrh is bronchial: if it be nasal, phosphoric acid in infusion of cascarilla would rather be indicated.

Whatever line or plan the reader may adopt it should be rational above all things: if there is really nothing else for it, let it be selected by or from a well chosen empiricism, either personal or acquired. How to meet the bulk of cases encountered in practice will be described in the course of this work.

It is no part of the present scheme to provide a complete treatise on Practice of Physic. There are many such works of great excellence which can be profitably consulted. The attempt here is rather in the direction of enabling the reader to wield satisfactorily a great proportion of our remedial agents, and to guide him in his therapeutic evolution; teaching him how to educate himself, and how to apply remedial agents intelligently and successfully. Some learn quickly for themselves how to combine remedies, how to construct prescriptions exquisitely adapted to the case before them; but others are not so fortunate, and for them the combinations given in a concrete form throughout these pages may be useful.

§ 9. Our remedial agents form themselves into a number of classes. Several members of different classes may often be advantageously combined in one prescription. Then there are different remedial measures. They may be also united with good effect at the same time. We may briefly construct a typical prescription, and then may review combinations of different measures. Medicinal agents comprise remedies either possessing a general action, or acting chiefly upon one system, or perhaps one excretory organ. These latter agents have been supposed to possess this property by virtue of some stimulating effect upon that organ especially. For instance, urea is a true diuretic, acting powerfully upon the kidney when administered experimentally. Aloes acts upon the bowels if applied to a blistered surface, as well as when given by the mouth. It is not quite certain how far these agents act simply as increasing the blood-supply to the different organs, and so increasing their functional activity—for these two stand in strict relation to each other; or how far they are eliminated by these organs and so stimulate them into action. Of this more anon. Agents may possess a general action like mercury or iron. It may be necessary to give two agents possessing different actions together, say as sulphate of magnesia and iron, in a case of anæmia with constipation. These are the two chief factors of the prescription. It is necessary however to give them in a vehicle which may itself possess some value. Consequently it does not follow that they need be given merely in water. There may be a certain loss of appetite which may

indicate some bitter infusion, as quassia, as the best vehicle. Then it not unfrequently happens that such a dose is not very perfectly borne by the stomach; it seems to be cold, or to be followed by a sense of nausea, or eructations of wind. Under these circumstances a few drops of tincture of capsicum will form a capital addition. This is termed an adjuvant. Consequently the prescription will stand ultimately in the following form:—

℞ Magnesiæ Sulph. ℈i
Tinct. Ferri Perchlor. ♏vi
Tinct. Capsici ♏iv
Inf. Quassiæ ℥j.

This may be taken two or three times a day, from fifteen to thirty minutes before food; either before breakfast and dinner, or before dinner and supper, or before all three. Medicines are apt to be somewhat nauseous; and the above forms a bitter and warm chalybeate. Consequently something is desirable to take away the taste. A draught of water accomplishes this best. Such draught not only removes the taste but it often acts usefully,—is indeed of material value. Especially is this the case with chalybeate and alkaline medicines. It is often remarked that natural waters of these two classes effect good results when similar remedial agents given medicinally have distinctly failed; and that, too, after long and persevering trial. The amount of water makes the difference. Alkalies and iron should be taken before food, and be washed down by copious draughts of water, and it will not often be necessary to send patients to spas for natural waters to achieve what home-treatment has failed to accomplish, if this rule were generally attended to. This is an important practical "wrinkle."[1]

It may so happen however that it is found convenient to modify the prescription. For instance, it may not be easy to hit upon the exact amount of purgative the patient requires in order to keep the bowels gently open. It is one of the most disturbing matters possible in prescribing to adjust the exact

[1] I suppose such hints are called "wrinkles" because, like wrinkles, they indicate the presence of age, and, therefore, of long experience. A life-time may be spent, by no means uselessly, in the gleaning of such wrinkles.

amount of a purgative. So commonly is this fact recognized that it is usual to ask a patient whether he, or she, is easily purged or not. This is a question that in many cases it is undesirable to omit. Consequently then, instead of sulphate of magnesia in the mixture, a pill of aloes and myrrh at bed-time, every night or second night, may be desirable. A slight action on the bowels is almost always beneficial at the commencement of a course of iron; but it had better be within bounds else it may be harmful, or it may disgust the patient. Sometimes, too, quinine is indicated as a tonic in addition to the iron as an hæmatic and tonic. The prescription would then stand thus:—

℞ Quinæ Sulph. gr. i
Ac. Hydrochlor. Dil. ♏iij
Tinct. Ferri Perchlor. ♏v
Tinct. Capsici ♏iv
Inf. Quassiæ ℥j.

with

Pil. Al. et Myrrh, gr. v. p. r. n.

at bed-time. There is nothing contradictory in such combination. Even more complex arrangements are sometimes needed. As, for instance, supposing the patient has piles, it would then be necessary to resort to another remedial measure:

Ung. Gallæ. Co.

A small quantity to be applied on the tip of the finger to the piles after each motion of the bowels: taking care to bathe them well, or rather wash them thoroughly with cold water immediately after the bowels have moved. If it happens that the patient is a female it is more than probable that under these circumstances she will have leucorrhœa too, and then something more will have to be added, viz., another measure also of an astringent class:—

Aluminis Sulph. ℥ij
Aquæ ℥xvi.

to form an injection to be used twice a day, with the patient in the recumbent position.

§ 10. Such would form in most cases a comprehensive line of treatment; and though looking at first sight a complicated affair, is nevertheless clearly intelligible and consistent. Another therapeutic measure even might be indicated if there also existed, as there very possibly would, a certain amount of palpitation. In that case it might be well to add an external application to the skin,

Emp. Belladonnæ 6 × 4,

to be applied over the region of the heart. The patient by this time would be pretty effectually drugged, and it would scarcely be quite prudent to start with all this at once. It might, however, all be necessary if the patient had been long under medical care in other hands, and nothing but a thoroughly effective and comprehensive therapeutic plan will be of any avail. If the piles caused much distress and prevented sleep, it might be necessary to add one more therapeutic measure, often very serviceable—

Morph. Mur. gr. ¼
Gallic. Acid gr. ij
Cetacei ʒj,

to be inserted nightly within the anal ring; placing it upon the tip of the long finger of the right hand, in order to pass it easily through the sphincter.

§ 11. This would in its entirety form a fairly exhaustive treatment, carrying with it the elements of probable success. But it might not be wise to cease even here. It might be necessary to recommend a cold bath every morning, or if this was too severe, or not practicable, a sponge bath. Also it may be desirable to advise long hours of rest in a well-ventilated bedroom; with early hours to bed, and late ones at which to rise. A protest might be raised at this by some well-meaning friend, who has a sort of impression in his or her mind that long hours in bed are wicked. Such a notion has retarded the recovery of many a patient. If it were only necessary to count beads during waking moments, such plan of short hours of sleep might be free from mischief; but with something more to do, long hours of sleep are often imperatively necessary to

ensure a sense of energy when awake. They are still more necessary in the restoration of a state of health. The safest rule is to permit patients to sleep wherever, and whenever, and as long as they please and can, until they no longer feel sleepy. If the practitioner have the time, and the patient craves attention, he might substitute for the suppository mentioned above a hypodermic injection of a solution of morphia. This is a most efficient means of procuring sleep.

It is further requisite to direct the diet. This should be at once nutritive and digestible. It is commonly most convenient to have a large portion of it in a fluid form. Milk, to which more or less of an alkali has been added, eggs lightly cooked, meat-juice, sago, arrowroot, or corn-flour puddings, custards, blanc-mange, &c., would form the chief dietetic material. To this might be added, according to circumstances, some generous wine, sherry, burgundy, champagne, moselle, or even port. Or a little brandy and water some would prefer; whilst others are the better for some sound malt liquor in good condition, as pale ale, stout, &c., in bottle and "well up."

§ 12. Of course the orders given will very much depend upon the social position and the means of the patients, as well as upon the ailments. There is in my opinion nothing more cruel than to order patients what they or their friends cannot procure. It matters little whether it arise from thoughtlessness or cruel indifference, it is equally heartless and useless to order patients what it is impossible for them to attain.

§ 13. Having calculated then so far as is possible—and in the great majority of cases in general practice it is quite feasible to do this—the means of the patient, as well as his needs, it behoves the practitioner to lay down his line of treatment; bearing in mind the condition of his patient, and the action of the remedies about to be prescribed. There is a something to be learned by experience in prescribing which tells when the ammonio-citrate of iron with tincture of nux vomica will succeed—and it does—where the muriate of iron and liquor strychniæ have failed, which it is impossible to transfer from one person to another. Careful perusal of the following chapters will, it is hoped, do much to enable the reader to do this for himself; but this he must do for himself,

no deputy, however willing and enthusiastic, can perform this labour for him. Education is not mere information; and it is not so much any mass of mere information afforded in the following chapters which can give this work any value it may be found to possess; but rather that there is such a selection made as will best illustrate principles, and so enable the reader to peruse, with more profit and advantage to himself, the systematic treatises on Practice of Physic and on Materia Medica, which already exist in no stinted number; and whose place this work does not aspire to usurp, rather it trusts to be auxiliary or even ancillary to their study.

CHAPTER II.

ASSIMILATION.

§ 14. The first subject which obviously calls for our attention is that of assimilation, or the means by which what is taken in as food is converted into the material by which the system is sustained. The different morbid changes which interfere with assimilation necessitate careful attention to the physiology of this process, in order that we may have an intelligent comprehension not only of the changes themselves, but of the *rationale* of our therapeutic measures. We shall find that the subject, though difficult, is not by any means so insuperable as many suppose. The application of clear common sense and the determination to understand the subject will enable most men to surmount the difficulties. The following sketch of the physiology of digestion and assimilation is not intended for teachers of that subject, but is a broad outline for readers whose physiology may not be very clear, or which may have grown rusty in practice.

As said before, all force, all manifested energy, is derived from our food. This food is chiefly that form which supplies our animal heat, viz., the hydro-carbonaceous. It is furnished to us in starch, sugar, gum, oil, fat, butter, &c. "The union of these with oxygen, or their combustion appearing to generate the force which is rendered apparent in locomotion or manual labour." (Carpenter, 7th ed., § 58.) Such food however will not support life for long if altogether dissevered from nitrogenized materials. These nitrogenized principles are requisite for the formation of tissues, and for the evolution of force. Without nitrogen the force stored up in the body could not be unlocked or

manifested. The leopard could not run a race with the antelope, but it can catch the deer by a sudden rush; because its blood is highly charged with nitrogen-compounds, and it can generate rapid if but briefly sustained motion. The antelope can go much further, but it cannot escape the rush, because it cannot discharge its force fast enough. (Haughton.) But hydro-carbons are also essential to the formation of healthy tissue; while nitrogenized materials evolve some force in their oxidation. Sufficient supplies of each are requisite in order to repair daily wear and tear, and to give out force. The hydro-carbons are the fuel convertible into force in the body as much as coal in the locomotive's tender is the driving-power in a static form. The oxidation of the one drags the train from terminus to terminus; the oxidation of the other gives us all, or nearly all our body-force, intellectual or physical. Various salts, containing lime, chiefly in the form of phosphate, potash, soda, iron, &c., are also required to keep the body in health. We will now briefly trace the course of food.

§ 15. Food may be solid or liquid. If the latter, the digestive process is somewhat simpler, and mastication is not required. If solid, food is rolled over with the tongue, ground with the teeth, and thoroughly mixed with saliva, in the mouth. Here the first change is undergone, namely, the conversion of some of the starch into sugar by the action of the saliva. A certain amount of oxygen is worked in too, which, along with the salivary secretion, makes digestion easier and more perfect. Then the mass is swallowed. In the stomach it is turned over and over, and the nitrogenized matters are gradually dissolved by the action of the gastric juice. This juice is an acid secretion formed in the epithelial cells of the gastric tubules, and contains a ferment named *pepsin*. Pepsin is an animal ferment capable of digesting meat out of the body if in the presence of warmth and an acid fluid. It is the only ferment of the body with which we are yet generally familiar; but there are other ferments in the body, which serve important functions in the animal economy. In the stomach nitrogenized material is converted into *peptones*, in which form it is absorbed into the blood. Unlike other forms of albumen, peptone is very diffusible. "It diffuses with remarkable facility through animal membranes."

(Carp. § 104.) During the digestive process the pyloric ring is pretty contracted, and only permits of the passage of digested material until the termination of the digestive act, when it relaxes, and the undigested and indigestible materials pass along the intestines towards the anal orifice. After passing the pyloric ring the fat we consume is brought under its own special digestive process. It is brought in contact with the pancreatic juice, by which it is emulsionized.[1] Fatty stools are almost pathognomonic of cancer of the head of the pancreas. In the intestines the different products of digestion are absorbed, either by the lacteals of the intestinal villi, and so borne into the receptaculum chyli, or by the venules of the portal circulation. The blood of the portal circulation contains during digestion a relatively large amount of albumen, of sugar, and of water. After long abstinence it does not differ from that of the venous system in general. A large quantity of bile is also poured into the chyme, as the digested food is termed. This bile is however usually reabsorbed, and but little bile is normally found in the lower intestine. Fæces consist of the solid and indigestible constituents of food, chiefly, that is, with certain salts, mostly phosphates, and certain excretions from the glands of the intestines.

In connection with digestion must be included the function of the liver. The liver is a most important viscus, but the general impressions as to it and its function are very vague, and even erroneous. The prevalent idea is that it excretes bile, as a noxious product of digestion; and that biliousness indicates a sluggish liver. This view is essentially erroneous. "The ultimate source of sugar and of every other constituent of the body is, of course, the food we eat; and this, as we may easily see in a typical meal of beefsteak, bread, and pudding, consists of fat, albumen, starch, and cane sugar. The fat takes no part in the production of sugar within the organism, but the other three do. After they have entered the intestinal canal the starch is converted into grape sugar by the saliva and pancreatic juice, and the cane sugar into a mixture of glucose and another sugar, called lœvulose, by the intestinal juice. The albumen is converted into peptone by the gastric and pancreatic juices. The sugar and

[1] Starch and albumen are also acted upon by the pancreatic fluid.

peptones thus formed by the intestinal canal are absorbed by the intestinal veins; but they are not all at once poured into the general circulation and carried to the brain and muscles. If this were the case, these structures would get all their nutriment at once, and they would have to stow it away themselves for use during the intervals of fasting. The liver acts as a storehouse in which the superfluous nutriment absorbed during digestion is laid up, and gradually given out again into the blood during fasting. The sugar which has been absorbed from the intestines is conveyed by the portal vein into the liver; and there it is converted into glycogen, and stored up in the hepatic cells. If the portal vein be ligatured so that the blood finds its way from the intestines to the heart and body, by means of the collateral circulation, without passing through the liver, glycosuria occurs. The first great function of the liver, then, is to form glycogen from the sugar and peptones supplied to it from the intestines, and to store them up till wanted. The second great function of the liver is to give out, during fasting, the nutriment which it has stored up during digestion. This is effected by the glycogen, which has been stored up in the organ, becoming gradually transformed into sugar again. It is then washed out of the liver by the blood, and carried with it into the general circulation." (Lauder Brunton.) The bile thrown into the intestines is, to a large extent, superfluous matter. It probably, however, serves some useful purpose in digestion.[1] Normally, it is chiefly reabsorbed. In excess in the bowels it produces diarrhœa. When its outflow is checked we have constipation, as in jaundice.

This function of the liver must be remembered in our treatment of various forms of ailments. Mercurial purgatives do not increase the bile-secreting power of the liver, but they sweep out the bile products in the intestines and portal circulation in excess. Thus they produce bilious stools, and give relief to that condition known as biliousness. It is very important to bear this in mind. It clears up a very difficult subject, often obscured by so-called explanations.

In addition to the digestion described above, a species of digestive power exists in the cæcum, especially in certain animals. This, and the power of absorption possessed by the lower bowel,

[1] Bile aids in the filtration of fat through membranes. (Hermann's *Physiology*.)

are important matters when feeding by the rectum becomes necessary.

§ 16. After this brief sketch of assimilation, we may now profitably consider the different disturbances which mar or interfere with these various processes. Firstly comes the question of the changes undergone in the mouth. Very little can be done by drugs here, so we may dismiss them at once. But it does not necessarily follow that therefore nothing can be done. Much indigestion, and consequent imperfect assimilation, takes its origin in decayed teeth. In consequence of the condition of the teeth the food is not well masticated. Not only that, but as a result of the loss of power to masticate, the food is swallowed without being fairly saturated with saliva. It is thus doubly unfit for reception by the stomach. When such a condition obtains, the dentist may be of much service. So far as the medical practitioner is concerned, he can advise a suitable dietary. The food ought to undergo such culinary preparation as will, to a great extent, do away with the necessity for mastication. Light puddings, soups, minced collops, sausage meat, various entrées, preparations of eggs and milk, furnish a not unvaried, or unpalatable dietary for the toothless. It must be impressed upon them that the rolling of the meat about by the tongue, and the mixing of it with saliva are important matters; and the hard gums often form no very imperfect substitutes for the missing teeth. If the craving for slices from the joint be very strong, it may be indulged with a minimum of bad result by the skilful and industrious use of the knife ere the meat is conveyed to the mouth.

Sialagogues.—This is a class of agents with which we are not very familiar, and little can be said about them. All sapid and acrid tasting materials cause the mouth to water by the flow of saliva so occasioned. The smell of cooking usually produces a similar result, if we are hungry. If we are sated with food, the same smell causes nausea. The tasty materials which are sometimes consumed at the commencement of a long dinner, as caviare, &c., probably act to some extent as sialagogues. The presence of food in the stomach causes a flow of saliva, as Dr. Gairdner found in a case of cut throat. Here the injection of broth into the stomach caused a distinct flow of saliva. The importance of the addition of saliva to food is shown by the

experiments of Spallanzani and Réamur, who found that perforated tubes containing food placed in the stomach of animals gave the following results. Food moistened with saliva was most quickly digested; then food moistened with water; and lastly, food not moistened at all. Mercury is a sialagogue, but the excessive flow of saliva serves no useful purpose. Neither is pellitory ever used to increase the flow of saliva for admixture with food; nor as yet jaborandi.

§ 17. When the food is passed into the stomach a change in the condition of that viscus is at once instituted. Ere the food is taken, the mucous lining of the stomach is pale, only slightly moist, and possessed of an alkaline reaction. On food being placed within the stomach, the gastric blood-vessels dilate, the colour of the lining membrane changes into a rosy hue, and the gastric juice, freely secreted by the gastric follicles, is poured out on the surface, which becomes bedewed with the secretion. At the same time there is a change in the muscular walls. No longer quiescent, they commence to contract and dilate in such a manner as to produce a rotation of the contents of the stomach *en masse*. By this means the whole contents are brought in contact with the digestive fluid, and are reduced to pulp. Such is the action of the stomach in perfect normal digestion.

There is, however, no more common disturbance than imperfect digestion. This may arise in various ways; each indicating its own proper remedial measures. It not uncommonly takes its origin in either an imperfect amount of gastric juice, or in an inferior form of juice of impaired solvent properties. It is and must be a difficult matter to settle, which of these pathological states of the gastric secretion obtains. Consequently our treatment is rather empirical than rational, and is really educated guessing. Two plans of treatment suggest themselves: either to increase the amount, or to improve the character of the gastric juice.

We will take the latter first. The knowledge that the stomachs of animals digest food of various kinds just as perfectly as do our own, has suggested the use of the digestive fluid of animals. The most suitable animal is the omnivorous pig. When properly prepared, pepsin is a very active agent. It can either be used fresh, or in the dried form of powder. It is given in doses of from five to fifteen grains usually, with a certain amount of dilute

muriatic acid (5 to 10 drops), or it may be given on bread and butter. The use of pepsin is far from being as yet very explicit. Wood (*Treatise on Therapeutics*, Philadelphia, 1874) says, "Evidently one of two things is certain: either the present practice is ridiculously absurd, or else pepsin acts upon the stomach in some way as a stimulant." He, however, admits that its utility in the treatment of imperfect digestion with diarrhœa in children is much more certain. He thinks pepsin is much more powerful in the primæ viæ of children than of adults. Muriatic acid and lactic acid are also occasionally used for the purposes of aiding the gastric juice to perform its work.

§ 18. If we do not feel quite assured of the utility of pepsin in all cases, there exists no doubt about our capacity to increase the flow of gastric juice, and so to render digestion more perfect. The various pathological conditions of the stomach will be considered in their fitting place in Chapter XVI., at present we are concerned with assimilation only, and the changes in the stomach in digestion. In fact we are here considering imperfect digestion, regardless of its causes, only in so far as the digestive act is imperfect. As said before, the functional activity of an organ is in direct relation to its blood-supply. An increase in the blood-supply gives greater functional power: a diminution in the supply of arterial blood lessens the functional power. Many agents increase the vascularity of the stomach, and so improve digestion. These are called stomachics.

Stomachics.—This is rather an old-fashioned appellation, but it will serve our turn well nevertheless. The list contains agents otherwise possessing widely different properties. Thus alcohol, arsenic, ipecacuan, capsicum, and others find themselves together. They all possess this property in common—they increase the vascularity of the stomach, in small doses; in large ones they act like irritant poisons, and produce inflammation of the stomach. They all are apt to produce vomiting in excess; and certainly their continuous administration in liberal quantities produces an irritable condition of the stomach. How they produce their action we do not exactly know.

Ere proceeding we will just glance at the arrangements of the nervous supply of the stomach. It contains fibres of the

sympathetic nervous system, and terminal branches of the pneumogastric. Speaking broadly, fibres of the sympathetic produce contraction of involuntary muscular fibre: cerebrospinal fibres produce dilatation. Thus the brothers Weber found the vagus to inhibit the action of the cardiac ganglia, and irritation of it delayed the ventricular contractions. M. Bernard has found by various experiments that galvanism of the pneumogastric excites a flow of gastric juice; while similar irritation of the sympathetic arrests the secretion. Section of the pneumogastric nerves stops digestion, and the mucous membrane of the stomach, previously turgid, becomes pale and exsanguine after such section. Thus we see the pneumogastric fibres dilate the blood-vessels, the sympathetic fibres contract them. From this we can understand how any great emotion acting on the sympathetic may at once produce indigestion. Whether our stomachics act by stimulating the pneumogastric fibres, or by paralyzing the sympathetic, we do not know; there is no doubt, however, that they increase the vascularity of the stomach. In practice we find that in many persons a small quantity of alcohol improves digestion; and that by its means a meal can be digested which would otherwise be undigested, and so wasted. But it must be borne in mind alcohol and artificial pepsin do not agree, and therefore should not be given together. Arsenic produces a vascular flow in the stomach, often very useful. In large doses it produces irritability and inflammation. It is a difference of degree. Like alcohol, a small dose increases the vascularity of the mucous lining of the stomach and a free flow of gastric juice; a poisonous dose produces inflammation and total arrest of the flow. Ipecacuan produces a vascular flow in small doses; in larger doses vomiting results. Ipecacuan formed part of the best old dinner pill, which ran something like this:—

Pulv. Ipecacuan. gr. i.
Ext. Cinchon. gr. i.
Pil. Al. et Myrrh gr. ij.

and as such was very useful. This pill is not so much in vogue now; but its turn may come again.

Ere prescribing arsenic as a stomachic permit me to give a

quotation from Ringer about the action of alkalies. "We wish to draw attention in this place to one important property of alkalies—namely, their power to increase the secretion of the gastric juice, itself an *acid* secretion. We venture to think that many facts warrant the following generalization:—that alkalies applied to the orifices of glands with acid secretions increase their secreting power; while alkalies applied in a corresponding way to glands with alkaline secretions lessen or check this secretion." Given, then, almost immediately before food, the following prescription contains promise:—

Pot. Bicarb. gr. v
Fowler. Solut. ℥ij
Inf. Gent. ℥i.

It might be given before breakfast and dinner.

Next to the question of stomachics comes the question of vegetable bitters, commonly known as tonics. It is not as tonics they are described at present, but simply in their relation to the stomach and to digestion.

Bitters.—Unfortunately it is not possible to give such a clear physiological explanation of the action of vegetable bitters as it is in the case of stomachics. There is, however, no better established fact in medicine than the action of vegetable bitters to increase the appetite and improve the digestion. They are in one form or other the resort of all dyspeptics, and the mainstay of herbalists. Marvellous and poetical discourses have been written as to the action and effects of these bitters, and their beneficial action has been chronicled by dyspeptics. As yet physiology has little or nothing to say. The facts are not to be disputed, but no explanatory voice is yet audible. There are various forms of these bitters; some simply bitter, others highly aromatic and partly astringent, from the presence of tannin. Quassia is the simplest bitter. Powerful, intensely bitter, and free from tannin, it forms the vehicle when iron is indicated. It is also the chosen agent in the dyspepsia of drunkards. It is usually given with some acids, hydrochloric or nitric usually:—

Ac. Hydrochlor. dil. ℥x.
Inf. Quassiæ, ℥i.

with or without a few drops of tincture of capsicum, is a capital appetizer to the stomach saturated with alcohol. Gentian is agreeable, and forms an excellent vehicle for quinine, when not combined with iron. Chiretta is a coarse gentian. Cascarilla is a very pleasant aromatic bitter, and forms an excellent vehicle for alkaline remedies when given without iron.

℞ Sp. Chloroformi ℥xx.
Pot. Bicarb. gr. x.
Inf. Cascarillæ, ℥i.

is a capital combination in the dyspepsia of the gouty, or even where there is excessive acidity of other origin.

The well-known cinchona in infusion is often much better tolerated than is quinine in solution. This fact is very apt to be overlooked; but it is well worth remembering, and its remembrance is often very useful. We will consider these agents again in their relations as tonics.

The action of these vegetable bitters upon the digestive organs is as inexplicable as it is well assured. In his *Clinical Medicine* Dr. King Chambers gives a very pleasant account of them, which is worth quoting, though it is quite imaginative, and utterly unsupported by any valid evidence. "Vegetable bitters brace up and harden the mucous membranes, as may easily be tried by their effect upon the mouth. Hence exosmosis is lessened and endosmosis is increased. Digestion is made more rapid and effectual, nutriment is taken up more copiously and quicker. Even in a healthy person the remains of the last meal are sooner disposed of, and the appetite for the next sharpened by a bitter. This is the pure action of a vegetable bitter. . . . . When mucus is in excess, it doubtless interferes much with the taking up of nutriment by membranes, and the checking of its growth is an indirectly constructive aid. Many of the vegetable bitters contain tannin, or other astringent constituents, and are thus peculiarly suited to the leucophlegmatic (or mucogenous) diathesis."

This at least gives a notion of some kind about their action, and that is not quite a useless matter in giving direction of their therapeutic aim. It fits in with the facts, and in so far is useful. But it cannot be regarded as a physiological explanation of the

action of vegetable bitters. There is no doubt but that these agents do increase the sensation of hunger, and these sensations depend for their expression upon the stomach. Consequently these bitters must have some action, if we only knew it. Equally certain is it that digestion is also furthered and rendered more efficient by their use. They are of avail in furthering digestion if given after a meal as well as before it. But in so doing their appetizing effect is largely lost.

§ 19. After the digestion of starch and nitrogenized principles we come to the digestion of fat. Fat is emulsionized mainly by the juice of the pancreas, which broadly resembles saliva, but has a much more powerful action upon oleaginous matters. It is a gland about which, in disease at least, we know very little. In health, and physiologically, it has been carefully examined. M. Bernard experimentally found that ether introduced into the stomach determined soon afterwards a considerable flow of pancreatic juice. This was a very valuable observation at a very important time. The introduction of cod-liver oil by the late J. Hughes Bennett is a matter of our own times; and the importance of a sufficiency of fat for the building up of truly healthy tissues is a comparatively recent addition to our knowledge. The association of the formation of tubercle with a dietary too defective in fatty constituents, the repair so often instituted when fatty food was given and assimilated, pointed distinctly to an increased use of fat by the consumptive. Cod-liver oil is the most easily digested of all fats; and as such has come into almost universal use. In convalescence from acute disease, as well as in the palliative treatment of chronic disease, and especially of consumption, in supporting the system under the severe trial of surgical fever, cod-liver oil has won for itself a well-established position.

One difficulty has always been felt, and it is this. Even cod-liver oil is not always digested, and therefore something else was wanting. Dr. Balthazar Foster, of Birmingham, conceived the idea of utilising Bernard's hint, and so combined ether with cod-liver oil. The increased flow of pancreatic juice so induced led to assimilation of the cod-liver oil, and thus another step forward was made in practical therapeutics. Another effect noticed by Dr. Foster was the return of a liking for fat under

this plan of treatment, where previously a strong distaste to it had existed. One method is to give from ten to thirty drops of ether (sulphuric) in the dose of oil; or the ether may be given in water immediately before the oil. In private practice Dr. Foster prefers to give the following mixture:

Potassæ Bicarb. ʒ iss, ʒii.
Acidi Hydrocyan. Dil. ℥ m xii—xvi.
Spt. Ætheris ʒ iss—ʒiii.
Aq. ad, ʒviii. misce.
ʒi. ter in die sumat.[1]

This method of adding to the usefulness of a course of cod-liver oil deserves wide and general attention.

The adoption of a pancreatic fluid derived from animals and rendered useful in relieving the necessities of man, has been brought forward by Dr. Horace Dobell, and is often useful. These preparations can be easily purchased ready prepared and directed at almost any chemist's.

The changes in the pancreas of the calf, its large size and great cell-activity during the suckling period of calf-life, and its gradual diminution to a fixed size as this food is changed for a vegetable diet, point to the close relations betwixt the function of the pancreas and the assimilation of fat.

§ 20. Assimilation is never very perfectly performed if the action of the intestines be sluggish and imperfect. The waste matters of food must be swept away, out of the small intestines at least, in order that the nutritive material of the next meal may be brought in contact with the intestinal villi and absorbed. In the large bowel some secondary digestion may take place, but it is of questionable utility; and it is practically much better to keep the large bowel unloaded than to look for anything from secondary digestion. The accumulated fæces are very apt to become hard and pouched in the valvulæ conniventes, and so become the cause of much disturbance. The mere load, and its pressure on parts around, are often sufficient to interfere sorely with the functional activity of a susceptible

[1] *Clinical Medicine*, 1874. The whole of the paper is well worth reading, as indeed are the other essays in the book.

and feeble stomach. In many persons digestion is never comfortable nor effective while the bowels are loaded. The enormous consumption of aperient pills, quack and other, in this country, to say nothing of aperient waters, testifies to the wide-spread conviction on this head. The use of an aperient pill at bed-time and a draught of cold water first thing in the morning obtains largely, and might with advantage obtain still more largely. The purgative in such cases may well be accompanied by some nux vomica, which excites the vermicular contractions of the muscular coat of the bowels. A carminative may be profitably combined. A good pill for common use would run so:—

Ext. Nucis Vom. gr. 1
Pulv. Piper. Nig. gr. i.
Pil. Coloc. Co. gr. ii. ss.

at bed-time every night, or every second night; or instead of this Pullna, Fredericschall, or Marienbad water may be taken; the dose apportioned to each individual and his exigencies, according to the directions given with each bottle. A certain action upon the bowels is often beneficial, especially to those who control their bowels from social necessities. Such persons are all the better for occasional purgation. A slight amount of purgation is almost always indicated in the commencement of a course of hæmatics, especially chalybeates.

§ 21. *Hæmatics.*—This is a very important group of agents, though its members are few. Hæmatics furnish to the blood matters which are defective in our dietary. They are indeed foods rather than medicines; though a hæmatic may of course be used in what is truly a medicinal dose. Hæmatics go to build up the blood, to increase blood formation, and with it the growth of every part which is fed by the blood, and that is, in fact, the whole system. One of the group is *phosphate of lime.* Especially useful is this agent during the period of growth. "Wherever cell-growth is active, there is phosphate of lime in excess," says Ringer. Over-worked town individuals and over-suckling mothers, as well as growing infants, are benefitted by this hæmatic. It is especially useful in rickety children. It controls morbid nutrition of the skeleton, while it

supplies the lime for proper ossification. It is not needed in large doses. In fractures of bones in pregnant women lime is useful. The administration of lime during pregnancy in women whose previous children have shown tendencies to rickets is yet untried; but it seems to offer a good and hopeful prospect.

Of all hæmatics, however, *iron* stands first—pre-eminently first. It is rather a food than a medicine. "Iron is a constant and necessary constituent of the body, and must be regarded as an important food." (Ringer.)

Iron, though a normal constituent of the body, is chiefly present in the red-blood corpuscles, though there only to a limited extent. By its use we can increase the amount of hæmoglobin, upon which the chemical interchanges conducted by the red-blood corpuscles depend. Under its use in anæmia, the cheeks grow rosy, the lips recover the usual colour, the eye brightens, the tongue is less flabby, there is a general increase in body-weight, a development of muscle, and a heightened condition of nerve action. Tone is given to every part of the system. "Iron salts in anæmia possess important properties other than influence over the growth of the corpuscles. They act bracingly in the relaxed mucous membrane of the digestive canal, and probably in this way tend to restore its functions. Moreover, it is highly probable that, after its entrance into the blood, the iron exerts an influence beyond that of merely increasing the quantity of red corpuscles. Hence iron preparations are useful, not simply as a food in promoting the formation of the blood-discs, but on account, likewise, of their beneficial influence on the tissues of the body. Iron, therefore, cannot be regarded merely as a food to the system; it is also an important curative agent. Large quantities of the soluble astringent preparations should be administered where we desire to benefit tonically the mucous membrane of the digestive canal and the tissues." I make this quotation from Ringer in its entirety, in order to show that, while iron may be given as a hæmatic, it may be usefully given in larger quantities than can be utilised in the blood. The excess acts as a tonic.

When given to healthy persons for a long period, iron commonly produces plethora, or an excess of red-blood corpuscles. When given to anæmic persons, it raises the condition.

of the blood to that of health. "But after a time the blood appears, as it were, to become saturated with it, and ceases to assimilate it." (Wood.) In certain chronic conditions, it is very difficult to see any point of saturation; and iron may in many cases be usefully continued for years.

What becomes of the excess of iron in the blood? It is chiefly cast out in the fæces, which become black from the union of the iron with the tannin in the fæces, or the sulphuretted hydrogen it meets there. It is also eliminated in the urine. Brücke found that in rabbits, after a time, nearly all the ingested iron could be recovered from the urine. Quevenue found it as a normal constituent of urine; and Becquerel has observed the amount found in the urine to vary with the amount given.

Iron in all its forms is useful. "Almost all of the preparations of iron are more or less astringent, and, when in the blood, very probably they exert a direct influence upon the tissues contracting them, not merely by increasing their tone, but also by acting on their vital contractility." (Wood.) Much difference of opinion exists as to the best forms of iron for common use. Some advocate iron in powder; others as haloid salts; while some prefer what are called the lighter preparations, as the ammonio-citrate, and the potassio-tartrate. Personally, I prefer, to commence, in convalescence, with the lighter preparations, and then go on to stronger forms. Much will depend upon what it is desirable to combine with it. For instance,

Amm. Carb. gr. v.
Ferri Am. Cit. gr. v.
Inf. Quassiæ ʒj.

is a capital form in early convalescence, or in the treatment of amenorrhœa. After a time the following may be substituted for it with advantage:—

Cit. Fer. et Quinæ, gr. v.
Liq. Strychniæ, ♏iv.
Inf. Calumbæ ʒj.

This forms a beautiful tonic—effective, agreeable, and pleasing to the eye.

A common form, much used in both public and private practice, is the following :—

Quin. Sulph. gr. i.
Tinct. Fer. Perchlor. ℥x.
Ac. Hydrochlor Dil. ℥iij
Inf. Quassiæ, ℥i.

Often the iron is felt to be heating, and then a little sulphate of magnesia is of service. The following is a typical prescription :—

Quin. Sulph. gr. i.
Mag. Sulph. ℈i.
Liq. Fer. Persulph. ℥v.
Ac. Sulph. Dil. ℥v.
Inf. Quassiæ ℥i.

If this lies cold on the stomach, a few drops of tincture of capsicum may be added.

For a permanent prescription, requiring to be continued for months, a pill is the best form. It admits of a large supply of material in a small space; the nausea of the disagreeable taste daily for months is also avoided; it does not affect the teeth and it can be taken after food without attracting the attention of others—often so trying to persons in weak health. The following is a very favourite form with me :—

Ac. Arsenic. gr. i.
Fer. Sulph. Exsic. ℈i.
Pulv. Capsici. ℥i.
Pil. Al. et Myrrh. q. s.
in pil. LX. div. 1 semel aut bis in die.

Taken immediately after a meal, this is a digestive and tonic pill of the highest value.

One beautiful preparation of iron should not be forgotten; it is often well borne when other forms are not tolerated, and consists of the recent addition of the tincture of iron to acetate of ammonia.

Tinct. Fer. Perchlor. ℥x.
Liq. Am. Acet. ℥i.

It is beautiful to the eye, palatable, and, in consequence of the decomposition produced, readily assimilated.

There are many excellent preparations of iron which can only be alluded to now as occasionally furnishing a more suitable form than any here given. There is the ferrum redactum, Vallet's ferruginous pills (carbonate of iron), Griffith's mixture (Mist. Ferri. Comp.), excellent with Decoct. Aloe. Co. in amenorrhœa and in low forms of gout, Blancard's iodide of iron pills, the syrup of iodide of iron, Parrish's chemical food (phosphate of iron and lime), &c., &c.

The addition of iron to the food often produces effects little less than marvellous. It not only gives tone to the whole system, but nutrition is markedly advanced by its presence in the fluids of the body. This is often well shown in the improvement in a feeble heart under a course of iron. Digestion becomes more perfect under the use of chalybeates. "Digestion cannot be normal when the blood has ceased to be so." (Stillé.) Every part seems to perform its function more efficiently under the stimulus of iron, of blood once more rich in one of its most important constituents. One remarkable thing about the action of iron is its effect upon the dyspnœa of chlorotic girls and others. In these cases there is pallor, amounting often to waxiness, from absolute diminution in the number of red corpuscles, and marked shortness of breath on exertion, from lack of these oxygen carriers; there is general loss of body temperature from imperfect combustion or oxidation, while what ought to have been burnt is stored up as fat. In fattening cattle, farmers often bleed an animal which is not fattening quickly, in order to artificially produce anæmia. Under conditions of anæmia changes take place spontaneously such as the farmer induces deliberately, especially in young and not fully-grown persons, chiefly girls. Iron soon induces a change, and restores matters to their normal condition. It must, however, be borne in mind that when the blood is either broken down, or its formation hindered by some blood-poison, iron will not cure the anæmia unless combined with some specific remedy to the poison in each case. For instance, in lead-poisoning iodide of potassium is absolutely requisite to good blood formation; in syphilis, mercury; in gout, potash; in malaria, quinine should be added

to the iron. It is matter for surprise how little this fact is recognized. Often, indeed, these specifics are true hæmatics, by destroying the poison which is exerting so injurious an influence upon the blood. The question of the effect of imperfect elimination and its consequences upon the blood will be considered in the next chapter.

Iron will be alluded to again in several chapters as occasion requires, and where its action as a hæmatic renders it an important factor in the treatment.

There are other hæmatics, as soda, potash, &c., which require a word. Soda is a natural constituent of the blood. As chloride of sodium it forms an important addition to our food, and the consequences of its withdrawal are so baneful, that it formed a terrible old Dutch punishment. Water and bread made without salt was one of their most exquisite tortures. The decomposition of common salt furnishes hydrochloric acid to our gastric juice, and soda to our bile-salts. African tribes will, like the buffalo, travel several hundred miles to procure this coveted addition to their food.

Potash is a normal constituent of muscle, and is a valuable hæmatic in lithasis.

§ 22. Ere leaving the subject of hæmatics a few words are essential as to the value of water as an adjunct. All the hæmatics are soluble, and require water for their solution. Not only that, but it is a well-known fact that systems often can be brought under the influence of iron at chalybeate spas which have resisted all medicinal treatment, no matter how ingenious or varied. The difference has been found to lie in the amount of water. In all natural waters the iron exists in a state of high dilution, and a large bulk is required to furnish any material quantity of iron to the system. The late Dr. Fuller has pointed out how chalybeate remedies may be rendered much more effective by adding to them large draughts of water. From a fairly long experience, I can quite corroborate this statement; and amidst the humbler classes, where a sojourn at a spa is simply impossible, such addition is often of the highest service. Especially is this the case where chalybeate and alkaline remedies are combined, and given before food. A draught of water, varying from half a pint to a pint, after each dose, will

often make all the difference betwixt no benefit and the most satisfactory treatment. The dilution has the most excellent effect, and iron so diluted is absorbed when in a concentrated form it is not assimilated.

Under certain conditions, water is a true hæmatic. All substances which are held in solution by the water of the blood must escape wherever there is a free outflow of water, whether by kidneys, skin, or bowels. In cases of lithasis this is especially noticeable, and furnishes an explanation of the excellent effects often derived from a stay at hydropathic establishments. Not only does water wash away the waste matters which have accumulated, but in doing so it paves the way for the growth of new material. Ringer says, with much force, "If water drinking exerted only a disintegrating influence, it would merely lead to loss of weight; but simultaneously with this rapid disintegration, a corresponding increase of assimilation takes place in the same tissues; whence it happens that water, taken under certain precautions, may increase both construction and destruction of tissue, and so act as a true tonic, improving the vigour of body and mind." This view I quite endorse. Further, there is every reason to believe that too little water is drunk by most persons, especially in the upper classes. The thirst produced by labour compels the drinking of water. Those who are not compelled to labour are very apt to diminish their bulk of water to an injurious minimum. Doubtless its effect upon the bladder is occasionally inconvenient, especially in certain places of common resort, and especially to ladies. Also its tendency to appear through the skin as perspiration is at times inconvenient. Nevertheless the consumption of a fair amount of fluids per diem is an excellent measure, and ill-health is commonly the penalty for the abstinence so practised. A draught of cold water every morning is an excellent hygienic measure; it stimulates the action of the bowels; it is a tonic to the digestive organs; and it is a true hæmatic, by its removal of waste matters, hindering histogenesis. This effect is very much increased when the water used is from some natural spring. Apollinaris water is a delicious beverage alone, while it mixes well with most things, notably red wine. Other waters, as Nassau Seltzer, are very good indeed. Some can only be

made pleasant by adding them to wine or spirits. The use of mineral waters as beverages is much on the increase. This is good in several ways. These mineral waters are often pleasant medicines. But more than that, these palatable and trustworthy waters will lead to more water drinking—to the ingestion of more fluids.

§ 23. The next class of remedies which claims our attention is scarcely inferior in value to that just considered. This class is that termed *tonics.*

A tonic (from τείνω, I stretch) is an agent which has a systemic action. The ruling idea is that it gives tone, just as the tightening of a cord or wire causes it to give out a better tone. A tonic differs from a stimulant in that its action is not merely temporary and exhaustive, leading to reaction. The effect is more permanent and lastingly beneficial. Neither does the action depend upon astringency. Doubtless tannic acid is often a tonic, and that too by its astringency; but quassia contains no tannin, and quinine is as tonic as cinchona bark. Nor again does the tonic action depend on any aromatic qualities, for many tonics are decidedly not aromatic. They do not merely act on the muscular system, though that develops under their use. They act upon mucous membranes in restoring them to a normal condition, and very frequently tonics add very much to the efficacy of astringents. What their action upon the mucous lining of the intestinal canal is we do not know. But we know well enough that under their use the appetite returns and digestion improves. "The effects of tonics upon the general system are never rapidly displayed; but after they have been taken for some time their influence is obvious by the increased force of the circulation, the greater energy of the digestive organs, the improvement of the secretions, the abatement of nervous susceptibility, and the augmented power in particular which is communicated to the muscular system. The effect of a tonic, when administered under proper circumstances, and when it operates favourably, is, in fact, to place the system in that state which characterizes health; and from the mode by which it produces this effect, the description of diseases in which tonics are indicated is sufficiently obvious; they are evidently those of depressed power." (A. Todd Thomson.) Such is the brief but

vivid sketch by one of the past masters of therapeutics. There is no more recent sketch which in my opinion is so good. Tonics, indeed, have been but little lighted up by modern physiological investigation. All we know of them is derived almost solely from empiricism. But our knowledge is not stinted, and tonics are one of the most important therapeutic benefits obtained from empirical observations. Not only has empiricism given us tonics, but it has also furnished us with many little hints as to the best means of securing their action, and of the different circumstances which should guide us in their use and selection.

In the first place, tonics are both mental and material. Hope is a capital tonic. Depressing mental conditions will often neutralize the best plans for administering tonics and thwart our desires. Nextly, the prospect of recovery will often bring about satisfactory results almost in the absence of material tonics, and certainly often helps out wonderfully a lame line of treatment. Mental tonics can usually be advantageously combined with material tonics.

Material tonics are usually bitter, often aromatic. The aromatic principle is commonly stimulant, and consequently aromatic tonics as cusparia, cascarilla, &c., are often given in early convalescence. Many are also astringent, and this astringency often is a useful property. Astringent tonics are indicated when there exists any tendency to excessive secretion, as undue perspiration or looseness in the bowels. Sometimes, if given too early, they produce disturbances in the bowels. "It is also well known that if their dose is not proportioned to the susceptibility of the digestive organs, they may not only cease to produce a tonic effect, but absolutely destroy the appetite and give rise either to diarrhœa or constipation. It is, moreover, a familiar fact, that a febrile state of the system altogether contra-indicates their use, because they then immediately derange the stomach and augment the vascular excitement." (Stillé.) There is much truth in what Stillé states, and all writers have held similar views about the undesirability of giving tonics during conditions of febrile excitement up to a recent period. Of late, however, both in France and Germany the plan of giving large doses of quinine —an unquestioned tonic—to lower the temperature in pyretic

affections has obtained with many competent authorities. Nevertheless, the rule not to give tonics during conditions of febrile excitement is a good one. During the presence of a pyretic condition, especially in connection with acute disease, it is well to stick to mineral acids. When the temperature has fallen somewhat, and the fever is defervescing in its other symptoms, then an aromatic bitter may be given with advantage. The prescription of dilute phosphoric acid ℥ xv. and cascarilla ʒi. is a good and suitable one, or a certain amount of a stimulant may still be necessary, and then something like the following prescription is indicated:—

Sp. Chloroformi ℥ xx.
Acid. Hydrochlor. dil. ℥ x.
Inf. Cuspariæ,
or Inf. Cinchonæ, ʒi.

It is often a good plan to gently act on the bowels at the commencement of a course of tonics after acute disease. A dose of aloes is very suitable either as pil. al. et myrrh, or decoct. aloe. co. Aloes, indeed, itself possesses a bitter principle of no mean properties as a tonic. Often, especially after the violence of an attack of bronchitis is over, carbonate of ammonia is a good stimulant to combine with tonics. It goes specially well with ammonia, citrate of iron, and quassia (§ 20). Quinine may often be given with advantage along with some acid in an aromatic tonic.

Quinæ Sulph. gr. i.
Sp. Chloroformi ℥ xx.
Ac. Hydrochlor. Dil. ℥ v.
Inf. Cascarillæ ʒi.

forms a pleasant and efficient tonic. When tonics disagree with the stomach several measures may be indicated. A change in the form of the tonic is one; the addition of a carminative is another. At other times a slight action on the bowels is desirable, and a little sulphate of magnesia removes the heating sensation complained of. Very often a mineral acid is indicated; if a small quantity be already added, it is well to increase the dose of it.

Tonics are especially useful when given with iron, and this well known association has made the expression "iron and bark" one as well known in the household as in the lecture-room. There also exists in the minds of many, a strong impression that the lighter forms of iron, as the ammonia-citrate and the potassio-tartrate given in quassia or calumba are better agents to commence with than the more powerful and astringent preparations. Two cases will point this well. A patient recovering from an acute ailment was ordered quinine and the muriate of iron. This disagreed with her, and the ammonia-citrate in calumba was substituted for it. This agreed perfectly, and at the end of a week the former mixture was resumed, and then was taken without discomfort. Another, and even more striking case occurred lately. A patient suffered much from anæmia and debility. I ordered her the ammonia-citrate of iron with tincture of nux vomica in quassia. She improved forthwith most satisfactorily. One day, when nearly well, she brought me her old prescription to look at. She had taken it for six months, not only without benefit, but absolutely she had lost ground under it. To my amazement, it consisted of the muriate of iron and liquor strychniæ. What the difference was it is not easy to say, but the result was widely different. The only possible source of fallacy in the matter, to call in question the difference in the form of the medicine in producing the result, was that she was told to go into a larger bedroom.

Quinine is the type of tonics, yet it does not agree with everyone. Many East Indians volunteer the information that they either cannot take quinine, or it does not do them any good. There is one matter of some importance about quinine not sufficiently well known, and that is its tendency to produce irritability in the bladder, especially in elderly people. In fact it is not so well suited to elderly persons, as a rule, as to the young, the adult, and the mature. Stillé says—"The elimination of the salts of cinchona with the urine exposes these organs to irritation. If the urinary tract be anywhere the seat of disease, it is apt to be aggravated by these medicines. This effect is frequently observed in gonorrhœa. Sometimes, independently of such a cause, the patient is affected with irritation about the

neck of the bladder, with hæmaturia, or with retention of urine." This is well worth remembering. *Experto crede.*

There is a large amount of acquired skill in the right selection and combination of tonic remedies which cannot be transmitted at once to another. But by careful observation the young medical reader will learn for himself what it is impossible to communicate by writing. The very fact that there is something to be learnt that cannot be so conveyed will certainly stimulate many to find out what that something is. Those who succeed will find in their knowledge the reward of their labour, while those who decline to observe their experience intelligently will have to go without the benefits they would otherwise receive. That something is the power to see a relationship betwixt a certain case and one previously encountered, which indicates that the plan necessitated in the previous case will be the one best suited to the present one. This is a knowledge which cannot be conveyed, but close observation will enable a man to learn it for himself.

§ 24. In addition to the tonics described above, there are the common tonics of pure air and water. That persons who breathe pure fresh air, and drink pure and uncontaminated water, are in a better state of health, have more tone about them, is demonstrated by the effects of epidemics. When the air is foul and the water filthy, their systems succumb to the onslaught of zymotic affections more extensively than do systems existing under better hygienic arrangements. The establishment of convalescent homes in the country, in connection with metropolitan hospitals, is a proof of the tonic effects of good air and water. In private practice it is the rule to send patients away to health resorts, if the conditions of life are such that their home surroundings are not quite what they might be. The change of air annually indulged in is a famous tonic.

Then there is also the effect of cold water upon the skin—no mean tonic. The bracing effect of the sudden chill, the sense of energy it gives, the glow which follows, all tell of the tonic effects of cold bathing. Experience has decided that the good effects of cold water are increased by its being salt. Consequently it is very common for convalescents to prefer the seaside, where they can have sea bathing combined with fresh air and pure water.

For children, the addition of Tidman's sea-salt to the water in which they are bathed is often beneficial; and a substitute for a sea dip is thus furnished, not altogether without value. Still it is a substitute, and nothing more.

Assimilation is an important part of nutrition; and the best energies of the medical man are often bent earnestly towards securing it by the various methods that have been just described. The necessity for good and perfect excretion, in order to permit of healthy tissue growth, will become apparent in the course of the next chapter. How the body waste may check nutrition will be shown; and the proper combination of agents aiding in excretion with those conducing to better assimilation, will be pointed out.

Before leaving this chapter, however, there is one point on which some stress must be laid; and that is the peculiarities of some individuals: There are some organisms which seem to perform a maximum of work with a minimum of waste. There are others again which consume a large quantity of fuel, while they leave a huge quantity of ashes, &c., and only perform a small amount of work. If these latter are to be so fed that there shall be but little ash and waste, they will simply perform no work at all, they would die out. It is not only in animal organisms, so varied and diversified, that this occurs. It is to be seen in furnaces, engines, and flues. Some work with very little waste, their combustion is perfect. While others always need to have their refuse removed, else they cannot get on at all. So it is in certain systems. If we attempt to reduce their supplies to what they can perfectly consume, we simply starve them. Their supplies must be liberal, and the removal of their waste constant. There are many people who consume a large amount of food—indeed without it they could not work at all—who are all the better for occasional, almost, in some cases, persistent purgation. They are always having too much bile in their intestines, and they seem to get on better with having it swept away than when it is reabsorbed and an attempt made to consume it. It would seem that they do better when their bile is always freshly made than when it is taken up from the chyme. Limited quantities of food do not prevent these people being bilious. What they want is to have their spare bile got rid of. Regular action in the

bowels, especially by alkaline purgatives, good food, and a tonic occasionally, enable these individuals to reach a much higher standard of health than they usually attain. They are wasteful organisms, it is true; but it is no good destroying them in attempting to make them more economical. They require that plan which enables them to work best.

CHAPTER III.

EXCRETION.

§ 25. HAVING just seen the importance of a healthy assimilation in the production of normal nutrition, we now come to the question of excretion. This is a much more important subject than is usually supposed. We have for long been familiar with the gravity of imperfect nutrition ; but are not equally intimate with the still graver subject of defective excretion, and the evil effects of imperfect elimination. It is not merely that life soon becomes extinct if the different excretory actions of the body are not carried out—a method of destroying life much more rapid in its action than the withholding of ingesta—but it is also the more chronic action of imperfect elimination, which is fraught with grave issues. The importance of the functions of *egestion* as compared to those of *ingestion* was insisted upon by Marshall Hall in 1842. The system is soon poisoned if it cannot get rid of its own carbonic acid. The excreta of the urine are powerful neurotic poisons, causing coma and convulsions; and bile is equally destructive to life in large quantities. It would appear, indeed, that the assimilation of food is accompanied, or followed by the production of principles of a pre-eminently destructive character, either as injurious products of the food taken when split up, or as waste matters—the result of histolysis. Very grave, indeed, are the questions relating to retrograde metamorphosis within the organism. Especially is this the case with nitrogenized principles. These nitrogenized matters do not merely go towards tissue formation, and then, by a process of oxidation, pass from one form of histolytic product

to another. They do not break up in tissue destruction into creatin, creatinin, tryosine, and other early products of tissue decay, and then pass on into uric acid and urea merely; each form being in large amounts a dangerous poison. They also form within the animal organism ferments which exercise no unimportant function. Pepsin, so powerful a ferment in the production of the digestion of albuminous matter, is a secretion, and in so far an excretion of the stomach by means of its follicles. Ptyalin is the ferment of saliva, very effective in the conversion of starch into sugar. Pancreatine is another albuminous ferment, formed in the pancreas, also possessing marked power as a digestive agent. These different products are in so far excrementitious, that they are thrown out of one part of the system, and yet they are most effective in promoting digestion by their action upon the material which is furnished as food. These excretions are valuable digestives and ferments. Carpenter, in his article "Secretion," in the *Cyclopædia of Anatomy and Physiology*—a most valuable paper, to which frequent reference will be made in this chapter—says: "Thus the salivary, the gastric, and the pancreatic fluids all contain an animal principle nearly allied to albumen; but this principle seems to be in a state of change, or of incipient decomposition; and it would not seem improbable that whilst this very condition renders the albuminous matter useful in promoting the solution of the aliment, it renders it unfit to be retained within the circulating current." This is a suggestive paragraph. It throws a ray of light over the subject of the relations of excretions to nutrition.

There are also albuminous ferments scattered through the body, which cause, it is believed, the changes which give us our body heat. The glycogen stored up in our livers, and there reconverted into sugar, is broken up into lactic acid, and this acid, uniting with the soda of the blood, is gradually oxidized, and the oxidation of lactic acid, as lactate of soda, causes our body heat. (Headland.) The production of waste matters in excess, by the action of these ferments when over active; is a matter just coming within the range of our physiological vision. There are already indications enough to give us grounds for good expectations from it.

Before we go further with excretion by the different organs,

we must first look at excretion in its entirety. Thus, in the lowest forms of life, we find the surface generally excretory as it is also generally tactile. But as certain portions in time manifest greater activity in certain directions, and form the rudiments of special senses; so apparently there are certain areas which are more active than others in the excretion of waste products; and so we get the rudiments, the first shadowings out, of special excretory organs. As these develop, they come to possess certain *specialties;* yet nevertheless they do not lose altogether their primitive characteristics as part of a general excretory surface.

"In all instances, then, the excretory organ essentially consists of a limitary membrane, which forms part of the integument of the body, or of its involutions, and of cells covering the free surface of that membrane, and consequently in direct relation with the external surface. Thus we have the limitary membrane of the true skin, and of the mucous membrane of the alimentary canal, which is directly continuous with it, sunk into follicular depressions; and the free surfaces of these are lined with cells, the layers of which are continuous with those of the epidermis and of the gastro-intestinal epithelium respectively. We trace inwards another extension of the same membrane along the genito-urinary passages up to the kidneys, where it forms the wall of the tubuli uriniferi; and there, too, its free surface is covered with an epithelial layer of cells, which is the efficient instrument of the selection of the constituents of the urinary fluid, and which, when exuviated, is conveyed along the urinary passages to the exterior of the body. So, too, the hepatic cells, by which the biliary matter is eliminated from the blood, are brought into direct continuity with those of the external surface, though the hepatic ducts and gastro-intestinal mucous membranes. The case is not different, in any essential respect, with regard to the organs by which the recrementitious secretions are formed. Thus the lachrymal, salivary, pancreatic, and mammary glands are in like manner composed of a continuation of the limitary membrane of the true skin, or of the mucous membrane lining the alimentary canal, involuted into tubes and follicles, the free surfaces of which are covered with epithelial cells. These cells, drawing into themselves certain

constituents of the blood, are cast off when they have completed their full development, and their contents, set free by the disintegration of the cell-walls, are carried off by the ducts, which collect them from different portions of the glandular structure, and deposit them in the situation where the purposes of the secreted product are to be answered." (Carpenter.)

This gives us a clear view of the community of origin of the different excretory organs. We can see how, gradually, the function of each has become more and more specialized, until we have the different systems distinctly established. The air-tubes are nothing more than involutions of the general tegument, by whose means the respiratory changes are carried on. They also furnish the means by which oxygen is brought within the system, to perform its combined action of the production of force, by the oxidation of material within the body, and of the removal of waste. While permitting of the chemical interchanges which furnish oxygen, and also of the removal of carbonic acid, these air-tubes resemble the skin, in that they provide a large surface, from which water may exhale. The air-tubes, with their alveolar pouches in the lungs themselves, are an involution of the general tegument, preserving many of its primitive characteristics. The lungs and skin give off the water of combustion within the the body. The kidneys represent the ingested water rather, and their secretion varies with the amounts of fluid imbibed. There is a general play, backwards and forwards, betwixt these excretory organs in the elimination of water from the system, occasionally interfered with, or augmented by the action of the gastro-intestinal canal. The skin and kidneys play backwards and forwards very much according to the temperature; in hot weather the skin is most active, in winter the kidneys. Agents like potash act as diuretics, or diaphoretics very much according to the temperature surrounding the organism. It is not in the elimination of water merely that the mutual action and reaction of the skin and kidneys are demonstrated. They each excrete, along with water, waste products and salts. Long ago Nysten observed that urinous products were given off by various emunctories when their passage by the kidney was interfered with. "The passage of a urinous fluid from the skin has been frequently observed in cases where the renal secretion

was scanty; and the critical sweats, by which attacks of gout sometimes terminate, contain urates and phosphates, in such abundance as to form a powdery deposit on the surface. It has lately been ascertained that in warm climates urea is an element of the perspiration even of healthy persons." (Landerer, quoted by Carpenter.) At other times a urinous fluid is cast out by the gastro-intestinal canal, which possesses an excretory as well as an absorbent action. As excretory organs, these involutions of skin and their primitive form, the tegument, possess much in common.

§ 26. Along the gastro-intestinal canal there are established a series of excrementitious actions, resulting in the production of numerous albuminous products which are also recrementitious, and are very useful in the elaboration of our food. Though varied they possess much action in common. That is, along the digestive track, the primitive tegument has undergone such modifications as to excrete, or secrete, a series of products which fulfil no unimportant function in assimilation. And yet these excretory organs give off other products when the system is charged with them; products too far advanced to possess any nutritive power, and simply active poisons. From the times of Chirac and Helvetius, who noticed that a urinous fluid was passed off from the stomach after ligature of the ureters, down to the time of Roberts, this power on the part of the gastro-intestinal canal to supplement the action of the other excretory organs, has been observed and acknowledged. In the same way, the biliary excretion is removed by different parts of the body, not usually eliminating bile, when the system is charged with it. The skin, the serous membranes, the mucous membranes, are often penetrated with the colouring matter of bile, which they have withdrawn from the blood. The urine is often so charged with bile as not only to give bile reactions in testing, but even to stain the linen; while bile-stained tube-casts are among the most striking objects revealed to us by the microscope. The elimination of the catamenial flow by other organs than the lining membrane of the uterus, furnishing what is called vicarious menstruation, is a phenomenon to which portentous importance is attached by many savage tribes.

Even milk has been found to procure an exit by other channels than the mammary gland-ducts.

The relations of excretion to nutrition are very much involved. We have seen how a great many products are excreted, and yet not cast out, but fulfil an important functional end. Unexcreted they might have been injurious; excreted they are useful and beneficial. But there is something more than this in their relations. "As was first pointed out by Treviranus, 'each single part of the body, in respect of its nutrition, stands to the whole body in the relation of an excreted substance;' in other words, every part of the body, by taking from the blood the peculiar substances which it needs for its own nutrition, does thereby act as an excretory organ; inasmuch as it removes from the blood that which, if retained in it, would be injurious to the rest of the body. Thus the phosphates which are deposited in our bones are as effectually excreted from the blood, and prevented from acting injuriously on the other tissues, as are those which are discharged in the urine." The effect of each act of tissue-formation is to remove that which if unremoved, would, or at least might, have exercised an injurious influence; and which, if accumulated, certainly would exert a prejudical action. What is requisite for one part is injurious to another. It is somewhat difficult to realise this fact fully, in an organism so complex and so interpenetrated, as the body is, by blood-vessels and lymphatics. At first sight it would seem that every form of pabulum must be carried to every tissue; just as small organisms are seen to melt in the jelly-speck—the amœba—a simple solution of the tiny creatures being set up; and a centrifugal distribution of the solution throughout the mass of sarcode, carries it at last, as waste, to the external excretory surface. But nutrition has become a complex matter as evolution has progressed; and the development of the different specialized areas, with their varied functions, is not more compound than is the general nutrition, which gives to one tissue as food, what would but be a poison to other tissues if not removed.

§ 27. And yet, through all this, there remains, in each and every excretory organ, a sufficient amount of its primitive

character to render one organ a compensatory excretory agent for the elimination of what is more distinctly the province of another organ. Consequently we get compensatory over-actions, which are often mistaken for disease. Indeed until physiological research came to illuminate our practice, such a thing as uræmic diarrhœa was unthought of, and as a consequence its proper treatment remained undevised. We had simply no conceptions of any augmented secretions, or excretions, other than as morbid actions. In this respect we have made great advances; and now we commonly recognize the secondary character of what is truly a compensatory action, and not a morbid process. Especially have we learnt this lesson in regard to the recurring ailments of advanced life.

In early life most ailments take their origin in imperfect nutrition—in failure in the nutritive processes; in advanced life, ailments usually arise from impaired elimination of waste products. Of course zymotic, and accidentally-acquired diseases act alike in both extremes of life.

Many valuable lessons in practice are to be learnt solely from physiology, and it is only now becoming possible to learn them. It is only at the present time, that we are in a position to admit of an intelligent and rational comprehension of much of the ill-health of matured existence.

Ere proceeding to go practically into this question, it is desirable to make one more quotation from Carpenter's suggestive monograph. It relates to the power of one excretory organ to supplement the action of another, when defective. He calls it "Metastasis of Secretion," and writes,—"Although the number and variety of secretions become greater in proportion to the increased complexity of the nutritive processes in the higher classes, and although each appears as if it could be formed by its own organ alone, yet we may observe, even in the highest animals, some traces of the community of function which characterizes the general surface of the lowest. It has been shown that, although the products of secretion are so different, the elementary structure of all glands is the same; that wherever there is a free excreting surface it may be regarded as an extension of the general envelope of the body, or of the reflexion of it which lines the digestive cavity; that its epithelium is

continuous with the epidermis of the integument, or with the epithelium of the mucous membrane from which it is prolonged; and that the peculiar principles of the secreted products pre-exist in the blood in a form at least closely allied to that which they assume after their separation. Now it may be stated as a general law in physiology, that in cases *where the different functions are highly specialized* (that is, where every one has its special and distinct organ for its own purpose alone) *the general structure retains, more or less, the primitive community of function which characterized it in the lowest grade of development.* Thus although the functions of absorption and respiration have special organs provided for them in the higher animals, they are not altogether restricted to these, but may be performed in part by the general surface, which (although the special organ for exhalation) permits the passage of fluid into the interior of the system, and allows the interchange of gases between the blood and the air. In the same manner we find that the functions of secretion are equally performed in the lowest animals by the whole surface, whilst in the highest there is a complicated apparatus of glandular organs, to each of which some special division of the function is assigned; either the general muco-cutaneous surface, or some one of its subdivisions or prolongations, is able to take on in some degree the function of another gland whose functions may be suspended. This truth was well known to Haller, who asserted that almost all secretions may, under the influence of disease, be formed by each and every organ. This statement, however, needs to be received with some limitation, and it would probably be safest to restrict it to the *excretions* whose elements pre-exist in the blood, and accumulate there, when the elimination of them by their natural channel is suspended." This introduction to the physiology of excretion will enable us, all the better, to take up the subject of its abnormalities, and to see more clearly the indications for a rational treatment.

§ 28. Thus, for instance, we see how water is eliminated from the system by the different emunctories, the skin, kidneys, lungs, and bowels. When the skin is very active the bulk of urine is small; and a similar decrease in the amount of water excreted by the kidneys, follows a sharp diarrhœa with watery

motions. Sometimes when the action of the skin is checked while the kidneys are acutely congested, a condition often produced by exposure, we see a general œdema induced, a storage of the water in the areolar tissue, only to be removed by sweating and purging.

Carbonic acid is chiefly exhaled by the lungs, but a portion also escapes by the skin. Under certain circumstances of arrest in the action of the lungs, the amount passed off by the skin becomes notably increased. Holding the breath in summer quickly induces perspiration in many persons. In fact when the exhalation of carbonic acid by the lungs is interfered with the skin passes it off. "Moreover, it has been observed not unfrequently that the livid tint of the skin which supervenes in asphyxia, owing to the non-arterialization of the blood in the lungs, has given place after death to the fresh hue of health, owing to the reddening of the blood in the cutaneous capillaries by the action of the atmosphere upon them; and it does not seem improbable that, in cases of obstruction to the due action of the lungs, the exhalation of carbonic acid through the skin may undergo a considerable increase; for we find a similar disposition to vicarious action in other parts of the excreting apparatus. There is also evidence that the interchange of gases between the air and the blood through the skin has an important share in keeping up the temperature of the body (Chap. XII.); and we find the temperature of the surface much elevated in many cases of pneumonia, phthisis, &c., in which the lungs seem to perform their function very insufficiently." (Carpenter, *Human Physiology*, § 309.) Every observant practitioner will agree with this last, as he must have had opportunities of noting this fact about the consumptive patient when far on his journey. About 5 or 6 A.M. the patient will usually do one of two things: either waken up and beg for air, sitting gasping, from the diminished lung space, and throwing into play all the auxiliary muscles of respiration, breathing for dear life indeed; or he falls into a deep comatose sleep, and becomes drenched with perspiration. Sometimes one happens, sometimes the other. In each case there is a desperate effort made to get rid of the carbonic acid of the system. In some of the lower animals the cutaneous respiration is an important matter.

Even still more important, and withal interesting, is the

subject of the elimination of nitrogen. It is usually taken for granted that nitrogenized waste passes off by the kidneys. Few practitioners think of the other means of its exit, in their practice and treatment. The importance of renal inadequacy is being now very generally comprehended, and a short review of the matter may be profitable. Prevost and Dumas were the first to find that when urea was not cast out by the kidneys it accumulated in the system. Since then we know that urea, uric acid, and the earlier products of histolysis, creatine and creatinine, are all to be found in the blood after ligature of the renal artery. Such being the case, these waste matters pass out by different emunctories. A quotation from H. C. Wood will show the attention paid to to this subject:—

"In 1851 Dr. Schottin discovered urea in the sweat of patients suffering from the collapse of cholera. Not only has the discovery of Schottin been confirmed by the researches of G. O. Rees, of Fiedler and Jürgensen, of Leube, and of G. Deininger, but it has also been abundantly proven that the skin excretes urea freely during the advanced stages of Bright's disease, and also during the partial suppression of urine of scarlatinal desquamation and nephritis. The urea in renal disease may even form a distinct crystalline powder on the skin; but it is most abundant about the mouths of the sweat-glands. I believe Landerer was the first to announce that urea was present in the sweat of healthy persons; and although chemists of excellence have been unable to detect it, yet its presence at times can no longer be denied, since it has been found not only by Landerer, but also by Funke, in 1858, by Meissner, and by Leube; Fourcroy has found it in the sweat of horses. By a series of elaborate experiments Leube has rendered it probable, if he has not actually proven, that in health there is such a relation between the skin and the kidneys that when the former is very active the latter excrete less than the normal amount of urea." (*Loc. cit.* p. 435.[1])

From this it would appear that suppressed gout may arise from defective action of the skin as well as from renal inadequacy. Richardson found that ammonia was given off by the breath in

[1] I have omitted the references to these authorities given in the text. Any reader wishing to go further into the matter will find them given in Wood's *Treatise on Therapeutics*, at p. 435.

uræmic coma (Asclepiad), and experience has made it a common observation.

Zalesky found in serpents, after ligature of the ureters, that all the organs and tissues were strongly infiltrated with urates, which formed thick white crusts and patches on all the mucous and serous membranes, in the joints, in and upon the kidneys, liver, heart, and spleen. By chemical analyses uric acid was also abundantly found in the lungs, muscles, and throughout the body. (Roberts on *Renal Diseases.*) The same authority says, "When the vomiting is really uræmic it takes place without reference to the nature of the contents of the stomach, and is oft repeated or uncontrollable; the vomited matter is a watery fluid, either distinctly ammoniacal to the smell, or (if acid) evolving ammonia when caustic potash is added thereto. The alvine dejections are similarly characterized when due to the same cause." (Part iii. Chap. iv.) We are all familiar with the inflammations of serous membranes so commonly found in chronic Bright's disease.

Thus we can see how a whole array of so-called ailments may arise in consequence of imperfect elimination of nitrogenized waste; and that such, of course, will most commonly occur where the kidneys are no longer in their integrity. But these affections are not the disease itself. They are forms of natural cure. They are better obviated, if possible. If this is not feasible, they may be aided by proper treatment. A large series of the affections of advanced life find their origin in impaired elimination of nitrogenized waste. They are compensatory actions rather than diseases *per se.*

§ 29. It is, from the foregoing, very obvious that in the treatment of affections originating in the imperfect elimination of nitrogenized waste there are several points to be attended to. 1. To reduce the amount of nitrogen consumed. This needs no explanation. 2. To give large quantities of fluids, in order to bathe the tissues, and wash away the sparingly soluble salts. 3. On no account to attempt to stop the compensatory excretory action, until the normal excretion is restored. 4. To act upon the different compensating organs, and set up vicarious elimination through other channels. For this last purpose, action upon the skin is at once the most physiologically rational, and at

the same time practically feasible. In all cases, then, the skin may be kept in action with advantage. Warm baths, Sir James Simpson's bath (see p. 88), the hot-air bath, &c., all may be resorted to beneficially. Especially are they useful when there is obstinate vomiting. When the stomach is unaffected, large draughts of water, pure or alkaline, are indicated. Such draughts may advantageously be used to wash down the following dose:—

Pot. Iod. gr. v.
„ Bicarb. gr. v.
Inf. Buchu ʒi. om. 4tâ horâ.

At the same time, if there be evidence of congestion of the kidneys, hot sinapisms may be applied over the loins, or dry cupping resorted to. The bowels may be smartly acted upon by drachm doses of compound jalap powder, or the following:—

Pulv. Cambogiæ, gr. v.
Pot. Bitart. ʒij.
Pulv. Pip. Nig. gr. x.

daily, followed by action on the skin and draughts of water. Such a plan of treatment must be pursued intelligently and courageously; and if so followed out will often give very satisfactory results. Affections demanding such a plan of treatment are much more common among elderly people than is ordinarily supposed.

Even after the violence of the outburst is quelled, it is very important to remember the pathology of the morbid condition, and to avoid vegetable astringents, and still more opium. This last is often a desperate poison in conditions of impaired elimination, and must be scrupulously avoided. If the diarrhœa persists after the action of the kidneys is fairly re-established, the skin must be kept in action, and the following mixture may be prescribed:—

Liq. Fer. Pernit. ℥xv.
Pot. Nit. gr. v.
Inf. Buchu, ʒi. ter in die,

until matters have once more become normal.

It is a matter of much importance in the treatment of such cases to put the patient on a slop diet, which contains a minimum of nitrogen. The error made by our predecessors, in their adoption of a slop diet, was, that they applied it too exclusively, and did not, with sufficient care, discriminate betwixt the cases where such a diet was indicated, and those where a more liberal dietary was desirable, and even imperatively necessary.

For some time, indeed, after any outburst associated with impaired elimination, the patient must live very carefully. The diet must be largely farinaceous, the skin be kept well clad in flannel, and the bowels regulated with alkaline purgatives. The pathology of the ailment shadows out the true and rational treatment.

§ 30. It not unfrequently happens that organs actively engaged in compensatory action, or vicarious elimination become themselves affected from this functional activity. Thus in chronic renal changes it is very common for the skin to become chronically diseased, and the skin affections, so induced, are very intractable if their origin be not remembered. Numerous chronic skin affections, exzematous and scaly, are cured, for the time being, by a course of Buxton or other waters. The elimination of the waste products, by the action of the alkalies dissolving them, and so permitting of their washing out with the different water-channels of the body, is followed by the cure or relief of the affections, induced by the vicarious functional activity of the skin. But they return again, usually in a brief period, unless the drinking of some alkaline water is continued.

A very illustrative instance of the effect of well-directed treatment is furnished by the following case:—Some years ago, a friend of mine asked me about a case of very obstinate irritable ulcer in a lady patient, who had been troubled with it for eighteen years, and, during that time, had consulted many leading surgeons at home and abroad. It had resisted all, and every form of treatment hitherto devised. Remembering the instructions of my excellent surgical teacher, Joseph Bell, of Edinburgh, that irritable ulcers were commonly found in gouty persons, I asked if there was a possibility of the lady being gouty.

He thought it probable, though she had never suffered from regular gout. The ordinary mixture—

Pot Iod. gr. v.
,, Bicarb. gr. x.
Tinct. Sem. Colch. ℥x.
Inf. Buchu ℥i.

was given three times a day, with copious draughts of water. Simple water dressing was applied to the ulcer. In three weeks the ulcer had healed, to the patient's immense satisfaction.

Not only the skin, but the bronchial membrane is exceedingly apt to become chronically deranged from vicarious action; and in these cases iodide of potassium, &c., is extremely useful. Indeed, these are the cases of bronchitis which yield to this remedial agent only. In many cases the stomach seems to suffer continually from the irritant effects of the uric acid present in the gastric juice. It may be merely a coincidence, but it has occurred to me several times to see cancer of the stomach developed after a long history of gouty dyspepsia. It is quite possible that the irritation, so caused, ultimately leads to a development of pathological connective tissue of a grave character, viz., scirrhus.

Dr. C. J. B. Williams has drawn attention to the relations of localized inflammations with general conditions of imperfectly depurated blood. He says: "Irritation and inflammation are sometimes caused by excrementitious matter retained in the blood, where the functions of the excrement organs are impaired." And again he writes: "The natural excretions of the body become most acrid irritants when brought into contact with serous membranes; thus urine, fæces, and bile, effused in serous membranes, even in the smallest quantities, produce intense irritation and inflammation."

Such being the case, it is quite possible that long-continued irritation, by trifling quantities of these substances, may result in tissue changes of a chronic character; and, in those advanced in life such change, may assume the direction of malignant connective tissue.

§ 31. Another important effect of impaired excretion is the action of retained excreta upon the blood formation. These

poisons—for they are identical in their effects with blood poisons—so produced within the system itself, act in the most prejudicial manner upon the formation of the blood, or, if not that, they break the blood down when made. In the London Hospital it is quite common to see what they there denominate "fæcal anæmia"—that is, anæmia caused by the action of the excretions of the intestinal canal being again absorbed, during persistent constipation, and exercising a destructive action over the blood corpuscles. Purgation at once improves this state of matters, and the condition of anæmia is relieved ere chalybeates are resorted to. In the same way we find the anæmia so common in the course of kidney disease, to be produced. The presence of renal derivatives in excess affects the red blood corpuscles in reducing their number. Anæmia follows, and iron, alone, will not relieve the condition. As in fæcal anæmia, iron will not increase blood-formation unless a specific be added to it. Purgatives in all cases aid the action of iron, and this is the explanation of much of the benefit derived from such combination. In gouty anæmia, potash added to iron, and the dose washed down by large draughts of water, produces at once a pleasant change in the state of matters. Such combination is furnished by the Mist. Ferri Co. It is perhaps better to combine iron with potash thus :—

Pot. Bicarb. gr. x.
Ferri Pot. Tart. gr. v.
Inf. Quassiæ ℥i., ter in die,

gradually decreasing the potash and increasing the iron, until a good state of health is produced. It has fallen to my lot to see gouty anæmia pass away, and the hue of health come back to the lips and cheeks, simply under the use of potash and diuretics, before a single grain of iron had been administered. In this respect anæmiæ, the result of systemic poisons, resemble the anæmiæ of syphilis, of lead-poisoning, and of malarial disease. In each case the specific, mercury, iodide of potassium, or quinine, must be added to the chalybeate, ere good blood construction can be induced. Promoting the action of the skin is often useful in bringing the system under the influence of iron in these cases. This is brought about by its eliminant

action. Warm baths and purgatives are very serviceable as adjuncts to the hæmatic remedies in these cases. Thus mercury, iodide of potassium, or quinine are true hæmatics in these cases, because they directly aid in inducing healthy blood-formation. (§ 21.)

In many cases of anæmia the ordinary methods of giving good food and iron totally fail. The treatment is persevered with, but is of no avail. The blood-formation is prevented by some poisonous material in the blood, and all our efforts are futile. When the specific remedy is administered then progress is made, and the case goes forward. When anæmia is a consequence of impaired elimination of nitrogenized waste a spare diet, but poorly supplied with nitrogen, will often produce excellent effects, and procure an improved blood-formation. Such a plan of treatment would never suggest itself except under two sets of circumstances. 1. A good comprehension of the physiology and pathology of assimilation. 2. A close and observant experience, which can guide the treatment of one case from its remembrance of the course of events in another. Few are equal to the latter; the former is easily possible. Such a plan of restricted diet must always precede any restorative treatment, in cases of inadequate excretion. However the patient may dislike it—and some do rebel in earnest—it is the only plan. We might wish to reap our corn as soon as the ear is shot—and the folly of that is clearly apparent—without satisfactory results: so sometimes patients wish to hasten processes, instead of allowing them their proper order; and the folly becomes apparent in time. The old trainers' plan of clearing out the system, ere commencing to build it up, was sound and sensible.

§ 32. There is another product which in its waste or excess is certainly an excretion, and that is bile. Though the creation of the liver essentially, when the flow through the gall-duct is obstructed, there is a general saturation of the body with bile products. The different involutions of the general primitive tegument are specially involved, as vicarious and compensating eliminants. Bile may either not be secreted originally, if indeed this occurs at all, or it may be reabsorbed: the latter being infinitely more common. Biliousness usually springs from

the reabsorption of spare bile going round and round in the portal circulation. "In either case, the urinary apparatus is the principal channel through which the biliary matter is eliminated, the urine becomes tinged with the colouring principle of bile, being sometimes of a yellowish or orange hue, and sometimes of a brown colour with a considerable sediment; and the presence of the most characteristic constituents of the bile has been determined in the urine. The same result presents itself when the biliary duct has been artificially obstructed by ligature. Other secretions have been found tinged with the colouring matter of bile: thus the pancreatic fluid has been seen of a yellow colour in jaundice; and the milk has presented not merely the hue, but the characteristic bitterness of the biliary secretion. The cutaneous transpiration is not unfrequently so much impregnated with biliary matter as to communicate the tinge to the linen covering the skin; and even the sputa of patients affected with bilious fevers have been observed to be similarly coloured, and have been found to contain biliary matter. The secretions of serous membranes, also, have frequently been seen to present the characteristic hue of bile; and biliary matter has been detected, by analysis, in the fluid of the pleural and peritoneal cavities." (Carpenter, Art. *Secretion.*) This quotation demonstrates the excretion of bile by various organs, when its escape from the liver is interfered with.

In practice, however, we do not treat functional disturbances of the liver by acting on other emunctories, so much as by measures which will be detailed in Chapter XVI. (§§ 165, 166.)

We are also familiar with disturbances wrought in the system by the excess of a normal product, viz., lactic acid. It is a normal recrementitious excretion in the gastric juice, and it normally exists "in the parenchymatous juices and especially in that of muscle." It is apt to be found in excess in those whose diet is too exclusively farinaceous. It is formed in great excess by the organism in acute rheumatism, or rheumatic fever. Indeed rheumatic fever has been induced by doses of lactic acid given medicinally.[1] In acute rheumatism the skin is bathed in a sour perspiration, the saliva is usually sour, the intestinal canal pours out sour and offensive fæces, and the urine is acid and

[1] See Balthazar Foster's *Clinical Lectures.*

charged with lithates. As the patient recovers the secretions become normal. This again shows how under certain circumstances general excretory activity is induced, with the effect of cleansing the system from a normal product when in excess. We act upon the excretions in the treatment of rheumatism, as we shall see when we come to take up the question of rheumatism. (Chapter XI.)

§ 33. *Alteratives.*—"There are employed by practitioners of medicine to affect certain diseases most intimately connected with the processes of nutrition, various substances which do not, at least in the doses commonly employed, produce any very obvious symptoms. These drugs may perhaps neither stimulate nor depress, so far as can be perceived, any function of the body; their action may be silent and imperceptible, their mode of influence may be unknown, but their therapeutic effects are among the most assured of clinical facts. It is to medicines of this character that the name of *Alteratives* has been applied, because when administered they seem simply to alter morbid processes." (Wood.)

Our inability, as yet, to explain the action of alteratives by exact physiological experiment, is the less unfortunate that the clinical facts so well support what empiricism has taught us. It must not for one moment be supposed that all empirical facts which physiology or pathology cannot yet explain, are to be rejected accordingly. What will become of all which we trust to learn, if we are to cast away everything not yet illumined? We should be cutting ourselves off from some most valuable knowledge if we were to abandon the teachings of empiricism. It is certainly much more satisfactory to be able, by the light of physiological research, to elucidate what empiricism has demonstrated to be a fact. But where this cannot, as yet, be done we must acknowledge the facts, and in doing so perhaps pave the way for forthcoming investigations, which may tend to clear up our imperfect knowledge. "To deny, as has been done, the existence or value of medicines of this class because we cannot tell why mercury relieves syphilis, or why iodide of potassium cures rheumatism, is as absurd as to deny the existence of the syphilitic or rheumatic dyscrasia, because we do not know their ultimate nature." (Wood.)

Arsenic is a powerful alterative. We have seen before that it was a stomachic. The union of these two qualities renders it an excellent adjuvant to hæmatics. As an alterative it is found to be eliminated by the kidneys chiefly, then by the intestinal canal, by the skin, and even by the saliva and tears. Thus we see that it is eliminated by the principal excretory organs, and can understand its efficacy in procuring more perfect elimination of waste, and so more perfect nutrition of the body. The improved elimination leads to a more thoroughly healthy state of the secretions and excretions. Consequently we find that arsenic is used in some countries, especially Styria, to give robust health. This it does, and endows the arsenic eater with ruddy cheeks, the bloom of health, long wind, and a good physique generally. It has been used in other countries for its famous alterative qualities, as a cosmetique, for both human beings and horses. It can be added to hæmatic and tonic remedies with advantage.

Fowler's Sol, ♏v.
Pot. Bicarb. gr. v.
Fer. Pot. Tart. gr. v.
Inf. Quassiæ ʒi. ter in die,

before food is often a capital combination.

Sometimes it is desirable to give arsenic in an acid solution with iron, as

Valangins' Sol. (Liq. Ars. Hyd. Chlor.) ♏ iii.
Tinct. Fer. Perchlor. ♏ x. ter in die,

in water, or other vehicle, after food. This is the best fluid form of arsenic to be given with hæmatics, when wishing to build up the blood and system generally. Or it may be administered in the pill given in § 20.

Mercury is a notable alterative. It is found in all excretions. It acts upon the flow of bile, it is found in the urine, in the serum of ulcers, in the saliva, fæces, and even in the seminal fluid. It has a marked action on the skin. Its value is generally recognized, not merely as an antisyphilitic and antipyretic, but as an alterative. When the tongue is foul, the skin dry, the bowels loaded, and there is a bitter taste in the mouth in the morning, calomel will almost at once make the difference in the effects of

purgation. Purgatives may have been resorted to in vain, but mercury produces a decided difference. As an occasional purgative it is most useful, but its severe after effects render its long continuance undesirable except in syphilitic cases. The soluble preparations, as the bichloride and the iodide, are most powerful poisons, and must be given in small doses. Headland has given somewhat lengthy explanations of the difference betwixt the soluble and the insoluble preparations, which may be profitably perused in his *Action of Remedies*. He thinks calomel, blue pill, and others are rendered soluble—without which they would be physiologically inert—in the gastric juice, or the alkaline chlorides of bile.

Mercury may be given in powder, pill, mixture, or by a plaister. It can often be combined with iron with advantage, especially in the anæmia of syphilis, whether acquired or congenital, where it is most useful. (Chap. XII. § 120.) It is unnecessary to write out any forms for the administration of mercury, everyone knows them! Some special combinations will be given from time to time as we proceed.

Iodine is a powerful alterative. It passes off chiefly by the kidneys, but is found in the secretions of all mucous membranes. I have tasted it in the mouth on waking after its local application to the knees. R. W. Taylor thinks he has found evidences of its free escape by the skin. As iodide of potassium it is one of our commonest and most valued remedies. Its absorbent power will be considered hereafter. (Chap. XX. § 201.) Its alterative action on the different emunctories, and especially in getting uric acid out of the system as well as the poison of syphilis, renders its use very common. Various combinations can be made, several of which have been already given. As a hæmatic it is given with iron, in the well-known syrup of the iodide of iron, or Blancard's unchangeable iodide of iron pills.

The most powerful alterative known is the combination of iodine, mercury, and arsenic, called Donovan's solution. In all cases where the excretory organs, at large, need acting upon this is a capital agent to employ:

℞ Donovan's Solut. ♏ xx.
Inf. Cascarillæ ℥ ss. ter in die,

is a famous alterative, especially in tertiary or congenital syphilis.

Alteratives are commonly and advantageously combined with purgatives; and often a liberal dietary becomes necessary at the same time that they are continued, especially if there be much wasting. Colchicum, sarsaparilla, and guaiac are vegetable alteratives often used along with iodide of potassium. Guaiac is a better vehicle and adjuvant than sarsaparilla in most cases, especially in the rheumatic.

§ 34. In actual practice the well directed use of alteratives will often give the most gratifying results. Indeed they are a class of agents too little understood by the merely well-taught hospital student, but with which he will do well to make himself more familiar, if he desires success in private practice. Their effect not being explicable or demonstrable by actual experiment, they are too often neglected, to the injury both of medical man and patient. They were much more used by the practitioners of the last generation than they are now; but we are not quite certain that we are better practitioners than our predecessors. Their neglect is one of the surest pieces of evidence that while our profession as a science has distinctly improved, in some respects it has retrograded as an art. There really is no room for doubt but that the brief mercurial course—not to the extent of salivation, but a few grains of Plummer's pill every night for four or five nights—so commonly resorted to by the practitioners of the past, was often very salutary. Such means threw into action the different emunctories of the body, and so restored the blood to a normal condition, or in homelier phrase "cleansed the blood." In the treatment of affections of the skin, so notoriously associated with imperfect elimination, or the formation of crude matters by imperfect assimilation, these alteratives are chiefly relied upon for the cure of many of the most obstinate of these rather intractable diseases. Of old it was quite common to fall back on a course of alteratives when any affection was more than ordinarily rebellious, and now we resort to the same thing whenever there exists a suspicion of syphilis. But it is somewhat irrational to assume that the poison of syphilis—be it what it may—is the only one eliminated by agents acting generally upon the excretory organs. There are systems, about which experience alone can give much information, where alteratives are distinctly indicated; people with muddy complexions, unctuous skins, a disagreeable

odour in the breath, and generally constipated bowels. Such persons are all the better of a course of alteratives and purgatives, from time to time, when out of sorts.

It was a practice among the practitioners of the past to give a dose of calomel and James's powder at bedtime, with a Seidlitz powder in the morning, to patients who presented themselves with severe colds. Here the tongue was usually foul and the skin dry, with some thirst. After the bowels had been freely opened, acetate of ammonia with ipecacuan wine, as diaphoretics, were given for a day or two. Excellent effects were thereby produced, as my experience in my father's surgery taught me. Nevertheless, when at last a graduate, in the fulness of my knowledge, and after a hospital training, I took the reins of practice, it seemed quite proper to discard alteratives as impostors, whose claims could not be substantiated. Consequently, and logically, they were put aside. But, as time went on, one case after another turned up where the administration of the powder and purgative produced better results than the diaphoretic treatment, without such preliminary preparation; until, at last, a silent recantation was brought about, and the powder and Seidlitz resumed their place as of yore—after their temporary seclusion.

All this may seem to some readers as simple twaddle, that the results were coincidences, and that the patients would have done just as well without the alterative. Of course there exists the right of private judgment in matters therapeutic, as in matters theological; and such persons have a right to their own opinion. I thought at one time as they may think now; but at present my opinions have changed, without making me a worse practitioner, I trust; and the right and skilful use of alteratives is, to my mind, one of the best evidences of an observant experience and of thoughtful practice.

No doubt habits of cleanliness, better ventilated bedrooms, more regulation of the bowels, and a systematic attention to the general health have altered matters much; and that the appeal to the general excretory organs, once so necessary, is not now so strictly indicated among the more affluent classes; but among the humbler classes the old plan of commencing treatment is a sound one.

So, too, in convalescence, the occasional use of alteratives is

proper and beneficial. It often happens that a steadily progressing recovery is suddenly clouded by a state of feverishness, a foul tongue, loss of appetite, and general *malaise*. Under these circumstances it is a good plan to give some Pil. Cal. et Colocynth Co. at bedtime and some citrate of magnesia in the morning; or to give a few grains of calomel with jalap or scammony in the morning, if the patient be seen in the forenoon. A gentle action on the bowels generally restores the condition to what is to be desired. But it must not thence be conjectured that it is the mere purgative action which is the whole matter; like results will not happen if the mercurial be omitted.

The alterative action of arsenic is well illustrated in the excellent effects produced by its combination with iron. In many cases of impaired health, where the hair has lost its gloss, the skin is dry and harsh, the tongue always furred, and the assimilative process is imperfect, a course of arsenic and iron restores the lost lustre to the hair, the skin recovers its pliability and softness, the tongue cleans, digestion and assimilation progress, the system gathers weight, and the person possesses once more the characteristics of health. In cases where there has been mischief in the lung, as for instance where an acute attack of pneumonia has degenerated into tubercle, or incipient tuberculosis exists, then the combination of arsenic with iron, and a liberal dietary, seems specially valuable, and gives most gratifying results.[1]

The combination of iodine with iron, as in the syrup, has been found most useful in the treatment of the strumous, and especially strumous children. Whether it is in the convalescence after some exanthem, or in imperfect growth with defective assimilation, the union of iodine with the chalybeate is usually adopted as a matter of course—as a consequence of experience merely, without any investigation into the *rationale* of the matter. In fact it is done as a matter of habit, as a consequence of what has been observed and silently registered, the outcome indeed of experience.

Neither is it difficult, after the physiological introduction to this chapter, to comprehend why a generally improved excretion should exercise such a beneficial action upon assimilation. Waste

[1] It is of service even in spreading caseous pneumonia.

must be removed ere new material can be deposited in a tissue; and waste products must be efficiently eliminated, if the assimilative processes are to be carried on with normal efficiency. This truth has found an expression in the wonderful growth of a system of treatment now becoming fashionable and common. It is only about a century since Vincent Priessnitz, a peasant in Austrian Silesia, evolved the idea of modern hydropathy. In spite of obvious folly in some of its practices, in spite of the neglect and disdain of the profession, in the face of the fact that it has not yet succeeded in attracting the best men into its ranks, that it is indeed tabooed by most orthodox members of the profession; hydropathy is establishing itself and making good its claims, not only to our attention, but to our respect. In the treatment indeed of the ailments of mature life, especially of the man who has kept himself up to his work by large supplies of rich food and a liberal amount of alcohol, and in whom the system is saturated with the products of waste, this plan of liberal draughts of water is excellent. The waste products of the body are soluble, if but sparingly soluble in water, and the bathing of the tissues with water, and the washing out of the system, are applications of sound physiology, even if arrived at by an uncultured empiricism. By this means, by the powerful alterative action of water in unstinted quantities, the aim of purifying the organism, by exciting its different emunctories into high functional activity, is achieved. To this is conjoined an almost total abstinence from alcohol—the beverage is water. The food is simple, and not specially inviting, there is nothing in it to tempt too free indulgence; there is a total absence of the *entrées* and various wines that have led to repletion, as the consequence of pleasant viands rather than of systematic wants. There is good food for the needs of the organism; there is plenty of fresh air, with its waste-removing oxygen; many hours every day out of doors in bracing air; and finally, there are early hours to bed, and an early hour to rise in the morning. In fact there are aggregated all the conditions under which a jaded and overtaxed system may recover itself; where it may get thoroughly rid of its waste, and inaugurate a course of healthy tissue-formation: a process of which it stands much in need. Indeed in hydropathy we see empirically achieved what a scientific

physiology would ere long have indicated as the logical and rational plan of treatment of numerous affections of mature and advanced life, which take their origin in the imperfect elimination of waste, either the products of tissue change, of histolysis, or the results of protein compounds imperfectly assimilated or furnished to the system in excess of its needs.

We are rapidly coming round to a point when the importance of proper, sufficient, and healthy excretion, in the maintenance of health and the treatment of disease, can be established by scientific evidence, as well as by the accumulated but undigested facts of simple empiricism. As a logical sequence, then, alteratives are again being included in our armamentarium with benefit to our patients.

CHAPTER IV.

BODY-HEAT AND FEVER.

§ 35. WHETHER under the burning sun of the Sahara, or on an iceberg in Davis's Straits, the body-temperature of man is practically the same. There may be sometimes a slight difference, but it is only to be measured by tenths of a degree Fahrenheit, or little more. To a certain extent this result is due to clothes, and without warm clothing, by which the body-heat may be conserved, man could not maintain a temperature compatible with life in the Arctic regions. But admitting that clothes are an indispensable auxiliary, this body-heat is maintained in the one case, and regulated in the other by most important processes going on within the organism.

All our heat is the result of combustion, of oxidation of the material consumed as food. At one time it was thought this combustion was carried on in the lungs solely—that they were the furnaces of the body. We now know that oxidation goes on in all the minute capillaries of the body. But the combustion is much more active in some than in others. The chief combustion goes on in the muscles. The actual combustion is said to consist chiefly of the oxidation of lactic acid in union with soda. The hydro-carbons are stored up, for the time being, in the liver as glycogen, which, when liberated, becomes sugar, and is then split up into lactic acid and as such is oxidized. The muscles have each a little store of glycogen, but the great storehouse is the liver. The more permanent storage is in the form of fat; and on these stores of fuel the body lives when deprived of food. As the reserves of glycogen become exhausted the fat is

utilised to sustain the body-temperature. This temperature is almost entirely maintained by the union of oxygen with the carbon and hydrogen of our food. To a small extent nitrogenized matters are oxidizable, and so furnish a small quota of heat. A certain combustion goes on in the viscera, and the venous blood of the kidneys and liver is warmer than the arterial blood supplied to these organs. The blood of the inferior vena cava is warmer than that of the superior vena cava, and even than arterial blood itself. A greater amount of heat is produced during the action of muscles than when the same muscles are inactive. It makes a decided difference, however, whether the muscular action is doing so much work, or whether it is not so employed, as to the amount of heat produced. In tetanus very high temperatures are reached. In ordinary muscular action a certain amount of what would otherwise be heat goes to produce mechanical results; and there are good grounds for holding "that the products of muscular contraction — *i.e.*, the heat and the mechanical results—are conjointly the expression or equivalent of the chemical action which goes on in the muscle." (Wunderlich.) Heat is also furnished by mental exertion; this is more marked in tropical climates than in cold ones. Very active mental exertion produces a rise of temperature of from one-half to a degree Fahrenheit. A large supply of good food also occasions a temporary rise of temperature, probably from the increased heat produced by the active changes of digestion and assimilation.

On the other hand, heat is lost chiefly by the skin; and to a less extent by the respiratory tract. The blood circulating through the skin is cooled by heat-loss, by the radiation away of the heat in the surrounding cooler air. The larger the amount of blood circulating through the cutaneous vessels the greater the heat-loss. Consequently, in cold weather, the skin is cold and marbly; it is also white and anæmic. The vessels are contracted, and the heat-loss reduced to a minimum. On the contrary, when there is an excessive heat-production, the vessels of the skin dilate; the skin is high-coloured and glowing; it is in a highly vascular condition. We have seen that a free blood supply leads to functional activity, and if the heat production be maintained, we get the sudoriparous glands thrown

into action, and perspiration ensues. The consequence is that the cooling effects of evaporation are called into play, and still further heat loss is occasioned.[1] By such means the temperature is kept at or near the norm. In tetanus, and in rheumatic fever, there is free perspiration often found along with very high temperatures; but all that this proves is that the evaporation and heat-loss are unequal to neutralizing the excessive heat-production. (The body-temperature often rises after death, and continues high for some hours. This is due to the fact that the heat-production is no longer met by heat-loss, by radiation of heat away by a blood current through the skin.) The play backwards and forwards betwixt the production of heat and its loss is not only very interesting, but is of the highest practical importance.

Rosenthal has divided the body into an internal, or heat-producing area, and an external, or heat-losing area, with a mixed, or intermediate plane betwixt them. In the internal area heat is being produced by combustion; in the outer area it is being lost, or got rid of. Now it is obvious that a great effect must be produced by the amount of blood circulating in these two opposite areas. If the vessels of the skin be contracted by the action of external cold, then the amount of blood circulating in the cutaneous vessels will be small, and the heat-loss will also be small. Further, if there be but little blood circulating through the outer area, there must be more circulating in the internal, or heat-producing area, and consequently greater heat-production. The combined effect of this is increased heat-production and diminished heat-loss in cold climates; and so the body preserves its normal temperature in the coldest regions —aided, as we have before said, by the action of clothes.

In hot countries this process is reversed. There is in a surrounding medium of high temperature, a fulness or dilatation of the vessels of the skin. By this means the heat-loss is brought to a maximum, and heat-production to a minimum. The lesser the amount of blood in the internal, or heat-producing area, the less heat is evolved. Consequently, there is a lessened heat-production, and very little oxidation or wasting. Under these circum-

[1] The evaporation of water produces much coolness, from the amount of heat rendered latent, as water assumes a gaseous form.

stances life can be maintained on a very small amount of food, as evidenced by the long fast of the crew of the *Arracan* in the Indian Ocean, from which all recovered.[1] In a cold climate they would have been burnt out in a very few days. In the high temperature by which they were surrounded, their reserve stores of fuel were scarcely drawn upon to maintain their body heat, and so remained available for mechanical results. In order to be well and healthy in tropical regions but a small quantity of food is absolutely necessary. That people should not lose their gustatory tastes in hot climates, and, as a consequence, eat a great deal more rich food than is either necessary or good for them, does not bear on the real question. The ill-health which follows systematic over-indulgence, sufficiently proves the desirability of maintaining a strict moderation in the matter of diet. It is unnecessary and undesirable to furnish to the system in excess the material for combustion. Where there is such indulgence there follow discharges of waste fuel from the liver, and the cooling effects of purgation.

§ 36. For the maintenance of health it is necessary that the temperature of the body be near the norm. According to Wunderlich the mean normal temperature is 98·6° Fahr. (37·5° centigrade), and the range of normal temperature in the axilla is from 97·25° Fahr. (36·25° centigrade) to 99·5° Fahr. (37·50° centigrade.) There is a constant oscillation, back and forward, betwixt the two antagonistic areas of Rosenthal—keeping the heat-production and loss in equilibrium. Speculations have been indulged in as to whether or not there is a "heat-centre" which regulates the heat supply, like the governing balls of an engine, or the steersman of a craft, who by gentle movements of the wheel keeps the vessel's head steady. Its existence cannot yet be regarded as proven. Certainly there are good reasons for holding that there are two sets of nerve fibrils running along the walls of the blood-vessels—at least, of the arteries—by which their calibre is maintained. The one, the vaso-motor nerves of the sympathetic, tend to contract the calibre of the vessels; the other, the vaso-inhibitory nerves, derived from the cerebro-spinal system, are antagonistic to the vaso-motor nerves, and produce dilatation.

[1] Fifteen days of short commons, and then seventeen of almost absolute fast.

Betwixt these two sets of nerve fibrils the calibre of the vessels is maintained in constant equilibrium, by perpetual oscillations however; and similarly the body-heat is kept at a norm by constant back and forward play betwixt the antagonistic heat-producing and heat-losing areas; but here also there is probably some oscillation on each side of the straight line.

By the resort to clothes man voluntarily aids in the maintenance of the line of normal temperature. At night, when the surrounding temperature is cooler, he covers himself freely with non-conducting materials, and so retains his heat. This is the more necessary in that the cutaneous vessels are dilated in sleep—to permit of the requisite cerebral anæmia—and so there would be greater heat-loss if not so restrained.[1] In warmer climes the clothes are lighter, and of less perfect non-conducting materials, so as to interfere but little with the dispersion of heat. If man is careless about protecting himself warily in the daily changes of temperature, where there are burning noons and chilly nights, disease, the result of temperature-disturbance, will certainly result.

In addition to his clothes, man has the aid derived from fire, and the protection from external influences furnished by buildings. Further, he can, when exposed to cold, derive much aid from fluids artificially heated. He draws from the fire, by the heated drink, so much warmth, and so saves his own consumption in heat-production. When too much hot drink is indulged in perspiration follows. By reversing this process, and by the inhibition of cold fluids in warm climates, or when surrounded by a heated atmosphere, man cools himself down, or neutralizes the effects of heat accumulated from insufficient heat-loss. The use of iced fluids is greatly on the increase, and the terrors of a chilled draught, when heated, are being dissipated. By such various means, and especially by skilful combination of them, man aids his heat-regulating processes to maintain his temperature at or about the norm.

§ 37. The variations from the normal temperature are of the greatest moment to us. High temperatures, with which we all are so familiar, will engage our attention at considerable length,

[1] When exposed, unprepared, to severe cold it is well known that the man that sleeps—dies. Wakefulness alone can preserve life.

but, before entering upon that side of the question, we will first examine the subject of low, abnormally low temperatures. A lowering of temperature may be variously induced: in lesser degrees it is the consequence of exposure, especially without effort (heat-production), or of hæmorrhages, or of free discharges. When more pronounced the fall is called collapse. Slight lowerings of temperature, down to 96° or 95° Fahr. are not in themselves dangerous to life. Further lowering from 95° to 93·5° Fahr. indicates danger, and needs active measures. The lower the temperature the more active the measures required to maintain life. If the limit 93·5° is reached, the danger is great; and if the temperature falls below 92° there is deep algide collapse, from which the patient rarely, if ever, recovers—except in cases of acute alcohol poisoning, where a temperature of 90° is not incompatible with recovery (Bathurst Woodman). Below 92° survival for a brief period is possible, but recovery can scarcely be looked for. Too low a temperature is as incompatible with the continuation of existence as is too high a temperature. States of collapse are more readily induced in children than in adults; in women than in men; in the sick than in the healthy.

The measures to be pursued or adopted for the treatment of low temperatures are various. The first thing to be done is to conserve the body heat to the utmost, and to economise it by the use of non-conducting materials. In addition to this, external heat can be utilised to lessen the heat-loss, and even to give heat to the body. Consequently it is desirable to see that the patient is surrounded by blankets, or other woollen material; to have bottles of hot water placed around him, taking care not to burn the skin; and further, to furnish to the organism heat artificially, by the administration of hot fluids. These fluids may contain alcohol with advantage; its presence makes them more palatable, while it acts upon the heart, increasing its contractions in frequency and in power (Binz). The heat-loss, however, must be obviated, else the alcohol will act mischievously. We shall shortly see that alcohol is a potent means of lowering temperature. As to any medicinal means of increasing heat-production, it is very questionable whether we possess them in any practically useful form; and it is more questionable whether we can avail ourselves

of them in practice. Such an agent is belladonna, in moderate doses, which notably raises the temperature.

Very frequently there occur sudden, passing lowerings of temperature known as "catching cold." The essential starting-point here is the quick abstraction of heat in excess of heat-production. Thus colds are commonly caught by the sudden removal of the body from a persisting high temperature into a cold surrounding medium. The vessels of the skin are dilated and partially paralyzed by the warm surroundings, and when suddenly exposed to the cold environment they, instead of contracting, become still further paralyzed by the cold; and then an immense current of warm blood is brought into contact with the cool air. Great heat-loss follows: but there is not a corresponding sensation of cold, because the current of warm arterial blood prevents the cutaneous nerves from feeling cold, as is illustrated by the hands of the snow-baller, which glow in spite of the contact of the frozen mass. There is, however, much greater heat-loss with these dilated cutaneous vessels than when the vessels are contracted; when the cutaneous nerves are not bathed in a warm current of blood, and so register the sensation of cold. The feeling of cold and the amount of heat-loss are, consequently, often in inverse proportion to each other. Habit endows the system with a certain power of regulating the heat-balance, and of giving off heat when required to meet great heat-loss. This is well illustrated in the case of those much exposed to great variations of temperature; they become inured to such changes—we say. The system is educated to look after itself, and by habit the vessels of the skin are taught to contract on contact with cold, and so to lessen the amount of blood in the cooling area and to increase the bulk in the internal or heat-producing area. This is the effect of the constant use of the cold bath; viz., to educate the system to develop its heat-regulating actions. When the cutaneous vessels are paralyzed a large mass of blood is in the cooling area, and the heat-loss is great. Further, too, there is a correspondingly small amount of blood in the internal heat-producing area; and the evolution of heat is proportionately small. Consequently, in the combination of the two we find that loss of temperature known as "catching cold." The secondary fever, often amounting to no more than feverishness, is the consequence of delay in the

heat-regulating processes, and an excessive heat-production comes on when too late, too long deferred to be useful. It forms, however, a pyrexia, often calling for our aid to dissipate, or rather to aid in dissipating the excessive heat. The pathology of taking cold is at once simple and highly interesting, while it clearly points out two things. Firstly, how to so conduct matters as to lessen the primitive depression of the body-temperature; for usually the secondary reaction is in direct proportion to this original depression. To avoid cold, then, it is necessary to keep the skin in good tonic action; then it must be borne in mind that if the exposure to cold after being long at a high temperature, as at a ball for instance, be but brief, the excessive heat merely may be got rid of; but if the exposure be prolonged, then great heat-loss is experienced. The less, too, the system is inured the greater the risk. The second indication furnished is—to get rid of the superfluous heat, occasioned by the delayed heat-production, the pyrexia, or secondary reaction, by measures to be described a little further on, § 41—44.

§ 38. An increase in the body-heat forms the condition known as fever. A pyretic condition may extend from a mere condition of feverishness, with a temperature of from 99·5° Fahr. to 101·5°, states often found in children without any sinister meaning whatever; up to a high febrile state of from 107° to 108·5° Fahr., beyond which existence is possible for only a brief period, and recovery impossible; though there are some isolated cases to the contrary, this statement of Wunderlich is almost universally true. A temperature of 113° Fahr. has been found ere actual death; while a sharp rise of temperature is a common precursor of death in febrile states.

The different conditions under which pyretic states are found are so numerous, and these pyretic states are so common, that fever, in some form, is one of the most familiar morbid conditions we are called upon to treat. Not only in the ravages of fever known as epidemics, or in its local persistence as an endemic affection, as on the Gold Coast; but in isolated cases, specific fever has for us, as practitioners, a deep interest and a powerful attraction. As typhus it follows overcrowding; as typhoid, or enteric fever, it forms the nemesis of sanitary negligence; as relapsing fever it hangs around periods of famine; while

in the form of the exanthemata it is the plague of our youth; as ague it is the scourge of undrained marshes; while as malarial or climatic fever it strews the shores of the Gold Coast, of Guiana, and of the Mexican Gulf with the remains of the natives as well as of the white man. It is commonly found in the form of well-marked specific disease; but it is not essential that it should be connected with anything specific. A prolonged high temperature—no matter how produced—will occasion that state known as "the typhoid condition." We see it produced by hectic in the consumptive; by surgical fever and pyæmia in other cases. Wherever met, it forms a characteristic and a terrible condition; and this consequence of a persistent high temperature is the chief danger of all fevers.

The typhoid condition is thus graphically described by Tweedie, whose experience of fever enabled him to picture it well:—"It is announced by the decline of the previous more acute symptoms; by the pulse becoming more rapid and soft; the tongue, dry and brown, tremulous, and protruded with difficulty; by the incrustation of the teeth with sordes; by the increasing intellectual disorder, indicated by the constant low muttering delirium, and the greater insensibility and deafness; and by the condition of the muscular system, evinced by muscular tremor and subsultus tendinum, and in some cases by irregularity or intermission of the pulse; by the patient lying sunk on his back, or sliding to the foot of the bed, the muscles being unable to support the body even in the horizontal posture." With this condition all medical men of any experience are unfortunately but too familiar. It is a condition which, to a greater or less extent, obtains in every well-marked attack of typhus, and is common in severe cases of enteric fever. From its frequent occurrence in specific fever it has acquired the name of the typhoid condition, and was once supposed to be found solely in specific fever. Consequently, when this condition showed itself in the course of any other affection, the practitioners of old said, "the disease has turned to typhus;" because they recognized a condition, as they thought, pathognomonic of typhus fever. In this they were distinctly mistaken. It is true that such a state is associated with a sustained high temperature —a condition most commonly supplied by specific fever—but it

is not causally associated with the specific fever *per se*, but with the sustained high temperature. They were, then, in error in supposing that the ailment had turned to typhus when they observed a typhoid condition coming on; but, ere the day of the clinical thermometer, the recognition of the association of this state with a persistent high temperature was simply impossible. Even yet the well-worn formula, that such a person's disease turned to typhus, which killed him, is heard from time to time. Still are patients suffering under different maladies sent into fever hospitals because they have passed into a typhoid condition. In his very able work on medical diagnosis, the well-known physician, Da Costa, writes, "No blunder is more common than to misconstrue into typhoid fever a typhoid condition of the system."

§ 39. The pathology of the typhoid condition is a matter so important that a section may well be devoted to its special consideration. Such examination of its pathology will both clear up its origin, and point the direction of the therapeutic agents to be employed. To commence with, it is necessary to point out this fact, viz., that at the ordinary temperature of the body the nitrogenized tissues wear away but slowly, and their oxidation is a trivial affair. But as soon as the body temperature rises the nitrogenized tissues begin to melt down by oxidation; and there is found a corresponding excess of histolytic products in the blood. The higher the temperature the greater the waste of the nitrogenized tissues, especially the muscles. After a fever, the fat of the body is left comparatively untouched, but the muscles are shrunken and wasted. A microscopic examination of the muscles after death from fever demonstrates that they are the subjects of extensive structural changes. Zenker has pointed out these changes, and his observations have been corroborated by others. The changes are not so marked where death has taken place in the earlier stages of the pyrexia, but if it has been delayed till the later period, they are very distinct. "There are two forms of degeneration, the granular and the waxy. The granular form consists in the deposition of minute, highly-refracting granules in the contractile tissue, giving to the fibres a dark appearance by transmitted light, and obscuring the striæ. This muscular deposit is not wholly composed of fat. The

degenerated fibres are very friable. The waxy form consists in the transformation of the sarcous tissue into a homogeneous, colourless mass, glittering like wax, and causing a complete obliteration of the striæ and nuclei of the fibres, the sarcolemma remaining intact. The waxy cylinders thus formed crack up into numerous fragments, which crumble down into a finely granular detritus, and this is gradually absorbed." (J. Harley.) Rindfleisch gives a plate of these changes in the muscular structure of the heart after relapsing fever. Such changes are not only found in the dead, but, by a process known as "harpooning the muscles," identical changes have been found in fever patients, alive, and who have ultimately recovered. They are not, then, *post-mortem* changes; they are the changes wrought in the muscle by a sustained high temperature. They are not confined to febrile conditions of a specific nature; they are found also in the hearts of women who have died from puerperal septicæmia.

Such being the actual condition of the muscular structures of the body, we can feel no surprise at the sense of prostration which is so marked in the typhoid condition. Muscular weariness is an initial symptom of fever; muscular prostration marks its height. "If you could place your fever-patient at the bottom of a mine twice the depth of the deepest mine in Cornwall, and compel the wretched sufferer to climb its ladders into open day, you would subject him to less torture from muscular exertion than that which he undergoes at the hand of nature as he lies before you, helpless, tossing, and delirious, on his fever couch." (Haughton). Murchison says, "There is found too, on the whole, a direct relation between the temperature and the amount of urea. . . . . According to Brattler, there is a close correspondence between the amount of urea and the temperature: the greater the amount of urea, the greater the temperature." The normal excretion of urea *per diem* is about 400 grains, but as far as 1,065, and even 1,235 grains have been excreted in one day in pyrexia. Some of this might be due to the albuminoid matters given to the patient as food, or there may have been imperfect action of the kidneys for some time before, still, admitting all this, there is a large quantity of urea remaining, which is, in all probability, the result of tissue-waste. In cases

of pre-existing kidney disease, the elimination of urea in fever is impeded, and consequently the waste products of histolysis accumulate, so that Murchison says: "The gouty diathesis, from its being so often associated with disease of the kidneys, is a very serious complication. I have never known a gouty person attacked with typhus recover." Urea not being found in excess in the urine may, then, point to a still more perilous condition than its presence in excess would indicate. These are important points to be considered, not only in the estimation of the patient's danger in a typhoid state, but they also bear directly on the remedial measures to be employed.

A still more important matter to recognise is this:—The excessive waste of the nitrogenized tissues in febrile states, proportioned, we have been told, to the rise of temperature, is not solely connected with specific fever. Thus Unruh found an excess of nitrogen in the urine in twenty-eight cases of febrile temperatures, of which sixteen only were specific fevers. In all of them, however, the amount of nitrogen was high, amounting to half as much again as is the average in health; while in some cases it was twice as much. Naunyn found, by experiment, that an increased body-temperature was produced by the simplest of all methods of raising it, viz., by confinement in a heated atmosphere saturated with moisture; and along with this rise there was found an increase in the amount of urea. These experiments corroborate the views of Traube, Vogel, and others, that the excess of urea is the measure of high temperature, *pur et simple*, without relation to its cause. The association of the excess of waste products with the typhoid condition, where, we have seen, the muscles undergo degeneration in life, and their production, in undue quantities, in the simplest forms of high temperature, close the circuit in this direction, and point to the conclusion that these changes in the muscular structures, accompanied by the formation of urea in excess, are the consequences of a sustained high temperature, without reference to its causation.

It is a matter then of the greatest practical importance that we should clearly recognize these facts, as to the manner of the production of the typhoid condition—which is essentially the same in specific and non-specific pyrexia. Its treatment—

speaking broadly—is the same, whatever the form of disease with which it is casually associated, or co-existent. Its oncome is of deep import, and indicates a condition of peril whenever and wherever met. Everywhere and ever, a typhoid condition is a condition of grave seriousness.

§ 40. We have seen that the typhoid condition is associated with a high temperature, no matter how produced. We will now see how far this pathological review will explain the condition of the patient, and the peculiar symptoms of this state. It is probable that the temperature of the blood going to the brain has somewhat to do with the production of that abnormal condition—the delirium. There is much evidence tending to show this: viz., its association with high temperatures, and its removal by lowering the temperature by means of the application of cold. With the fall in the temperature the reason returns and resumes its wonted sway. This, too, is quite irrespective of ultimate recovery or death. Delirium is extremely common in children during febrile attacks, and sharp high temperatures are common also: the two commonly go together. Of course, too, an excitable brain is much more easily thrown off its equilibrium than is a less mobile one. The functional disturbances of the nervous system are—nevertheless and admitting all this—in the typhoid condition, chiefly produced by the waste products in excess in the blood. Murchison says: "The observations which have been made in relapsing and pythogenic fevers also support the opinion that the head symptoms of typhus are due, not to inflammation, as was once believed, nor to the presence of the original fever-poison in the blood, but to the circulation through the brain of urea, carbonate of ammonia, or other products of disintegrated tissue . . . . As in other febrile conditions, the increased formation of urea, notwithstanding the diminished supply of food, is evidently the result of an exaggerated disintegration of the muscular and other nitrogenized tissues. As long as the urea continues to be eliminated by the kidneys its effects are comparatively trifling; but if the quantity be excessive, and, still more, if from any morbid condition of the kidneys, either antecedent to or resulting from the febrile attack, its elimination be interferred with, it accumulates in the blood and gives rise to uræmic (typhoid) symptoms. If the urine be completely

suppressed, as sometimes happens, death speedily ensues, under symptoms of coma, and sometimes with uræmic convulsions; but if the suppression be less complete, it may still give rise to delirium, stupor, and coma." In fact the brain is poisoned by the waste products in excess in the blood, there being direct evidence to show that the blood does contain urea, &c., in this condition; and the congeries of symptoms, so produced, is perfectly characteristic, especially when read in connection with the peculiar muscular symptoms. The oncome of the symptoms of the typhoid condition ever indicates the presence of the products of histolysis in the blood in excess; the lighting up of the intelligence marks the cleansing of the blood, and an improvement in the condition of the patient generally. Under certain circumstances this grave typhoid condition is comparatively free from danger, as in the course of specific fevers in the young; but when found in the elderly, and associated with chronic renal disease, it is ever fraught with peril, and is commonly fatal.

As the direct consequence of a sustained high temperature, the typhoid condition indicates what measures should be employed for the arrest of its oncome, viz., means calculated to keep down the temperature; it shows the dangers which accompany a sustained high temperature, and the importance of apyretic measures. At the same time its own production, or genesis, is very instructive in pointing out to us what measures we should adopt in the treatment of the condition itself.

By careful and repeated examination of the urine, along with similar temperature observations, and a general summing up of the various symptoms, it is possible to calculate fairly well what the exact position of the patient is; and whether the kidneys are equal to their work or not. As the condition progresses—as if unrelieved it certainly will—the general indications show that the system is becoming more and more poisoned by the products of histolysis. There is the persistence of the posture in bed, viz., on the back, with the tendency to slip to the foot of the bed, indicating the muscular prostration; there is the starting of the tendons, due to the clonic spasms of the muscles in connection with them, which differ but in degree from general convulsions; there is inertness of the sphincters; there are also disturbances of vision, indicated by the picking of the bedclothes, and the

graver indications, disturbances of hearing, as imaginary ringing of bells, &c., showing how deeply the nervous system is affected; there is also a brown, chapped tongue, well retracted, the brown fur consisting of an accumulation of dead epithelial scales—significant of the condition of the whole intestinal canal; with brown sordes on the teeth of similar origin, accompanied by the formation of crusts upon the lips; there is the hissing respiration, so characteristic of this condition, and contrasting with the stertorous breathing of apoplexy; and very often an urinous odour of the breath, due to ammoniacal matters, which form crystals of muriate of ammonia when a glass slide moistened with hydrochloric acid is held under the nostrils. Everything goes to show how deeply the system is under the influence of products formed from disintegrating tissue, by the effect of a sustained high temperature. There is much to demonstrate the importance of preventing a high temperature being reached; or if that be impossible, or we do not see the case till a high temperature is already inaugurated, of lowering it as speedily and effectually as may be.

§ 41. *Apyretics.*—For the purpose of lowering the body-temperature various means have been resorted to from time to time, according to the state of our knowledge, the fashion of the day, and the progress of physiology; consequently we have had bleeding, diaphoretics, depressants, various applications of cold, and a strictly scientific use of agents acting upon the circulation, and through it affecting the temperature. The manner of action of each is widely different; the end reached in each case the same.

It is obvious that an increase of temperature must depend upon one of two things: (1) an increase in heat-production, and (2) an imperfect heat-loss; in some cases the two are combined. Some remedies act upon the heat-production, and lessen it; others act so as to increase the bulk of blood in the heat-losing area, and to set up perspiration with its cooling effects. Bleeding belongs to the first of these. Bleeding, or venesection, is now almost obsolete as a general practice, chiefly in consequence of its abuse. It is an effective measure for the lowering of temperature, and may still be resorted to beneficially in rural practice, when it is desirable to produce an impression, quickly and decidedly, upon a rising temperature. Marshall Hall found bleeding to lower the temperature, but it rises again; and bleeding should be confined

to making an initial impression, and its effects should be followed up by the administration of depressants. Bouchut has recently advocated the practice of bleeding, and has found that a fall of two or three degrees Fahrenheit is quickly produced by venesection. The error of bleeding was the excessive abstraction of blood at one time, or the repeating it to meet the after-rise of temperature, instead of resorting to apyretic remedies. Where its use was followed by the administration of salines, or the old "fever mixtures," the effects of venesection were far from undesirable.

Another method much in vogue at one time, and still in favour in many institutions, is the use of mineral acids to check high temperatures. As to their practical efficiency there exists no manner of doubt. As to their mode of action we, as yet, know nothing. Acids are nevertheless excellent febrifuges, and in the tropics, and sub-tropical climates, acids and sub-acid fruits are largely used for their heat-lowering properties. The acid treatment of fevers is very extensively practised, and in the late war of 1870-71, the recoveries, under the plan of fresh air and sour wines, were very numerous and satisfactory.

Acid. Hydrochlor. dil. ℥ xv.
Syr. Aurantii. ʒi.
Aquæ ʒij.

every three or four hours, is a pleasant and grateful mixture to administer to a fever-stricken patient; and it may be continued through the whole course of an ordinary uncomplicated typhoid fever case into the convalescence, when it may be exchanged for a tonic. The aromatic sulphuric acid may be substituted for the hydrochloric, if an astringent be indicated. With some the dilute phosphoric acid is the favourite agent.

Salines of various kinds have also been much used for the treatment of febrile conditions. Salines however have been resorted to rather in febrile conditions associated with local inflammatory changes, and in the exanthemata, than in simple continued fevers. Why, it is impossible to say! Irrespective of any action they may have upon the blood, they usually act upon the different excretory organs, as the skin, bowels, kidneys, &c. Acetate of ammonia is a famous remedy in the pyrexia of children, and in sub-febrile conditions in adults. Along with

iodide of potassium, or tartar emetic, it forms a capital agent for the dispersion of accumulated heat, dilating the cutaneous vessels, and increasing the action of the sudoriparous glands, and so encouraging heat-loss.

Pot. Iod. gr. vi.
Liq. Amm. Acet. ʒi.

every six hours, is an excellent fever mixture, especially in a severe cold. An old formula, once in most extensive use, was something of this sort:—

Vin. Ant. Tart. ℥xx.
Tinct. Hyoscyami, ℥xxv.
Liq. Amm. Acet. ʒi.

every four or six hours. Probably this is a standard fever mixture with hundreds of practitioners at this day. It is fairly effective.

Citrate of potash, the nitrate and acetate of potash (neither pleasant forms), the bitartrate of potash, sulphate of soda or magnesia, have all been used in the treatment of pyretic affections. All forms of potash act upon the skin as well as the kidneys; and the effervescing citrate of potash acts powerfully as a diaphoretic upon some persons in summer. A sharp action on the bowels also lowers the temperature, at least for a time, and so purgation may be indicated; and, in combination with either of the formulæ just given, a Seidlitz powder, or a draught of laxative water, may often be exhibited with advantage. Wunderlich states that vomiting depresses the temperature more effectually than purging, the reaction being the same in each case. The nausea produced by antimonial and ipecacuan wines has probably much to do with their efficacy as febrifuges; but of that anon.

In ordinary colds, with a dry, burning skin, it is often necessary to give nauseants in full doses to produce a sufficient impression upon the skin; and such doses disorder the stomach much, and not rarely interfere with the administration of other remedies. In order to avoid this resort to nauseant diaphoretics, the idea of acting upon the skin directly by warm baths, and so exciting it to renewed action, has obtained extensively. The

ordinary warm bath, especially for children and infants, who can be readily put into a bath, or even a bowl of warm water, is very convenient; but such baths for adults are unattainable in the homes of the poor. For their needs the late Sir James Simpson devised a most capital bath. It consists of the simple apparatus of six or eight soda-water bottles, as many woollen stockings, and some hot water and corks. Each bottle is filled with hot water, and tightly corked. Then a stocking is wrung out of hot water, so as to be moist, but not dripping, and drawn over the bottle (as it is over the foot when put on); each bottle, so encased in the moist stocking, is put into bed, and the whole are placed around the feverish patient. So packed round the sides and betwixt the legs, &c., each bottle steams away, the moisture of the stocking making the air damp. In from twenty to thirty minutes a thoroughly free perspiration is in full swing; and thirty-five minutes are usually enough for one bath—at least with most persons. If the patient be then wrapped in a blanket and covered up for thirty or forty minutes more, the diaphoresis is kept up; and then the patient may be unwrapped and left in bed, with his skin moist and bedewed with perspiration. If the bed be improperly wet the patient may be removed into another bed, which has been previously thoroughly well aired and warmed. If only one bed be available the patient must be enclosed, along with his bottles, in a large blanket, which can be removed, leaving him in bed after the bath is over. Combined with iodide of potassium and acetate of ammonia, this bath forms a capital treatment for the first stage of a simple pyrexia: it is at once efficient and safe. Probably a dose of jaborandi will be found a famous adjunct to this bath; but as yet little can be said practically about this drug.

§ 42. Ere proceeding further with the action of apyretic or febrifuge remedies, it may be as well to glance again at the causation of pyrexia, in so far as it gives us indications for treatment. A rise of temperature is generally associated with a lowering of the blood-pressure, a dilatation of the peripheral arterioles, and a rapid action of the heart. The consequence of this rise is that there is a free flow of blood through the capillaries, and an increased number of respirations per minute,

with possibly some action upon the tissues themselves, about which we can only as yet speculate; all of which combined bring about an increase of oxidation, and keep up the high body-temperature. In addition to this, Cullen held there was spasm of the arterioles of the skin, and so lessened heat-loss. Recently Traube and Senator have espoused Cullen's views. Leyden thinks there is not diminished heat-loss, but that the heat-loss is not sufficient to meet the increased heat-production; and so the body-heat accumulates, causing a rise of temperature. It is obvious, then, that our remedial measures must take the direction of attempting to restore the lost balance betwixt heat-production and heat-loss. We have just seen that increased action of the skin exercises a most distinct effect upon heat-loss. Consequently agents termed diaphoretics have been rationally, and logically, resorted to in the treatment of pyrexia. Experience, however, has taught, what our scientific knowledge now explains, that the diaphoretics to be selected for the purpose of lowering the temperature are those exercising a depressant action; that is, they not only act upn the cutaneous vessels, but they at the same time depress the circulation. They are the nauseant or depressant diaphoretics, of which antimony and ipecacuan are the best known instances. These agents not only dilate the cutaneous vessels, and act upon the sudoriparous glands; but they also depress the action of the heart, and so retard the circulation, and with it lessen the chemical interchanges.

Rasori, in 1800, introduced the plan of treating fevers and inflammations by full doses of tartar emetic. The plan was very successful, but was much abused, and has now for some years been out of general favour. Nevertheless it was an efficient plan, especially in small and oft-repeated doses, so as to produce a steady effect, instead of the oscillations of distinct depression and after-rise, which follow any one decided blow by a large dose, or a repetition of powerful blows at long intervals. Hufeland regarded bleeding with tartar emetic and opium as the basis of all therapeutics (1830). This plan of Rasori's led to another step in the same direction by Fleming of Birmingham, who in 1844 struck the key-note of a new and most successful treatment. Observing the objectionable effects

of antimony in large doses upon the system, and the gastro-intestinal disturbance so produced, he investigated and brought forward the action of aconite as a febrifuge. Aconite had been investigated to some extent by Störck in 1763, when the apostle of homœopathy, Hahnnemann, was a child; but it was left to Fleming to establish its position. He found that it lowered the pulse both in force and rapidity—that the pulse was lowered sometimes thirty or forty beats per minute. At the same time the action upon the skin was to bedew it with moisture. In practice he often combined aconite with bleeding, and found the aconite most beneficial in maintaining the action of venesection, and preventing the reaction or after-rise of temperature. Ringer, who has every claim to be listened to with the greatest respect in reference to the action of aconite, says: "Aconite is to be most esteemed for its power, little less than marvellous, of controlling inflammation and subduing the accompanying fever. It will sometimes at once cut short an inflammation. It will not remove the products of inflammation, but, by controlling the inflammation, it prevents their formation, so saving the tissues from further injury. When given in the earliest stages of the commoner and milder pyrexiæ, the skin—dry, hot, and burning—becomes in a few hours comfortably moist; and in a little time longer is bathed in a profuse perspiration, often to such an extent that drops of sweat run down the face and chest. With the sweating comes speedy relief from many of the distressing sensations, as restlessness, chilliness, heat and dryness of the skin, aching pains and stiffness; and at the same time the quickness of the pulse becomes much reduced in frequency, and in a period varying from twenty-four to forty-eight hours both pulse and temperature reach their normal state." He further says: "The method of employing the drug has much to do with its efficacy. It should be given, as already stated, at the beginning of the disease; the medicine should never be delayed; every hour is of importance. Half a drop or a drop of the tincture, in a teaspoonful of water, should be given every ten minutes or quarter of an hour for two hours, and afterwards hourly; and if there be much prostration, with a feeble and weak pulse, a still smaller dose."

To some readers this suggestion may be somewhat repugnant,

as savouring of a *soupçon* of homœopathy; but Ringer, Phillips, Ashburton Thompson, and others, who have made trial of this plan, advocate it as much superior to that of giving ten drops every four or six hours. Such plan, they tell me, produces a steadier action. For those who are but feeling their way with aconite and other vegetable febrifuges, the combination of small doses of aconite with acetate of ammonia or iodide of potassium may suggest itself; using the aconite in small doses instead of antimonial wine. The plan of controlling fever by aconite is much on the increase.

Another powerful remedy for controlling the temperature in febrile conditions is chloral hydrate. This agent exercises a very distinct action upon the heart, as well as upon the peripheral, and especially the cutaneous arterioles. Liebreich, B. W. Richardson, Hammond, and others have found that the temperature falls 3° or 4° Fahr. after a full dose of chloral hydrate (40-80 grains). And Lauder Brunton has found that by wrapping a rabbit in cotton wool, so as to conserve its heat, a dose of chloral will be survived, which is fatal when no such precautions against heat-loss are taken. It has also been observed that chloral acts very powerfully upon both the respiration and the circulation, the heart's action being gradually reduced, so that in chloral poisoning it is found in diastole. (Wood.) In consequence of its hypnotic action, as well as its other actions, it seems specially indicated in those cases where of old antimony was added to opium. It is *par excellence* the hypnotic of pyretic conditions. H. C. Wood says: "The physiological action of chloral may be summed up as follows:— Upon the cerebrum it acts as a most powerful and certain hypnotic: in full doses it acts as an intense depressant upon the centres at the base of the brain and upon the spinal cord, causing slowing and weakening of the heart's action, probably vaso-motor paralysis, slowing of the respiration, and muscular weakness, with a certain amount of anæsthesia; in fatal doses it causes death generally by arresting, through paralysis of the nerve-centres, first respiration, and then the heart's action in diastole." Chloral hydrate may be given in various forms, of which, however, the syrup is the favourite. It may be given alone; or if there be also acute pain, as in rheumatic fever, it

may be combined with opium. This combination suggests itself whenever there is severe suffering.

Veratrum viride is a remedy in much repute in the United States. Bullock has obtained from it two alkaloids, both of great activity as depressants of the circulation, and thus useful in the treatment of acute pyrexia. Veratrum does not seem to have much action upon the skin, but its action upon the circulation is energetic. Wood says: "When true sthenic arterial excitement is to be combated in any disease, except it be gastritis, veratrum viride may be employed as a prompt, thoroughly efficient, and at the same time very safe remedy—very safe, since it is almost incapable of producing death in the robust adult, unless used with great recklessness, and in repeated doses. In the early stages of sthenic pneumonia it offers, I believe, the best known method of reducing the pulse-rate and the temperature and of ameliorating the disease." Of its administration he writes, "In administering veratrum viride it should always be borne in mind that it will do no good in acute disease unless given in increasing doses until its physiological action is manifested. In almost all cases vomiting is to be avoided as far as possible. To do this, small quantities of the drug should be given at short intervals, and corresponding doses of laudanum (5 to 10 drops) should be exhibited fifteen minutes after each dose of the veratrum viride. An hour is generally the best interval between the doses." The addition of the opium will serve several good ends, especially in its action upon the nervous system, and in its effects upon the skin.

A word upon the use of opium in the treatment of high temperatures may not be out of place. Given alone in pyrexia, the action of opium is unsatisfactory. As we have seen in an earlier section of this chapter, high temperatures seem to excite the brain, and the first effects of opium would add to the existing excitement. Consequently the combination of opium with antimony, a direct depressant, has been found desirable and efficacious. The less the pyrexia, the less the antimony; the greater the vascular excitement, the greater the dose of antimony, was the rule. Graves, as abridged by Ringer, says: "Each drug appears to assist the action of the other; and the relative doses must be determined by the circumstances of the case. In

furious delirium the tartar emetic must be given in full, and the opium in small quantities; while if wakefulness is the chief symptom, the delirium being not very boisterous, the dose of antimony must be reduced and the opium increased." This rule for the combination of opium and antimony, here given, shows consummate skill in the prescriber—skill, however, which all ought to aim at, even if it be given but to a few to attain it. Opium and antimony may often be given with advantage together at bedtime, as a grain of opium with five grains of pulv. antimonialis, along with the fever mixtures given above. If the fever be very sthenic, something like the following may be given:—

Vin. Antim. ℥ xx.
Tinct. Opii, ℥ xv.
Liq. Amm. Acet. ʒi.

every four or six hours. It will be found a pretty effective mixture in sthenic pyrexia. Or opium may be given alone in pill, or with a few grains of Plummer's pill, or as Dover's powder.

In addition to the remedies given above there are other measures which are useful in pyrexia for dissipating heat: one of the most effective is alcohol. Since the days of Duméril and Demarquay this action of alcohol has been the subject of much investigation, and of no little discussion. The conclusions of these observers are now generally accepted, chiefly through the work of Binz, of Bonn. It has been found that alcohol acts very powerfully upon the cutaneous vessels, dilating them, and so increasing the bulk of blood in the external cooling area of Rosenthal. Whatever other points there may be in the action of alcohol leading to the lowering of the temperature, there is unanimity about this.[1] Binz says that if the heart be excited by alcohol while the vessels of the skin are dilated a large mass of blood must be driven through the cooling area. Bathurst Woodman states that at the London Hospital he has several times noted a temperature of 90° Fahrenheit (32°·2 Cent.) in alcohol poisoning, where the patient has recovered. The effects of alcohol in predisposing those under its influence to die of cold in low

[1] Schmiedeberg holds that alcohol interferes with oxidation, and in this way also lowers the temperature.

temperatures are well known. Thus in cold days men under the influence of excessive doses of alcohol often become benumbed, and have to be put into warm beds, and have heat artificially administered, in order to restore them. The plan of taking alcohol on going out into the cold is a most mistaken one. It may produce a sensation of warmth by dilating the vessels of the skin, and so bathing the cutaneous nerves in a current of warm blood, but in doing so it increases the heat-loss. In warm weather a dose of alcohol, with many people, at once produces a flow of perspiration; but this action upon the skin may lead to serious depression of the temperature in cold climates. As a means of dispersing accumulated heat alcohol is often very serviceable.

§ 43. Such are the different measures to be resorted to in pyrexia associated with heat accumulation, from defective heat-loss. When pyretic conditions are found with a dry burning skin, and arrest of the action of the sudoriparous glands, the restoration of the function of these glands and the relaxation of the cutaneous vessels are the ends to be aimed at. Leyden has found that in increasing fever there is no evaporation of water to be demonstrated under an impenetrable covering; while in defervescence there is always a well-marked perspiration and exhalation of water. The effects of water exhalation and the change of form from water to vapour, with its cooling effects upon the body-temperature, are too much mere physical facts to permit of any doubtfulness about their action. Consequently, with pyrexia under such circumstances, the agents to be employed are the depressants just given: there is defective heat-loss, and this must first be increased.[1]

When, however, there is pyrexia with a moist perspirable skin other measures are indicated. Here there is no defect in heat-loss, and, as the skin is already moist, it is well to resort to apyretic agents, which appear to strike directly at heat-production. Such agents we possess in quinine and digitalis. The apyretic action of these agents has been chiefly worked out by German observers. Wunderlich has found that quinine in

[1] In the last edition of his *Handbook of Therapeutics* (1874), my friend Sidney Ringer subjects these views to some gentle criticism, without however invalidating the position taken up.

pretty large doses, as from twenty to thirty grains, divided into three doses, given within a few hours of each other, has a decided effect in lowering the temperature in typhoid fever. In some cases a fall of several degrees was observed; in one the fall was from 105°·8 Fahr. to 97°·25. Liebermeister has found, from a large number of observations, that quinine distinctly lowers the temperature in typhoid fever. It is not in typhoid fever only that quinine exercises this apyretic effect, for Kerner and Jürgensen found that quinine arrested the rise of temperature which ordinarily follows exercise. As to how quinine exercises this action, is not quite clear. It has been held by some, as Ackermann for instance, that quinine, like digitalis, raises the blood-pressure, and so limits tissue-changes; but other observers deny that quinine does raise the blood-pressure. It is surmised that quinine exercises its apyretic action by virtue of some effect upon the nervous system; but this is not yet demonstrated. The elaborate labour of Binz leads to the supposition that the apyretic action of quinine lies to some extent in its checking the ozonising power of the blood. Whatever the explanation, there is no doubt that quinine exercises a powerful action upon heat-production in pyretic conditions.

Digitalis has also been used for its apyretic action. Wunderlich found digitalis to distinctly affect the temperature in the latter stages of typhoid fever. The fall lasts about twenty-four hours, and is then followed by a rise, which never, however, attains the original height. Other observers have noted the apyretic action of digitalis.[1] In fever there is partial vaso-motor paralysis, with dilated arterioles, a low blood-pressure, and increased tissue-change, in and around the dilated terminal vessels. Digitalis contracts these vessels, raising the blood-pressure. Ackermann states that as the blood-pressure rises, the temperature falls; and that as the blood-pressure falls, the temperature rises;[2] that there is, in fact, an antagonism betwixt

[1] Bernheim found digitalis always to produce lowering of temperature in typhoid fever; either complete defervescence or remission; that the pulse and temperature fell together, but not always in a parallel manner; and that the delirium often ceases with the decrease of heat, and the respiration is calmer.

[2] This is in strict accord with the observations of Heidenhain, who found by experiment that a rise in the blood-pressure caused a fall in the temperature.

temperature and the blood-pressure. There is no doubt a good deal of truth in this, and such is probably the explanation of the apyretic action of digitalis.

Digitalis and quinine may be profitably combined in the treatment of pyretic conditions where the skin is moist. They may be prescribed with mineral acids in the following form :—

Quin. Sulph. gr. v.
Tinct. Digital. ℥xv.
Ac. Phosph. Dil. ℥xv.
Aquæ ℥i.

every four or six hours. In a case of post partum-pyrexia, with a temperature of 105° Fahr., and a skin bedewed with perspiration, this combination brought the temperature down to 101° in twenty-four hours; and that too whilst the case steadily proceeded to a fatal issue in a few days. This shows that the fall was not due to any general improvement, but directly to the apyretic action of the remedies.

When the typhoid condition is established, depressant apyretics are distinctly contra-indicated; and the measures just described should be adopted. The last formula may be used, and with it alcohol might be freely administered, together with milk and other nutrient fluids. But it must be admitted that when the typhoid condition is pronounced, the chief hope lies in the capacities of the organism, and it becomes largely a question of stamina. The more need then to avert its oncome, if possible. For the theory of the action of stimulants, and their use under these circumstances, the reader must consult a later chapter. (Chapter X. § 95-98.)

From what has just been said, it is perfectly obvious that in taking the temperature the medical man must do something more than merely note the rise of the register. In addition to the mere body-heat, there are the equally important matters of the condition of the skin, and the amount of perspiration, telling of the amount of heat-loss going on, to be observed. While taking note of the actual temperature, it is necessary to apply the trained intelligence, and to have a clear comprehension of the how and why of the febrile state, as to the relative amounts of increased heat-production or diminished

heat-loss, and to calculate exactly the factors of the febrile state, and to select the remedial measures accordingly.

§ 44. The application of cold in the treatment of febrile conditions dates back beyond the days of Hippocrates, and seems to have taken its origin in man's instinctive acts long ere the era of written letters. "The use of cold in the treatment of disease may be traced to the very earliest historical periods, and in the records or usages of every people. Savage and civilized nations have employed it, and it has been equally the instrument of physicians and the resource of quacks." (Stillé.) Sydenham was the first of modern physicians to treat fevers systematically by cool surroundings, cold water and fresh air. After him Cullen advocated the treatment of pyrexia, and the dispersion of accumulated heat, by the external application of cold in the form of baths. It has been left however for Liebermeister, of Basle, to introduce the use of external cold in the treatment of pyrexia on a well-established basis. It is a rational and sensible plan of getting rid of superfluous heat: and though there are some popular prejudices to be overcome, this plan of treating hyperpyrexia will obtain more and more. Possibly the fear that we do not yet know exactly how far to go and when to stop, is not altogether groundless; and further experience in hospitals, under skilled supervision, may be necessary ere this plan will, or can be largely introduced into private practice; but that it will ultimately become a general, perhaps even a universal practice, there seems but little reason to doubt. The feeling of comfort, the loss of muscular weariness, the diminished thirst and restored consciousness given by a cold bath, all testify to the relief afforded by the reduction of the temperature. The loss of body-heat, so brought about, relieves the patient from the direct consequences of a high temperature enumerated above.

Cold sponging with vinegar and water has long been a recognised method of relieving the burning heat which obtains during the coming out of the eruption in the exanthemata. More efficient measures are now adopted. Brand gives different forms of applying cold externally. The cold wet compress; frequent washings with cold water; an ordinary bath gradually cooled; and the cold wet sheet, are the chief forms. The packing in a

cold wet sheet has found many supporters. It forms an effective measure, readily applied in the humblest houses. The patient can be wrapped in the wet sheet and then swathed in a blanket and put into bed: and this could be repeated at intervals, four or six times a day, as long as the temperature keeps rising. All would depend upon the progress of the case: and it is very desirable for the interests of this method that every medical man, commencing this line of treatment, should first put it into practice in his immediate neighbourhood, so that he can keep the patient under his own eye.

The method of putting the patient into a warm bath and then gradually cooling it down is only suited to houses where such a bath can be procured, and is best adapted to the regular bath where cold water can be turned on gradually. Ziemssen and Immermann immerse their patients in a bath at 95° Fahr., and in the course of twenty or thirty minutes gradually cool it to 60° Fahr. This bath is agreeable to fever patients. (Ringer.)

Such external application of cold ought to be generally adopted, and in most cases will be found practicable in some form. The feelings of the patient will usually secure the continuance of the treatment, even if the friends are somewhat timid, and unnecessarily afraid of potential evil consequences.

As to the treatment of high temperatures by iced fluids internally, or pieces of ice to suck, it is to be hoped that no one will be at once so ignorant and so cruel as to withhold them. They will usually relieve the sensation of thirst, and do not create nausea. In a severe attack of scarlet fever the writer looked anxiously for the basinful of lumps of ice, which were greedily consumed, despite an ulcerated tongue and throat. After a feast of ice, some cold water in the water-pillow, and a bladder of iced-water to the head, a feeling of comparative comfort was attained, which no concurrent delirium could obscure, nor passage of time obliterate.

The cold thus taken into the body destroys or neutralizes so much heat, and in doing so aids to reduce the body temperature. In our treatment of pyretic conditions we should aim at keeping down the temperature on the one hand, and dissipating the superfluous heat on the other, by every means in our power.

Consequently in addition to the measures above mentioned it is desirable to place the patient in a cool well-ventilated bedroom, in which a current of air can be maintained without exposing the patient to a draught. Unless there be lung complications the air may be allowed to play about and around the patient, especially while the temperature is rising. By such means several ends are served. The cool air respired destroys so much heat, while the cooler temperature around the body increases heat-loss from the general surface. In order to secure this latter the bedclothes must not be too thick; a sheet or light blanket is often sufficient for the day, especially in warm weather; but in cold weather, and at nights, a second blanket may be desirable. It is easy if any chill be experienced to give some warm fluid or to put on some more "cover;" but, as a matter of fact, in a rising temperature with a dry burning skin chills are not readily produced. There is not here the same risk of carrying the cooling process too far that exists when the body is heated and perspiring freely: then the cooling is easily carried too far, and a serious chill is often the result of careless or prolonged exposure to cooling agencies. But there is all the difference possible betwixt such dispersion of accumulated heat in a healthy organism, with a glowing and perspiring skin, as is safe; and the exposure to cooling influences which may be not only undergone with safety, but even with actual benefit, when there is excessive heat-production and a dry burning skin; as is the case in the pyretic rise of a severe attack of fever. In the latter case the increased heat-production soon meets and neutralizes any chill; in the former excessive heat-loss is followed by a subsequent rise of the temperature, and may easily be induced unless good care be exercised.

The whole subject of body-heat, its production, its dispersion, and their disturbances, call for more general attention than they have yet succeeded in attracting. The use of the clinical thermometer as a diagnostic aid is now very general, but a like interest in the *rationale* of hyperpyretic temperatures is far from being equally general. Men will use a thermometer assiduously who cannot, however, be induced to give much thought to the how, the why, and the wherefore of the pyrexia, and consequently of the best means of reducing it. And yet this is what

the clinical thermometer, properly and intelligently used, ought to be the means of attaining. It should not only register the actual temperature, but it should furnish information as to the amount of heat dispersion, and so yield indications for the selection of the apyretic measures best adapted to the exigencies of each case.

NOTE.—The new agent jaborandi seems to possess very peculiar properties as a safe and yet effectual and withal rapidly-acting diaphoretic. It has not yet been procured in sufficient quantities to admit of much experience of it; but it promises to be a valuable addition to our armamentarium as an aid in heat-dispersion.

Salicylic acid also promises to be an efficient measure for lowering the temperature. In dram doses it produces a decided fall in most cases. Whether it acts by lessening oxidation or by modifying thermic conditions is not yet certain. (Ewald.)

CHAPTER V.

INFLAMMATION: ITS VARIETIES.

§ 45. THE morbid process denominated inflammation is a curious and often complex affair. Whether it be always a disease or always a reparative process is a question which can be more easily raised than settled. Without it the injuries inflicted by accident, or deliberately by the surgeon, would remain unrepaired. By its means a fractured bone is united, and at the same time the fractured ends are maintained in their place by an inflammatory cell-formation around them, which consolidates the surrounding tissues and keeps the parts at rest. The less perfect the appliances of man, the greater the efforts of Nature to procure quietude. Every reader of Hilton's charming work on *Rest and Pain* will remember the case of the washerwoman with the broken collar-bone. She persisted in working, unconscious of the fracture, and the movements of the arms, necessitated by her occupation, disturbed the fractured ends, and nature threw out such a mass of callus that it was mistaken for a bony tumour. Ultimately, having achieved the desired end, this natural splint gradually disappeared, leaving an instructive lesson behind it. The bands of plastic lymph which form in enteritis are the consequences of the movements of the intestines which they tend to arrest. Their continuance however forms a source of the greatest danger to the life of the individual in whose abdomen such plastic bands lie hidden. If it were not for an inflammatory process which forms a defensive wall, how commonly would gastric ulcer lead to perforation of the stomach! By its means abscesses find their way safely from the interior of the body to the external surface, and so the organism is preserved.

At other times however inflammation forms a very serious danger, imperilling the system without any apparent useful purpose. For instance, pneumonia is often, especially in the chronically enfeebled, a simple unmitigated danger to life. Under other circumstances there is much reason to believe, that the process known as pneumonia is really not the disease but the process of repair. As in bronchitis, some occult injury has been received, which the inflammatory process alone will or can compensate, or cure. Put a grain of sand into the eye, and soon there is not only a flow of tears from the effect of the irritation exciting the lachrymal gland into functional activity, with the result at times of effecting the removal of the irritant; but the vessels of the conjunctiva undergo a process of dilatation, and there is an increased blood supply to the part and additional cell-formation. The design, if such expression may be permitted, is not destructive and mischievous, but benevolent. If the case were quite successful, the grain of sand would be encapsuled in a mass of lymph—unfortunately however the delicate structures of the eye are generally destroyed in course of the process. The inflammatory process often needs the guiding hand of man; indeed the disturbance occasioned by it is frequently a source of much danger. Equally too the benevolent but misdirected zeal of man often ends in the death of the patient, and the attempts to regulate the course of the inflammation destroy the life of the organism. If nature does not always work wisely and well, if her attempts sometimes are too energetic, the same charge can be equally substantiated in relation to the efforts of man. When inflammation was regarded as a raging demon to be felled at once, no matter what the risk incurred by smiting it, the efforts of the medical man had to be, above all things, energetic and decisive. Then it might be said with some approach to truth, that nature and disease were two men fighting, and the doctor was a blind man who struck with a club, and cut down either the disease or the system. At present however more correct notions obtain, the inflammatory process has been followed up and tracked to its furthest retreats by a legion of industrious workers, and been found to be almost a physiological action. As we have just seen, it is often really benevolent—the natural process of repair. We now know that

there is no sharp line of demarcation to be drawn betwixt that process of increased nutrition which develops masses of horny epidermis on the hands of the workman, and the process which disturbs the valves of the heart; nor yet even betwixt it and the inflammatory action in the lungs which so frequently closes the career of pyæmia. After all, they are processes of increased nutrition, which differ in degree rather than in kind. Unfortunately the function of the lungs is so important, and essential to the existence of the organism, that the extensive changes set up throughout them kill the patient: and an effort benevolent in itself becomes directly destructive. In the same way we must look at inflammation in order to clearly comprehend how it is that it so commonly occurs under circumstances of lowered vitality; how it is that the impaired condition of the system generally is so associated with these local disturbances of nutrition, that the inflammatory process is ill-controlled, and becomes a source of danger instead of a reparative action. We are not yet sufficiently acquainted with the actual processes of nutrition to understand the relations positively existing betwixt the tissues and their blood-supply. Consequently we do not yet know how it is that the combined action is instituted which we recognise and denominate inflammation. Whether there is merely a disturbed condition of the innervation of the blood-vessels of the part, leading to hypervascularity and consequent cell-formation; or whether there is a starting-point located in the tissues themselves, which casually induces the vascular changes; we do not yet know, and can only surmise. In fact the existence of trophic nerves is not yet established to general satisfaction. There appear to be grounds for believing that blood-vessels have not only their vaso-motor nerves, derived from the organic nervous system, which produce contraction of the muscular wall of the blood-vessels; but that there are cerebro-spinal fibres as well, which inhibit the vaso-motor nerve-action and dilate the vessels. Consequently when a part is much exercised the vascular branches of its nerves—the trophic fibres of its motor-nerves—are thrown into action with the rest of the nerve-fibres, and we have as results the well-developed calf of the ballet-dancer and the muscular arm of the blacksmith. It is apparently in the relation of the tissues to these trophic nerves

that we see the commencement of the inflammatory process in its most normal aspects, as in the healing of an amputation. Where the starting-point, and what the initial action in visceral inflammations is, we must candidly admit that we do not yet know. We can only trace the action going on after disturbance of the blood-vessels has commenced. The dilatation, the increased blood-flow, the retardation of the flow, the ultimate stagnation, the cell-formation outside the minute blood-vessels, are described and pictured in a legion of works on physiology. Not only is there a local process going on, but the action on the blood-vessels extends to the whole circulatory system. There is general vascular excitement: but at the same time, the nearer the inflamed spot the greater the effect. Thus Lawrence found in a case of whitlow, that on bleeding from both arms the blood ran much faster from the arm connected with the inflammation. In the case of a gentleman who crushed a finger and had it amputated, and in whom there was much constitutional disturbance with acute inflammation of the whole hand, I found the radial artery of the injured limb was at least one half more in diameter than the corresponding artery, and in its dilated condition felt like a loose round cord. Inflammation has been much more worked at by surgeons than by physicians, and it is in surgical works we find the best articles on inflammation, except in the excellent, and now little-known book, the *Principles of Medicine* by C. J. B. Williams, a work every thinking student should procure and peruse carefully. If it is in surgical inflammations of the limbs and in experimental researches that we find the little we yet know about the first starting-point of inflammation: we know enough of the more advanced stages to direct our treatment of the inflammatory process, and that is the side of the question we are most engaged with here.

§ 46. In inflammation there is great local vascularity, increased cell-formation, and local evolution of heat. The old phrase, pain, heat, redness, and swelling, gave a fair idea of the pathological changes going on. But this local action is not without effect upon the system generally; and it is with these systemic disturbances that we are here chiefly interested. Any operative and purely surgical measures are not included in the

scope of this work; they would be out of place even if I were successful in putting them correctly. Nevertheless an inflammation which best illustrates the different measures to be employed will be found in the surgeon's domain, and consequently a little poaching may be permissible for once. Take tonsillitis, or a whitlow, for instance. There is first local congestion, hypervascularity, swelling, with pain, tenderness, and heat. Then there is the formation of pus, and after its evacuation the process of repair. There is also much constitutional disturbance. The pain interferes with sleep. There is general vascular disturbance and a feverish condition of the whole system. The appetite vanishes, the tongue is furred, there is much thirst, the bowels do not move, the urine is scanty and high-coloured, there is general langour and muscular lassitude, while the head is not uncommonly hot and painful. The secretions and excretions are deranged.

Now what are the measures to be adopted to relieve this condition? The first indications are to lower the temperature and the vascular excitement. To attain this end most persons would select acetate of ammonia, as it is diaphoretic and cooling. Others again might choose nitrate or citrate of potash, or effervescing mixtures; while a third might have a preference for sulphate of magnesia, and utilize the cooling effect of purgation (Wunderlich, pp. 136—137). Any of these measures might be adopted with good results. Even the simplest form of getting rid of superfluous heat, the cold bath, might not be at all a bad measure to adopt. The thirst would probably indicate cool beverages, which would dissipate or neutralize so much heat. If the fever were high, and the skin burning, a little tartar emetic might not be out of place. There is also the pain to be taken into account. It is not usual to employ opium constantly in such a case, though it might be resorted to in some cases with benefit. A dose of it is commonly given at bedtime to try to secure some sleep. To be effective it must be given in a full dose. A grain and a half or two grains of opium, with three grains of calomel and five of James's powder, might be given at night, and a seidlitz powder, a black draught, or a dose of the bitter water of Friedericshall be taken in the morning. The opium would at least soothe if it did not procure sleep (Chap.

XIII.), and the purgation would cool. Then there might be a mixture of this kind given every six hours :—

Vin. Antim. ℥xx.
Tinct. Hyoscyam. ʒss.
Liq. Am. Acet. ʒi.

Another might prefer to use aconite, or even better still, if there be no great pain, hydrate of chloral. Personally I think chloral the most physiological. It would lower the vascular excitement, both in its action on the heart and the peripheral vessels, especially of the skin; it would act to some extent on the nervous system, and modify the sensations of pain and the headache. It might be combined with opium, thus :—

Chloral Hydrat. gr. xv.
Tinct. Opii ℥x.
Mist. Camph. ʒi.

every six hours. A dose of Plummer's pill, with a grain of opium, at bedtime, and a saline laxative in the morning, would be of service. Such would be the plan of treatment during the rise of the inflammatory process.

If it were a viscus that was inflamed, say the lungs for instance, another therapeutic measure might be brought to bear. This is to reduce the bulk of blood either by venesection or by its equivalent—bleeding the patient into his own vessels. To do this it is necessary to increase the general vascular area. All agents achieve this end which dilate the blood-vessels, as antimony, aconite, chloral, &c. The more the blood-vessels are dilated the less the blood-pressure on the inflamed part. The vessels of the inflamed area are already dilated, and so there is no local action to be feared in the use of the depressants of the circulation, which usually lower the heart's action while dilating the peripheral blood-vessels. A further enlargement of the vascular area is achieved by dilating the vessels of the skin by the application of heat. A large jacket-poultice dilates the vessels of the skin of the trunk to such an extent that effects similar to venesection are produced upon the blood-mass; while the blood remains within the organism, and is still available for future needs. Its effects are seen in the relief afforded by such

poultices in cases of inflammation of the lungs, or cardiac dyspnœa where the right ventricle is gorged to distension. Such a method of affecting the circulation would scarcely be suited to a whitlow. If a knee-joint were inflamed, the plan of ligaturing the femoral artery, and so shutting off the blood-current at the main, is at once rational and successful in practice.

§ 47. A whitlow, though an excellent example of simple inflammatory fever of local origin, ought not to be the best example that could have been chosen for illustrating the type of ailment, with its appropriate treatment, which intervenes betwixt the inflammatory rise and the true convalescence. During this period there is still some constitutional disturbance with an oscillating temperature. An example of what is meant is furnished by the condition formed in an abscess, when the tension and extreme pain, with accompanying constitutional disturbance, are relieved by a surgical incision, or the bursting of the abscess spontaneously; and there is left a free discharge of pus, with some general irritation and an irregular temperature or evening hectic. After a whitlow, or tonsillitis, the course of which is very identical, the relief afforded by the escape of the imprisoned pus is usually sufficient to at once admit of sleep, of a returning appetite, &c.; but where this is not the case, and there is an interval betwixt the inflammatory rise and the convalescence proper, then a modification of the treatment is necessitated. The direct depressants of the circulation are to be laid aside, having served their turn—and often well,—and a line of treatment is to be instituted which is tonic or stimulo-tonic, and yet calculated to control any tendency to temperature disturbance. Such measures we shall find in the union of mineral acids with vegetable tonics. Nitric, muriatic, or phosphoric acids in combination with cascarilla, cusparia, gentian or calumba, and still more quinine, are good measures. Any tendency to constipation could be met by a dose of sulphate of magnesia, either in the form of mineral waters or in some pharmacopœial preparation. A good form of combination of acid and tonic is furnished by the following prescription:—

Ac. Hydrochlor. Dil. ℥ x.
Inf. Cinchon. Flavæ. ℥ i.

or it might be varied in this manner:

Quin. Sulph. gr. i.
Ac. Hydrochlor. Dil. ♏ x.
Inf. Cuspariæ
Aut Cascarillæ ʒ i.

This might be given three or four times a day. By such measures the tongue cleans, the appetite returns, the skin becomes moist and cool, the bowels begin to move again; and that convalescence is steadily approached which will require a special treatment, meet and suited to its wants.

Ere proceeding however to discuss the period of convalescence, a few words as to the diet suitable to the first and second stages of inflammation may be not altogether out of place. The loss of appetite which usually marks conditions of pyrexia, especially when accompanied by sharp pain, and the condition of the primæ viæ indicate that any food taken at the time should be of a bland and non-stimulant character. The digestive power is so feeble that any solid food is out of place. At the same time a certain amount of food, of force-bearing food or hydrocarbons, is much more indicated than is at present thought, if judged by the prevailing treatment. In it beef-tea and its congeners take a foremost place. In reality, however, there is little or nothing of actual food in beef-tea, or solutions of Liebig's extract. They form agreeable and grateful beverages, but they are rather stimulants than true nourishment. The cups of beef-tea which are now so sedulously administered to the sick, in all stages from the *malaise* of commencing fever to the establishment of convalescence, are a measure of questionable utility. They procure a sense of "feeling better" after their introduction into the system. But this often serves no good end. The feeling is procured by borrowing so much of the reserve strength of the system, which might more wisely be economized till the hour of need. Such practice is a part of that meddlesome officiousness which must always be doing something. Such interference often takes its origin in the bustling mischievousness of a self-satisfied relative, in the ignorant though well-intended suggestions of an anxious paterfamilias; and not rarely in a desire to please the friends and relatives of the sick person on the part of the medical

attendant, who feels it safer to follow the fashions of the day than to map out a distinct and rational plan of treatment and to stick to it. As our knowledge progresses it seems more and more probable that systematic plans of treatment will largely supplant the present plan of treating symptoms, or groups of symptoms, as they arise; and of varying the medicines and the food according to some passing phase in the case itself.

In supplying food it should be at once bland, nutritious, and easily digestible. Such a combination is found in milk and seltzer-water. This forms a pleasant and supporting beverage. It can be easily and readily chilled by the addition of ice. When so chilled it is a febrifuge medicine, destroying so much heat. Iced lemonade forms a pleasant beverage. Some persons cannot take milk, and then it is necessary to fall back on something else. Lemonade and claret might be given as a beverage; and a cup of beef-tea or Liebig's extract may be given, or blanc-mange, or chocolate in a fluid form. The coffee and milk now procurable in tins, may be prepared according to directions, and be permitted to cool ere being given.[1] This last is especially indicated in the second stage. Water, aërated or otherwise, can be administered, usually without stint. It may be chilled or acidulated, or both. Water, in which rice has been boiled, may be used as a combined food and beverage with advantage. The question of how far alcohol is useful in the first stage of the fever-rise, may well be raised. The action of the alcohol on the heart while the skin is dry and burning, perhaps forms a strong objection to its use, as tending to raise the temperature still farther. When the first stage is over, then alcohol may be resorted to usefully. It may be used at bedtime as a hypnotic instead of the opium, or Dover's powder, which are better suited to the first stage. Its action on the skin lowers the temperature and conduces to sleep. It may be given along with portions of food, and both stimulates the digestion and spurs the appetite. As a food it is readily available; as a stimulant it promotes the processes of assimilating food for the body-needs. It is a grateful beverage, and a valuable auxiliary in the treatment of

[1] Vogel, in his work on *Diseases of Children*, recommends coffee as a useful stimulant in the ailments of children: with good milk or cream it is a good food in conditions of depression.

sub-febrile conditions, especially when subsequent to acute pyretic states. In the form of the brandy-and-egg mixture of the Pharmacopœia, alcohol is very serviceable in these conditions, and even in the more advanced stages of a typhoid condition. As the convalescence becomes established the dietary may be varied, and the more ordinary forms of food added. Little allurement in the nature of the viands is required to tempt the appetite in convalescence from acute disease; it is usually eager and active, and plain food is taken with avidity, and large quantities are digested and assimilated with suprising ease.

§ 48. Some readers may feel surprised that no reference has been made to a plan of treatment introduced by Dr. Hamilton of Lynn Regis. This consists of the administration of calomel and opium in inflammations, especially when serous or fibrous. It has been much in vogue. Probably there are practitioners who yet regard it as their sheet-anchor in the treatment of inflammatory conditions. The explanations of its action are so contradictory and unsatisfactory, and their success in practice over those who do not use this combination so trifling—if indeed the balance is not rather the other way—that it cannot be recommended to young practitioners, save and except in the treatment of inflammatory conditions of a syphilitic origin, or occurring in a system saturated with syphilis. My personal experience of it in other conditions is chiefly confined to having seen harm, often grievous, done by it. The opium without the calomel is well enough; or an occasional dose of calomel when the tongue is foul is not objectionable.

The general plan of treatment of inflammatory states may be aided by local applications of heat and moisture. Linseed-meal poultices are grateful and beneficial, especially when there is local suppuration. They are also good in pericardial and pleuritic inflammations. In peritonitis they are too heavy. Hot cloths sprinkled with turpentine or laudanum, or both, are often of the greatest service. At other times, lead, acetic acid, and opium are very useful. In the inflammation often found in a bruised or injured part, cool and evaporating lotions, or a constant dripping of cold water, are most serviceable in moderating the excessive reparative action, otherwise known as inflammation. Local bleeding, cupping, or leeching, are often very desirable in

controlling localized action, and in moderating the vascular fulness. In mammary abscess belladonna ointment smeared on the breast often gives great relief. Some remedies used by quacks and old wives are not without value, and mallows, turnips, and carrots, made into hot poultices, often give much relief, especially in inflammation of veins. The "drawing" qualities ascribed to various remedies of this order by the vulgar are not demonstrable, nor is the confidence reposed in them by the laity enjoyed by the profession. The action of blisters and counter-irritants will be explained—so far as they can yet be explained—in a forthcoming chapter. (Chap. XIII. § 132.)

§ 49. Sooner or later a period of convalescence is established, and there exists no longer a sub-febrile temperature. The process of healing goes on triumphantly from this point. There is undisturbed sleep, a restored appetite with a renovated digestion, and a recovery of the body-weight, until the pre-existing weight is again reached, or even exceeded. The different functions of assimilation, of secretion and excretion, are once more acting with unimpaired vigour, and the pristine integrity of the system is recovered. Such is an ideal progress; commonly a less perfectly satisfactory state of matters exists. At these times there may be impaired functional activity and loss of tone. The food taken may seem not to benefit the patient, or there may exist much torpor in the gastro-intestinal canal. For the latter a dose of medicine, containing more or less of a mercurial in combination with laxatives, is indicated. Especially is this the case where there is a furred tongue, the fur having a yellowish tinge, and there co-exists a foul taste in the mouth on awaking (under such circumstances the addition of a slight amount of a mercurial is certainly indicated). If the appetite is capricious and assimilation imperfect, then a combination of vegetable tonics and iron, with or without mineral acids, suggests itself as most appropriate. Consequently a mixture more or less like the following will be found advantageous:—

Tinct. Fer. Perchlor. ℥ v.
Ac. Hydrochlor. Dil. ℥ x.
Inf. Calumbæ ℥ i.

three times a day, half an hour before meals. If the mixture is

palatable and grateful probably it will do good. If the palate rebels against it, it will be better to change it for something else. Citrate of iron and quinine, in a bitter infusion, may be indicated instead. The bitter acts beneficially upon the stomach; the tonic action does good generally; while the iron helps in the blood-formation. Such combinations, then, are very serviceable, and if the bowels be inactive merely, with a fairly clean tongue, a little Pil. Aloe et Myrrh. at bedtime every night or every second night will be found sufficient to keep matters going straight. A gentle action on the bowels is almost always useful at the commencement of a course of chalybeates. It often happens, too, that the combination of a vegetable tonic with iron does not quite agree with the patient, and each dose is followed by a disagreeable sense of feverishness, or as the patient says, "the medicine heats me too much." Here the addition of a little sulphate of magnesia will usually meet the emergency.

Mag. Sulph. ℈ ss.
Quin. Sulph. gr. ½.
Liq. Ferri Persulph. ♏ v.
Inf. Quassiæ ℥ i. ter in die.

forms an excellent and useful combination, where the ordinary quinine and iron mixture do not perfectly agree.

In convalescence it is a great matter to see that it be not interrupted. If it be interrupted, the second progress is never so satisfactory as the first. It is always and invariably slower, at the least. There are two sources of disturbance to which the convalescent is susceptible, and which are the usual causes of such interruptions; these are febrile conditions from lowered power of resisting changes of temperature, and digestive disturbances. The first is a very common and well-known cause of illness in those recovering from acute disease, and as such is generally well guarded against. Great care about exposure is very necessary, and brief periods of exposure often bring on baneful consequences. Any chill, however slight, should at once be met by a well-warmed bed, some hot fluids with alcohol, and confinement to bed for twenty-four hours. By such means the cold may be kept off altogether, or, if not that, it

may be hurried through its different stages, and so be brought to a close in a brief time.

The other source of disturbance is also very common, and the rise of temperature is also very sharp. It is more apt to happen when the appetite is just becoming very brisk, and is the consequence of what our forefathers termed "a surfeit." Here the old-fashioned remedy of an emetic, followed by a purgative, is most efficient. If the form of the disorder be mistaken for cold, and therefore the correct treatment missed, this febrile condition may go on for days, and cause much disturbance and some dismay. It is in children chiefly that this form of ailment is most commonly seen. Frequently the progress is unbroken, and the patient steadily gains strength and weight. It is often desirable to send convalescents, if in a town, into the country or to the seaside. Excellent effects are usually so secured; but sometimes the change disagrees. (This subject will be further discussed in a later Chapter, XXIII.) Fresh air, good food, pleasant surroundings, and cheerful society, are all good and useful adjuvants to strictly remedial measures.

Such is the progress of a simple, or sthenic inflammation. At other times the convalescence is disturbed by some pathological changes, which will be reviewed hereafter. But it is not in the stage of convalescence only that there are variations from this simple course, the character of the febrile state may be quite different, and need appropriate changes of treatment.

§ 50. The most important modification of the progress of inflammation and of its constitutional accompaniments is furnished by what is termed "asthenic" or "low" inflammation. This is an aspect rarely presented by the youthful, the robust, or the rustic. It belongs to exhausted systems, no matter whether reduced by prolonged overwork, fast living, drunkenness, or life in insanitary neighbourhoods. Existence in unhealthy, badly-drained, and worse-sewered districts, amidst an overcrowded population, with foul air and impure water, will produce such modifications in the system, that, when it becomes the subject of an inflammatory or febrile affection, it takes the following aspect:—The pulse is sharp, but unsustained; the temperature is high, but liable to fits of collapse; there is a tendency for the tongue to become furred, and the typhoid

condition readily manifests itself. Careful observation of one case in actual bedside practice will teach more—and that too far more effectually—than any information that picture-writing will convey. There is a low asthenic type of disease, once recognized by the eye, never to be forgotten, and needing little description. In the wards of hospitals, with broken-down patients, and in those physiologically bankrupt, such cases are very common.

They are not to be treated by depressants. Such treatment sinks them at once. They require alcohol, ammonia, bark, beef-tea, milk, &c., in liberal and unstinted quantities, and at brief intervals. They do not possess that reserve fund of force, discussed earlier in § 6, on which they can live during an acute pyretic attack, and consequently the whole plan of treatment has to be modified accordingly. The enfeebled system has above all things to be supported. The most effectual means of influencing the inflammatory process is to endow the system as far as possible with the power to assume the usual control over it. The ordinary plan of treatment has to be reversed, and instead of lowering the general condition in order to depress the inflammatory action, it becomes necessary to improve the general condition in order to affect the inflammatory process beneficially. Consequently, instead of antimony we give ammonia, instead of laxatives we give barks, and instead of slops we give the most stimulating forms of food. Neither is it irrational or illogical to do so. In speaking of this form of inflammation Erichsen expresses himself with such incisive good sense that he must be quoted verbatim. He says, "It is the type that is affected by this constitutional disturbance, its sthenic or its adynamic character, as indicated by the pulse and the tongue, and not the mere diagnosis of the local disease, that must guide the surgeon"—and I may add the physician too—"in the adoption of his line of practice. We may advantageously treat with antimony and blood-letting acute inflammation of the conjunctiva, or that which is the consequence of a wound of the lung, in an otherwise healthy and robust man of thirty; whilst in a broken man of seventy, ammonia, bark, port wine, and brandy, would be equally proper; but if we were (except under peculiar and exceptionable circumstances) to reverse this treatment—to

stimulate the young or vigorous and to deplete the aged or feeble —we should act contrary to common sense, and probably destroy rather than cure our patients. It is of far greater importance to be able to estimate accurately the true constitutional condition of the patient, than to be able to form a minute diagnosis of the precise seat, extent, and depth of the local mischief. It is a fatal error, too often committed, to attach too much consequence to the recognition of the local malady. and to attach too little importance to the character of the constitutional disturbance attending it. The surgeon who acts thus runs the risk of treating the name and not the thing. If we treat erysipelas or pneumonia as mere affections of the skin or lung, on one uniform plan, without reference to the type of the constitutional disturbance accompanying it, we shall miserably err in a considerable proportion of the cases. But if, paying but little attention to the local affection, except so far as its characters indicate the general type of the disease, we make the constitution of our patient our guide, and deplete or stimulate according to the state in which we find it, and thus, perhaps, treat two patients with the same disease, so far as name is concerned, on totally opposite plans, we shall not act inconsistently, but in strict conformity to the natural condition of the patient and of his disease." These words are pregnant with thought, and contain a deep and subtle insight into the actual requirements of patients. They should be read and re-read by the student, pondered over, and committed to heart. They should be incorporated with him, printed distinctly on his brain-cells, and colouring all his trains of thought as they pass through them, give a direction to his observations, and guide his treatment whenever brought in contact with disease. To be able to recognize the distinctions just given by Erichsen may not be very useful at an examination table, but it is of paramount importance in dealing with actual disease at the bedside. It is the gradual diminution of such power, along with such strict attention to mere diagnosis, that is making the more correctly educated student of to-day actually less useful to the sick man than his less perfectly trained predecessor in physical diagnosis—who was however a superior antagonist to disease—and so has done harm not only to the profession but to humanity generally.

When the inflammation assumes an adynamic or low type, the treatment must be suited to the change.

Amm. Carb. gr. v.
Sp. Chloroformi, ℥ xx.
Inf. Cinchonæ, ℥i.

may be given every four or six hours, with wine, especially effervescent wine, milk, beef-tea, or egg and brandy, and at frequent intervals. The ethers of wine make it specially suitable to such asthenic conditions. Effervescent beverages, such as brandy and water with citrate of potash, are of service; and indeed the utmost possible union of stimulants with tonics and nutritious food is indicated, to get the organism through the period of peril which is hanging over it. The typhoid condition will obtrude its grim visage in spite of everything, in some cases; but the faintest appearance of it should always put the wise and thoughtful practitioner on the alert. There is danger hid behind it, wherever and whenever it shows itself. Its appearance should at once call out our most strenuous and energetic measures (§ 41).

Such a modification of the ordinary inflammatory process is far from uncommon, and its early recognition, and the consequent adoption of appropriate measures, will form an excellent test of the natural good sense and of the genuineness of the training of the medical man. If he has so studied disease as to make bedside practice merely subservient to the requirements of examinations, it is very probable that he will make his observations and form his conclusions too late to be of service to his patients, or of credit to himself. Too much insistence, it may appear to some readers, is being made here on this power of discriminating betwixt different forms of one morbid change, according to the organism in which it shows itself, but such power is of so great value in actual practice both to patient and practitioner, that it is well-nigh impossible to lay too much stress upon it—especially in a work designed to enable the student to meet disease as it presents itself in real life, and not in the antiquated types of some examination tables.

§ 51. Such are the commonest forms of inflammation as they reveal themselves to the physician; but there is still another form of inflammation which it is of the greatest moment to

fairly comprehend, and consequently to know how appropriately to treat it. Such inflammation as we will now proceed to consider is excited by the presence of abnormal constituents in the blood, or by the presence in excess of what is quite normal. Under the first heading will come the chest complications of measles, the suppurative inflammation of the parotid glands in scarlatina, and the various complications of small-pox. Under the second heading can be classed the inflammatory processes of acute rheumatism and the numerous inflammations of chronic Bright's disease.

It is at once obvious that in such inflammatory actions—no matter where located, or in what tissue—one great point is to remember their causation and the indications for treatment furnished thereby. If the exciting cause can be removed, the consequential disturbances will vanish, at least in the majority of cases. If the exciting cause cannot be removed then the case must be treated on general principles directed by the exigencies of the case. In the exanthemata, for instance, we possess no means of evicting or neutralizing the poison, which forms the initial point, and therefore we fall back on general principles, and treat the complication—as it is termed—either as a simple inflammation, in which case the remedies for a pyretic state are those indicated for the treatment of the rise of the inflammatory process; or if an asthenic type be assumed, the line of treatment which has just been indicated as appropriate in such cases is to be adopted. The character of the inflammation will rarely or never be dissociated from the type of exanthem; and when an asthenic type is assumed by one, the other will be found to present similar indications; for the rash and the inflammation are but part and parcel of the whole, and the measures indicated by the one are the measures best adapted to the other. In other cases, however, the line of treatment to be pursued is that of the condition generally with special reference to the individual cause. For instance, in syphilitic iritis energetic treatment of the syphilis is the best line of treatment of the iritis; and saturating the system with mercury will ordinarily give the best results. At the same time it must be distinctly understood that even here the type of the inflammation cannot be overlooked. The mercurial ought to be given along with vascular depressants or with stimulants and tonics, according as each line is indicated

by the characters of the case. That is, while a mercurial course is being administered, the appropriate measures are to be combined with it: and according to the system in which the syphilis is, so must be the auxiliary measures with which the mercurial is combined. The syphilitic iritis must be met, but whether it shows itself in a robust youth, or a broken down constitution is a matter of importance in selecting the therapeutic measures to be combined with the mercurial.

When the inflammation rests casually upon the pressure in excess of what is normal in the blood, as, for instance, of lactic acid in rheumatism, and lithic acid in gout, the originating cause gives at once a direction to the line of treatment. If pericarditis come on during the course of acute rheumatism it does not necessitate any change in the plan of treatment. It merely indicates the necessity for perfect rest—which includes the avoidance of pulling the patient about in the *nimia diligentia* of diagnostic ardour—and the application of hot poultices persistently and assiduously to the pericardial region, or rather the whole of the front of the chest. Very few men now-a-days—and those only the practical men, who, according to Mr. Disraeli, are the men who practise the errors of their predecessors—would think it necessary to give calomel because pericarditis had showed itself, no matter how strong might be their views as to the usefulness of mercury in the ordinary inflammations of serous membranes. The alkaline treatment would be pushed more actively, and fuller doses of opium given than before; that would be the line to be pursued, not any radical change of plan in consequence of the complication, as it must simply be regarded. The condition presented to us is that of rheumatic fever, and the different complications which arise during its course are part of itself, and are to be treated accordingly. If a complication came on not casually associated with the prevailing disease, as, for instance, a sharp diarrhœa in the course of acute rheumatism, it would be simply stupidity not to treat it with its appropriate measures merely because it occurred during rheumatic fever. The natural common sense must be the director as to whether the complication is a part of the whole, or is an adjunct to be individually arranged with. To one the relations may be clear and the line to be adopted quite distinct, while to another all is misty and

obscure, in which case it is not so well either for practitioner or patient. The known sequences of ailments will give a clue at least in the worst times of diagnostic trouble.

The most unfortunate evidences of the lack of discrimination in discerning betwixt simple and specific inflammations are unquestionably furnished by the inflammatory outcomes of chronic Bright's disease. Again and again are inflammatory affections, in people of middle age and advanced life especially, treated as simple inflammations, when in reality they are gouty exacerbations with local complications. In the form of bronchitis, pleurisy, arthritis, &c., we constantly see the outcomes of renal inadequacy. No one would dream of treating gouty inflammation of the great toe as he would treat a whitlow, for instance; he would at once proceed on a recognition of the gouty element, and administer colchicum and alkaline laxatives freely. In one respect the treatment would in no wise differ from a simple inflammation, namely, that the inflamed part be kept at rest,—in as near perfect rest as is practically attainable. But if few would make a mistake about gouty arthritis, there are hundreds who would as certainly miss the gouty element in a case of bronchitis, and in doing so would fail to treat the case satisfactorily. The importance of such recognition was borne in upon me with much impressiveness during my connection with the Public Dispensary of Leeds, where I met with many cases of chronic bronchitis in winter, which were unaffected by the ordinary measures. A little careful observation and comparison enabled me to classify the cases; and a class soon stood out vividly where colchicum and potash formed a far more efficient cough mixture than any combination of expectorants. By treating the causation of the mucous rheum results could be achieved which could not be attained by measures merely directed to the rheum itself. The different inflammations of serous and other membranes, which arise from uræmia, alike the consequence of disease and the result of ligature of the renal arteries, point to the causal relations of the morbid actions, and demonstrate that in the removal of the exciting cause lies the best means of treating the morbid changes. Whenever inflammation is recurrent in those at or over middle age without some very obvious exciting cause —as, for instance, inflammation of the liver from excessive

drinking bouts—the renal origin of it must never be forgotten, as a strong possibility at least. Wherever there is an obvious exciting cause for an inflammation, such cause must be borne in mind and remembered in the treatment, if the practitioner wish to be successful. Perhaps few of us, however, learn to see these relations clearly until after the chagrin of clear and demonstrable error has been experienced. In all inflammations of a gouty nature, treat the gout first of all, and the inflammation in the second place, is a rule well worth adhering to.

§ 52. *Parenchymatous Inflammation.*—A most important modification of the nutritive processes is that known as parenchymatous inflammation (Virchow), which is essentially a cell-proliferation. It consists of an increase in the cell-production from the connective tissue. Connective tissue, or basement membrane, is the lowest form of organized tissue. It forms the packing which keeps together the vessels, tubes, and nerves—say of the kidney, for instance. When from any cause there is excessive vascularity in a part there is an increase of cell-growth, a true hyperplasia. In a muscle it may lead to increased growth of muscular fibre, or hypertrophy. In other tissues the growth is by development of connective tissue, as in the valves of the heart, for instance. In the different viscera this increase in the development of connective tissue is well marked, where there has been sustained functional activity. Thus there is developed excess of connective tissue in the granular kidneys of the gouty; where excessive and long-sustained functional activity has led to structural changes. It may be occasioned by repeated local hyperæmiæ, as in the gin-drinker's liver. At other times it arises from venous congestion, as in the increased connective tissue of the lungs, brain, liver, spleen, and kidneys, which result from mitral disease and arrested circulation. It would appear that cell-growth may arise from congestion of the venous radicles as well as from arterial fulness. It may arise from local irritation, as in the chronic interstitial pneumonia associated with the respiration of organic particles in the miller, the mason, the potter, or workers in certain departments of woollen manufacture, &c. Or it may be occasioned by functional activity prolonged and excessive. We have seen that much activity of a part is accompanied by an increased vascular supply, probably

through the agency of trophic nerves: if this be ill controlled it may proceed to inflammation. "Habitual use or over-stimulation of a part, by producing determination of blood to it, may readily drive it into inflammation." (Erichsen.) So we actually see that inflammation of the aortic valves is a very common occurrence where the occupation, or the voluntary pursuit, leads to sustained arterial tension, and consequently violent closure of the aortic valves. Thus in men who wield heavy hammers, called strikers, such ailment is very common. Aortic valvulitis is also common in the sustained high arterial tension of chronic Bright's disease, where the valves are closed violently, and so become inflamed. The loud sound produced by the forcible closure of the aortic valves is to be heard constantly during the course of chronic Bright's disease, and is of most valuable diagnostic import. In the same way atheroma, which is really cell-proliferation in the walls of the arterial system, is found locally at points subjected to great strain; or as a general condition in renal disease from the same cause as the aortic valvulitis, viz, over-distension of the arterial system. Such cell-proliferation is the means by which arteries may be thickened when their work is increased; consequently atheroma is usually found along with hypertrophy of the ventricle and similar change of the muscular wall of the arterioles.

Such parenchymatous inflammation is nutrition run a little wild. It is however a conservative process originally. When very excessive it becomes baneful, but often it must be regarded as a modification of nutrition far from simply injurious. That it amounts to what we call disease does not militate against the view that it is a mere modification of physiological processes. A pathological process is often but an excessive or perverted physiological process. Such is atheroma.

There is one most important practical lesson well taught us by atheroma, and which quite bears out what Erichsen said in the foregoing quotation. It is this. The progress of atheroma is wonderfully modified by the organism in which it is found. If in a hale and so-called healthy old person it will go on for years, undergoing little change, and rarely endangering life, except by apoplexy. In another of broken constitution, and especially if a drunkard, or saturated with syphilis, the cell-

products known as atheroma quickly undergo degeneration. The patches on the inner coat of the blood-vessels soften and break down into the *purée* of peas, and washing out in the blood current, lead to embolism on the one hand, and atheromatous ulcer (*geschwur*) on the other. Each of these actions endanger life, and especially the open ulcer in the arterial walls. At other times, in other constitutions, the atheromatous degeneration is markedly calcareous, and leads to gangrene of the limbs by the loss of arterial elasticity; or forms a serious source of trouble to the surgeon in ligaturing the vessel for aneurism, or in amputation for gangrene. Yet nevertheless in these different cases the essential starting point is a parenchymatous inflammation, a cell-proliferation of connective tissue elements under the tunica intima: but if the initial process is the same the ultimate course is widely different.

§ 53. The treatment of parenchymatous inflammation is a complex matter. To use the language of Herbert Spencer, we have to adapt complex concatenated measures to complex concatenated actions. The whole of the origin and course of the parenchymatous inflammation must be subjected to a bird's eye view, and then each part of the whole seen in is true relation to the rest. At the same time each part should have careful special attention given to it and its needs. If it be interstitial pneumonia in a mason working on fine stone, he must leave his occupation and flee for his life. As a police officer, a soldier, or an emigrant he may live, but if he remain a fine hewing mason he will surely die; and that too before long. If the striker or boatman, on the first evidences of aortic valvulitis, quit his occupation and take to some lighter form of labour, he may live to a fair length of days. But if he adhere to what has produced disease in healthy organs, the morbid processes will be aggravated and the end accelerated. If the gin-drinker reform, his injured liver may yet last for years with care. If the gouty man reduce his consumption of nitrogen to what his kidneys, aided by his skin, can fairly eliminate, length of days may not be absolutely out of the question, but such prolongation of life is incompatible with self-indulgence.

The removal, or if that be impracticable, the reduction to the least possible minimum of the exciting cause is the first and

most important step in the treatment of parenchymatous inflammation. Any especial action of remedies is not very applicable, except when the chronic inflammation is within the surgeon's reach. When so within reach and not complicated with any functional activity, so that rest is attainable, local applications, first of opium, to lower the vascular activity, and then of mercury or iodine to remove certain products, are available. A thickened joint when placed at rest in splints may be reduced by the use of absorbents: but it is quite a different matter with internal changes, where such rest cannot be first secured. Consequently the use of ioduretted or mercurial applications in cirrhosis of the kidneys, valvulitis, or atheroma, does not suggest itself as containing the elements of possible success. Rest, physiological rest, is what must be aimed at for recovery and the arrest of the morbid process; removal of the morbid products cannot be attained in chronic changes in the viscera.

Attention to the general health, strict hygienic arrangements, and careful avoidance of the various and special exciting causes will often give very gratifying results in the arrest of parenchymatous inflammation, and in escape from the consequences of the morbid changes.

§ 54. Inflammatory products are not always to be regarded as a disease *per se*. Very frequently that proliferation of connective tissue which constitutes an inflammatory product is useful and conservative. Thus in perforating ulcer of the stomach the products of inflammatory action are often the means of preventing the ulcer opening a passage into the abdominal cavity, which would be fatal. By like means an internal abscess, as of the liver or kidney, may safely make its way to the surface. In cases where disease is disturbed by motion inflammatory products procure rest. This is well seen in the thickening around a diseased knee. By cell growth a certain support is given, as it were by a natural splint, at the same time that the stiffness, so occasioned, aids to limit movement in the joint, especially in connection with the pain elicited by motion and friction of the diseased surface or surfaces. In a broken limb we see first a general infiltration of the part around the fracture, and then a growth of cells from the periosteum known as callus. The less perfectly the part is kept at

rest the greater the call for these conservative efforts, the more perfect the treatment the less the necessity for the reparative and protective processes of nature. It is always desirable to limit as far as possible any excess in these natural efforts, as the new growth, having served its turn, may itself become a source of trouble, or be unsightly. Thus, for instance, in strumous inflammation of a joint the thickening which conduced to give rest and limit motion, and so saved suffering and favoured reparative action, may remain an eyesore, if not actually troublesome; consequently it becomes desirable to exercise a certain amount of control over such growths, and by reducing the necessity for them to a minimum to get their good effects without the drawbacks. If a fractured limb be carefully and skilfully placed at rest, there is often no more new growth than serves for efficient repair, and in a year or so the point of union may no longer be detectable: if perfect rest be unattained, or unattainable, a mass of callus will mark the site of the injury. If strumous, or other inflamed joints be put at perfect rest in splints, or leathern or other appliances, the cell-growth, or natural splint, is limited, and is ultimately so slight as neither to occasion impaired utility nor even deformity. The inflammatory products are not to be regarded as hostile, but rather as friendly if indiscreet allies. They require guidance, and then they are beneficial; if unregulated they are apt to become excessive. The great point is to limit their growth; once established, they are apt to be unmanageable. Rest, pressure, and the use of absorbents (Chapter XX.) will frequently aid the natural process of absorption, which is often spontaneously instituted after the necessity for the new growth has passed away, and in a number of cases the deformity is by these measures much reduced.

CHAPTER VI.

ANÆMIA—PLETHORA—CONGESTION.

§ 55. THERE are various states of the system depending upon an insufficiency, an excessive amount, or an irregular distribution of blood, which are of much importance in practice. The two first form general conditions of the greatest moment when dealing with many affections; the third is also a condition of much importance, and stands in such relation to each of the foregoing that it can only be properly considered after the first two have engaged our attention.

Anæmia.—This is a condition of general diminution of the bulk of blood. It is a condition which occurs very commonly in connection with blood poisons. Consequently, as has been pointed out before, it is found along with syphilis, gout, lead poisoning, malarial infection, &c. It may arise from imperfect supplies of food, from starvation, or it may take its origin in mal-assimilation, in impaired digestion. At other times it is due to drains upon the system, as lactation, menorrhagia, or leucorrhœa, chronic diarrhœa, hæmorrhoids, or the growth of a malignant tumour, robbing the system to promote its own increase. In the first cases there is a poison existing which either breaks down the blood corpuscles, or hinders their formation. In the second series the blood is not sufficiently fed by the nutritive processes. In the third there is a drain upon the system which is impoverishing the blood. A proper recognition of the causal relationships of anæmia is of the utmost value in giving the right direction to the remedial measures. It is of little use to give hæmatics to a menorrhagic woman, whose system is simply drained every three or four weeks, if at the same time measures

are not taken to check the drain. Very often, indeed, it is a more successful line of practice to stop the blood-loss, and so permit of blood-accumulation, than merely to build up so much blood to be periodically lost. The one substitutes a steady progress for the violent oscillations of rapid blood-formation, alternating with severe losses, which is induced by the other. Especially is such plan desirable in stout women given to rapid blood-formation.

Anæmic persons are not necessarily spare. Chlorotic girls often become very fat. At the same time there is much lassitude, drowsiness, muscular inertia, defective secretion, and general loss of tone. Every organ feels the lack of arterial blood; especially does the brain feel it. With the large amount of blood normally in the encephalon and its rapid flow, a condition of anæmia, with defective circulatory force, is soon felt by the contents of the cranium. The sense of energy, so delightful to all, is gone, and langour takes its place. The person is drowsy when up, and feels as if he (or rather she) never could sleep enough. At times, however, the rest is broken from the blood flowing more freely into the brain when the head is laid upon the pillow. Consequently it is no uncommon thing for such patients to sleep almost propped up in bed. There is a great tendency to neuralgia, which may be cranial, facial, or intercostal. "Pain is the prayer of a nerve for healthy blood," wrote Romberg; and very commonly it is so. When the pain is intercostal it is usually found in the sixth or seventh intercostal nerve of the left side in women. When so found it is generally associated with suckling, or with discharges from the genitals, and usually with leucorrhœa. Where there is pelvic irritation it would seem that the nerve currents coming up the splanchnics especially affect the spinal nerves, springing off at the point of entry of the greater splanchnic into the dorsal ganglia. From each dorsal ganglion pass fibres to the intercostal nerve, and in some occult way the sixth and seventh intercostal nerves become the subjects of neuralgia in uterine irritation. Such neuralgia rarely yields to general treatment, unless the reproductive system be also attended to, and the drain, whether leucorrhœa or suckling, be arrested. Neuralgia, or, in others, pain in the vertex of the head, are the scourges of anæmic women.

Palpitation is a very common occurrence in states of anæmia, and arises chiefly from nerve disturbance. The roots of the vagus nerves are imperfectly supplied with blood, and consequently, the vagus cannot exercise its wonted controlling, or inhibitory, action over the heart. As the bulk of blood increases the palpitation vanishes. Hæmic murmurs, either aortic or pulmonary, are very common, but ought rarely to be mistaken for the murmurs of organic change. The veins often give out a hum, the *bruit de diable,* which is commonly regarded as the most marked physical sign of anæmia. These murmurs of the circulation are very common in conditions of impoverished or diminished blood-supply; they are very curious, but their origin is scarcely yet established.

Breathlessness upon exertion is a very common phenomenon in anæmia. It is not due to debility in the diaphragm, the respiratory muscles, nor yet in the right ventricle. These different factors may have some influence, but they do not form the essential matter. The real source is the diminished amount of red corpuscles, and the impaired chemical interchanges resulting therefrom. The supply of oxygen is too imperfect for exertion and effort; and if these are attempted breathlessness follows. Upon this condition of diminution of blood-corpuscles and defective oxygenation depends also the fatness so often found in the anæmic, and especially in the chlorotic. These pallid, pasty creatures often become very obese, becoming paler, more languid, and breathless as they wax fatter. The fact is that they grow fat from lack of blood-corpuscles to supply oxygen to burn their hydrocarbons, and the fuel becomes deposited as fat. As they recover from their anæmia, and regain the bloom of health, their stoutness diminishes, until they once more possess their pristine symmetry. Not uncommonly the colouring matter of the corpuscles, dissolved in the hydræmic blood, is deposited in the areolar tissue, as in the dark suborbital patches of anæmia, and the general staining of the skin in chlorosis; or passes away in the urine as urohæmatine.

When anæmia is very marked it not uncommonly happens that there comes on œdema of the lower extremities. It is most marked at night, and is relieved by resting in bed, and the swollen ankles of the evening, on getting out of bed in the

morning, present a normal appearance. Here the œdema is due to fulness of the venous radicles and atony of the circulation. It also disappears with improvement in the condition of the blood.

§ 56. The indications for treatment furnished by anæmia are varied and important. It is obvious enough that the measures indicated are those which will tend to restore the condition of the blood to the norm. Animal food, soups, broths, &c., are indicated, in small quantities often repeated. Farinaceous food alone is not desirable. The blood must be built up by an increase in the formation of blood-corpuscles. In order to secure this the diet must be fairly rich in nitrogen. It is desirable that it be of a stimulating nature, and it may profitably be combined with wines of a generous character, as Burgundy, port, or Madeira. Exercise in the fresh air, cheerful society, and glancing sunlight are all valuable auxiliaries. Not uncommonly the anæmia will assume a phase of the most obdurate persistency, and defy the best laid schemes of the medical adviser. Under these circumstances a residence at a chalybeate spring is certainly indicated, and Bath, Tunbridge Wells, Harrogate, Gilsland, Moffat, at home, and Carlsbad, Kissingen, Homburg, Schwalbach, Pyrmont, Tarasp, or Orezza, on the continent, and Ballstown, New York, or the Rawley Chalybeate Springs, Virginia, may be resorted to with advantage. The amount of dilution is a matter of the greatest moment in attempting to bring the system under the influence of chalybeates in many cases. This fact alone often makes the difference betwixt failure at home and success at a spa. At the same time the change of place and scenery, the psychical impulses so inspired, and the direction given to the thoughts are all very useful. The habits of others at these chalybeate springs often form a great incentive to invalids, who are inclined to be despondent, to exert themselves and so to aid in their own recovery.

At the same time it must be remembered that very commonly anæmic patients are most difficult to manage from the effects of impaired nutrition on the brain. As soon as ever the blood is at all enriched severe headaches come on and harass the patient extremely. There is often, too, such cerebral excitement that some depletory measure seems indicated, and relief is not uncommonly brought about by bleeding from the nostrils. Many writers have drawn attention to these consequences of too

suddenly filling the cerebral vessels with blood. Dr. Handfield Jones says:—"Nothing is more common than to find anæmic patients complaining of headache from the administration of the necessary tonics, because their nerve centres have been brought into such a state of hyperæsthesia by the impaired nutrition that they can hardly tolerate anything of a stimulant nature. A little excess, therefore, even of spanæmic blood, may cause distress to a feeble brain, which, after it has acquired a more healthy tone, will bear and be benefited by a much larger amount of much better blood. The case is similar to that of the starved man, whose very preservation depends upon his being fed most sparingly for a time." In such cases chalybeates may be combined with bromide of potassium, as they commonly are united in the treatment of melancholics.

Pot. Brom. gr. v. aut x.
Fer. Pot. Tart. gr. v.
Inf. Quassiæ, ʒi. ter in die,

is a good combination under such circumstances. At other times these effects of debility of the nervous system—where irritability is so associated with adynamy—may be obviated by the combination of purgatives with the hæmatics or tonics. A good form is given in § 49. At other times lighter forms, as the ammonia-citrate of iron in some bitter infusion, may be given, and the bowels acted upon by saline purgatives, or an aloetic pill. Where the anæmia is associated with amenorrhœa it is very desirable that the iron and aloes be given together. Griffith's mixture with the compound decoction of aloes forms a good combination. It is however only suitable to be given before food, and it is a golden rule that iron, as a pure hæmatic, should be given after food and digested with it. Consequently iron in pill with an aloetic purgative, is here indicated. Arsenic may be conveniently added. The following form is a capital combination:—

Arsenic, gr. i.
Fer. Sulph. Exsic. ʒss.
Pulv. Pip. Nig. ʒi.
Pil. Al. et Myrrh. ʒii.
In pil. LX. div. 1 bis in die.

Each pill to be swallowed shortly after food. Half a drop of Ol. Sabinæ is an excellent addition in amenorrhœa—an addition now too rarely made.

§ 57. Where anæmia is found with some specific poison, then it becomes necessary to neutralize, to destroy, or to eliminate the poison by some agent which exercises a specific action upon it. It is here of as much importance to meet the specific poison by its antidote as it is to use hæmatics. This subject has been referred to before in § 31, and so need be but briefly alluded to now. Very often, however, there are drawbacks in the remoter effects of the antidotes themselves, and then it becomes very necessary to obviate these secondary actions of remedies whose primary action we wish to secure. For instance, in using mercury for the treatment of syphilis, the effects of the mercury upon the organism are often far from pleasing. What then is to be done? It is obvious that the mercury is to be used for the treatment of the syphilis; consequently the effects of the mercury which are not desired, but which are unavoidable, must in their turn be met by the administration of good food, of iron, and, if necessary, of cod-liver oil. Such a plan of treatment is very commonly indicated in the children so commonly seen in our out-patients' rooms, where there exists a condition of anæmia, or of impaired evolution, often taking its origin in the action of some inherited syphilitic taint. In other conditions of specific anæmia—as these anæmic conditions depending upon the presence of some blood poison might properly be denominated, in order to distinguish them from the other forms of anæmia not so occasioned, and which may fairly be termed simple anæmiæ—similar plans are indicated.

At other times anæmia may be associated with some profound impression made upon the nerve centres, or the nerve centres may be the parts most seriously involved in the general anæmia. The most obdurate case of anæmia ever brought under my own notice was that of a very healthy girl—healthy both in herself and her family history—whose father dropped down dead at her side at market. He was a strong, hale man, and nothing could have been more unexpected. The shock so affected his daughter that she became markedly pallid and anæmic in a brief time, and no combination of remedies, nor perseverance

in their use, ever produced any effect, worth speaking of, in this girl. What is the true pathology of this condition, and what the effect of the shock upon the assimilative apparatus, it is impossible in the present state of our knowledge to say. Whatever it is, its action is enduring. At other times the condition of anæmia is much relieved, and the general nutrition is good, and yet there remains an anæmic condition of the brain. The person, usually a girl, is still drowsy and listless, and her lack of energy is commonly attributed to indolence. Indolence it may be; but how comes it to be there in the midst of returning health? It depends upon an imperfect supply of arterial blood to the cerebral centres, and when such condition remains the administration of iron and quinine, or of Easton's syrup, must be long continued. Whether it is that the cerebral cells have not regained their pristine power of attracting blood at will, and in sufficient quantity, or that the blood supply is itself defective; it is clinically certain that iron and agents which exercise a decided action upon the nervous tissue should be still continued, until the lingering cerebral anæmia is successfully combated and a feeling of energy is once more present.

In anæmia there is rarely any very marked tendency to local congestions, but such occasionally occur. This will engage our attention in the last division of this chapter. (In the treatment of pronounced anæmia in girls, especially in chlorosis, it is good practice to send the patient to bed at the commencement of the treatment. Improvement will often set in after the patient is confined to bed, under the same remedies that failed to do good before, while she was engaged in her usual avocations.)

§ 58. *Plethora.*—This is a condition which does not loom so largely in the professional mind now as it did a generation or two ago. Whether there is not so much gross feeding now as there used to be—as in the days of old, when Queen Elizabeth's maids of honour had so much beef and beer at breakfast, dinner, and supper; or whether there has some inexplicable modification of the constitution come over us, as some very careful observers assert, it is impossible to say; but plethora is very far from being the prominent subject now that it was of yore. No reader of George Eliot's admirable works of fiction can have failed to be struck by the frequent introduction of

medical subjects into her conversations, and by the perturbation of the minds of the subjects of George III. on the important affair of the lowering and feeding methods of treatment. That the opposite method to that which the individual really required, was the one espoused by each, is one of those exquisite delineations of real life which are so characteristic of that gifted authoress.

The most characteristic instances of plethora are furnished by the type of individual which used to be regarded as the apoplectic *par excellence*. Such individuals were short, stout, florid, short-necked, and short-winded. Christmas, as old Father Christmas, is a well-known instance of the plethoric individual. It is commonly denominated the alderman type, and is certainly associated with good living. In fact, plethora depends upon a redundancy of red-blood corpuscles. The blood-vessels are full, often turgid, and the capillaries distended. There is usually an hypertrophied heart, but there is rarely palpitation, in men at least. In women sometimes there is a certain amount of dilatation with the hypertrophy, and then there is palpitation. The blood-vessels of the face are dilated, atheromatous, and gorged with blood. Very commonly the arterial twigs are distinct and well-defined. The face approaches in appearance the face characteristic of the old stage-coachman and the modern engine-driver; but with this difference, that in plethora the condition of the face is only that of the vascular system generally. In consequence of their wealth of red-blood corpuscles, and their full supplies of nutrition, such persons are generally warm, they withstand cold well, and they do not readily suffer from exposure. But they are usually somewhat inactive bodily, not always from lack of energy by any means, but from what is understood as fulness of habit. They are to be seen commonly in charge of brewers' waggons, and about breweries, though the type exists in other ranks of life, and in all grades. Such persons are not uncommonly mentally energetic, in fact they are often gouty, with the energy and hasty temperament of the gouty.

There is in such persons a strong digestive power, and a liking for generous food and for alcoholic drinks. The tongue is rarely clean. The bowels may or may not be active, but the motions

are always very offensive. The urine is usually laden with lithates, and the liver is often gorged, and bilious purgings, naturally instituted, are not uncommon. The relation of the condition of plethora to the free consumption of animal food is seen in its frequent occurrence in butchers, pork-butchers, publicans, and butlers. In women the same type prevails, and, if very pronounced, gives a bloated appearance. Here its origin is the same as in men. It not rarely happens, however, that such women are the subjects of amenorrhœa, and that too of an obstinate nature. They are commonly sterile; especially if this plethoric condition takes place in early life. Such women are very short-winded, and asthmatic, as they term it. It is however little more than the shortness of breath of the obese. They are not rarely the subjects of palpitation. As to their secretions and excretions, they have the character given above.

These plethoric individuals are very subject to apoplexy; it was a mistake, however, to associate apoplexy exclusively with persons of this build and type. The vascular turgescence, which exists, leads to different changes in the circulatory organs. The heart is powerful and well-nourished, in which respect it resembles the muscular system generally. The blood-vessels are well filled, and the blood is driven in by a powerful ventricle. Consequently the blood pressure is high, and an atheromatous condition of the blood-vessels is, sooner or later, induced by the over-distension. It can be no matter for surprise that the thin-walled vessels of the brain often give way in such persons, especially under excitement—when the smaller vessels of the encephalon are dilated, and the current of blood is large, and driven by an energetic and active ventricle. The association of apoplexy with hypertrophy of the left ventricle was long ago pointed out by Rokitansky, and the observations of that great pioneer in pathology have been corroborated by numerous other pathologists. The strong action of the heart is exaggerated by the condition of the arterial walls, and the pulse is well-sustained, and the arteries are resistant and incompressible. This form of pulse is usually regarded as a typically good one, rather than as illustrating an abnormal form. It is an abnormal pulse, however, and as such must it be regarded. The

fulness of the vessels of the face is not unlike the condition of the vessels of the head, and both are but parts of a general condition which is known as plethora; and which requires a certain line of treatment, suited to its needs and adapted to its exigencies. No matter what the form of ailment to be treated in the plethoric, the line of treatment must ever be that which makes the plethora the most prominent and leading object. In some there is much abdominal fulness, with congestion of the liver, and not rarely hæmorrhoids. The discharge from these hæmorrhoids is often most useful, and forms an excellent drain on the vascular system too turgid with blood. Very frequently the disinclination to exert themselves bodily in such persons is marked, and, the appetite remaining good, the plethora is thus aggravated. Often, too, in plethoric females the heart is not equal to much exertion, and exercise cannot be taken, and so the congestion and fulness of the abdominal organs is unrelieved, as it would to some extent be if exercise were feasible.

§ 59. Enough has been said to enable the reader to see that this condition gives distinct indications for treatment. There are two lines of approaching the condition of plethora; both effectual, but neither of them likely to be agreeable to the patient. The one is to diminish the blood-formation; the other is to lower the vascular fulness by measures of depletion. The effect of either plan, in reducing the vascular supply to the brain, is to lessen the sense of well-being, *bien-être*, which takes its origin in a good supply of arterial blood to the posterior lobes of the brain. The free vascular supply to which they have been accustomed makes many of these patients very susceptible to any depletory measures, and they readily cry out that the plan of treatment is "too lowering." It is this sensation of *bien-être* which has lured them along the path they have taken, and when they feel at all depressed or deprived of energy, they commonly rebel at the treatment. It is not difficult to see that such should be the case. If they feel the better of their food, why should they not go on taking it, is their argument; and as they cannot be supposed to be familiar with chronic pathological processes, they are easily induced to persist in their wrong course. The matter must be explained to them, and they must be made to see that a lessened sense of energy and of feeling well, is

directly connected with their future improvement; and that it is undesirable to subordinate the future to the present.

Having taken this precautionary measure, it then becomes expedient, firstly, to diminish their food in quantity, and still more in quality. Such persons like good food and enjoy it, and poor food they are averse from. Their soups are good and their sauces rich. It becomes necessary, then, to alter the character of their viands. Instead of rich *entrées* they may profitably take a little more fish, and in place of Marcobrunner and Burgundy, they should take *vin ordinaire*, or Niersteiner. Port wine after dinner should be avoided, and claret substituted. The quantity too may be reduced with advantage. If the patient be a coachman or a brewer's man, he must be instructed to diminish the amount of malt liquor he takes. There must be a reduction of both food and drink, and the amount taken must be proportioned to the wants of the system, and not to the gustatory tastes of the individual. Rich animal food must be indulged in but sparingly, and those adjuvants to a good appetite, piquant sauces, are quite superfluous. The meat should be plain, so as not to be too tempting. If the appetite be brisk, fish should form a large portion of the chief meal. All appetizers, as gin and bitters, are quite uncalled for; and the frequent draughts of alcohol in which some plethoric individuals indulge, are to be strictly forbidden, or very much limited.

Then it is very desirable that exercise should be taken, so as to meet and neutralize the large amounts of food consumed. One north-country squire well known to the writer, knew the value of exercise well, and not a labourer on his farm worked half so hard for his bread as he did, in order to indulge in the pleasures of the table with impunity. Some years after the allotted span had been reached the plan was working famously. Where exercise is not so taken—and with many it would be impossible—then abstinence and depletion must be its substitutes. The meals must be fewer, more sparing, and of poorer quality.

Then there must be established a system of depletion. At one time bleeding was much in vogue, and persons were bled periodically for plethora. But this is a radically bad plan. It is well-known that losses of blood are often rapidly repaired, and the more often repeated the loss, the greater the assimilative power.

Consequently when persons are bled at frequent intervals the blood-formation is rapid; a state of recurrent plethora is swiftly induced, and the distention of the blood-vessels arising therefrom is a great source of danger, and especially of apoplexy. The same may be said of any other form of depletion, including intermittent purgation. The thing to be aimed at is a steady, continuous drain. This is often established by hæmorrhoids, and in some plethoric individuals the arrest of this loss from any cause is followed by general vascular fulness, injected countenance and dyspnœa; all of which disappear when the bleeding from the piles recommences. The same symptoms follow from the temporary arrests of other drains. Then the bowels must be acted on; and this action must not be restricted to keeping the bowels open, or even well open, it must amount to free purgation. For this purpose saline purgatives are chiefly indicated. If vegetable agents are used it must only be in connection with mineral salts, as in the well-known black draught. Purgation, when continued, forms an exhausting discharge; when artificially induced in plethora it forms an excellent remedial agent. The bitter water of Fredericshall is one of the best purgatives we possess for the relief of plethora. The dose can easily be regulated so as to merely open the bowels, or to cause active catharsis. Other waters possess similar properties. The advantage of purgation is that it can be continued steadily week after week, and month after month. It is this that qualifies it so well for the treatment of plethora. A brief residence at a sulphur spring is a very good measure, but then it is too often temporary in character. It is very instructive to see the number of stalwart and full-fed plethoric individuals who gather together at Harrogate, as soon as warm weather cuts down their power of getting rid of their food by oxidation. The bracing air, charged with oxygen, and the sulphur springs combined, give Harrogate a great advantage over most other health resorts, as the number of persons drinking the waters in the pump-room every morning, and then, after a walk, besieging the numerous cloacæ, abundantly testify. After such a course the pleasures of the table resume their wonted attractiveness. Without such a course, in many of these *habitués* life would soon be extinguished. Where this line of treatment is impossible, or the necessity for purgation is continuous and persistent, such

natural waters can be purchased in bottles and drunk at home. If mineral salts be used it is desirable that they should be diluted, in imitation of the natural waters. Waters charged with purgative alkalies are specially indicated where the tongue is foul, and there are other evidences of biliary turgescence. It is scarcely desirable to take mercurials constantly, and alkaline purgatives are the best for continuous use. Where there is a weak and dilated heart, such waters are indicated as contain both saline constituents and a certain amount of chalybeate matter. Very often a little chalybeate water goes well with sulphur water—not combined before drinking—and the union of these two at one spa is a great advantage. When the patients are of the humbler ranks of life, and a summer at Harrogate and a winter at Bath are out of the question, artificial substitutes for these spas are quite feasible. Salts of various kinds are attainable, and perhaps the best is furnished by sulphate of magnesia.

Mag. Sulph. ℥ ss.
Sod. Pot. Tart. ℈ ii.
Inf. Gent. ℥ ii.

taken warm every morning, or second morning, will be found to relieve the portal circulation without destroying the appetite or disturbing the stomach. Often, however, the loss of appetite is the best thing that could happen—and this natural loss of appetite in plethoric individuals is an instinctive action which should not be hastily interferred with.

Such is the line of treatment to be pursued in the cases of plethoric individuals. But the discriminating medical man will soon learn to distinguish betwixt those cases where depletion simply is indicated, as in sthenic plethora; and those cases of asthenic plethora, where the florid complexion and swollen capillaries are associated with a weak heart and a compressible pulse—where iron and tonics may be profitably combined with depletory measures. He will also bear in mind that the treatment must be persistent to meet an enduring condition.

§ 60. *Congestion.* — Congestion differs from inflammation, though it may be very commonly an early part of the inflammatory process. Congestion means dilatation of peripheral blood-vessels, whether external or internal. It is most commonly seen

in the act of blushing; it has also been seen in the tails of newts after amputation from the body. It may be chiefly located in the arterioles, as in general plethora; or it may be situated in the venous radicles, as in the venous congestion resulting from impaired circulation, especially when due to tricuspid insufficiency. When congestion is long continued various changes take place. If it be a serous membrane, there is usually effusion into the serous sac. If a viscus, there is usually a development of connective tissue, as is so frequent in the venous congestion, the backward-flow, or *rückwirkung*, of chronic valvular disease of the heart. Under these circumstances there is commonly albumen in the urine, as there is after ligature of the renal vein. Under all circumstances, long continued congestion leads to tissue changes, and so should be obviated as far as possible.

We have just seen how much congestion of the viscera is associated with a condition of general plethora; and have further seen how such congestion can best be met. Poor food and repeated depletion by various measures are the means by which it must be met under these circumstances. They had better be guarded and persistent than violent, and at intervals merely. When indicated, they had better be set on foot without delay. The result apprehended may occur before the plan of treatment is inaugurated, as once happened to a patient of my own. The means of relieving congestion of the portal circulation in such cases have been given in the preceding section. In addition to purgation, a few leeches to the anus are an excellent measure in congestion of the liver, &c. If there be uterine congestion, a leech to the os uteri is often advantageous. In this last affection we see one of the frequent causes of congestion, viz., irritation or sustained imperfect function. Where congestion of the uterus is due to ungratified sexual aspirations, to imperfect intercourse, or to substitutes for intercourse, its pathology is as follows:—There is that arterial fulness which is normal and physiological—if the condition be also normally relieved by orgasm, and secretion from the glands of Naboth synchronously with the secretion from the glands of Duvernay—that is, if there be natural intercourse. Under other circumstances the natural relief is not obtained, and the gorged vascular condition remains. This acts

upon the cranial centres, through the numerous spinal fibrils in the nerves of the reproductive system, and the cerebral excitation maintains a dilated condition of the blood-vessels of the part. The consequence of this is that the uterus becomes enlarged, heavy, often hot, and subjectively a source of disturbance. It is the subject of congestion which is vascular truly, but which takes its origin in nerve-disturbance first. Consequently, not only must measures for the relief of the circulation be adopted, but measures for lowering the nervous action must also be had recourse to. Therefore not only ought the uterus to be unloaded by local abstraction of blood—and this should be accompanied by a general depletion of the portal circulation by purgatives—but certain neurotics, known to possess an effect upon the nervous system generally, and the nervous supply of the reproductive organs in particular, must be exhibited. Bromide of potassium, hyoscyamus, and camphor are the agents in most repute for such purpose. The different measures may be profitably combined. But other addenda suggest themselves; such as the avoidance of any load in the lower bowels, any irritation in the rectum, any local irritation of whatever kind, or anything which might lead to local congestion from its effect upon the nervous centres first, whether intrinsic or extrinsic. All straining at stool, horseback exercise, which produces pelvic congestion, heavy clothes hanging from the waist and compressing the pelvic viscera, hot rooms, and soft and warm arm-chairs should also be avoided. No remedial measures would be at all likely to be successful if the patient lay in a warm room, on a soft couch, and read French novels; or if she worked steadily at a double-treadle sewing-machine.

The liver is especially liable to congestion, and here again the measures just enumerated for the relief of a loaded portal circulation may be profitably resorted to. But here it is desirable to avoid another set of conditions which would tend to keep up the congestion. First is the avoidance of alcohol, especially when in large quantities and undiluted. If this agent be taken the excessive vascularity of the liver will be kept up in spite of free purgation. Another thing to be avoided is indulgence in highly-spiced and rich dishes. By such food a condition of biliary, as compared with true vascular congestion, will be kept

up. At the same time large hot poultices over the region of the liver will often induce these discharges of bile, which give such relief in congestion of the liver.

The kidneys may be, and often are, congested, and when this is the case great relief will be afforded by free action on the intestinal canal; for such action not only forms a derivative, but the relief of the portal circulation has been found to ease the renal congestion. The skin must be freely acted upon by warm baths. Such action of the skin produces the same effect in depurating the blood as is achieved by the action of the kidneys, as well as lowering the blood-pressure generally, by the dilatation of the cutaneous vessels. Mere local measures, such as wet or dry cupping over the loins, mustard, and blisters, or hot poultices dusted over with mustard, are also efficacious. All these various lines of treatment may be combined in cases of acute congestion of the kidneys, which so commonly threatens the existence of man.

Congestion of the lungs is a common consequence of cold. It also arises from disease of the left side of the heart. Further, it is frequently seen in the course of severe attacks of fever, especially in asthenic systems. It becomes at once obvious that the treatment of pulmonary congestion must rest upon its causal associations. Where it arises from cold it is usually necessary to throw the skin into free action, and as the cutaneous vessels dilate the pressure is reduced in the pulmonic circulation, and relief is obtained. This plan succeeded admirably in a case of hæmoptysis recently under treatment. Where it is associated with cardiac mischief, it is desirable to enlarge the general vascular area by dilating the cutaneous blood-vessels of the trunk by a jacket poultice, thus taking off from the distension of the right ventricle;[1] and also at the same time to stimulate the gorged right ventricle to contract upon its contents by administering digitalis, along with ammonia, spirits of chloroform, or alcohol. When, however, pulmonary congestion arises during the latter stages of an adynamic type of fever, it is what is usually termed hypostatic, *i.e.* the result of the action of gravity merely. When the patient lies upon his back, as he does in the typhoid condition,

[1] The effect of heat upon the heart must not be altogether overlooked: it is a not unimportant factor in the treatment.

the posterior portions of the lungs are among the most dependent parts of the body. The blood collects in them, from lack of tone in the vessels to prevent such stagnation. It becomes at once apparent that under these circumstances stimulants must be administered, and freely too, in order to maintain the power of the circulation. But more than that, mere position is not without its importance. As long as the patient can turn over on either side, the lung of the other side is to some extent unloaded, and so relieved. Old practitioners are always hopeful of fever patients so long as they can turn over. The same species of hypostatic congestion is found under similar circumstances in the kidneys; and when the power to turn over is lost, it is a good practice to roll the patient first on to one side, for an hour or two, and then on to the other, in order to mechanically unload the congested viscera of each side alternately, especially in advanced typhoid states. Such measures, combined with stimulants, are often successful in enabling many fever-stricken patients to recover from a condition which ever gravely imperils the existence of the organism.

At other times there exists a state of congestion of the lungs, which commonly enough is the immediate precursor of tubercle. If this condition of vascular congestion persists, cell-growth, its sequel, will usually not be long deferred. Sometimes this congestion is relieved by local hæmorrhage, or hæmoptysis; and however alarming at the time, and to the subject of it, there is no room for doubt but that at times hæmoptysis is one of the very best forms of local bleeding. It can, however, often be obviated by purgation, or by increasing the action of the skin, and these measures may often be advantageously aided by giving a fillip to the driving power of the heart. The lungs furnish distinct illustrations of the various forms of congestion, and of the different measures to be adopted in each case, according to its causation and associations.

Cerebral congestion illustrates well the association of local determinations of blood, otherwise known as congestions, with conditions either of anæmia or plethora. The feeling as if a bolt were driven through the forehead, together with vertigo, pulsation of the carotids, and a flow of distorted ideas, is characteristic of cerebral hyperæmia with plethora; as dull headache and a feeble

pulse, are indicative of asthenic hyperæmia; not uncommonly found along with states of general anæmia. The treatment of these allied yet dissimilar conditions, is widely different. In each hæmorrhage from the Schneiderian membrane will often give relief: and so far as local measures are concerned, there is little difference betwixt sthenic and asthenic congestion. It is in the general treatment that the difference essentially lies. To treat asthenic congestion with a sharp cathartic, might possibly be successful, but it will be much more likely to be harmful; while in sthenic cerebral congestion, it would form an excellent measure, indeed the first to be adopted. Low diet, purgation, and the derivative action of mustard to the calves of the legs, or the foot-bath of hot-water and mustard, are indicated in active hyperæmia. Even bleeding may not be altogether out of place. But in asthenic cerebral hyperæmia, stimulants and tonics, together with agents improving the circulation, are just as certainly required. The fulness may be arterial, and need depletion; or it may be venous, and need stimulation. According to its pathological relations will be its treatment if the practitioner be thoughtful and wary.

§ 61. So closely is œdema associated with congestion that it is necessary to consider it here. It may be of various origin, but it is rarely allied with sthenic congestion. It may be occasioned, and often is, by venous fulness with pressure on the venous radicles. As such, it is often found in the lower limbs when the circulation is defective, either from cardiac failure, obstruction to the circulation through the lungs, or general debility, either in simple anæmia, or in conditions of advanced disease. It is found in either upper or lower limbs where there is pressure upon the venæ cavæ, or upon the main venous trunk of a limb. It is also found in renal disease. If chronic, it is partial, but more or less extensive; if acute, it is general, forming anasarca. It indicates a condition of blood in which there is hydræmia, or an excess of water. Consequently the measures best calculated to relieve it are those which improve the circulation, or aid in the elimination of water. Often these may be combined with advantage. When the circulation is at fault the treatment for cardiac dropsy (Chap. XIV. § 141) must be adopted. Where the emunctories of water are acting imperfectly, the bowels and skin

may be called into requisition as auxiliaries to the inadequate action of the kidneys (Chapter XVII. § 172). At times relief may be given by permitting the effused fluid to find its way out by prickings or incisions. If the œdema be cardiac, without renal complication, this last plan is less effective than when there is a renal factor in action.

CHAPTER VII.

GROWTH AND DECAY.

§ 62. As an apple grows, ripens, and then decays, so does the human organism. It has its three periods too: 1, the period of growth; 2, the maintenance of integrity; and 3, the period of decay. There are many matters connected with the first and third periods which call for special attention. The middle period has nothing about it, normally at least, calling for especial remark. But of the other periods it is different. During the period of growth there is not only the repair, but the growth of the tissues to be promoted. Consequently the appetite of the child is active, and its assimilative powers are not readily overtaxed. The tendency however of childhood, in its more special maladies, is towards failure, more or less complete, in the nutritive processes. In this it presents a strong contrast to aged life, where the chief difficulties lie in the inability of the system to dispose satisfactorily of its waste. The food of the child should be simple, should be satisfying, and should contain a fitting proportion of the material required for healthy tissue-building. In milk, combined with farinaceous matters, we find the most appropriate food for infancy, and the dietary of the nursery is a choice determined by long experience, of which, however, advancing knowledge thoroughly approves. A certain proportion of fat is also essential. At present there is a decided objection on the part of children to eat fat; some of this is doubtless in many cases due to an inability to digest fat in its ordinary forms, and consequently the more easily digestible fats, butter and cod-liver oil, must be resorted to. But in other cases the objection has no such

valid foundation, and is rather due to fashion or caprice. The importance of a sufficiency of fat in the dietary of children cannot be over-estimated. With a suitable dietary children do not need, or very seldom, that drugging which seems to some parents indispensable. It is too much the fashion to administer medicines of various kinds to children, most of which are quite uncalled for. The chief medicines required by children are those that act upon the intestinal canal, which is apt to be disordered from its functional activity. But even here it is often well to let the child alone; the loss of appetite is a natural outcome of repletion, and the malady carries with it its own cure. A great portion of the ailments of children are natural actions rather than diseases *per se*, and those children who are left most alone usually do best.

There are, however, many troubles which are inseparable from this period: some are unavoidable; others again are more or less due to causes which admit of being met, or being avoided altogether. Among these latter are the different disturbing causes which act mediately upon the child through the system of the mother. Such are mental disturbances. After a great fright a mother has been known to suckle her child, and forthwith the child has died. What the change was which made the mother's milk a poison to her child we do not know. Lesser effects are much more commonly induced, and a fit of passion in the mother often so modifies her milk that it purges her infant. Such are some of the risks run by the baby which are capable of being averted by thoughtfulness and care. There are however numerous other causes of disturbance which cannot so easily be averted. Among these are the common disturbances of babyhood, which arise from passing periods of acidity to which the digestive system of the infant is liable. It often "possets" its milk, which in curdled lumps is vomited, or ejected by purgation. In which case it is well to get rid of the indigestible mass; and the ejective process should not be rashly interfered with. To obviate such curdling an alkali must be added to the milk, and of such agents the best is lime-water. This not only neutralises the excess of acid but it also furnishes lime to a system in need of it. Alkaline carbonates are apt to cause disturbance from the disengaged gas

given off in the stomach. This renders them unsuited for permanent use. As an occasional resort they are unobjectionable enough; and the following forms a capital mixture for children that are griped after their milk:—

Pot. Bicarb. gr. ii.
Ol. Cajeput. ℥. i.
Aq. Menthæ, ʒ ii.

three or four times a day. This usually gives relief, and speedily too. It may be advantageously preceded by a dose of castor-oil. At other times children seem to suffer severely from the act of digestion; it does not appear to them a painless process, but one which produces suffering. In such cases bromide of potassium is indicated:—

Pot. Brom. gr. vii.
Aq. Anethi. ʒ ii., ter in die,

will often give great and decided relief. In the troubles of teething some such medicament is indicated in order to deaden the painful sensations which accompany and arise out of the emerging of the tooth from the gum. This irritation often causes a febrile condition, especially if the saliva secreted so freely by the reflex consequences of the irritation in the gum is wasted on the bib. It is a matter of observation that the child which wets its bib much is that which suffers most in teething. Vogel says that the saliva is purgative, and that the purgation lowers the fever temperature, and so does the infant good. If this be so, it will not be wise to check purgation under these circumstances, unless it be excessive. When however it is necessary to check diarrhœa in children, the measure selected must be in accordance with the indications. If the secretions are acid and sour to the smell, and are accompanied by griping, then magnesia in a fluid or solid form may be administered. If the diarrhœa is profuse and persistent, decoction of logwood is the best of all agents to select. Its taste is not unpleasant, its use is not accompanied by danger, and its chief drawback, its staining properties, is easily met by putting an old cloth of any kind under the chin when it is being administered. It is an advantage to combine it with chalk.

Sometimes it may be necessary to cut the gums, especially if convulsions are threatening. If the tooth is just emerging there may be no objection to this. But if the gum is swollen and congested over a tooth not yet at, or near the surface, such cutting is undesirable: the cicatrix resulting forms an obstacle to the tooth in the future; an obstacle not rarely sufficient to throw the tooth out of the straight line of growth. Probably a slight purgative given to the child, or to its nurse if still suckling, will relieve the congestion as well, or better, than the gum-lancet. We now know that every little divergence from ideal health does not call for immediate active interference.

When it becomes desirable to add some other food to the baby's milk a varied choice is offered. It is no part of my scheme to decide upon the merits of the numerous foods for infants with which the civilised world is flooded. Suffice it to say that, as well as hydrocarbons, a certain amount of nitrogen and a certain proportion of various salts are requisite. Flour, however prepared, is an improper food with water alone; a little meat-juice is better; but milk is the proper accompaniment. Milk should form a great portion of the dietary till the full growth is reached. Oatmeal porridge and milk is the best of all combinations for growing children, though of course it is not absolutely necessary to adhere to this exclusively. In the abandonment of such farinaceous food, and in the now prevalent dislike to fat, do we find the explanation of much of our modern disease. Imperfect evolution, degraded or arrested tissue-growth, and numerous others of the troubles belonging to the period of evolution take their origin in an erroneous and mischievous dietary. We now know distinctly that hydrocarbons play an important part in cell-formation and in tissue-building. They are not less necessary for perfect histogenesis than they are requisite for the maintenance of the body-heat and the manifestation of energy.

The aversion to fat, which is often the precursor of consumption—which leads to imperfect tissue formation, and thus to tubercle—is very often a foolish caprice and an ignorant prejudice; though doubtless at times it may arise independently of the will. If the inability to eat fat were successfully

opposed, many of those dangers of imperfect cell-growth might be avoided, which afterwards cause so much consternation, and subsequent contrition. When tubercle has once established itself, then there is resort to cod-liver oil—which after all is nothing more than the most digestible of fats—to medicine, a fixed dietary, and to numerous means which would have been much more effectual if adopted as preventive, rather than as remedial and restorative measures. Those very measures we adopt to restore tissue-growth to its pristine integrity are those which should have been used all along.

§ 63. The food of the child should be simple, and not such as to unduly incite the appetite. If a child is well it will usually eat sufficiently freely without any special temptation. In consequence of the demands of growth the digestive system is much exercised, and is a common source of trouble. There are passing fits of constipation, needing a gentle laxative, as manna, a fig, or a prune. There are periods of diarrhœa which may be treated as directed in the last section; but there is another form of diarrhœa than those given there which calls for its own special treatment. Here there is a certain amount of irritating material in the bowels, and the diarrhœa is an abortive attempt to get rid of the offending material.[1] In such cases castor-oil is the best of remedies. It may be given in the following formula taken from Ringer:—

Ol. Ricini, ʒ ss.
Mist. Acaciæ, ʒ iii.
Ol. Menthæ, ♏ iii.
Aquæ Distil. ʒ v.

This might be given in two doses at an interval of four hours. At other times children are liable to accumulations of bile, which generally pass away in "a sick fit." There is vomiting, soon bringing up bile, and then spontaneous purgation follows, which should not be rashly interfered with. Sometimes there is a sharp rise of temperature at the commencement of these attacks, as they are termed. In addition to these troubles

[1] The fluid poured out by the natural effort is often below the seat of the offending matter, and so fails to remove it. A purgative excites action above as well, and the irritant mass is then swept away. (Lauder Brunton.)

children are very apt to have attacks of acute indigestion, in which the temperature quickly rises to 105° Fahr. The very sharp rise, and its height, will generally distinguish these attacks from a commencing exanthem. An emetic, as Pulv. Ipecuc. gr. v., Cal. gr. iii., will often be found useful; after the vomiting spontaneous catharsis may come on; if it does not a few grains of jalap, scammony, &c., or a little senna may be given. It must be understood that in speaking of children here the term is meant to include the period of the second dentition, up to about ten or twelve. The dose mentioned here is adapted to an age of six or seven. If younger the dose must be lessened, if older a little more must be given.

In addition to the various ailments given above, and which are more or less found in every child, no matter how healthy, there is a form of fever known as infantile remittent fever (of old "worm fever") to which children are prone. In the morning, in slight cases, they are almost well, in the evening they are feverish. In more marked cases there may be one or two remissions each day. The old-fashioned plan of treating such pyretic conditions by acetate of ammonia, &c., is very far from satisfactory. Personally I have found quinine in a mineral acid give much more beneficial results:—

Quin. Sulph. gr. ½.
Ac. Hydrochlor. Dil. ℥iii.
Syr. Aurantii, ℥xx.
Aq. ad ℥ ii.

three or four times a day has produced very good effects.[1] In some children rapid growth produces febrile conditions with much *malaise*, but without the marked remission which characterises the last form of fever. Here mineral acids seem to give relief.

§ 64. The most marked characteristic of the acute diseases of children is the quickness with which they usually come and go. If however the child is feeble or weakly, acute disease commonly lays the foundation of a chronic ailment. In children

[1] In some cases "infantile remittent" is probably really a more or less masked attack of typhoid fever. At other times it is connected with rapid growth. I have known it to cease at once on the vomiting of a round worm.

where such mischief may be apprehended, the greatest care should be taken to see that the convalescence be not checked or interrupted. Fresh air, good milk, a little tonic, and then iron and cod-liver oil, must form the routine treatment of convalescence in such children.

There are some points of much importance about disease in children which may be alluded to here. The first is this. Children can often endure much, but if they get bronchitis it is very apt to be fatal. Bronchitis, which very rarely kills the healthy adult, is a very grave matter at the extremes of life. It is commonly fatal in weakly children, and it often severely tests the powers of strong children. In no ailment, which we are called upon to treat, is it so necessary for the practitioner to recognise the dangers ahead, and to learn to meet them. Milk, beef-tea, and wine have often to be given freely before there seems much need of them. If their administration be delayed till the hour of need arrives, it will be found to be too late for them to be of use. Very commonly the mother will be found to protest against such measures, as calculated to increase the fever, so she says; but she must be instructed to follow out the orders, and the result will usually confirm the view taken. In tea-fed children bronchitis is most fatal, and a whole family is sometimes swept away, one by one, by this malady.

Children are liable to acute colds and passing inflammations in consequence of their tendency to lose heat readily on the one hand, and their ignorance of how to guard against such loss on the other. Fashion, too, leaves the child often unprotected against the blasts to which it is exposed, and acts in utter defiance of the physiological fact that children lose heat rapidly. Here the very helplessness of the child is abused by those who ought to be its guardians and protectors. The plan of systematically "hardening" children is professedly abandoned; but it nevertheless obtains yet. It is certainly undesirable that children should be made artificially delicate and susceptible by the "coddling" plan; but the combination of this latter plan with insufficient clothing when out of doors, is very dangerous.

§ 65. The chronic affections of children are often very

serious, and are always very troublesome. One of the greatest evils which besets early life is the tendency to form tubercle. This form of perverted growth will be discussed further on, but a few words now are not out of place. This degraded form of cell-life is very common in childhood, and is chiefly found in the bowels and in the brain. In the latter it gives rise to hydrocephalus (tubercular meningitis). As such it is very swiftly fatal. As however tubercular meningitis (hydrochephalus) is not always to be distinguished from simple meningitis, it is as well to treat each case as possibly tubercular, and the best remedial combination is that of iodide and bromide of potassium in full doses several times a day. Counter-irritation to the head has its advocates. When the tubercle is in the bowels and peritoneum, the disease is lingering and troublesome. Astringent mixtures, milk, iron, iodide of iron, &c., are all indicated from time to time, according to the varying phases of the case.

At other times there is softening of the osseous system, known as rickets. This may extend from mere curvature of the spine, especially if the child be borne almost exclusively in one arm of the mother, up to the advanced condition vividly pictured by Sir William Jenner:—"It is strange to see a little child sitting placidly on the bed, without moving, for hours together,—its legs placed so as to escape pressure, its spine bowed, its head thrown backward, the chief weight of its body cast on its arms; and to know that, notwithstanding the apparent calm, the tiny thing is indeed fighting the battle of life; for it is striving, with all the energy it has, to keep in constant action every one of its muscles of inspiration—endeavouring so to supply the mechanical defects of its respiratory apparatus, due to the softening of the ribs. It wants no toys. It is the best of children if you only leave it alone; move it, and you inflict pain on its tender frame; show it the horse or the doll that was once its delight, and it turns away its head or stares vacantly: to notice would divert its attention too much from the performance of those respiratory movements which are essential to its existence." In its most aggravated form rickets is an intractable affection; but in the less marked cases much may be done by phosphate of lime (10 grains ter

indie), or syrup of phosphate of iron and lime ʒ ss. (Parrish's), together with milk, fresh air, and salt water spongings.

Marasmus, or simple wasting from mal-nutrition, is a common affection, and the wasted, old, and even wizened faces of the unfortunate babies have a weird look about them. There is often too an unnatural calm about them which is very appalling. They rarely benefit much by medicines given by the mouth, but they often improve surprisingly by inunctions of olive or neat's-foot oil. The child should be stripped before the fire and a table-spoonful, or two, of oil should be well rubbed into its skin with the hand. This should be done twice a day. After the child has begun to improve the syrup of phosphate of iron and cod-liver oil may be administered with advantage. If olive-oil be not easily procurable other fats may be used. Wasting with green stools is often the result of too prolonged suckling. Here the child should be weaned, and iron and cod-liver oil given as above; when it usually rapidly improves.

At other times syphilis interferes with healthy evolution, and manifests itself in numerous and widely different forms. In skin eruptions, ulcerations, deformity of the nasal bones or of the forehead, in internal diseases, in anæmia, or arrested evolution, the inherited taint manifests its baneful influence. It is common to treat such cases with iodide of potassium; but my personal preferences are in favour of a course of mercury combined with iron, as follows:—

Liq. Hyd. Bichlor. ℥xv.
Tinct. Fer. Perchlor. ℥iii.
Aquæ ʒ ii. ter in die.

Given after meals, this combination secures all the good effects of mercury, and yet obviates its evil effects upon the system. The iron and good, nutritious food counteract the lowering and destructive action of the mercury, while it engages the syphilis and destroys the taint—whatever it may be.

Of all the diathetic affections of childhood perhaps struma is the worst misfortune. As scrofula, or king's evil, it was supposed to require the royal touch, and great was the discussion as to whether William the Third possessed the power to heal it, or not. But now we have abandoned all such figments, and

have set to work, under the combined lights of pathology and experience, to combat the perverted nutrition which we recognize as the visible sign of the strumous diathesis. Our fairest child—the little piquant precocious fairy, whose pretty imperiousness compels all to yield to her caprices, with open eyes and long eyelashes, the family pet—is usually not a perfectly healthy organism; any more than is the bright creature whose neck becomes furrowed with the cicatrices of scrofulous ulceration. The intelligent, active boy who comes home one day from school with a limp, complaining of his knee, and who after long suffering we find at the seaside crippled for life with hip-joint disease, is another illustration of strumous taint. The full-lipped pink and white countenance, with a certain fulness of the alæ of the nose, often so attractive, especially when combined with high intelligence, is also a modification of struma. So also are the marked features, earthy complexion, and dense, straight or highly-arched black eyebrows, which often give such character to a face. When black-haired or red-haired persons once develop tubercle they usually go very rapidly; much faster than the brown-haired, or even than blondes.

In early childhood this taint frequently shows itself in thickening of the epiphyses and fulness of the joints. Often this thickening is regarded as evidence of wonderful physical power in the future, and the child is said to be "double-jointed;" but this is an utter mistake. A little latter the taint shows itself in precocity, and the child is a prodigy of cleverness and learning. This may be; but it is only, after all, another evidence of struma. It may grow very beautiful, and from love of praise very good—"too good for this world." At puberty, in those that survive, there is often rapid growth, which commonly terminates in consumption. When adolescence merges into adult life the character of precocity remains; but, though quick, the person is too often superficial. These persons are generally anxious to become parents; but they are not quite justified in their self-elected task. Their families are often large, but individually their offspring are weak and delicate. Such persons form a large portion of mediocrity and of society, but they are far from ideal types of physical development.

This brief sketch will perhaps aid the reader to detect the

strumous diathesis in its finer shades. It is easily diagnosed in its grosser manifestations. When diagnosed it requires a distinct line of treatment. First of all the secretions and excretions must be attended to. The bowels are apt to be sluggish or irregular, the liver does not always do its work, but suffers from passing derangements: both of these must be attended to and regulated—but the less mercury used the better. There is also a constant tendency to acidity, which requires lime-water, seltzer, or Vichy; the first is best adapted to infants, the latter for growing children. The perspiration is often acid and the urine contains quantities of lithates, or even uric acid. The men of past generations, Brandish and Lugol, found potash the best remedy for the relief of strumous affections. They observed that it possessed no truly curative action; but it gave relief. The effect of fresh air upon strumous children is well-known. Doubtless it favours the combustion of the imperfectly oxidised products with which the system is laden. But in fresh air and potash we find only aids to improvement, the excessive formation of acid finds its causation in faulty assimilation. Dr. Broadbent, in a sentence full of suggestive thought, says, "When, therefore, we examine the excretions for the products of combustion, and thence draw conclusions as to the completeness of the process, it must be remembered that the more or less perfect oxidation may depend upon the more or less perfect antecedent nutrition, and not merely on the supply of oxygen, or any immediate influence on destructive metamorphosis. Thus, the uric acid which forms the urinary excretion of birds whose habits are active and temperature high, and whose blood is highly oxygenated, cannot arise from insufficient supply of oxygen, but must depend upon some peculiarity in their tissues; so also in man, uric acid may be the effect of defective nutrition or primary assimilation, and not merely of imperfect metamorphosis or oxidation. The clinical history of the so-called uric acid diathesis supports this view, and shows that the remedy in many cases must be sought, not in the promotion of the oxidation, but in modification of the nutritive processes." From this view it is impossible to dissent, and in the pathology of the ailment we find a direction given to our treatment. The alkalies we administer may be

given with advantage in vegetable-bitters, or aromatic-bitters. To these may be added at times some potassio-tartrate of iron. When the assimilation of food is imperfect and ordinary fats are refused, cod-liver oil may be given, and if that disagrees, or if the patients think it too commonplace, cream may be given; and for the latter class cream and maraschino form a capital combination. The bowels also should be attended to, and the skin kept in action by baths, with or without sea-salt. Such persons should be much in the open air. Their holidays should be spent at the seaside in some far-away, but bracing nook. Their schoolrooms should be airy and well-ventilated. Their hours of study should not be long. In fact they should be discouraged from study, and any temporary lagging behind will usually be readily made up; after the physique has been improved, and thus the brain better sustained by an invigorated nutrition, the progress will be more rapid and yet more thorough. In persons of this diathesis an active brain is often let down by its association with a defective and easily-exhausted physique.

So much for the general indications as to the requirements and necessities of growth. The different pyretic affections to which youth is liable, and especially the exanthems, will be given in a subsequent chapter (IX).

DECAY.

§ 66. From the attainment of maturity the organism maintains itself for many years in its integrity without much alteration, unless it be some increase in weight. But in time there commences a series of changes known as senile decay. Such changes are easily recognized in the very old, whether old in years or physiologically old, but they are commonly overlooked until their existence is almost forced upon the attention of the observer. This is unfortunate, as it is often a matter of great moment, in the recognition of the true state of a case, to be able to detect the early evidences of impending decay. The process is normally a slow one, and consequently the first changes must be insidious and occult. Not only that, but they will usually be very slowly developed. This however forms no reason why these changes should be over-

looked, and thus their significance be omitted from our estimate. Many people too, even medical men, have irrational notions about their health and their tissues. The idea that there may be commencing atheroma in their blood-vessels, that there is a commencing hypertrophy of the heart, or that their kidneys are no longer in their integrity, is sufficient not only to perturb them, but to set them to work at once to prove, at least to their own satisfaction, that they are free from anything of the kind. They quickly persuade themselves that their tissues are perfectly healthy, and that they are free from the slightest taint of commencing decay. If it were merely a subject of self-satisfaction to the individual it would matter little; but unfortunately such attitude and conduct stand in the very way of a proper comprehension of the slow and gradual progress of some chronic changes. These prejudices foster ignorance; and that ignorance often assumes an aggressive character.

Long before they obtrude themselves upon the vision of the unwilling observer there are instituted changes which mark the oncome of age. The hair commences to frost, or to fall off, and loses its lustre. The skin becomes dry, and no longer glistens with the glow normal to youth. The frame loses its elasticity, and the step is no longer springy. The gait is stiff; the motions are slower. The mind is not so quick in its operations, and no longer learns so readily; it has lost much of its apprehensiveness. Names, words, dates, and other matters which do not lie in the direct path of associations, are elusive and not readily recalled. The residua are still in the cerebral cells, but they are not so readily communicated with as of yore. The thought is not so nimble, though it is more deliberative and accurate in its processes,—at least in the early stages. The secretions are less active, and a foul odour of the breath tells that excretion is no longer so perfect as it used to be. There is also a tendency to rheums from the different mucous surfaces. The bowels are sluggish, and there is a marked inclination to accumulate fæces in the intestinal canal, together with torpor in the muscular fibre of the gut. The flow of urine is often increased —except where there is disease of the heart; but it is either of low specific gravity, or, at other times, laden with lithates, indicating imperfect oxidation. There are, too, troubles in

connection with the making of water. There is an increased susceptibility to the natural calls, while these latter cause greater urgency, so that it is no longer possible to evade complying with them. This vesical irritability is a great source of annoyance to elderly people, and harasses them at public gatherings, or when travelling, &c. It is commonly associated with enlargement of the middle lobe of the prostate gland. This forms an obstruction to the complete emptying of the bladder; never empty, it soon fills to the point of creating a call to void its contents. And that call must be attended to at once, it cannot be restrained! The circulation is no longer so perfect, and effort produces dyspnœa, or shortness of breath, on slight exertion. The costal cartilages ossify, and the movements of the thorax are impaired. There is a tendency to emphysema from the violent efforts made at times, especially if there be a certain amount of chronic thickening about the bronchial tubes. There is frequently a great tendency towards an abnormally profuse secretion from the air tubes, not always of an inflammatory, but sometimes of a degenerative character. It is not bronchitis, but one of the rheums of age. There is also a flow from the lining membranes of the nasal cavities.

The whole of the tissues are modified, and so is their functional activity. The hand is tremulous, and highly co-ordinated movements are being gradually impaired, so that the hand and fingers fumble where they used to act almost unconsciously. The application of the attention is requisite for movements which were once almost intuitive. A long and tedious process is required to recall what at one time almost leapt upon the consciousness, so quick the act of memory. A careful inspection of a microscopic section of an aged brain shows that the spur-like processes of the cerebral cells, which once formed a sort of interlacement, are worn through, and the cerebral cell is rounded and club-shaped—its residua remain to each cell, but the communicating lines no longer exist; and so the residua can no longer be communicated with—in other words, the memory fails, and then ultimately is lost. The muscles lose their plumpness, become lax and lose their power. The viscera are sluggish and inactive, and lesser matters serve to disturb them than has hitherto been the case. There is a lessened power to withstand

disturbing influences; the loss of heat is more easily induced, and the intolerance of a low temperature is pronounced. In this last the old person once more resembles the child. There is a gradual tendency to sleep more and more, and the short hours of sleep which characterize middle age merge insensibly into longer and longer hours, till the hours of sleep once more exceed the waking hours. The petulance of childhood is again approached, and elderly persons brook control little better than a child. The appetite is impaired, and is often capricious. The power to digest large quantities of animal food varies, and in place of underdone meat well-cooked animal food is preferred. At last meat is little craved after, and milk-puddings, bread and butter, and the non-nitrogenized diet of early days are again the staple food. The waning brain-power no longer desires the stimulating nitrogen to spur its lagging action. The prattling child becomes once more the most highly appreciated companion; and garrulous age loves to pour into uncritical youthful ears long tales of a far by-past time. In habits, thoughts, taste, food, in the obsolescence of the sexual passion, age approaches youth. The process of evolution has given place to a reversed action, or involution. The higher processes, which are slowly developed and are to a large extent outcomes of training and education, gradually fade out, and lose their controlling power,—the last to develop and the first to go; and the most vivid and enduring impressions of the doting brain are the experience of its early days, the impressions of childhood.

§ 67. This brief sketch of the changes of age will enable the reader to comprehend, more clearly, the indications for treatment in the ailments of advanced life. It is obvious that the aged frame is unequal to anything approaching heroic treatment. The defects in functional activity require to be met by a steady and persistent medication, rather than some sudden active effect upon the sluggish organs. It is no longer desirable to purge actively, except in emergencies; but the bowels must be regulated so as to keep them acting from day to day. Warm aloetic purgations, or confection of senna, are the laxatives best suited to the aged. If salines are taken it must be in combination with such vegetable allies and carminatives. All straining at stool is to be deprecated, as putting stress upon organs no

longer fitted to bear it with impunity. The blood-vessels are more or less rigid tubes, and any strain upon them is apt to produce rupture. The structures of the heart are no longer in their pristine integrity, and are undermined by fatty degeneration or molecular necrosis; consequently they are unequal to effort, and straining at stool is not rarely followed by cessation of the heart's action. There is induced either rupture of an atheromatous artery from the heart being comparatively too strong, or the structurally decayed heart stops in an imperfect attempt to overcome the resistance offered to its contraction—unequal to forcing its contents into the altered arterial system. Many salines are too depressant to the heart to be given alone, and if it be desirable to administer potash it should be given with squill, digitalis, or belladonna. The stomach is unequal to the work of digesting a large meal, so that food should be given in small quantities and not at long intervals. It should be so prepared that it will require little or no mastication. The taste for highly-spiced foods is gradually diminished, and the food may be plain in character, as well as simple and easily digestible, with advantage. As to drinks—tea, coffee, and cocoa are all suitable; but alcohol in some form is usually the best fluid. It furnishes a readily available food, it is an easily oxidised carbo-hydrate. It is stimulating and refreshing.[1] It gives a fillip to the digestive organs, and by increasing the vascularity of the stomach, aids it in its solvent and digestive action. It prevents the spasms, or colic to which elderly people are very liable. It feeds the starving brain, and once more gives it sensations of well-being, and enables it to work pleasantly. All this too is accompanied by little fear of its becoming a tyrant, or of its use being converted into an abuse. "Wine is the milk of the aged," is a Rhineland proverb; and there is much truth in the statement. Its stimulant effect is less seen in the aged, while its qualities as a food become more prominent. It forms an excellent hypnotic; and some alcohol and hot water, with some sugar, forms a famous "nightcap" for elderly persons when getting into bed. They are apt to be chilled from the slowness of their movements in undressing, and when they get into a cold bed the vessels of the skin are chilled and contract, and,

[1] Chambers's *Manual of Diet*, chap. x. "The Decline of Life."

not readily dilating again, the sleep is broken, imperfect, and unrefreshing. Consequently the bed should be aired, the room should be warmed by a fire lighted some hours previously, and the loss of heat should be met by a draught of warm fluid containing alcohol, &c., on getting into bed. The alcohol is quickly burnt, giving heat; it dilates the vessels, and produces sleep of a refreshing character. It is obvious that the loss of heat by the dilated cutaneous vessels must be met by good bed-clothes, else the alcohol may do more harm than good. At other times old persons prefer beef-tea or Liebig's extract. This is a pleasant stimulant, but it is inferior to alcohol as a food, and should be combined with some force-bearing food, as starch, in the form of sago, arrowroot, corn-flour, or biscuit-powder. In the case of the aged teetotaller a cupful of this last combination, hot, and if necessary spiced, could be administered on getting into bed, if the sleep be broken and fitful. Or a cupful of hot milk might be given. It is as well always to respect the prejudices and convictions of patients; and many people have their opinions upon alcohol with which it is not well to war.

It has been said before that elderly persons easily lose heat. Their clothes should be warm, comfortable, and unirritating. With old people comfort usually takes preference of appearance: though such is not invariably the case. There should always be flannel worn next the skin, from the neck to the wrists and ankles. These flannels should not be worn too many days consecutively, as the cutaneous excretion of aged persons is apt to become offensive. The clothes of the old should always be well-aired ere being put on. Their shoes, too, should be lined with fur or flannel. Their rooms should be comfortably warm; and they should not be permitted to catch cold in draughty, cold water-closets, or other conveniences. In such exposure, or in conducting their devotions in a state of partial nudity in cold bedrooms, do we find the origin of much of the illness of elderly people. Age is tenacious of habit; and in some cases the old are more easily managed if induced to adopt changes by some cajolement rather than by direct opposition. It is not possible to override the caprices of the aged, as can be done in case of the fancies of children. Their age entitles them to respectful treatment. Their waning power

however calls for our attention; which must be well directed and cautiously exhibited. There is no part of medicine, as an art, which better tests the natural powers, and the educational cultivation, of a medical man than his capacity to successfully meet the requirements of elderly patients. In each and every patient the skilful and enthusiastic practitioner will find a problem well worth his while to unravel and to thoroughly comprehend, and this is especially true of disease in advanced life; where every case will be found to have its own peculiarities, and to possess its own individual indications and necessities.

§ 68. As well as the clinical indications furnished to us by the extremes of life, there are other matters, connected with growth and decay, which deserve our attention. The consideration of them will enlighten us as to peculiarities in each case which are well worthy of our thought: and intelligent attention to these peculiarities will strengthen our hands as practitioners.

In youth we find that growth is active. The vascular system furnishes free supplies of pabulum, and the power of self-enlargement of each tissue is decided. When developed by exercise, or the demands of growth are active, each part attracts to it blood in free quantity. By what peculiar power the tissues do this we do not yet exactly know. So far as our knowledge extends, something like the following is shadowed out. There is not only a vascular supply to each part of the body, but there is also a nervous supply. This nervous supply is something more than the mere afferent and efferent nerves known as motor and sentient nerves. It consists of nerve fibres which are connected with tissue nutrition. These fibres are not the vaso-motor of blood-vessels which contract the vessel, and whose section is followed by *dilatation* of the distal vessels, as Claude Bernard found to follow section of the sympathetic in the neck. They are antagonistic in action to the vaso-motor nerves, so they are termed vaso-inhibitory, or otherwise trophic nerves. When J. Hutchinson's well-known case of ulceration of the little finger, from a cut involving the ulnar nerve but not the ulnar artery, was published, it gave rise to much thought. There is every reason to believe that that ulceration took its origin in lack of nerve supply, and not in any defect in the blood-vessels. But how did

this lack of nutrition come about? Schiff, Claude Bernard, Rutherford, Goltz, and others have indicated that there are nerve fibrils, belonging to blood-vessels, which are cerebro-spinal in all probability, and which produce active dilatation of vessels. When then the ulnar nerve was cut these fibrils were severed, and so the vaso-motor nerves, no longer held in check, contracted the blood-vessels, and then followed loss of temperature and molecular death. In a case of Mr. Hilton's, where a mass pressing on a nerve produced peripheral ulceration, bandaging the hand, so that the mass no longer pressed upon the nerve, led to the healing process being inaugurated. It is difficult to conceive how this could be if there were not trophic fibres in nerve trunks. Disorganization of the corneæ follows section of the fifth nerve if the least exciting cause of disturbance is in action. Disorganization of the lungs follows section of both vagi, but not of one. If a rabbit's head be cut off and the secreting fibres of the seventh pair irritated, the parotid will secrete fluid freely; and yet there is no possible increase of vascularity here. The secretion of course is limited to the fluid in store in the lymph-spaces of the glandular apparatus. We are only just beginning to see that nutrition is associated with something more than mere vascular supply; but it is not yet possible to be more precise. The trophic nerves are in all probability efferent nerves to the parts with which they are associated. Irritation of them produces increased vascularity of the areas with which the nerves are connected, and a diminution of calibre of the rest of the blood-vessels of the body. This latter increases the general blood-pressure, and sends the blood with greater force into the hyper-vascular area. The synthesis we may construct is possibly this. The relations of tissues to their trophic nerves is such that when much exercised, or when growing rapidly, the trophic or vaso-inhibitory nerves are put in action, and thus growth is rendered possible by a freer blood-supply. That such trophic fibrils are usually part of motor nerves suggests that as the activity is great in the motor nerves going to the part, so is the activity of the trophic fibrils of that motor nerve, and thus increased nutrition goes to functionally active muscular fibre. Thus we have the hypertrophy of the arm of the smith and the leg of the dancer. In

the same way paralysed parts waste. There is no motor activity leading to nutrition; and the palsied tissue wastes. It may even disappear, as in the essential paralysis of childhood. In this last instance the application of electricity to the palsied muscles, and so the exciting of action, is followed by nutrition and the maintenance of structural integrity in the paralysed muscles. Muscles waste in a limb after fracture. Here the nerve currents are not broken, only the muscles are kept passive, and so the relations existing normally betwixt acting muscle and its trophic nerves are disturbed. After the full stature of the individual is reached nutrition still goes on, and the frame becomes well "set," broad, muscular, and fully developed.[1]

This condition is maintained for some years; and then it yields to a gradual deterioration known as senile decay.

§ 69. The most familiar of all forms of textural decay is that known as "fatty degeneration." It is sometimes regarded as a species of atrophy: it is certainly a form of histolysis. Chemically it is allied to the formation of adipocere. It is sometimes a normal action. It is a part of the process of involution undergone by the uterus after parturition. It is found in paralysed limbs. It is equally common in the quiescent muscles of a limb whose bone has been fractured. Erroneous impressions

[1] Dr. Clifford Allbutt makes some very interesting remarks on the relation of nervous influence to nutrition in a paper in the *Practitioner*, for Nov. 1874. "We began to learn of trophic nerves, and at the present time we are tempted to explain that all tissues are but elaborated nerve-endings. Be this as it may, we have learnt that in the higher animals nerve changes constantly precede changes of other tissues, not only in normal function and in normal growth, but also in abnormal function and abnormal growth. Perhaps there is no more striking instance of the results of withdrawing nervous influence from the tissues than the case of nerving for navicular disease. The section of the nerve in the horse is followed, not by insensibility alone, but by a change in the nutrition of the skin known as the hoof. The nutrition of the hoof is so far deteriorated that in nerved horses the hoof, if submitted to any unusual strain, is not uncommonly dragged off the foot, and the horse will go forward upon the bared stump unconscious of pain. If the hoof should not be shod and the nerving be effectual, the whole of the tissues of the fetlock and foot below the section degenerate; they lose their definite structural characters, they become puffy and friable, and ultimately losing their histological features and their tenacity, pass into a quasi-gelatinous condition. Such are the effects of cutting off all nerve supply from a set of tissues: and other instances might be adduced to illustrate the effects of a partial withdrawal of nerve influence in deteriorating, or of irritation of nerves in preventing the growth and nutrition of tissues."

have existed about it. It has been confounded with fatty infiltration into the connective tissue betwixt muscular fibrillæ, and been supposed to have something to do with general obesity. Nothing could be farther from the mark. Extreme leanness confers no more immunity from fatty degeneration than does obesity incline to it. It has nothing whatever to do with corpulence. It is a form of structural decay which, according to Rindfleisch, commences in the germinal matter of muscle, and then extends throughout the formed material. It consists of the fat of the dissolved albuminous tissues. If this were removed by oxidation, and new pabulum freely furnished, possibly the muscles would recover their pristine condition; in the same way that they recover from the degeneration found in them after sustained pyrexia. (§ 39.) Certain it is, this degeneration is recovered from in the muscles of a fractured limb, and also in those associated with a paralysed part. Hammond says that the degeneration is progressive in the palsied muscles of organic infantile paralysis, and gives exquisite drawings of the gradual structural decay. He also gives the improvement in the condition of the structures in a case where recovery took place. In ordinary cases, where no cure is achieved, the muscle becomes ultimately a piece of connective tissue, after the oil globules of the decayed muscular fibre are absorbed. The reader should take the earliest opportunity of consulting Dr. Hammond's book, *Diseases of the Nervous System*, Chapter, "Atrophy and Disappearance of Motor and Trophic Nerve-Cells. Organic Infantile Paralysis."

There is little to be learnt therapeutically from the pathology of fatty degeneration, or tissue-necrosis, except the negative lesson of the futility of attempting to arrest it by mere nutrition in the form of food, and especially in an abstinence from fat. The idea that cutting off the fat would arrest fatty degeneration was founded on the old notions as to its pathology. It may possibly be useful in checking the amount of fat in the blood, and so leaving the oxygen free to prey upon the degenerate tissues. But even for this removal of the old effete matter to achieve any good in the end, the capacity for improved nutrition must still remain. Where a limb is paralysed galvanism or electricity may keep the muscular structure in its integrity, or something

near it; and a similar plan is useful in infantile paralysis. But of the means of arresting fatty degeneration, especially in the terrible form of fatty degeneration of the walls of the heart, we know nothing. How it comes, and what are its causal relations and its pathological associations, will be discussed in Chapter XIV., which relates to the vascular system.

At the same time we must admit that it seems possible that in certain cases something may be done for fatty degeneration. These cases are of this kind. After a long debauch, where the blood has been constantly saturated with the readily oxidizable alcohol, and the respired oxygen has been engaged with the alcohol, a certain amount of fatty necrosis of muscular fibre may remain, and prevent the growth of new tissue. The persistence of urea in the urine would indicate the splitting up of albuminous bodies, the hydro-carbonaceous portions either remaining as fat or being burnt off. But it would be very difficult to detect the presence of such unoxidized products in any tissue; and the possibility of procuring its removal by a diet highly nitrogenized and sparingly hydro-carbonaceous is at least hypothetical, and should never lull any one into a false sense of security about fatty degeneration of the heart.

§ 70. Rheums, or simple fluxes from mucous membranes, are far from uncommon in aged persons. They are associated with the processes known as general decay. They may occur in any mucous membrane, either in the bladder or from the bowels, but they are especially frequently found in the lining membrane of the respiratory tract. The fluid is thin, and devoid of acrid qualities. It forms the drop so commonly seen on the tip of the nose of aged persons, especially in cold weather. That it should appear during low temperatures rather than high ones, is probably due to the effect of cold air in increasing the vascularity of the respiratory tract, leading to the better warming of the inspired air. The local hyperæmia induces it. At the same time it is usually associated with fulness of the venous radicles. In other old persons there is a free secretion from the bronchial tubes, which is not to be regarded as of an inflammatory character, or termed bronchitis, so much as bronchorrhœa. It is usually associated with a failing circulation and venous fulness. By some writers such rheum has been regarded as

a degenerative change, and so it can be viewed. It is a degraded condition of the mucous membrane, commonly associated with a languid circulation. It is a matter of much question how far astringents, or expectorants, do much good in such cases. Squill often is useful; probably from its action on the circulation. In such cases the following formula would at least be pleasant to the palate, and probably of some use to the patient as well:—

Sp. Chloroformi ℥xx.
Ac. Hydrochlor. Dil. ℥vi.
Syr. Scillæ ʒ i.
Aq. ad ℥ i. ter in die.

If the pulse is failing or irregular, to this may be added a few drops of tincture of digitalis. In the acute bronchial catarrhs of very old persons, which much resemble bronchitis, such mixture is often of great service.

Where astringents can be applied locally to rheum-producing surfaces, they may be so applied, and may consist of vegetable or mineral astringents. Especially is this the case in rheums from the intestine. But in all rheums the condition of the venous radicles and the circulation generally must be entertained in relation to the choice and selection of palliative measures.

(Atrophy will be discussed under the heading of "Chronic Disease," Chapter X.)

CHAPTER VIII.

ABNORMAL GROWTHS.

§ 71. PATHOLOGY, simply as pathology and as devoid of practical therapeutic interest, is no part of the scheme of this work. Consequently in treating of abnormal growths there is no attempt made to go into recondite morbid anatomy. If the reader desire to do that he will find the work of Rindfleisch, translated by the Sydenham Society, such a book as he wishes. Here pathological developments will be entertained simply from a clinical point of view, and only that amount of pathological anatomy will be lent to the subject which is absolutely demanded for something like a fair comprehension of the matter.

In the first place, we are not acquainted with truly heteromorphic growths, unless indeed tubercle be such, though it is to be regarded rather as degraded connective tissue. Even the forms of cancer, which seem so far removed from anything with which we are ordinarily acquainted, are found only to be heterotopic, or heterochronic; that is, out of place, or out of time. It is a matter of considerable importance to have definite ideas about abnormal growths. They were most erroneously regarded prior to the time of careful histological investigation.

Hypertrophy.—Hypertrophy, or hyperplasia, is common in many textures, but it is with hypertrophy in muscular fibre that we are chiefly therapeutically interested. Excessive growth or hypertrophy of organs is a term rather indefinitely used. It is alike applied to epidermal thickenings on a workman's hands, to enlarged cerebral cells, to the increased bulk of one kidney

or one lung, when the other has been disabled, as well as to the highly developed state of muscles due to excessive work. It has been variously regarded as a harmless overgrowth, a disease, and finally and more truly, as compensatory growth. There was a time, not very far distant, when hypertrophy of the heart was energetically assailed as a disease *per se*. Hypertrophy was a disease, an excessive growth, and palpitation, its objective symptom, was over-action. How erroneous such views are we shall shortly see. Remains of such obsolete impressions still linger in many of our text-books. They are the *vestigia* of past thought, interesting from a retrospective point of view. They have been preserved however, as much from indolence as from any conservatism in the minds of the writers. Their present use is to indicate the line of our progress in knowledge.

Hypertrophy of muscular fibre is a thickening of already existing fibres; probably by multiplication in number rather than an increase in bulk of the fibrillæ. The consequence is an augmentation of volume in the hypertrophied part. Such augmentation in bulk we have just seen in the last chapter to be a complex result of functional activity and increased supply of arterial blood, linked together by some subtle nervous action. Thus we find that there is hypertrophy of the bladder, or rather of its muscular fibres, when a stricture, or an enlarged prostate offers an obstruction to the flow of the urine from the bladder. A similar development of muscular fibre takes place in the large intestine when a stricture in the bowel forms an obstacle to the forward progress of the fæces. There is no difference whatever betwixt such hypertrophy, such growth, and the enlargement of the ventricular chambers of the heart when the orifice, or ostium, through which such chamber expels its contents forwards, is narrowed, or partially closed, by valvulitis glueing together the free edges of the semilunar valves. After impregnation the uterine growth is a mere development of fibres already existing in an embryonic form in the virgin uterus. After impregnation they grow and become, according to Kölliker, from twice to five times as thick, and from seven to eleven times as long as they are in their primitive state. In the case of the development of the muscular fibres in the bladder and in the bowel, to overcome an obstruction in front, no one

would call the growth a disease. And yet a precisely identical growth in the heart has been regarded as a morbid process. Not only that, but it has been thought to require remedial measures. When the aortic orifice is narrowed, and aortic stenosis exists, the walls of the left ventricle grow in thickness, and the effect of such growth is an accession of power, until the ventricle can once more drive an equal quantity of blood in an equal space of time through the narrowed orifice. It is obvious that such a result could only be obtained by an increase in the driving-power. That driving-power is the muscular wall of the heart, and by hypertrophy of it alone could such compensation be secured. And yet such compensatory growth has been denominated disease! (See § 68.)

In the same way the enlargement of the left ventricle in aortic regurgitation has been regarded as a morbid process. But what are the real facts of the case? When the aortic valves are no longer competent, and a thin stream of blood is driven backwards through the imperfect valves, and that too forcibly from the recoil of the elastic aorta, the muscular chamber is subjected to an unwonted distending force. The effect of such increase in the distending force to which the ventricle is now subjected would be to dilate it immoderately, if hypertrophy of the muscular wall did not come in to arrest the dilating process. Under such circumstances do we find the most marked hypertrophy of the heart, the *cor bovinum*. So susceptible to any distending force is the muscular chamber known as the left ventricle, that enlargement of it takes place very commonly in mitral regurgitation. Here the blood is driven in with abnormal force from the gorged pulmonary veins (and the hypertrophied right ventricle behind them), and the left ventricle becomes delated—unless the dilating process be stayed by muscular growth. Hypertrophy's arresting hand alone can limit the dilating action. Here we have hypertrophy to arrest distention: that is clear enough. When the ventricular chamber enlarges from inability to expel all its contents, whether this arise from debility in itself or some increased obstruction now offered to its contraction by a heightened blood-pressure in the arteries, dilatation is checked by hypertrophic growth. When a hypertrophied heart is being undermined by

structural decay, or fatty degeneration, dilatation sets in. Hypertrophy has arrested the dilating action, but, when it is itself cut down in time, the dilating process is again inaugurated, and progresses without further check. Dilatation and hypertrophy are more closely linked together, and withal are much more intelligible so linked, than when treated as separate processes. There is no deep mystery about them. When there is disturbance in the equilibrium existing betwixt the driving-power of the heart and the work it has to perform, the ventricular contraction is incomplete. A small quantity of blood is left unexpelled and remains in the ventricular chamber. At the same time the blood is coming in from the pulmonic circulation, and the consequence is the ventricle yields, or becomes dilated—unless hypertrophic growth enables the chamber to contract completely and thoroughly expel its contents. In systems of imperfect reparative power dilatation becomes established under the very identical circumstances which evoke hypertrophy in others of better reparative capacity. The causation of hypertrophy and dilatation is the same; the presence of one or other indicates the capacities of the organism. Consequently we have dilatation at the commencement and at the end of the hypertrophy. The two conditions are so intimately blended, and developed in such varying proportions in different cases, that sometimes the dilatation in one case, and the hypertrophy in another case, may be scarcely, if at all, discernible.[1] Also when hypertrophy is wearing out and being undermined by molecular necrosis, dilatation recommences, and can never again be arrested. The true and just diagnosis of the different elements of the particular stage of the case, where there are found hypertrophy of the heart walls, with dilatation, is a matter of the greatest moment in prognosis. It is no unimportant matter therapeutically. If it be a mixed case where dilatation is being arrested by hypertrophy, the case has within it elements of promise. But if, on the other hand, it be a case where old standing hypertrophy is yielding, and dilatation is a matter rendered possible by structural decay, then the patient is going down hill hopelessly, and usually swiftly, and no power

[1] These views are given at length in an article on Hypertrophy and Dilatation.—*British Medical Journal*, 1872, first half year, p. 236.

other than supernatural can arrest the downward progress of the case.

It is perfectly obvious to all thinking minds that hypertrophy of the muscular walls of the heart, bowel, or bladder must not be regarded as a morbid process. That it may have some consequential outcomes not altgether beneficial is possible enough. Unalloyed good is not to be sought in the domains of pathological anatomy. Supposing that it were possible to remove this hypertrophy by any remedial measures whatsoever, what substitute for it could man devise? If it were possible to undo the compensatory growth, what good would have been achieved? The worst cases are those where the hypertrophy is imperfect; not those where it is well marked. Without the tissue-growth the case would go wrong forthwith; the hypertrophy is the saving of the system. The only rational method of affecting the hypertrophy is to strike at its causation. If it is practicable to do away with the exciting cause, the hypertrophy would pass away, just as does the hypertrophy of the left ventricle of pregnancy after parturition. Unfortunately, however, it is but rarely possible to reach the originating cause, and so the hypertrophy remains—fortunately not to be done away with by any therapeutic measure. If the attempts to reduce hypertrophy were successful the patient would have little room for gratitude to his ill-advised and mischievous medical attendant. Many cases of such reduction of cardiac hypertrophy have been recorded, and still figure in some works which are not yet obsolete. It is recorded that the late Dr. Elliotson announced to his class upon one occasion the successful treatment of two cases of cardiac hypertrophy by iodide of potassium, with such emotional disturbance as brought tears to his eyes. I do not sneer at the doctor's enthusiasm, but honour and respect it. He was simply mistaken. Simple hypertrophy of the heart, without any valvular disease, is almost invariably connected with the presence of nitrogenized waste in excess in the blood. A spare diet of slops and full doses of iodide of potassium would strike directly at the cause of the high arterial tension, and, by restoring the blood to its normal quality, relieve the vascular system, and with it the chief evidences of hypertrophy. But not the hypertrophy itself; at least, not directly.

The recognition of hypertrophy in a heart moderately enlarged and working quietly and steadily, and well covered by lung, is not by any means an easy diagnostic feat. This is a very different matter from the excited action of a hypertrophied heart not quite equal to its work. A well-known authority on the heart writes: "For my own part, I have never known the cure of indubitable hypertrophy proved by physical signs, and hold it unwise to promise any such result from treatment." (Walshe.) Instead, indeed, of attempting to do away with hypertrophy, it is our business to do our very best to conserve it. By good food, iron, digitalis, and, if necessary, cod-liver oil, must we strive to prevent its dissolution. By similar measures, indeed, do we hope to inaugurate it where the system is unequal to instituting it. Its treatment lies in the removal of its originating cause. In cases of hypertrophy of the bladder, and bowel, something may be done by the catheter, and by laxatives. In hypertrophy of the heart with valvular disease, the only palliative is general quietude. Where the hypertrophy is associated with a condition of the blood in which nitrogenized excess is present, then a low diet, alkalies, and purgatives are indicated; but not as measures acting directly upon the hypertrophy, but as striking at its cause. This part of the subject will be resumed in Chapter XIV. The chief therapeutic lesson to be learnt about hypertrophy is a purely negative one. It is this: it is equally foolish and futile to treat it as a disease.

§ 72. *Connective Tissue.*—Connective tissue is primitive tissue, from which the higher tissues are evolved, and it still forms the packing, or padding of the body. In the lungs, for instance, are blood-vessels, air-tubes, nerves, and lymphatics, all held together by connective tissue. When a solution of continuity occurs, it is by means of this connective tissue that the breach is healed and the solution bridged over. In inflammation of the bowels an albuminous effusion, which becomes ultimately connective tissue, is poured out; and so the inflamed surfaces are first kept asunder, and the vermicular action of the bowels, which disturbs the inflamed parts, is checked, partially at least. The bands which often tie down the visceral to the costal pleura after pleurisy, consist of similar histological elements. Of like nature is the growth which

constitutes the changes wrought in the valves of the heart. The process which distorts and unfits them for the full performance of their function is a growth of connective tissue, the result of valvulitis—a parenchymatous inflammation. The changes which ensue in the different viscera, from the brain down to the kidneys, in the venous congestion which follows upon valvular disease of the heart, are due to the excessive production of connective tissue. It is this tissue which is thrown out round the fractured ends of a broken bone, and which keeps the two ends quiet, and also together. If there be much movement this growth is developed in the tissues around the callus, and so gives more complete immobility. It is by means of connective tissue that the two ends are ultimately united. Cicatrix is connective tissue; so is keloid; but here the connective tissue is distinctly pathological. Connective tissue may remain as it is: its histological elements may undergo no change, and for years it remains in itself harmless. But under certain circumstances while so harmless it may be a source of danger to life, as in the bands remaining after enteritis, which so frequently lead to strangulation. The more normal is the tissue, the more likely is it to remain unchanged. Frequently, however, a species of mineral infiltration goes on in it, and we get the so-called ossification in parts, which is really rather a calcareous degeneration. There is a quantity of lime salts deposited in the new growth, just as they are found in the costal cartilages of elderly men. Such a calcareous ring has been formed round the heart, from the infiltration of lime into a pericardial band. Lime salts are also commonly deposited in the connective tissue of valvulitis, and give a species of stoneyness to the altered vela. This is in all probability the true pathology of what used, a generation ago, to be so often heard of—viz., "ossification of the heart." Similar changes go on in arteries which have undergone atheromatous changes, in certain organisms, and the elastic artery is converted into a rigid and brittle tube. This condition is not rarely very general; at other times it is more or less localized. It is a common cause of gangrene in the extremities, and gives the surgeon much trouble when attempting to secure the vessels, which break up when subjected to compression. It is found

also in the articular cartilage of bone, as, for instance, in the porcellanous deposit of arthritis.

§ 73. Connective tissue is at once an indispensable necessity and a disease, according to circumstances. It may or may not be permanent. Frequently large masses of it are absorbed, as is especially seen in the removal of callus after the union of a broken bone is complete. At other times it is useless to attempt its removal, as in the valves of the heart for instance, or the bands formed on serous membranes.

The different measures resorted to for its removal are usually combinations of iodide and mercury. The effect of these remedies upon some formations is very curious, and even in some cases almost magical. There is, however, a marked difference betwixt the ordinary masses of connective tissue and those growths of elements not far removed histologically, which are denominated tumours. There is little if anything to lead us to hope that true tumours are ever removed by absorbent remedies. For them there is nothing but removal by operative interference. On the other hand, masses of connective tissue are often successfully removed by the exhibition of iodine. In superfluous production of connective tissue-elements absorbents are often very useful, and much depends upon the nature of the mass, as to whether it is desirable to attempt its removal by medicinal agents, or not. The high hopes originally entertained are now much modified, and we hear little of the reduction of hypertrophied organs by iodine compared to what was said a generation ago. Now there are no surgeons who would hopefully treat a scirrhous tumour with iodine.

True pathological connective tissue is often injurious mediately from the consequences of its presence. Thus when developed in excess in the kidney it contracts and shrivels, as is its nature, and so compresses and destroys the tubules and Malpighian bodies, and ultimately ruins the kidneys. In a similar way it grows round the lobules of the liver, and compresses and destroys that viscus, lobule by lobule. In the chronic pleuro-pneumonia of oxen it creeps round the lobules of the lung, and then, as itself is transformed from a moist plasma into something like cartilage, it compresses the lobule of lung till it is as dense as india-rubber. In many of our chronic

complaints, especially in that form of disease of viscera known as cirrhosis, there is a gradual development of connective tissue which slowly spreads; first throwing a series of soft cells round a part, and then, as they grow and harden, clasping the part in its inexorable grasp, and rendering it utterly useless functionally. As this new growth spreads and grows, the viscus becomes practically destroyed for useful purposes. Such is the effect of healthy connective tissue upon viscera. Here it produces untoward consequences merely by its presence, and the effects of that presence upon the structures of the viscus. The consequences are certain—sure; but at any rate the progress is slow. A very different state of matters is instituted when the connective tissue is itself the source of trouble, as when it is too degraded to preserve its integrity, as in tubercle; or assumes a malignant form, as in scirrhus. As consumption and as cancer, connective tissue furnishes in its abnormal aspects two of the gravest and most terrible maladies to which humanity is subject.

TUBERCLE.

§ 74. To Laennec we owe the introduction of the stethoscope, a most valuable aid to diagnosis; to him also we owe most erroneous views about tubercle—views which have done much to retard our progress, and especially in the direction of treatment. Laennec held that tubercle was a special growth unlike any other tissue, and Carswell held that it was a secretion *sui generis*. Nothing could have been further from the mark, nor yet more obstructive to real advance in knowledge about tubercle and its associations. Tubercle is modified connective tissue—nothing more or less.[1] It varies from what is called "fibroid phthisis," that is, a form of pulmonary tuberculosis differing but slightly from interstitial pneumonia—cirrhosis of the lung, to masses of cell-growth which swiftly undergo retrograde metamorphosis, or even smaller or miliary tubercles, not unlike frog

[1] "The form is produced by the growth of the tubercle from single cells of connective tissue by the degenerative proliferation of single groups of connective tissue corpuscles."—Virchow, *Cellular Pathology*. At Fig. 140 he shows the "development of tubercle from connective tissue in the pleura." Translated by Chance.

spawn, scattered throughout the lungs. In the formation of the higher forms of tubercle the new growth springs from the connective tissue, but in addition in graver cases, the cell-growth is associated with the lining of the alveoli, and of the lymphatis, which accompany the terminal blood-vessels. The lower the form of tubercle, and the worse the case generally, the more does the growth involve the latter structures. Where the growth is confined to the connective tissue chiefly, the condition is rather that of cirrhosis. Where there is free growth from the other sources of tubercle cells the tubercle increases more quickly in bulk, and its cell-elements are of lowlier forms; too often so lowly that they cannot maintain their vitality, but soften and decay. These miliary tubercles are by far the gravest form of tuberculosis, which is usually fatal in a few weeks. Some writers have preferred to call it tuberculous inflammation of the lung. It is indeed a species of inflammation, or cell-proliferation, but it differs from ordinary inflammation in the quality of its products, and in its fatal character. Both possibly it owes largely to the general condition of the organism in which it shows itself. Miliary tuberculosis, from its hopelessness, need not engage much attention in a work on therapeutics—except from a preventive point of view. Of which anon.

It is rather as yellow tubercle, the bronchial tuberculosis of Rokitanski, that tubercle interests us here. But though we associate tubercle with the lungs, it is not because it is in relation only with the lungs; it may be found in different localities indeed, but it finds its most marked forms in the lungs, and as such has been most studied. Perhaps the simplest way to give a vivid, and yet fairly true impression of tubercle, as it appears in masses, is to follow Niemeyer, and say that it is an inflammation whose products are imperfect or degraded. The most perfect form of inflammation is followed by perfect restoration of the lung—that is in acute crupous pneumonia. If there be a tendency for the cell-elements which are the products of the inflammatory condition to become organized into fairly healthy connective tissue, then "fibroid phthisis" results. Commonly certain portions—possibly from some local condition which we cannot appreciate—are of lower forms of cell-growth than others, or undergo a degrading transformation

more readily than others. Consequently in a lung which is generally in the state known as fibroid phthisis there may be masses of lowlier cell-growth known as caseous tubercle. At other times a localized inflammation will result in the production of a mass in which the lung structure is infiltrated with a lowly form of cellular elements, and which is called caseous pneumonia. In still worse cases there is a more wide-spread inflammation, implicating several portions of the lungs, very commonly the two apices. Such inflammation may eventuate in several cheesy masses surrounded by fairly healthy inflammatory products; or each mass may be surrounded by a wall of degraded cellular elements, which itself undergoes early degenerate changes, and so cause matters to go from bad to worse. C. J. B. Williams has divided connective tissue into—1, Euplastic deposits, that is, healthy connective tissue, as cicatrices; 2, Cacoplastic deposits, which are more or less defective in organizability as ordinary tubercle, and, 3, Aplastic deposits, which are too degraded to possess any organizability, and which simply pass along in retrograde changes without any attempt towards organization. They do not constitute differences in kind so much as differences in degree. They are all of like descent, but they differ, often profoundly, in their course and career, and that, too, much according to conditions and circumstances now becoming fairly understood. No respectable comprehension of tubercle in any of its relations can exist, or ever will become practicable, so long as the views of Laennec and Carswell obtain, that tubercle is a heteromorphic neoplasm. It is not a strange intruder of foreign race and blood amidst the mild and inoffensive cell aborigines of a viscus, with grim front and lowering mien—a sort of Spanish *conquistadore* amidst inoffensive and harmless Indians—exerting a destructive and malign influence on all sides and everywhere; it is the "ne'er-do-weel" of the tissue family,[1] the degraded "nought-weel," of whom there is little hope of regeneration, who will scarcely ever be converted into anything more than a harmless tax upon its blood relations; and which much more frequently becomes a source of great danger to them. Tubercle is a degraded form of connective-tissue, and

[1] "Tubercle is always a pitiful production, a new formation from its very outset miserable."—Virchow.

there are various forms of degradation—some higher, some lower—but all below the standard of health. This is a broad view of tubercle, true in the main, if not actually correct, or described as it should be in a work purely devoted to pathological anatomy. The less degraded the type, the less unfavourable the prognosis; the more degraded, the more hopeless.

§ 75. What is of much more importance to us here is the question of what are the circumstances which affect tubercle; which keep it away or encourage its advances, or which arrest its progress when established, and stay its ravages. The hopeless pathology of Laennec and Carswell had nothing but a grave as the future of those who were smitten with tubercle. Now we know that recovery from conditions either actually tuberculous, or tending to tubercle, is very common. "In nearly the half of all cadavers we find traces of the nutritive disorders from which pulmonary consumption proceeds." (Niemeyer.) There are various forms or modes of recovery in the case of tubercles. They are thus arranged by Rokitanski.[1] (1) Obsolescence, or the withering up, the cornification of the tubercle, only too rare. (2) The cretefaction of yellow tubercle masses, in which the organic matter is ultimately absorbed, and masses of inorganic matter, like bits of mortar, are left; and not rarely expectorated long after all evidences of constitutional irritation connected with the tubercular deposit have passed away and almost been forgotten. (3) Elimination by a process of softening of the tuberculous mass, together with an ulcerative process around its periphery by which an outlet—as by perforation of a bronchus—is formed, and the softened tubercle got rid of. This last is the form that gives us the well-known consumptive cases with which all are so familiar. Many cases do badly, and the system sinks under the long process to which it is subjected. The hectic fever, the night sweats, the harassing cough, the general constitutional irritation, the loss of appetite and of digestive and assimilative power, which, combined, wear out the powers of the system, are all but too familiar to us. Yet there are many

[1] Some apology may seem due to the reader for following an authority usually regarded as already antiquated, but Rokitanski is not yet laid on the shelf, and is a bright, cordial, active-minded man still; though he is the father of modern pathology.

recoveries from this terrible condition; so many indeed as to encourage us to inquire into the factors which lead to recovery. If there are conditions which render recovery feasible, it is our first duty to discover what those conditions are; how they are brought about; and by what means they are best secured.

We must start off by understanding distinctly that tubercle is but a modification of ordinary inflammatory products, not a true neoplasm. Niemeyer lays down the following in clear and impressive language. "The consolidation and destruction of the lungs, which form the anatomical basis for consumption, are usually the products of inflammatory action, and the greater the quantity of cellular elements collected in the vesicles, and the longer the duration of the inflammation, so much the more readily will pneumonia lead to consumption, since these are the conditions most favourable for the production of caseous infiltration. Secondly, pneumonia resulting in caseous infiltration occurs most frequently, but not exclusively, in puny, badly nourished subjects. This is partly because such persons are especially delicate, and in part because all inflammatory nutritive disorders by which they may be affected show great tendency to copious cell-formation, with subsequent caseous degeneration." The production of the cellular elements is in inverse proportion to the quality—the higher the fewer, the lower the greater in quantity. And again, "The caseous masses upon which the consecutive (secondary) development of tubercles in the lungs depends are situated in the great majority of cases in the lungs themselves, and consist of the products of chronic pneumonia in a state of caseous degeneration. We have no hesitation in stating that the greatest danger for the majority of consumptives is, *that they are apt to become tuberculous.*" It is in this that the course of simple chronic pneumonia—probably a very much commoner complaint than we imagine, because it is not sought for by systematic investigation—differs from that pyretic state of hectic fever described in common parlance as "going consumptive."

It is obvious that the rational method of treating tuberculosis is to restore matters to that condition which existed before the patients became tuberculous, and which obtains in those who do not become tuberculous. In order to do this it is necessary

to consider the different circumstances which lead to the patients becoming tuberculous. First there comes the question of heredity. It is notorious that in some families the tendency of every form of cell-growth, especially cell-formation of rapid growth, or of inflammation, is to degenerate into tubercle. They are known as consumptive families. Their tissues bear the brand of inheritance. They readily yield and become tuberculous if placed under the following circumstances, which have much to do with the production of tuberculous degeneration. Imperfect nutrition, unhealthy surroundings, and especially an insufficient dietary are the factors which lead most directly to the formation of tubercle. The want of fresh air, the imperfect removal of oxidized, or rather partially oxidized products, have much to do with tuberculous degeneration. The effect of fever, and especially enteric or typhoid fever upon the nutritive processes is such that tubercle commonly follows any chronic pneumonia in the convalescence of these patients. Long continued inflammatory action may lead to similar results. Sometimes the effects of inflammation of the lungs upon the system in a perfectly healthy subject are so grave as to lead to degenerative changes in the inflammatory products. One of the commonest causes of general constitutional debility favouring tuberculous degeneration is rapid growth. The tax upon the powers of the system is commonly manifested in the tendency which then obtains for any cell-growth to develop a tuberculous character. Long periods of partial starvation, of imperfect nutrition, also render the tendency to such change very marked. It is a matter of personal observation that tubercle in a retrograding condition, on its road towards one of the forms of repair given above, is common in the lungs of sheep or of cattle, which have been previously underfed during the preceding winter, but which have fattened sufficiently for the market during the ensuing summer. Masses of tubercle, the size of a billiard ball, encapsuled by healthy connective tissue, together with similar masses undergoing cretefaction, are far from uncommon in the lungs of young cattle slaughtered for the food of man,—and perfectly good, wholesome fat meat they furnish. In sheep the tubercular masses are rather those of millet-seed shape and size, and masses of the size of a hazel

nut are rare. Occasionally in both animals cavities, lined with a species of membrane, and surrounded by healthy lung tissue, are found; marking the process of elimination by softening and expectoration.

§ 76. The foregoing series of factors, standing in a causal relationship to tuberculous degeneration of inflammatory cell elements, points very clearly in the direction—that imperfect cell elements are due to a low tissue-producing power in the organism, either congenital and inherited, or acquired; occasionally both combined. Especially, then, will tubercle manifest itself in those who, naturally delicate and predisposed to tubercle, reject all fat. It is well known that fat is wanting in tubercular tissue—that in other words the absence of fat is a great cause of tuberculous degeneration in inflammatory products. Consequently a rapid cell-formation in such individuals is commonly followed by tuberculous degeneration. Such is the actual history of much of the tubercular consumption we see around us. Dampness of subsoil may exert much influence; but the unwise yet prevalent custom of permitting children to leave all the fat of their meat on their plates untouched, is a much more powerful factor. It is just those slight, fragile forms, to whose systems fat is so absolutely necessary for healthy tissue-building, that reject fat most persistently; and where the parents should most steadfastly insist upon their taking fat—in some form or other. When once they can be induced to take fat the dislike to it vanishes, and not rarely becomes transformed into a positive craving for fat, in which case a cure, or its equivalent, is not rarely achieved. Such is one of the greatest of our curative agents: it is equally potent as a preventive measure.

When, then, we find good reason to suspect the presence of tubercle, or a tuberculous tendency in a patient, it becomes imperatively necessary to institute a distinct line of treatment. In passing it may be observed, that it is very unwise to rest the diagnosis of tubercle too exclusively upon physical signs in the lungs, as too many practitioners, and especially juvenile ones, in their full-blown zeal for physical examination, are apt to do; to the neglect of the many other equally important factors which only reveal themselves to the much more difficult

observations of a brain trained to observe and reflect—to estimate the *tout ensemble* of the case, and correctly appraise the family and the individual history of the patient. Having arrived at the conclusion that there is present in the organism connective tissue of a lowly form, or undergoing tuberculous change, the next question is—How to treat that patient? If there be no rise of temperature, or it be only a fifth of a degree or so, it is desirable at once to commence a plan of improving the nutrition. The food must be easily digestible, and furnished to the system in liberal quantities. It must be slowly consumed, and where necessary slowly and deliberately masticated. There must be a period of quiet maintained after each meal. The bowels must be kept open; and the digestive powers be well sustained. Frequently there is some gastric irritability interfering with digestion and assimilation. Here the following forms a capital mixture:—

Bism. Trisnit. gr. x.
Pot. Bicarb. gr. v.
Mist. Acaciæ ʒ i.
Inf. Calumbæ ℥ i.,

three times a day before food. Many practitioners regard such mixture, or bismuth with tragacanth, as their sheet-anchor in incipient phthisis. The food should be such as not to tax unduly the digestive powers. It might consist of milk with farinaceous foods, as tapioca pudding, arrowroot, maccaroni or bread puddings, various nutritive soups, fish in various forms, and still more oysters and other bivalves; meat, either cut very thin, with a fair quantity of fat, or carefully minced and not too highly seasoned, poultry, game, &c. Eggs in various forms are very pleasant, especially when done with butter, as follows. "Break four eggs into a basin, beat them well. Put a teaspoonful of cream, or of milk with a piece of butter in it, into a pan, with a little salt; when the cream is warm add the eggs, and keep stirring until the mess thickens, and then pour it into a dish, with or without buttered toast at the bottom. The mixture should not boil. (Time five minutes.)" Various glandular bodies, as sweetbreads, &c., may be tried; plain boiled, and eaten with butter, pepper, and salt, they form an eligible article of diet.

Marrow is also very suitable. The leading idea is to give fat, or fat-forming material, in such guise as shall be least objectionable to the patient's tastes, and at the same time most easily assimilable; and thereby to modify the cell-formations taking place in the body. If there already exist masses undergoing a process of degradation, they may be surrounded by a wall of healthy connective tissue, within which they are comparatively harmless. A glance over Chapter II. may be desirable for the reader at this point. There he will find the matter of assimilation explained at length; and will see how iron may be given with advantage after food in different forms, but especially with arsenic in pill. He will also see that cod-liver oil is stated to be the most readily and easily digestible of all forms of fat. It was in the recognition of this fact that J. Hughes Bennett laid the world under a debt of thanks to him, and demonstrated so palpably the aid physiological investigation can give to practical medicine. Cod-liver oil should be given after food, and then it is acted upon by the pancreatic secretion and emulsionized. It is also best borne by the stomach when so given; and very frequently if given before food, a most unphysiological time to administer it, it disagrees, and often it is not tolerated, but rejected. It is further an excellent plan in practice to commence with a plain and comparatively tasteless oil; and only after the toleration of it is perfectly assured, to proceed with the stronger-flavoured brown oils, which are alleged to be more serviceable. There are various vehicles in which the oil may be taken. Milk, solutions of gums, orange wine, lemon juice, cinnamon water, &c., are all recommended. Cod-liver oil may be taken in quantities varying from a few teaspoonfuls to four or six ounces daily, according to the requirements of the case and the digestive powers of the patient.

It frequently happens that the appetite of the tuberculous patient is very capricious in the morning, and that breakfast is not a good meal. This is a grave matter, and it is ever better when a good meal is taken and digested to commence the day with. Every means should be taken to secure a good breakfast if possible. One of the best measures is to give the well-known rum-and-milk in the morning, ere dressing. The following is the best formula for it:—"Take half a pint of new

milk and add to it an egg, a teaspoonful of powdered sugar, some grated nutmeg, and one or two teaspoonfuls of good old Jamaica rum: stir all together well, and let it be taken by the patient in bed." It is desirable that a little further rest in bed should precede the process of dressing. After such preparation breakfast is commonly enjoyed and assimilated.

It is often desirable to whet the appetite with some bitter infusion with acid, about half an hour before each meal. Phosphoric acid with gentian does very well. Chalybeates are best taken after food when used as a hæmatinic. By such a course of treatment, combined with well-ventilated bedrooms, plenty of fresh air free from impurities, and good warm clothing, many a case can be turned from its downward progress, and a process of repair be instituted. The question of climate is one of much importance. There is no doubt that a change of climate is often very beneficial. It is not always easy to say what that change shall be. To many the shores of the Mediterranean are distinctly preservative, and their winters should be spent, when practicable, amidst orange groves. Others again require a different climate, and the slopes of the Himalayas, the Californian Sierras, the Blue Mountains of Virginia, the high Swiss valleys, &c., give them the best chance of life. A long sea voyage to Australia is the salvation of others. How to decide in each case is very difficult, and the young practitioner will be prudent who defers the selection to some well-known authority. Whether the mild climate, furnishing a soothing air to the diseased lungs, or a bracing climate, improving the general tone, shall be chosen, is often a matter not easily of solution. It is a still graver matter often to decide whether an invalid shall be sent away with the prospect of dying among aliens in a foreign land, on the chance of a very hypothetical possibility of recovery; or to let the sands of life run out at home. I am glad to say that a reaction is setting in in favour of the latter. A foreign tour is very well in some cases, in others its recommendation is simply cruel. (Chap. XXII. § 232.)

§ 77. When the tuberculous degeneration is producing hectic fever, and the softened mass is being expectorated by means of an opening into a bronchial tube, another series of symptoms is developed. The ulceration around the periphery of the

tuberculous mass, which opens the way out, usually creates some fever. Frequently the fever is sharp. The mass too acts like a foreign body, and produces irritation which evokes the reflex act known as cough. The irritation being persistent, the cough is frequent, harassing, and often so continuous as seriously to interfere with the rest at night. Indeed ere a way out is secured for the softening mass, by which the system is relieved, very commonly a period is passed through which gravely threatens the existence of the organism. Great emaciation and exhaustion mark the time of trial. Here stimulants, nutritive food, and alcohol are required, often urgently. Wine is especially serviceable: it is a stimulant, while the alcohol is a readily available food. In full doses, too, the alcohol lowers the febrile temperature, and so is still further useful. Cream with sherry, or a liqueur, eggs and brandy, milk and seltzer-water, as a beverage, wine, whey, coffee with rich milk, or cocoa and milk, are all indicated, and in liberal quantities too. The question is whether the storm that is brewing, or already blowing, can be weathered or not; if the organism can be sustained till the gale has blown over all may yet be well. For this end free supplies of easily assimilable food are necessary—absolutely necessary.

Another great point is the question of what to do when the sleep is much broken by cough. When the cough is very wearing it is highly desirable that something be done. Unfortunately the means of palliating the cough are often very objectionable. Full doses of opium or morphia, however administered, are very apt to destroy the appetite and ruin the digestive powers. It is only when compelled to resort to them that they should be given. If necessary, then "must be" must. A grain and a half of opium in extract of aloes may be given.[1] Hypodermic injections may be resorted to, or a morphia suppository given. At other times the following is a good form of night draught:—

Pot. Brom. ℈ i.
Tinct. Hyoscami, ʒ ss.
Mixt. Camph. ℥ i.

This often affects the reflex mechanism, and lessens the cough

[1] A sixth of a grain of sulphate of copper will check the night sweats to which the opium alone might give rise.

very satisfactorily. At other times ammonia and Cannabis Indica seem beneficial. Often the night sweats are profuse, and then belladonna may be resorted to, or phosphoric acid in free quantities.[1] Fuller was fond of giving food and alcohol at bedtime. A large bedroom well ventilated is ever desirable.

Under all circumstances it is very necessary that rest, as far as is possible, be given to the diseased viscus. In all inflammatory conditions rest is clearly indicated. Quiet permits of the reduction of the hyperæmia which is the initial step of the inflammatory process, whether simple or tuberculous. It is the impossibility of securing perfect rest that renders the presence of tubercle in the lungs and bowels so much graver than is its appearance in an ordinary gland. The constant movements of the lungs, and of the bowels, cause a further development of connective tissue, just as does the movement of a broken limb call out callus, and this new formation takes on in its turn tuberculous degeneration. If rest could be secured this secondary formation might be avoided. The objections to opium have been given above, but other means of securing rest may be tried. In tubercle of the bowels rest may be partially secured by checking any tendency to diarrhœa, which increases the vermicular action of the intestines, and for such purpose myrrh is often useful. It may be given with bismuth in powder, ten grains of each, at bedtime, especially with a grain and a half of powdered opium. Strapping that half of the thorax in which the tubercle has shown itself, is an excellent plan for securing partial rest to the lung in pulmonary tuberculosis. Cough, too, irritates the affected parts mechanically, and should be avoided. Perhaps some day we may discover a remedy which will so deaden the nerve centres as to arrest to a large extent those reflex actions which, though often useful—as when a crumb is in the larynx—at other times are an unmixed evil. If such

[1] Tinct. Belladonnæ, ♏xv.
Ac. Phosph. Dil. ♏xv.
Mist. Camph. ℥i.,

every night at bed-time, gives very satisfactory results in the writer's hands. At Victoria Park Hospital atropine in pill is given at bed-time, and the effect on the night sweats is very pronounced. (From an 80th to a 40th of a grain.)

an agent could be discovered it would be most precious in the relief of the cough of pulmonary tuberculosis.[1] For the cough is very irritating as well as exhausting, and there is no hope of the irritant mass being expectorated, until it is softened and has a way prepared for it; after which the cough is very useful.

Finally, if a tithe of that care, of the good food, and of the fresh air of convalescent homes in the country, could be given to tuberculous cases at the outset, which sentiment provides for the closing of the scene, how different would be the end achieved. It is not my desire to undervalue these solaces to the dying which are furnished in no stinted quantities, even by Philistine boards of guardians; far from it. What I would do is to point out how inestimably valuable the same measures would be, if available before the cases became markedly tubercular. Often sentiment furnishes, when too late, what would have been priceless at an earlier period. When the Senior Resident Medical officer of the Leeds Public Dispensary, it was very heartbreaking to see case after case merging into tubercle which might have been arrested possibly, if any power to procure such things as these cases require had existed. Medical advice, medicine, and cod-liver oil could be given; but wine, stout, meat, &c., were only to be procured by making the patient a pauper, and that only was done when the case was hopeless; and then everything was furnished to prolong the last scene—in order that they should not die unsuccoured. Had that succour come out of intelligence, and been given in time, a life might have been preserved; instead of merely a death-bed being made somewhat less repulsive than it otherwise would have been.

Cancer.

§ 78. If tubercle be infinitely more common than cancer, cancer is still more hopeless, and still more dreaded. It is indeed an intruder of grim mien, and of grave import. Nevertheless it is but a modification of connective tissue.[2] Rokitanski,

[1] Such an agent, some think, is to be found in the *Gelsemium sempervirens.* (?)

[2] That is of those tissues enumerated as connective tissues by Carpenter in the third chapter of his *Principles of Human Physiology.*

in laboured phrase, says of cancers: "Heterologous growths not distinguishable from sarcomata by definite generic marks, and, like these, to be dealt with only as species; but contrasting with sarcomata in the single feature, common to them all, of malignancy. Carcinomata originate and subsist not rarely as local evils. Far more commonly, however, they are associated with a dyscrasis, which, in point of fact, often precedes and engenders the cancer. Hence the multiple appearance of carcinoma as the sequel to a single one, as the sequel to the extirpation of a voluminous and hitherto solitary one. Hence, in other cases, the original appearance of cancer in several organs simultaneously, or in rapid succession." Cancer is a modification of connective tissue, which shows itself under certain peculiar circumstances often of a puzzling character. It is common at the junction of skin and mucous membrane at the lip, and anus. And yet it almost never attacks the upper lip. It is common in the uterus and in the mammæ, and often arises at the change of life, when there is a certain hypervascularity of these organs present. At a corresponding age it is common in the stomach in the male. It is induced in the scrotum by soot, as chimney-sweeper's cancer. At other times it is more diffused, as if a cancer-building tendency existed throughout the organism. It is even supposed that such tendency lurks in many cases, without actual existence of cancer-cells, until a blow or other injury develops them locally.

Cancer will proceed from its primitive seat along the lymphatics, as is well shown by the secondary glandular enlargements which so often follow mammary cancer. Cancer-cells, when washed off into the blood-current of a vein, will float along until arrested, and then will at once grow and set up a cancer colony. Thus in cancer of the pylorus a tiny speck of cancer often breaks off into the gastric vein, and then becomes arrested, in the subdivisions of the portal vein, in the liver; the point of its arrest becomes a nodule of secondary cancer. A cancer-cell may wash away from this secondary nodule, and become arrested, in the subdivisions of the pulmonic circulation, and so become a secondary cancer colony in the lung. In some cases cancer-cells form a

mass in the lung, wash into the pulmonary veins, and, passing through the left heart, drift along the arterial current into the cerebral vessels, and establish another cancer colony in the brain. Another curious and interesting fact about cancer is this: The histological elements of cancer are not neoplasms, not new growths. They are a development of textures, normal in their place, or at their own time, but forming under other circumstances malignant growths. Thus scirrhus is scarcely, if at all, distinguishable from cartilage The rapidly-growing osteo-cephalomatous, or cerebral cancer, which is connected with bone, is the growth of a tissue in adult life, which is normal in fœtal life as the marrow cells of bone. Colloid cancer, a gummy mass, common in ovarian disease, is nothing more than the sarcode of the umbilical cord; which is useful in its place.

Another thing about cancer is this—any abnormal growth, as a fatty tumour, for instance, is in mature life apt to become cancerous, just as we saw that inflammatory masses in certain organisms become tuberculous. Consequently it is very desirable to remove such tumours, in order that they may not become the subject of cancerous change.

§ 79. Looked at from a therapeutic point of view, those modifications of connective tissue known as the varieties of cancer, are of a depressing and hopeless character. When they present themselves in situations where the surgeon can reach them their removal by operative measures is clearly indicated. In many cases such removal is effective. In other cases, where there seems to be a general constitutional tendency to cancer, such extirpation is of little avail, and is followed by cancerous manifestations elsewhere. Whatever means for the removal of the cancer be adopted, the extirpation must be complete. If the end of a cancer prolongation, often very like a crab's claw, be left, the cancer will grow again. If a cancer-cell be travelling up a lymphatic, and is not included in the operative measure, it will institute a secondary cancer in the first lymphatic gland it reaches.

There are two points where a medical opinion affects the purely surgical question of removal. One is, that in very old persons hard cancerous growths are as well let alone. The

sufferers will probably die off ere the cancer itself is fatal. The removal of the cancer may, however, become desirable in consequence of the pain it occasions. Another is this: if there exist any evidences of the presence of cancer in the viscera, then surgical interference is clearly contra-indicated. Recently a case came before me where on examination it was impossible to pronounce the left lung quite normal. It was probably cancerous, as the subject was a hale woman of over forty years of age with a gouty diathesis. She had had one mamma removed for cancer, but the operation was not quite successful. An opinion against further operation was given accordingly. Ultimately the case fell into the hands of a cancer quack, who inflicted much torture by his measures for removing the cancerous cicatrix. The lung symptoms rapidly increased, and the dyspnœa became intense, and ultimately killed the patient.

Cancer is usually regarded as a painful ailment. There are, however, no nerve fibrils in the cancerous mass, and cancer is painless where it does not involve pressure on a nerve. So strong is the popular impression that if there be no pain the tumour is not malignant, that it is sometimes simply impossible to convince the patient that he, or she, is the subject of cancer. Yet cancer is in itself absolutely painless, and, if it develop in a part free from nerves, occasions no pain. If, however, a nerve becomes implicated, especially if inclosed in the remorseless grip of scirrhus, then persistent, enduring pain is induced. So severe and excruciating is the agony inflicted by cancer, that Montgomery wrote of uterine cancer, "There is no temporary relief but in opium; no permanent rest but in the grave." Few diseases are more terrible than stricture of the œsophagus, or cancer of the pylorus. The subcutaneous injection of morphia and rectum-feeding may prolong a life which must have become a burden, and relieve an existence otherwise intolerable. In the last stages of gastric cancer ice often gives great relief to the vomiting. When cancer assumes a phase of rapid growth emaciation is marked. The system is robbed to feed the intruder, and drained that its destroyer may wax and grow. This, however, is a less agonizing mode of death than that produced by pain alone—by the torture

which results when nerves are caught by masses of malignant connective tissue.

The questions of fatty tumours, of adenocele, of recurring fibroid, and other growths, are too purely surgical to demand our consideration here. The more special requirements of abnormal growths, according to their individual exigencies due to their position, will be given in the chapters to be devoted to the diseases of the different systems.

CHAPTER IX.

BLOOD-POISONS—SPECIFIC POISONS.

§ 80. This is perhaps the most difficult chapter to write of any in this work, from the fact that what has been collected on the subject is so unsorted, and views vary so much, that it is simply impossible to write anything that will be in agreement with every hypothesis. It is not about the gravity, or the course of the maladies, when once established, that much difference of opinion exists. It is rather about the origin and commencement of the affections, denominated blood-poisoning, that there is so much confusion. In attempting to set forth what it is trusted will be an approach to a lucid statement to the youthful student, some offence may possibly be given to more highly instructed readers, who may think the matter to be put too definitely.

In the first place a blood-poison, in the sense in which the term is used, is a material which finds its way into the blood much after the manner of what are known as specific poisons. But there does not follow a definite group of symptoms and changes such as characterize each of the exanthems, and make measles and small-pox so distinct and distinguishable, in the case of what are known as blood-poisons; though pyæmia and erysipelas possess some fairly special characteristics. The tendency is ever to form an asthenic type of pyrexia, a quick pulse, a high temperature, both increasing towards evening, a dry skin, a loaded tongue with a foul breath, much depression of the nervous centres, together with a generally ominous appearance, which must be seen to be understood—but once seen ever again recognizable. It is very noticeable in cases of erysipelas in persons of broken-down constitutions; in some

children with ulceration of the throat; in those who having assisted at a post-mortem where there was erysipelatous peritonitis are struck down by blood-poisoning; or, again, at times after a puncture at a post-mortem. There is a rapidly advancing adynamy which, quickly following the first initial symptoms, causes the case to look serious, and too often soon renders the prognosis hopeless. The progress of these cases is swift, and a fatal issue is but rarely averted. It is the rapid progress that gives to blood poisoning an aspect so grim, and which distinguishes it from pyæmia—at least, as pyæmia usually manifests itself.

There is much difference of opinion as to the nature of the infecting poison. To put the matter broadly: the poison is either a decomposing particle wafted from the putrefying material of one organism away to some surface on another organism previously healthy, in which it sets up oxidising processes such as it itself is undergoing; or there is some lowly form of life, bacterial or others, which breeds in putrefying fluids, and which sets up putrefaction in other fluids if they gain access to them. It is not the place here to attempt to analyze the evidence for each view, nor is it of much practical importance, apparently, to do so. A large number of names of the highest eminence might be adduced in favour of the latter view, while the former is the view of those who have not yet given in their adhesion to the germ theory. The chief practical result from the difference of opinion is the stimulus it gives to the investigation and discovery of materials called antiseptics, or disinfectants, which possess alike the power of arresting putrefaction and of destroying lowly forms of life.

The strongest clinical evidence of the existence of such poison is furnished by the wards of hospitals where a gangrene in one patient will cause the wounds of other patients to assume a gangrenous character; or where pyæmia has located itself and seizes remorselessly every patient who is placed in the death-stricken chamber. In the disease known as charbon, or malignant pustule, the slightest contact of the fluids of a diseased animal with the fluids of another animal, previously healthy, will cause that animal to be affected in turn. These blood-poisons are apt to produce rapid suppuration in the great intermuscular planes of

areolar tissue, or very destructive suppuration in the interior of viscera: the first is known as phlegmonous erysipelas, the latter as the pyæmic abscess. But still the changes in the solids of the body are far from being so constant as the changes in the blood. The most vivid sketch, with which I am acquainted, of the changes wrought by a blood-poison is given by C. J. B. Williams in his *Principles of Medicine:* it is so graphic that it must be given *verbatim*, it would lose by any attempt at compression. "Necræmia, or death beginning with the blood, are terms," he says, "which I venture to give to those fatal cases in which the chief and most remarkable change is exhibited by the blood. In typhoid fevers and others of the malignant or pestilential kind, none of the solids of the body constantly exhibit such an early change of function or of structures as would warrant us in tracing disease and death to them. It is true that the functions of many solids are impaired—the muscular and nervous systems, secretion, digestion, assimilation, and nutrition, all suffer, but the very universality of the affection seems itself to point to some cause more general than can be found in any individual function; and such a cause may be found in the blood. The blood at an early period of these diseases, when they occur in their worst form, exhibits changes which show that disorder begins with it, and this disorder may reach to a fatal degree. The appearance of petechiæ and vibices on the external surface, the occurrence of more extensive hæmorrhages in internal parts, the general fluidity of the blood, and frequently its unusually dark or otherwise altered aspect, its poisonous properties as exhibited in its deleterious operation on other animals, and its proneness to pass into decomposition, point out the blood as the first seat of disorder, and by the failure of its natural properties and functions as the vivifier of all structure and function, it is plainly the medium by which death begins in the body. How far the change in the blood is in its structure and vital properties, or in its chemical composition, further research alone can determine; the vivifying function of the blood depends on all these combined, and it is this function which obviously fails. Hence, the complete adynamia, or general prostration, of all living powers, which occurs when this cause of death is most powerful. The blood,

the natural source of life to the whole body, is itself dead, and spreads death instead of life. Almost simultaneously, the heart loses its power, the pulse becoming very weak, frequent, and unsteady; the vessels lose their tone, especially the capillaries of the most vascular organs, and congestions occur to a great amount; the brain becomes inactive, and stupor ensues; the medulla is torpid, and the powers of respiration and excretion are imperfect; voluntary motion is almost suspended; secretions fail; molecular nutrition ceases; and at a rate much more early than in other modes of death, *molecular* death follows close on *somatic* death—that is, structures die and begin to run into decomposition as soon as the pulse and breath have ceased; nay, a partial change of this kind may even precede the death of the whole body (somatic death—Dr. Pritchard); and the fœtid apthous patches in the throat, the offensive colliquative diarrhœa of persons in the last stage of various fatal diseases; parts running into gangrene, as in the carbuncle of plague, the sphacelous throat of malignant scarlatina, and the sloughy sores of the worst forms of typhus, and in the large intestines in dysentery, and the putrid odour exhaled even before death by the bodies of those who are the victims of similar pestilential diseases—are so many proofs of the early triumph of dead over vital chemistry."

Such is the course of blood-poisoning in its worst and most rapidly fatal forms. At other times there may be but a sharp fever with depraved excretions followed by recovery. It may result from extreme saturation with scarlatinal poison, and so spring from what under other circumstances is but a simple exanthem, causing in its mildest form a slight fever for a couple of days. We can scarcely yet say that the effect is but the result of the amount of the poison, though there is much to favour such view. What the nature of the poison is in various zymotic diseases and blood-poisons we do not yet know, but many advances are being made which in a few years will give us, in all probability, certain and definite information.

§ 81. When the day comes that each poison, or the germ which bears it, can be recognized, then special specific measures against each may be available; but until the arrival of that day we must trust to less precise information. Up to a comparatively

recent period all putrid or very adynamic fevers were treated with wine, bark, and carbonate of ammonia, given in no stinted quantities. In this there is nothing of a specific character unless it be the quinine in the bark—as the recent experiments of Binz, of Bonn, as to the effect of quinine upon bacteria would tend to suggest. The plan, however, is not ill-grounded, and may be pursued with advantage in many cases. Then came the use of chlorate of potash in sœptic conditions. It was found that the administration of this agent was very commonly followed by the disappearance of the fœtor which marks a depraved condition of the fluids of the body; and the case passed from that of a sœptic form of disease to that of an ordinary pyretic affection. In more marked cases the effect was not so pronounced, and only a modification, amounting to degree, is the result. Chlorate of potash is best given along with lemon juice in the following form :—Chlorate of potash, ℥ ss. the juice of two large lemons, to a wine-bottleful of water (Oiss), forming a palatable beverage which can be taken at the rate of a wine-glassful three or four times a day. It forms a useful measure in ordinary exanthems, especially scarlatina, and is an excellent prophylactic for nurses and others in attendance on scarlatinal and other patients. Combined with the muriate of iron chlorate of potash is an excellent remedy in diphtheria, in severe cases of scarlatina with pronounced throat symptoms, and in all forms of fever assuming a distinctly sœptic aspect.

More recently the idea has arisen of directly neutralizing the sœptic material in the blood. For this we are indebted to Prof. Polli, of Milan, who introduced sulphurous acid in the form of sulphites of soda, as an internal antiseptic. "It was found that animals could, without any apparent ill effects, swallow and absorb large doses of the sulphites. It was then observed that when the animals were killed they long resisted the putrefactive process—that whilst an animal killed under ordinary circumstances exhibited rapid and marked signs of putrefaction, an animal which had previously absorbed doses of the sulphites betrayed no sign of putrefaction whatever. Another series of experiments, and in this series three hundred dogs were the bases of the deductions, showed that the sulphites exerted a prophylactic and curative power when sœptic poisons were introduced into the

economy. Then, as regards the human subject. It was found that the stomach would tolerate large doses of the sulphites of soda or magnesia. They were tried in the various eruptive fevers, intermittents, typhus, typhoid, pyæmia, puerperal fevers, dissection wounds, malarial fevers, &c. The records of cases treated in this way show an extraordinary amount of success." (*The Antiseptic System*—A. E. Sansom). Of course in the worst cases all measures unfortunately are futile. The blood seems to die, to lose its vital properties, under the influence of the poison imbibed, and then all measures are unsuccessful and unavailing. In the less pronounced cases sulphite of soda in doses of ten or fifteen grains every three or four hours is indicated, and in many cases will produce very gratifying results. So powerful is the antiseptic action of sulphurous acid when so introduced into the system, that "sulphites, administered by the mouth, will, it is said, prevent decomposition and putrefaction of urine in the bladder." (Ringer.)

There is indeed a great deal of evidence tending to demonstrate, and in no indistinct manner too, that there are agents which possess in the body much the same action that they possess out of the body upon putrefactive processes, viz., that of arresting them, or of neutralizing the poison. Before anything more definite can be done in the way of selecting certain remedial agents, in particular forms of blood-poisoning the nature of the various poisons must be indicated, after which more special treatment may become practicable. Modern research is rapidly collecting evidence on this matter and specializing the different forms in certain zymotic affections; after which may come the specific therapeutic remedy. Of course a liberal dietary and wine in free quantities are indispensable to the treatment of all blood-poisoning.

Specific Poisons.

§ 82. Under this heading may be properly placed first a class of ailments with which we are but slightly acquainted in England, nowadays, at least. Here there is a specific poison, known as malarial poison, which institutes a certain set of marked and characteristic symptoms. Under the name of intermittent

fever, or "fever and ague," as it is popularly termed, or in more marked cases "remittent fever," we have a recurrent disease of a peculiar character. During the interval all appears more or less well, even in the quickly recurrent form of quotidian ague. Then comes on an algide stage, accompanied by severe shivering, and a temporary enlargement of the spleen with contracted arteries, passing into sharp pyrexia, also lasting for a brief period. In remittent fever the intermission is brief, and a high pyrexia is almost constantly present. In other cases, as the returned East Indian, for instance, the sufferer will know but little of his malady, except at long intervals, when he will experience short attacks of the familiar fever. At other times periodical attacks of neuralgia will take the place of the febrile accession, and the intimate connection of the two is shown by their amenability to the same remedial agent.

At other times instead of an attack of fever an attack of dysentery is the consequence of malarial poisoning. It is distinguished from the dysentery of armies and camps by its symptoms, which are those characteristic of malarial fevers, and by its coming on under circumstances which ordinarily produce malarial fevers. It is found, too, that quinine is much more effective in malarial dysentery than is ipecacuan (Maclean). The diagnosis of these ailments cannot be considered here; they are known to depend upon a poison which is produced in swamps, fens, marshes, jungles, &c., and at Hong Kong from disintegrating granite. What the poison is, is yet unknown. Whatever it be, it possesses certain peculiarities. It is most powerful at night; it is the more certain the nearer the ground the person is at night; a circle of pines forms a great protection, while the blue gum-tree, the *Eucalyptus globulus*, is even still more effective; immersion completely under water will arrest the poison-producing properties of a marsh; while in more solid fens drainage destroys the malarial miasm.

The pathological sequences of malarial poison are found in the portal circulation and its viscera. Casorati thinks the stomach presents the most marked evidences of morbid changes. Usually there is hyperæmia, and in the notorious Walcheren expedition there were also circular ulcers in that viscus. The liver and spleen are also affected; the latter is especially involved.

During the cold stage of ague the spleen enlarges and contracts again when the paroxysm is over (Maclean); while as the case becomes chronic the spleen permanently enlarges and is known as "ague-cake." The liver is similarly affected and is congested and enlarged. At the same time there is increased cell-formation as well as vascular congestion in these viscera. A black pigment is commonly found in the spleen, liver, and kidneys of those persons who have long been resident in malarial regions.

Recently Lussana has given it as his opinion that the poison of malarial fever is confined to the portal circulation. This, if true, is no unimportant matter from a therapeutic point of view. It is well known that in many regions where quinine is not procurable the treatment of malarial fever has chiefly consisted of emetics and aperients. Ringer says:—"In some cases where this medicine (quinine) appears powerless, the administration of an emetic each morning sometimes brings the disease at once under the control of quina." In many cases the administration of an emetic at the commencement of the paroxysm, or just before it is expected, is a very useful measure in the treatment of malarial fever.[1]

§ 83. In the different manifestations of malarial poison our great remedy at the present day is undoubtedly quinine. Perhaps, indeed, the confidence in quinine is rather too pronounced, as in many patients there is a marked intolerance of this agent. Especially is this last the case in patients from the tropics. In such patients arsenic, strychnine, bebeerine, and the tincture of the *Eucalyptus globulus* may be resorted to in lieu of quinine. Arsenic is a measure which has been long in use in the East for the treatment of ague, but its utility was best seen in the French army under Napoleon, when the mastery of the seas by England cut France off from quinine altogether. In persons who are the subjects of malarial poisoning there is a marked tolerance of arsenic, and it requires to be given here in much larger doses than when it is used as an alterative. It is also desirable to continue its use for some time after the cessation of the fever: just as is the case with quinine. The other

[1] The old empirical treatment in the English Fens was first an emetic, then a sharp purge, followed by quinine and arsenic. It may be questioned if any improvement can be made on this plan.

remedies, of course, are given in their usual doses. They are uncertain, but may be useful when quinine disagrees or has failed.

As to quinine, the evidence is overwhelming in its favour. In fever-stricken districts quinine rises in price in proportion to the supply of the remedy and the severity of the malarial outbreak. This association is the more marked now that quinine is given in doses of from half a drachm to a drachm; the more ordinary dose being from ten to twenty grains. Thirty grains per diem, in three doses, is the ordinary plan of giving it, taking care that one dose be given a couple of hours or so before the paroxysm is expected. By such means the paroxysm is delayed and diminished. Sometimes the arrest is very distinct, amounting to so much each day, enabling the delayed advent of the paroxysm to be closely calculated. Quinine is best given in ague in an acid solution.

Quin. Sulph. gr. x.
Ac. Sulph. Dil. ℥x.
Syr. Aurant. ʒ ii.
Aq. ad ℥ i.

forms an agreeable dose three times a day. When the case has passed from an acute to a chronic form, it is not necessary to continue the quinine in such large doses; though when an agueish attack is felt to be coming on in a patient familiar with it, ten grains of quinine will often arrest the threatening paroxysm.

When the pyretic attack is very marked, as in those cases where the fever is termed remittent, the ordinary measures for reducing body-heat given in Chapter IV., such as ice, cold affusions, &c., may usefully be resorted to. At the same time the congested condition of the viscera of the portal circulation must be remembered, and purgatives must be given along with the quinine. But the administration of quinine must not wait upon the other measures—they are but the auxiliaries of the quinine. Maclean advocates the administration of quinine by enemata in cases where there is much gastric irritability with vomiting. My friend Surg.-Major Hall, of the Royal Artillery, has found the subcutaneous injection of quinine very serviceable.

"In 1866, at Barrackpore, nine fine young men out of a force of 130 died of remittent fever. The tongue in each case was covered with a thick yellow fur, and twenty-five grains of quinine three times a day were of no avail. Thinking the failure due to inability of the quinine to pass through the thick layer of dead epithelium cells forming this fur, I adopted the plan of introducing the quinine into the system by subcutaneous injection. It was quite satisfactory, and all after the adoption of this plan recovered. Too strong a solution caused ulcers to form at the point of injection. Ten grains of quinine dissolved in ten minims of dilute sulphuric acid and 100 drops of water formed a solution which could be injected without producing ulceration. The neutral sulphate of quinine is even to be preferred to this solution for future use." It has advantages over the plan of giving it in enemata.

Mercury, bleeding, and starvation, the old murderous plans of treating malarial fevers, are now passed into the realms of the dead past. At least we may hope so! In the form of inunctions to reduce the size of an "ague-cake," Maclean advocates the use of the bin-iodide of mercury. Preparations of iron, especially solutions of the sulphate, are in much favour for the treatment of enlarged spleen along with the malarial cachexia.

A very useful measure in severe cases of malarial fever is the secret preparation known as Warburg's Tincture. Among its other properties it is perhaps the most powerful sudorific we are acquainted with, unless it be jaborandi. It is especially indicated in those cases where there is intolerance of quinine. It is well to commence its administration by opening the bowels pretty effectually.

In malarious dysentery quinine must be combined with the ipecacuan treatment. If desirable it can be given subcutaneously. It may with advantage be pushed to cinchonism ere the commencement of the ipecacuan treatment. The treatment of dysentery by large doses of ipecacuan was introduced, or rather reintroduced, by Dr. Docker, and has been a great boon to the inhabitants of India. Usually a dose of two grains of opium, or from half a drachm to a drachm of tinctura opii, is given in the morning, and then in about two hours afterwards, when the patient is pretty well under its influence, a drachm of powdered

ipecacuan is given in mucilage. The opium tends to hold in check the vomiting induced by the ipecacuan. The treatment is not pleasant, but it is effective. Next day the stools are of normal character, and the patient is much better.

In the treatment of the malarious cachexia, which forms such a terrible outcome of acute malarious disease, large doses of ipecacuan are most serviceable where there is dysentery in a chronic form. Surg.-Major Hall informs me that it is his custom to treat such cases after the following fashion:—"The patient is kept in bed a day and is fed with milk solely. Next morning a drachm of ipecacuan powder is given in twelve pills, each containing five grains made up with mucilage. For a couple of hours ere giving the medicine the patient is requested to keep as still as possible lying on his back. Then the pills are given with the least possible disturbance and without any fluid, unless a sip of water be imperative; but the less the better. The patient is encouraged to resist the inclination to vomit, and usually can do so for a sufficiently long time to secure the effect of the ipecacuan." Since the introduction of these large doses of ipecacuan, the number of broken down dysenteric invalids in India has been very notably reduced. When the bowels are steadied by this treatment, then quinine in combination with iron may be systematically followed out for some considerable time. The reader will remember that in speaking of the relations of anæmia to specific affections, much stress has been laid upon the necessity for combining with the iron the specific remedy for each form of anæmia (§ 57). Consequently, in treating the malarial cachexia, quinine must be given freely along with the chalybeate; or if it be not tolerated, arsenic may be substituted for the quinine. But it is highly desirable that such patients be also sent away from malarious to healthy districts. They must also be careful about their food and drink. Pure water, pure air, nutritious food, especially milk, are all indicated as important matters. The clothing should be warm and abundant, especially in cold climates. By these measures combined, a fairly comfortable existence can be secured instead of the miserable condition which obtained of old, where death formed a happy release.

As "brow ague," a form of malarial disease is far from

uncommon in England. Not unfrequently it is regarded as congestive headache, and treated by blisters, evacuants, &c., without any good effect resulting. It can, however, be recognized by its regular recurrence at or about the same hour every day. Full doses of quinine speedily give relief. In frontal headache the young practitioner should always be on his guard as to the possibility of its being "brow ague;" and by his recognition or non-recognition of it he may seize or lose a good opportunity for displaying his knowledge. Its true treatment is that applicable to the other forms of malarial mischief.

§ 84. *Cholera.*—This is a matter of no slight difficulty to treat of from any point of view. It is surrounded indeed by difficulties, and has been written about *ad nauseam*. It has been regarded as an evacuation to be arrested by lead and opium, &c. Another view has been to regard the choleraic discharges as an eliminative process, and to encourage them by castor oil. The latest plan has been to look at it from its physiological point of view. Surg.-Major Hall found from observation, including a personal experience, that there was much evidence pointing to the conclusion that there was in cholera spasm of the arterioles, often so great as to cut off all secretion by the kidneys with laboured action of the heart, &c., and much venous congestion ; so that there was great effusion from the portal circulation. Accordingly he injected subcutaneously hydrate of chloral, of the strength of ten grains to the ounce, with very satisfactory results. His observations are to be found in the *Practitioner*, July, 1875, and are well worthy of the notice of all practitioners who are intending to seek their occupation in India and other districts where cholera is rife. The now generally acknowledged starting point of the pathological processes in cholera is spasm of the pulmonary arterioles. (Parkes and G. Johnson.) Elaborate experiments as to how to relax such spasm ending in clinical applications of various agents, as belladonna, &c., have not yet however attained any practical results of moment.

§ 85. In addition to these products of eastern and tropical climates we have certain other specific poisons which do not belong to any special areas, but which are scattered over the face of the globe. Those with which we are most familiar are enteric fever, typhus, relapsing fever, and the various exanthe-

mata. The aid given by physiology and pathology to therapeutics in these affections is very great; but it is not towards the treatment of any one of the group, so much as to the general question of the management of the rise of body-temperature. The various means by which such rise may be brought about, and the different measures by which it may be reduced, have been given at length in Chapter IV., and what is said there will apply to every specific pyretic affection—not being malarial. The general line of treatment is to give mineral acids at frequent intervals.

Ac. Hydrochlor. dil. ℥ v.
Syr. Aurant. ʒ ii.
Aq. ad ℥ i.

every four or six hours is a good form of fever mixture. The use of acids, of sour wines, or of chlorate of potash with lemon juice, or sulphites of soda, has taken the place of the old fever mixtures—such as acetate of ammonia with hyoscyamus—with advantage. As long as there are no complications, to render the treatment accordingly complex, such management may be continued throughout the case. In such complications as diarrhœa, melæna, or a purpuric state of the cutaneous rash, astringents are indicated. In the form of from fifteen to thirty drops of aromatic sulphuric acid, or of a fluid ounce of infusion of hæmatoxylin (in some cases they may well be combined), or of gallic acid or tanin, five to ten grains each, astringents are useful and may be administered at frequent intervals. When a typhoid condition threatens, the different measures given in the consideration of that state in Chapter IV. (§ 38-41) must be exhibited—no matter what the specific ailment with which it is associated. In all ordinary febrile conditions the general rules are to secure good ventilation, efficient nursing, a suitable dietary, a watchful and observant medical attention, ever on the outlook, rather than therapeutic rules of thumb. All these various matters have been given before, and need not be repeated.

§ 86. There are some points which deserve special attention, such as the prevention of pitting in small-pox, &c. A solution of nitrate of silver, a drachm to the ounce of water, is useful, and the surface may be washed with it in preference to Velpeau's

plan of touching each vesicle with a point of the solid nitrate, on the third or fourth day of appearance. A mercurial plaister, consisting of mercurial ointment twenty-five parts, yellow wax ten parts, and black pitch six parts, is useful in semi-confluent cases. The plan of dissolving gutta-percha in chloroform and putting a coating of the solution over the face has not been found to answer. Cold cream and oxide of zinc combined form a good application. Collodion has its advocates, while others rely upon a darkened room to prevent pitting, as the pits are most prominent where the parts are exposed to light. Others cause a light blister to be applied to parts not usually seen, in order to direct the eruptive explosions to these points, and so draw them away from the face.

In scarlatina the throat requires careful attention. With some practitioners it is the rule to give borax in honey, which comes in contact with the ulcerated throat as it dissolves and is swallowed. Others prefer to swab the surface with nitrate of silver solution, ʒ ss. to ʒ i. to the ℥ i. of water. Others prefer chlorate of potash. In the treatment of severe anginose scarlatina personally I have found the following combination give the best and most satisfactory results :—

Pot. Chlorat. gr. x.
Tinct. Fer. Perchlor. ♏ v.
Syr. Zingib. ʒ i.
Aq. ad. ℥ ss. o. 6tâ aut 4tâ horâ.

for a child from eight to ten years of age—the dose to be modified for those above and below that age. The addition of the iron gave better results than the chlorate of potash without it. In scarlatina a cool room and free ventilation in warm weather is most desirable. Coolness is most grateful in the burning sensation of the coming out of the rash ; but when desquamation has commenced the skin, having thrown off an epidermal layer, is extremely sensitive to any change of temperature, and a chill readily results. Chilling is as disastrous, and is to be as watchfully guarded against at that time, as coolness, including sponging with cold water and vinegar, is grateful and beneficial when the rash is coming out, or being well established.

During peeling, too, it is well to have the body rubbed over

with oil containing some carbolic acid; this catches and detains the epidermal scales, which would otherwise become detached, and, floating off into the air, become causes of infection; while the carbolic acid destroys the infecting power. This should be done daily after a warm bath.

In measles the great danger lies in the chest complications being overlooked or not sufficiently attended to. There is in measles much tendency to inflammatory affection of the thoracic viscera, and warm poultices to the chest are as needful in measles as is a cool temperature in the early stages of scarlatina. In fact, in both these exanthemata it must ever be borne in mind that when the rash is either originally imperfectly developed, or is from any cause arrested, the internal complications are apt to become more pronounced; while at other times as the rash fades the internal affection is aggravated.

In both maladies, and especially in measles, there are after effects which must be carefully guarded against. These are most common in patients of a strumous diathesis, and are to be met by cod-liver oil, steel, good food, fresh air in the country, and better still at the seaside. If such measures be commenced in time many unpleasantnesses might be warded off which cannot be arrested if the measures are delayed until the absolute necessity for them becomes imperative. No writing will compensate for the lack of individual knowledge and thoughtfulness on the part of a medical man in the proper treatment of each case, according to its individual exigencies, in those who are emerging from an attack of measles or of scarlatina. The general treatment of the pyretic stage has been laid down in its principles (Chapter IV.), and after careful perusal of these principles the intelligent student will be able to apply them for himself. The treatment of complications will still further test his grasp of principles and capacity to apply them. A bare enumeration of the more common complications and of the measures usually employed in them would not create any clearer impressions, and would be out of place;—if the principles given above in the various chapters do not make the matter intelligible, it is to be feared nothing can be done here but to refer the perplexed reader to different special treatises in which the complications are dealt with at length.

§ 87. *Diphtheria.*—This is an ailment which resembles the maladies described under the head of "blood-poisons" in many of its characters. There is a great tendency to sink by adynamy, and for a sœptic condition of the fluids to obtain. Death as commonly occurs from failure of the powers as from the local mischief in the throat. The membrane in the pharynx may be continued down into the larynx, and so cause death. Personally it has appeared that where nitrate of silver solution could be applied below the margin of the diphtheritic membrane its downward progress was arrested, and so that source of danger at least obviated. But this view is based on a limited experience of the malady. Nitrate of silver ought to be freely applied to the throat. The chlorate of potash and iron mixture given above will often be found most useful. Others prefer carbonate of ammonia and chlorate of potash. Beef-tea, milk, and alcoholic stimulants are very clearly indicated in the treatment of diphtheria. Tracheotomy may be required, and is doubtless too often delayed. In the treatment of the after effects, iron, quinine, bitter beer, generous wine, are all desirable, especially where there is any tendency to paralysis. Diphtheria is not a markedly infectious disease, but if any of the membrane is expectorated and reaches a mucous surface it will quickly spread and develop well-marked diphtheria.

§ 88. *Influenza.*—This is an epidemic catarrh of the air passages with adynamic accompaniments, so that to the aged and the feeble the ailment is sometimes a cause of death. It differs in its characters from simple catarrh, and partakes of the nature of specific pyretic affections. The expectorants and other measures should never be of a distinctly depressant character, and acids, with syrup of squill, are to be preferred.

Ac. Phosp. Dil. ℥xv.
Sp. Chloroformi ℥xxv.
Syr. Scillæ, ʒi.
Aq. ad ℥i.

four or six times every twenty-four hours is a good therapeutic measure. At other times the following mixture may be preferable, especially in the later stages preceding convalescence.

Ac. Nit. Dil. ℥ x.
Sp. Chloroformi, ʒ ss.
Inf. Cinchonæ, ℥ i.

three or four times a day. Influenza is not very much benefited by ordinary cough mixtures, unless of a tonic or stimulant character. Headland is in favour of treating it with vegetable acids.

§ 89. *Dengue or Dandy Fever* is a disease of tropical climates characterized by suddenness in the attack, a scarlet rash, with intense pains in the joints, simulating acute rheumatism. It occurs in remissions, and has been by some regarded as of a malarious nature. It does not however appear to be amenable to quinine like malaria in general. The method of treatment most approved of is to give emetics, and then purgatives, consisting of sulphate of magnesia and senna, with a little jalap. The free discharge of bile is followed by much relief to all the symptoms. When the attack is over tonics, such as quinine, strychnine, and steel, are indicated.

As to the terrible tropical fever, "Yellow Jack," it does not appear that any light has been thrown upon it which gives therapeutic indications of any kind. The yellowness of skin has been ascribed to liver complications, but this has given no clue as to the treatment to be pursued. It is a very curious fact that yellow fever never obtains beyond a certain latitude. If the fever-stricken ship can reach a certain latitude its crew are safe.

§ 90. *Pertussis, or Hooping Cough*, comes under the heading of specific poisons. It is an infectious complaint usually confined to the earlier years of life. It is characterized by disturbances of the respiratory nerves of a spasmodic character, and is a most troublesome affection. An emetic at bedtime often renders the cough less persistent in the night. Many remedies of an anti-spasmodic character have been tried, and of these bromide of potassium, or ammonium, in free doses is the best; but none are entirely satisfactory. When much emaciation is the consequence of the cough, leading to vomiting, the best thing to be done is to feed the child immediately after it has been sick, with milk, beef-tea, &c., so that the ingesta may be assimilated

ere the next attack comes on. Perhaps this is the most important part of the treatment of hooping-cough. Opinions differ as to the value of belladonna in pertussis. After the true ailment is over, usually lasting about three weeks, a convulsive cough often remains, the consequence of habit upon the different nerves implicated in the act of cough. Here quinine, steel, good food, and fresh air are indicated. It is often well to give the quinine in hydrobromic acid.

§ 91. *Erysipelas.*—This is an affection about which there is much confusion. True erysipelas is a well-marked form of pyretic disease characterized by much adynamy, and not rarely by distinct blood-poisoning. It is especially fatal to persons of broken-down constitution. It is usually found in the neck and head. In such erysipelas, tonics, stimulants, and half-drachm doses of the tincture of perchloride of iron every four hours, together with milk and nutritive food, form the best line of treatment. As external applications flour, oxide of zinc, and other powders, or cotton wool, are useful, while others prefer warm solutions of lead and opium. The tendency is to death from asthenia ; and if a typhoid state sets in the aspect of matters is very gloomy.

A totally different affair altogether is the erysipelas which sets in near injuries to the skin. This is not dependent on a specific poison—it is a true *dermatitis.* It is apt to occur in persons whose vaso-motor nerves are much shaken by excessive consumption of alcohol. It is to be treated by cooling medicines and applications of lead and opium, or of the solid nitrate of silver around the blush, which often arrests its spread.

At other times erysipelas is of a wandering character, and is seen in scrofulous children. It commonly travels from head to foot and back again, and, according to Lugol, is often followed by general improvement in the condition of the child. In one case which came under my notice such certainly was the consequence.

When phlegmonous erysipelas occurs it is a very serious affection. It is a dermatitis with rapid formation of pus in the subcutaneous areolar tissue, usually of the limbs and of the intermuscular planes. It is ordinarily casually connected with grave and fatal blood-poisoning; and when so occurring it

requires all the stimulo-tonic measures and antiseptic treatment that are available: too often with no good results. At other times, when rather a localised disease than an expression of a general condition, recovery takes place; but only after long and terrible incisions made for the purpose of evacuating the different *dépôts* of pus which form so freely in this malady. Carbonate of ammonia, wine, steel, beef tea, milk, &c., are all requisite in unstinted quantities, in order to give the system a chance of tiding over the period of peril. In a case of carbuncular inflammation of the lip the pronounced asthenia setting in was successfully combated by the resort to digitalis in addition to the measures just mentioned.

CHAPTER X.

ACUTE AND CHRONIC DISEASE.

§ 92. THERE are many reasons why a chapter should be devoted to the peculiarities of acute and of chronic disease—contrasting with each other as they do—and to the consideration of their relations. We shall find that acute disease of a part may persist in a chronic form; we shall also find that chronic disease has a tendency to assume an active form, at certain times and under certain circumstances. From the consideration of these matters we shall be enabled to see how to so conduct acute disease as to reduce to a minimum the tendency for it to linger in a chronic form; and also how to treat chronic disease so as to obviate to a great extent the assumption of acute manifestations.

Acute disease is a brief affair, which, if survived, often leaves the system but little altered. For the most part it consists of acute inflammatory conditions or zymotic affections; but it is not confined to these two genera of disease; it may result from some brief passing condition, as shock, disturbed innervation, &c. The indications most manifest are such as point conclusively to the imperative necessity for tiding the patient over the dangers of the hour. In a few days the danger to life usually passes away; sometimes, however, not until the existence of the individual has been most gravely imperilled, and the question of a satisfactory convalescence has been made a complicated matter. In the phraseology of the past, our duty in acute disease is to obviate the tendency to death. In order to do so with anything like an approach to success, we must clearly distinguish the side upon which death is threatening. Having

recognized the nature of the most imminent danger, it then becomes practicable to select measures calculated to arrest, or modify the impending risk to life. At one time a patient may seem to be sinking from sheer pain. The condition is that of cold extremities, a small or failing pulse, of agonized features, and a general approach to collapse. The impression made by the painful sensations upon the nerve-centres is such that a condition not widely different from that of shock is induced. Indeed, there is little difference betwixt the condition produced by severe burns, inflammations of serous surfaces, not in other ways immediately dangerous to life, and that induced by tortures or punishments deliberately inflicted for any purpose. There is a certain amount of nausea involved in the pain which is apt to be fatal. It is that form of pain which follows when a cricket-ball strikes a batsman on the genitals, and which is quickly fatal when prolonged, as in the form of murder not uncommon in India, where the testicles are firmly grasped until the victim is dead. The pain would seem to arrest the action of the ganglia of the sympathetic, and first to cause syncope and then actual death. It is especially associated with affections of the viscera, and differs from the pain produced by neuralgia or affections of the limbs, especially those osteal affections which are very painful. It is perhaps in degree rather than in kind that these pains differ, for collapse is not rare under the punishment of the lash, and the severe agony produced by the torture of "the boot," as in the case of Macbriar in *Old Mortality*, so vividly sketched by the author of *Waverley*. In despite of the stern and unflinching heroism of the man, syncope followed a certain measure of torture. We are not yet in a position to know or to be able to estimate how far such syncope and unconsciousness may not be directly preservative when acute agony is present. Unconsciousness may be the only means of averting death, or it may be an approach to death—a difference of degree only.

When fainting results from a brief temporary pain, as the extraction of a tooth, or the opening of an abscess, it may be safely left to itself. A few minutes in the recumbent posture is usually sufficient to restore consciousness. The patholgy of syncope is this. The heart fails to propel the blood into the encephalic vessels, there is a state of acute cerebral anæmia

induced, and failure of brain function follows, accompanied by loss of motion and of sensation. By the latter relief from suffering is obtained. When the causation is but temporary, the effect is but brief, and the heart soon commences again to beat. As soon as the arterial blood once more courses through the brain, functional activity returns; this is much aided by the recumbent posture, which permits the blood to run through the head equally with other parts, instead of having to be lifted up by the ventricular contraction, as is necessary when the head forms the highest point of the organism. At other times, when the pain is less acute and more persisting, as in the passage of gall-stones, for instance, a condition is induced which is rather that of imperfect or partial shock, where unconsciousness is not reached. Such is the consequence of severe pain, which we are often called upon to relieve or treat. Our principles of treatment run as follows. In acute shock, or syncope, stimulants, the more rapidly acting and diffusible the better, are indicated. Sal volatile, eau de Cologne, alcohol, or spirits of chloroform are all useful and serviceable. The following combination is very frequently desirable :—

Am. Carb., gr. v.
Sp. Chloroform, ℥ ss.
Aq. ad ℥ i.

It may be repeated. A teaspoonful of sal volatile forms a pleasant stimulant in water. When the patient is unconscious the fumes of ammonia are very useful. One point, however, must be borne in mind in connection with the holding of a bottle of ammonia to the nostrils of a syncopal patient, and it is this,—the unconscious patient cannot turn away the nose from the fumes, and if the bottle be held too persistently to the nostrils, inflammation of the air-passages may be caused.

When the condition is that of partial or imperfect shock, as in the condition which obtains in the passage of gall-stones, of calculi along a ureter, or inflammation of that great serous surface, the peritoneum, it is a matter of question how far stimulants are desirable. They will arouse the patient to a fuller and more vivid consciousness of his suffering; but this is itself undesirable. Under certain circumstances it may be

necessary to rouse an individual out of lethargy, even if acuter comprehension of pain be the consequence, as in accidents, where the sufferers must be moved. Here stimulants may be indicated. When the patient can rest in bed, the more rational plan is to deaden the receptivity of the nerve-centres by full and repeated doses of opium. The whole question of analgesics and narcotics will be given in a subsequent chapter, to which the reader is referred. (Chapter XIII.)

Where violent pain exists, very large doses of opium are borne with impunity—the two being antagonistic in action. As soon as the pain is relieved, the opiate must be stopped, or much reduced in dose, else fatal consequences may follow.

§ 93. At other times death may threaten from hæmorrhage. The bleeding may be continuous, as in the oozing from persons of a hæmorrhagic diathesis, or it may be from some larger vascular trunk. Whenever it is practicable, pressure must be applied to the bleeding part, in accordance with rules laid down by the surgeon. Where pressure can be applied by ligature, tourniquet, or finger, arterial hæmorrhage can always be controlled. Sometimes the actual cautery may be indicated.

In other cases, such as hæmorrhage from viscera, far different means are alone feasible. They consist of astringents, styptics, &c., as alum, perchloride of iron, zinc, acetate of lead, opium, matico leaf, &c. These may be given internally, or, if the bleeding can be reached, applied locally. Cold is often of the greatest service in the treatment of severe hæmorrhage. It may be given by the mouth, injected by the rectum—in impassable urethral stricture, from congestion, packing the rectum with ice soon gives relief from its effect upon the blood-vessels,—or applied locally, as to the right groin in the hæmorrhage of typhoid fever. At other times it may be necessary to resort to venesection, especially in hæmoptysis. In the well known case of George the Fourth, this was the only measure which arrested the hæmorrhage from the lungs. When bleeding is the result of high blood-pressure, venesection, or its equivalents, viz., bleeding the patient into his own vessels by vascular depressants, are the measures clearly indicated.[1]

[1] In a case of hæmoptysis recently (February) under care, the cutaneous surface and the hands and feet were very cold. By putting the patient to bed

In hæmorrhage stimulants are highly undesirable. The syncope which checks the hæmorrhage is a condition of arrest, more or less complete, of the ventricular chambers, with low arterial tension. When a stimulant is given, and especially an alcoholic one, then the heart's action is restored, blood is pumped into the elastic arterial system, and then the bleeding recommences. This goes on till syncope is again induced with arrest of the blood-flow. More stimulants are given, the pulse returns, and with it the hæmorrhage. This goes on until the system will no longer react to the stimulant, and so the organism is preserved; or it may, and it is to be feared often does, result in fatal loss of blood. This last untoward result is attained when the persons around the patient are sufficiently wilful and ignorant—or frightened out of their wits, and so rendered murderous in their well-meant but unfortunate measures. When the young medical man is called in to such a state of matters he must be prepared to find his plan of intelligent withdrawal of stimulants meet with a stern and indignant reprobation from the alarmed friends. To see the poor patient pale, blanched, unconscious, and tossing his, or more often her, arms about, and to withhold stimulants, to leave the poor thing in a drenched bed, cold and chilled, and not only that, but often to apply ice or cold to the gelid creature, seems heartless and repulsive. Often, indeed, in their sentimentalism, the affrighted friends would prefer a sympathetic meddlesomeness, even if the results are disastrous. It may be difficult to pursue a rational course under these circumstances, and, unmoved, to turn a deaf ear to the entreaties, but in the interest of the patient it must be done. In hæmoptysis, or hæmatemesis, ice may be applied externally over the chest, or to the epigastrium with advantage. Small chips of ice with astringents may be given—but cautiously. If the bleeding is in the stomach, any distension of it will be apt to dislodge the clot and start up further hæmorrhage; if from the thorax cold ingesta need not be so cautiously withheld, but vomiting must be avoided, as that might at once reinstitute

and packing her with hot bottles, the blood-vessels of the external area were dilated, the pressure on the pulmonic circulation relieved, and the hæmoptysis ceased. The case did well.

the blood-flow. When the flow is from a hollow viscus, ice or cold water with astringents may be injected.

Plugging is only permissible in uterine hæmorrhage, and that too when the uterus is either unimpregnated or only at the early months of gestation; otherwise the internal hæmorrhage which results is dangerous and not rarely fatal.

Quiet and cold are the great requisites in the treatment of hæmorrhage. Teaspoonsfuls of salt are a measure which may be resorted to when other remedies are not at hand, or are not available.

At other times there may be free discharges, usually from the bowels, which may threaten the existence of the individual. In such cases it often happens that the measures resorted to must be very vigorous. When diarrhœa is colliquative and profuse, the combination of stimulants and astringents with opium is clearly indicated; the first two in no measured quantities. The combinations in most use in such cases are the following:—

Am. Carb. gr. v.
Tinct. Opii, ℥x.
Inf. Hæmatoxyli, ℥i.

every three or four hours. At other times the combination of the logwood with acids is indicated:—

Æth. Sulph. ℥xx.
Acid. Sulph. Arom. ℥xx.
Inf. Hæmatoxyli, ℥i.

with or without opium, may often be given with advantage. At other times acetate of lead with opium in pill may be given, especially when there is much tendency to vomiting, and the stomach rejects readily anything which distends it. The young student will not give acetate of lead along with mineral acids, especially sulphuric acid, as the insoluble and inert sulphate of lead would be thus formed in the system, but will substitute sulphate of copper for the lead. Colliquative sweats often endanger life. They may be met by the measures given above, or by quinine and sulphuric acid, or again by the free use of phosphoric acid. Ringer has pointed out the efficacy of bella-

donna in profuse sweating, which is indisputable. It may be applied locally with advantage, as well as given by the mouth. Ten drops of the tincture three times a day, or oftener, will not uncommonly arrest or greatly diminish profuse perspiration; or atropine, from an eightieth to a fortieth of a grain in pill at bedtime, is often very good. Oxide of zinc in two-grain doses at bedtime often checks colliquative sweating. (Ringer.) It is commonly given along with hyoscyamus, which is not without a value of its own.

§ 94. At other times death threatens from impending stoppage of the heart or of respiration. When the action of the heart is failing, stimulants of any and every form are indicated. Those given in § 91 are applicable here; and very often they may be advantageously combined with digitalis or belladonna. Failure of the circulation is one of the commonest causes of death in diseases of the respiratory organs. The obstruction offered to the flow of blood through the pulmonic circulation produces distension of the right heart: as the ventricular chamber becomes over-distended so its power wanes, and then exhaustion threatens. In such cases there is a fast, compressible, and irregular pulse, becoming gradually intermittent, and after death the left ventricle is found small and contracted, and the right ventricle distended and full of black blood. The administration of digitalis in these cases often averts a fatal result. The pulse just described is the measure of the condition of the right heart really, not of the left;—which keeps time with the right side and passes on the amount of blood which comes over to it. When digitalis is given here, the right heart contracts more powerfully upon its contents as it recovers from its over-distended condition; once more a fair amount of blood is passed over to the left heart, and the pulse becomes fuller; the right ventricle on recovering its normal size contracts less frequently, consequently the pulse is not so frequent; the arterial system becomes better filled with blood, and, correspondingly, the venous system is not so much distended, and a general improvement results. Again and again will a fatal result be averted, when threatening from failure of the right side of the heart, if digitalis be given along with diffusible stimulants. Hot poultices to the chest, especially if dusted over with mustard or capsicum, will often aid in giving relief to this condition.

At other times death threatens from the side of asphyxia. Thus it occurs in pneumonia, especially when the space of lung remaining unaffected is insufficient for the purposes of respiration; or it is present in bronchitis when the air tubes are filled with mucous secretion, and the chemical interchanges conducted in the lungs are becoming arrested. Under such circumstances a condition of the gravest peril is induced. The action of the skin may be called into play by the different measures enumerated in Chapter III., and the compensating effects of exhalation from the cutaneous surface may be secured. If there be much accumulation of mucous in the air passages, vomiting may be induced, and in the worst cases, when apparently the very effort of vomiting would seem enough to asphyxiate the exhausted patient, emesis is followed by such cleansing of the air passages that a little sleep is secured, and the turning point is safely passed. Especially is this true of children, and the young practitioner must never be deterred by fear from trying the effects of emetics in the bronchitis of children. They can do no harm, and often do much good. As an emetic, sulphate of zinc combined with ipecacuan wine has proved in the writer's hands a very efficacious remedy: much better, indeed, than either singly. If the case is very desperate, irritation of the fauces may be resorted to, and the finger is much better than a feather. Of the more special matters of diseases of the respiratory organs and of failing circulation, they will be discussed at length when the diseases of these systems are considered. (Chapters XIV. and XV.)

Death may, and often does, result from collapse, and oftener from an exceedingly high temperature. These conditions and their indications for treatment have been given at length in Chapter IV. (§ 37, 41–44), and to them the reader must refer.

§ 95. *The Theory of Stimulants.*—There is nothing with which, as medical men, we are more familiar than the fact that there are agents which possess what is termed stimulant properties, *i.e.*, they produce a distinct effect in calling out more marked evidences of vital action. Under the influence of a stimulant the pulse rises in frequency, while its beats are more powerful; the extremities become warmer, the cheek flushes,

the eye brightens, the thoughts flow readily, and the hesitating tongue is loosened. Such are the ordinary phenomena of limited stimulation by alcohol. It is in watching the effect of alcohol that we are most familiar with the action of stimulants. Other stimulants, as ammonia, spirits of chloroform, æther, Cannabis indica, &c., produce like but not identical effects. In speaking of ammonia, Ringer says, "Ammonia induces a slight increase in the force of the pulse, some excitement of the brain, and a general sensation of warmth. Being a slight stimulant to the heart, ammonia is used in fainting and exhaustion. Ammonia is frequently administered as an antispasmodic—an action depending probably, in part, on its power to strengthen the heart's action, but, like all other anti-spasmodics, its influence is but brief." There is also a distinct rise in the force and frequency of the pulse after taking a dose of spirits of chloroform, or of æther.

In considering the action of stimulants there are two points that strike one strongly: they are (1) the effect upon the heart, and (2) the effect upon nerve cells. How far the first effect depends upon the action of the stimulant upon the ganglia of the heart is not yet demonstrated; but at least it is probable. There is certainly an increase in the vigour and frequency of the contractions of the heart after the administration of a stimulant, and this may take its origin either in direct stimulation of the cardiac ganglia, or in some remote action upon the complex nerve supplies to the heart. From the readiness with which stimulants act, the first seems the more probable. Certainly they do affect the heart, and powerfully, as is seen in their administration in fainting. In addition to this effect upon the heart there comes the action upon the cerebral cells. That the cerebral cells are influenced by stimulants is unquestionable; but whether this effect is produced by some direct effect upon the cells, or merely by an afflux of arterial blood, or both combined, is not yet quite settled. We know that the functional activity of the brain is in direct proportion to its blood supply. In stimulation it is not yet ascertained whether it is an afflux of blood to the cerebral cells which heightens their activity, or there is a condition produced in the cell which induces it to attract more blood to itself. Probably both factors act. The

capacity to attract more blood would exercise but little effect if an increased supply of blood were not forthcoming in answer to the demand: while an increased blood supply to a part would have but little effect if the tissues did not have an increased capacity to attract blood. In the case of alcohol it has been shown by Dogiel that along with increased action of the heart there is also dilatation of the carotid arteries, and, thus, an increased blood supply to the brain. There is also increased functional activity of the brain. If the stimulation be considerable, a condition of intoxication is produced.

In intoxication we find several stages. At first, "The effect of this increased blood-flow through the brain is to cause the brain to be more active. The thoughts flow rapidly, the halting speech loosens into eloquence; coldness of feeling gives way to affection, passion, or sentiment; despair becomes blended with hope, courage is reanimated; difficulties melt away, and the impracticable is almost realized. These are the sensations which have impelled men in every clime to devise some means of exalting the nervous life; and a fearful price is paid for it. Soon the ready speech grows muffled, the thoughts confused, the impressions blurred; the higher feelings become submerged under the rising animal impulses; hope becomes a disfiguring conceit, courage merges into recklessness and boasting, exhilaration into boisterousness, and sentiment into maudlin. At last the human frame lies unconscious, powerless; all is oblivion; the awakening is, however, a grim reality."[1] At first there is increased functional activity of the brain, and at this stage there is an increased blood-supply to it. There is, too, every reason to believe, as said before, that the cerebral cells are themselves stimulated into increased activity while the afflux of arterial blood renders such activity feasible. After much activity of the cerebral cells there comes on exhaustion. At first the nerve actions cease to be perfectly co-ordinated, the action of different parts is no longer accurately adjusted, and the more complex movements, as talking and walking, are impaired. An effort of will can, however, supply what is wanting or defective in the ordinary automatic action, and the appearance of sobriety may be maintained by an effort: but this is only so

[1] *The Maintenance of Health*, p. 150, 1874.

long as a certain point is not passed. After that, all the most active cerebration then possible is insufficient to produce co-ordination, and then is exhibited the spectacle, far from uncommon, of an intoxicated person, conscious of the condition which obtains, making the most determined efforts to maintain an equilibrium or to walk steadily, without the desired result being obtained. A little further on and all volition is abolished; and the medulla oblongata is alone in action, carrying on the circulation and respiration. At the time that the manifestations of brain activity are beginning to flag, the carotids are found to contract—not to their normal calibre, but to something below it, to a calibre less than normal (Dogiel). There is less arterial blood passing to the brain than in its unstimulated condition. At the same time the peripheral vessels of the system generally are dilated, and so there may be a withdrawal of blood away from the brain, as well as a diminished demand for it on the part of the exhausted cerebral cells. But when the functional activity of the brain is flagging, and pronounced intoxication by alcohol is present, the administration of ammonia will usually produce sobriety. That is, it will restore such a condition of brain as is compatible with comparatively sober action. It is not supposed by anyone that ammonia exercises any antagonistic action upon alcohol within the system, except such as Fraser, Hughes Bennett, and others have demonstrated to exist betwixt certain agents, as belladonna and calabar bean for instance, that is, an antagonistic physiological action, not a chemical action of neutralization. When, then, the cerebral cells are exhausted, and the arterial blood supply to the brain is impaired, and the venous radicles of the brain are probably full of blood, the administration of ammonia excites the cells into action, increases the supply of arterial blood, and with it the circulation through the brain, including the venous radicles, and so restores a condition of brain activity. That is, one stimulant will produce an effect when the nervous system has been exhausted by the action of another stimulant. A condition of exhaustion of the nervous centres having been artificially produced, then another stimulant is given which again rouses them into action. It must ever be borne in mind that conditions of exhaustion require doses of alcohol which under ordinary circumstances would

produce a drunken state, in order to procure the desired stimulation.[1]

§ 96. There are one or two points to be further alluded to in this account of the history of a fit of intoxication. One is the readiness with which intoxication is produced after long abstinence from food. Every one knows how swiftly the first stages of intoxication pass into the more advanced ones when there is no food in the stomach. Further, we are equally familiar with the fact of the power of a good dinner to endow a man with capacity to "carry" alcohol. It is well known that when a man who has long drunk hard, but with his assimilative powers unimpaired and appetite keen, begins to diminish the amount of food, that man "is giving way," as it is termed, or in other words, that his capacities are becoming impaired. To what does all this point? To me it indicates that when pabulum is freely offered to the cerebral cells during alcoholic stimulation they do not become exhausted readily—that the advanced stages of intoxication are not so easily reached. Especially is this the case when coffee and tea are taken amidst the alcohol. These agents act upon the vaso-motor centre and excite the heart into firmer contraction, while the peripheral vessels are induced to contract, or maintained in contraction, and so the blood-pressure in the arteries is increased and the blood-supply to the brain sustained. The whole of the arrangements of a dinner-party are so constructed as to enable the guests to take a maximum of alcohol with a minimum of risk of the earlier stages passing into the later stages of intoxication. In consequence of the abundant supplies of nutriment in the system, the tired nerve-cells are well nourished during the sleep which follows, and in the morning they are again ready for work. They may be played upon by alcohol with comparative immunity if they are well fed, and the effects of stimulation repaired by good supplies of nutrient material. In fasting, however, it must not be forgotten that alcohol is most quickly absorbed by the stomach.

[1] When exhausted the system will tolerate with only good effects doses of alcohol which would in unexhausted states produce advanced intoxication; and at critical times the amount required is far beyond what is ordinarily prescribed.

If, however, the stimulation has gone on to the latter stages —whether to a greater or less extent it does not matter, it is a difference of degree merely—the effects are well demonstrated next day. The nervous system is unstrung, the hand is tremulous, the thoughts are erratic, the emotional condition is that of depression, the digestive powers are impaired, the secretions are scanty or depraved, and the capacity for labour of any kind is diminished. There is craving for fluids—the temperature is generally high—and a desire to remain in bed, the consequence of the feeling of exhaustion. If it be absolutely necessary to get up and go about the duties of the day, further stimulation by alcohol is usually unavoidable. If this condition of excessive drinking at nights, followed by resort to alcohol early next day, be continued, a condition of systemic exhaustion, or approaching physiological bankruptcy is induced. The vital powers are so exhausted that what would otherwise be trivial demands upon the system become important; and what is termed the resistive power of the system is lowered. Slight acute attacks in such systems commonly lead to fatal results.

§ 97. Such are the consequences of chronic alcoholic indulgence, of persistent stimulation. They will enable us to comprehend all the more clearly the points to be attended to in the administration of stimulants when it becomes desirable to prescribe them medicinally. One of the first lessons taught is this. The stimulation must bear a distinct relation to the forces of the system on the one hand, and to the habits of the individual on the other. If the stimulation be out of proportion to the forces of the individual, stored up in a static form—the reserve fund of the system on which we subsist during enforced starvation—then exhaustion is directly induced; the strength is called out in useless displays of energy, and dissipated ere the hour of need arrives. This is very common in the over-stimulating present time. It is seen in the exhaustion produced, amidst the ignorant lower classes, in parturient women, whose energy is dissipated by draughts of alcohol during the first stages of labour; and then, when the second stage arrives, the strength that should have carried them through the active efforts then required is gone, having been wasted when useless and

inoperative. This is equally obvious in the process of stimulation by alcohol and beef tea in the early stages of acute disease, especially fevers, when an officious attendant dissipates the body reserve-fund ere the hour of need has approached. When the time for resort to stimulants comes, the force the stimulant can, and otherwise would evoke, is wanting, and the patient sinks—slain by good intentions. If the reserve-fund cannot be maintained by supplies of easily-assimilable food, to some extent at least, stimulation is exhausting, and should not be resorted to prematurely, nor be unduly persisted in; the time may and often will come, when it may be simply "neck or nothing," when a point must be rounded at all risks. If the reserve fund has not been unduly drawn upon, success is often practicable; but if it has been already dissipated, then success is no longer feasible.

In the same way individuals who have rendered themselves physiologically bankrupt by chronic stimulation readily sink under the demands of acute disease. In such persons stimulants have to be given in enormous quantities to produce ordinary effects, and then, too, often without the desired results being attained. There is a close analogy betwixt the condition of these last-mentioned individuals and those whose stores of energy have been dissipated by stimulants in the early stages of acute disease.

§ 98. In attempting to fairly estimate the action of stimulants, and especially of alcohol, one point it is of the utmost importance to remember. It is this—alcohol is a food! If alcoholic stimulants were mere disengagers of static force, early exhaustion would be the rule. But as alcohol is a readily oxidizable form of hydro-carbon, it is also a food as well as a stimulant. In fact it is one of the most easily assimilable forms of food, and very frequently it can be taken and utilized when no other form of food is available. While it is a stimulant, an evoker of force, it also supplies to some extent that force in its readily oxidizable self. The recent experiments of the late Dr. Anstie and Dr. Dupré have placed beyond all question, or honest doubt, the fact of the oxidation of alcohol within the organism. If alcohol is oxidized in the body, then alcohol is a true food or furnisher of

force.[1] It is of great importance to have definite ideas on this head. In administering alcohol as a stimulant we also give a food; if it were not so we should often exhaust the patient whom we really conduct through a time of peril into the haven of convalescence. When other stimulants, as ammonia or ether, are given, we must remember that they are not foods, and their administration must be accompanied by food and alcohol.

Beef-tea is a useful stimulant, but it is only to a very slight extent a food. As ordinarily given, it is scarcely a food. It contains nothing out of which tissues may be built, for its products are too far advanced for histogenesis: while its oxidising power is so small as to furnish little or no force to the system. Beef-tea as a stimulant is much abused, to the detriment of sick persons.

Alcohol, being at once a stimulant and a food, naturally takes its position on its merits as the agent required *par excellence* for the treatment of acute disease in its later stages, and also for the inauguration of convalescence. It can be combined with readily assimilable forms of food, with milk, farinaceous preparations, especially when given along with infusions of meat; and as such is an excellent agent. It furnishes by its stimulant properties that condition of the system which is necessary to the assimilation of other foods. What those stimulant properties consist in we have just seen. There is an action on the heart by which its activity is increased, and a more rapid propulsion of blood into the arterial system achieved. There is also an action upon the peripheral arterioles, which still further aids the rapid flow of arterial blood. This is seen in the effect produced by alcohol upon the encephalic circulation, upon the kidneys, and upon the skin. There is also, as seen in Chapter II., § 18, an action produced upon the lining membrane of the stomach, whose vascularity is increased by alcohol. There is every reason to believe that a condition of hyperæmia of the organic nervous system is induced by alcohol, similar to its action upon the cerebro-spinal system. Indeed, it is strange if the organic nervous system alone escapes from the action of alcohol upon

[1] "It is essential, in order that the organism should continue to exist, that it be continuously supplied with free oxygen and oxidizable substances. The latter are called *the organic constituents of food.*"—Hermann's *Physiology*, p. 2.

the arterioles. As a condition of arterial vascularity is intimately associated, causally associated indeed, with functional activity, there is, in the absence of direct proof, every reason to believe that stimulants, and especially alcohol, act upon the organic ganglia, and increase the activity of the organic processes. By means, then, of the combination of stimulants with easily digestible food, we secure assimilation in debilitated conditions, while we procure a loan from the reserve-fund of body force, and so we are enabled to tide our patients through times of peril, and to inaugurate a satisfactory convalescence. As convalescence proceeds, the stimulation gradually gives way to liberal supplies of food, and to the action of those agents termed "tonics."

The effect of alcohol upon the cutaneous vessels is such as to produce a free blood-current through the skin, and so to get rid of some of the excessive heat in high temperatures. This action is often very beneficial, and, added to the other effects of alcohol, points to its eminent usefulness in the treatment of acute conditions associated with high temperatures: alcohol also diminishes the chemical interchanges. This action upon the skin is much affected by the influence exercised by the other remedial agents given along with alcohol, and so its use in pyretic conditions, or apyretic conditions can be regulated, and the maximum of good effects secured.

The proper combination of alcohol with food and with tonics as the convalescence proceeds is a matter involving thought in each individual case. Very often the necessity for the administration of alcohol, except at meals, becomes abolished, but the custom lingers from the liking for the effects of alcohol, or from want of attention to the case on the part of the medical attendant. There is, unfortunately, much reason to fear that in some cases habits of indulgence in alcohol have taken their origin in some carelesness or want of caution in the medical man, who permitted the imbibition of alcohol to continue after it was no longer indicated. In early convalescence a glass of wine and a biscuit during the intervals of meals may be very proper, and be clearly indicated; but as the digestive powers become restored, and a larger bulk of food can be assimilated at one time, such irregular meals become less necessary. But

too often the glass of wine remains, and is taken before or after a walk or a drive. "You had better have a glass of wine, dear, before you go out; you are not strong yet;" has laid the foundation of many a ruined life. The alcohol is, however, not only permissible at meals, but is desirable, and may take the form of sound malt liquor, or some generous wine. But as a rule there should be no other consumption of alcohol except it be at bedtime, when it may be taken for its direct hypnotic qualities. The effect upon the cerebral cells is first to gently excite them into action, and especially to produce that pleasant emotional condition associated with a sufficient supply of arterial blood to the posterior cerebral lobes, and after such a condition sound sleep, either dreamless or free from unpleasant dreams, is achieved. Too frequently at bedtime the cerebral cells are wearied, and evoke *triste* or deeply-shaded thoughts as the outcome of their anæmic condition, and unhappy impressions tint the dreams and take away from the good effects of sleep in the convalescent. A draught of alcohol dispels the gloomy thoughts, and in this agreeable emotional condition sleep comes on, and is sound and refreshing; and no shadow of unhappy dreams is projected across the waking thought of the morrow. That dilatation of the encephalic vessels which is part of the first action of alcohol is quickly followed by the dilatation of the vessels of the body generally; and this is succeeded by contraction of the carotids and lessened cerebral activity, and in this condition of cerebral anæmia sleep comes and wraps the patient in oblivion.

The two chief dangers to be kept carefully in view in the medicinal use of alcohol are these. Firstly, the administration of alcohol during the acute stage of the disease, and when there is great exhaustion, at times produces great gastric irritability. This leads to much evolution of gas in the stomach; this accumulates, and, by pressure, interferes both with respiration and the action of the heart. The patient is extremely ill, and another dose of alcohol follows, which aggravates the condition. In such cases alcohol should not be given by the mouth; it is doing more harm than good. Only the blandest matters should be taken into the stomach, and the brandy should be administered per rectum. This is the great immediate danger in the use of

alcohol. (The risks of too early and of excessive stimulation, whatever the stimulant resorted to, have been given already in an earlier part of this section.) Secondly, there is a danger of the use of alcohol being continued as a habit. Of course this danger is much greater with some persons than with others. The feelings created by alcohol are such as with some to form a dangerous allurement of a seductive character, and this possibility must never be forgotten by the medical attendant. Drinking habits are commonly attributed to medical advice as the least unpleasant explanation of their origin, by those who are so unfortunate as to have contracted such practice, without any such foundation in fact in many cases. Still there is room for grave fear that in some cases the statement is absolutely true; and that ever such a small proportion of drunkenness should so originate is a matter for deep regret. It may be absolutely necessary in the patient's interests to give alcohol, and freely too, at critical periods; but if this resort to alcohol degenerates into an evil practice, then it may be questioned how far it might not have been well to have let the case take its chance without this remedy, so potent for good or evil. Where the inclination to take alcohol lingers in too pronounced a form it appears to me to be the bounden duty of the medical attendant to warn the patient and the patient's friends, in unmistakable language, of the dangers so incurred. As the convalescence proceeds, and ordinary food can be taken in increasing quantities, the amount of alcohol should be distinctly diminished. In advanced convalescence alcohol should be abandoned, except at meals, and when taken with food, or at bedtime. If indulged in at other times, it may turn out to have been a most unfortunate thing for the patient that the illness was survived.

§ 99. *The Relations of Acute and Chronic Disease.*—There is much that is instructive and suggestive in the careful consideration of the relations which exist betwixt acute and chronic disease. We are all familiar with the tendency for acute disease to become chronic, or rather to persist in a modified form as a chronic affection, and, as such, to require a totally different method of remedial procedure. On the other hand, as Wilks is fond of pointing out, it is a matter of much importance to prevent chronic disease from assuming an acute form. Of the

two certainly the latter is much the more common, especially in the recurrent inflammatory, or other acute ailments of advanced life. The consideration of both forms of the relations of chronic to acute disease is well worthy of our attention.

The most familiar instance of acute disease becoming chronic is the gradual merging of a gonorrhœa into a gleet. At first there is an acute inflammatory condition with pretty profuse cell-proliferation, the result of a sustained hyperæmia. This in time becomes a simple mucous discharge from the affected surface, holding its ground tenaciously, and not readily dislodged by the most persevering treatment. The acute cell-proliferation and hyperæmia have declined into a less active condition, which differs from the first in degree, but not in kind. There still remains a condition of exalted local nutrition, with degradation of cell-products. Instead of a quiet and normal formation of epithelium cells to line the urethral tract, there is a production in excess of mucous corpuscles—imperfectly developed epithelium cells—which forms a discharge from the meatus. The condition is precisely analogous to the chronic bronchitis which frequently follows an acute inflammation of the bronchial membrane. It is often most difficult to get rid of these lingering perversions of nutrition. They may depend upon some peculiarly irritable condition of the mucous membrane; at other times there is some constitutional condition, as syphilis or suppressed gout, which may maintain an abnormally active condition of nutrition in the membrane over which an inflammatory storm has passed, and which has been altered thereby. Certainly the function of either membrane is scarcely compatible with physiological rest.

The methods of approaching the cure of these lingering modifications are various. There are two ways of laying siege to them: (1) general measures, and (2) local measures. To take the last first, there is the plan of applying astringents directly to the diseased surfaces. In chronic urethritis this is easily done. In bronchitis it is more common to try the effect of medicated inhalations, though by means of the spray astringents may be inhaled, and so be brought into contact with the bronchial membrane. Other different local measures may be resorted to under different circumstances, according to the indications

furnished by the exigencies of each case. At the same time general measures may also be resorted to with manifest advantage. In all cases of lingering changes in organs, the result of some acute disease, the constitutional treatment is of the utmost importance. Not unfrequently a condition of low persistent cell-proliferation will obtain simply as the result of general debility, especially in the strumous. There would appear to be a lack of capacity for perfect repair in an injured organ, depending upon general adynamy. In such cases good food, warm clothes, chalybeates, tonics, cod-liver oil, careful attention to the general health, and especially to the primæ viæ, together with a residence under suitable hygienic conditions and favourable surroundings, are indicated. Change of air, especially to some seaside resort, is often most serviceable, though it is not at all easy to say how such change acts. It is, however, a well-established empirical fact. In bronchial affections, or affections of other respiratory organs, a mild and soothing atmosphere is often most beneficial, and residence in a cold region, where the air is also laden with mechanical irritants, is proportionately injurious. At all times it is a matter of the gravest importance to secure for the part as perfect physiological rest as is practically attainable. If the part be exercised, it is almost impossible for it to be thoroughly repaired in a short time. This it is which interferes with perfect recovery in parts whose functional activity is absolutely necessary for the continuation of the existence of the organism. If the vela of the mitral valve could be placed at rest after an attack of acute rheumatism involving the endocardium, we should see much less of the mitral disease so provoked. If we could relieve the kidneys of their labour, an attack of tubular nephritis would soon pass away completely ; but unfortunately this is impossible.

In acute affections of the stomach nutrition may be effected by the rectum. When there has been an attack of meningitis or acute cerebral congestion, great quiet and inactivity on the part of the brain produce satisfactory repair. When a limb is fractured rest permits of union, and in inflamed joints splints and immobility are the great means for bringing the nutrition of the part back to its normal state. When such physiological rest is unattainable, the progress of a part towards recovery,

when injured or diseased, is far from satisfactory or what we could desire; and such progress forms a strong contrast with the ready repair of parts which can be completely put at rest, and where the process of reparation is not modified by that hyperæmia which is necessary to functional activity.

At other times a general condition may obtain that interferes with the repair of any part which has been affected by acute disease. Such conditions are notably found in gout, rheumatism, and probably syphilis. The local action is modified by the constitutional condition, and a state of persistent activity is kept up, which is most undesirable. Whenever it becomes manifest that there is such a general condition, and that this is the reason of the intractableness of the malady, then it behoves the practitioner to appeal to that general condition, to treat it, and so to remedy the local affection. Experience has taught me the value of the recognition of constitutional conditions in the treatment of persisting local affections: and the recognition is usually the first step towards satisfactory treatment.[1] Of course, at times the exactly correct treatment is accidental and fortuitous in its origin, and then the *rationale*, the connection of cause and effect, is not so palpable.

By such measures and means as have just been detailed do we strive to improve an injured organ and to secure for it complete and perfect repair—with more or less success. Our distinct aim is to give the injured part the best opportunities for repair by freeing it as far as possible from any functional activity that can be spared, to secure for it physiological rest as far as is practicable; and at the same time to aid the reparative power of the system by placing it under the most favourable conditions, hygienic and other; and improving the general nutrition so as to enable the reparative processes to be carried on in a thoroughly efficient manner. In fact we try to "level up," to bring all parts to an equal condition of perfection.

§ 100. At other times, however, a very different plan of action must be adopted. Health, practicable health, consists in a balance of parts in power as well as in function. If there exist a distinct disproportion betwixt the body generally and one part

[1] See Sir James Paget's papers "On Gout in its Surgical Relationships" (*British Medical Journal*, May and June, 1875) for some excellent remarks on this matter.

in particular, the existence of the organism is imperilled by that very disproportion. To illustrate my meaning I may adduce this instance: A person has got a heart far advanced in fatty degeneration, and yet is generally active and vigorous. Such a condition not rarely obtains as the consequence of disease of the coronary vessels. His muscular efforts and capacity to exert himself are much more liable to bring that heart to a standstill from sheer adynamy, than is the case in another who is a general invalid, and therefore less liable to tax his degenerated heart. The case of aneurism furnishes a precisely similar predicament. No chain is stronger than its weakest link; and practically the capacity of the elastic arterial system to resist distension by the contained blood is lowered to the point of the capacity of the walls of the aneurismal sac. Any rise in the blood-pressure might easily rupture the sac and at once suspend the existence of the individual. Again, if a person be the subject of advanced renal disease, how much more likely is he to survive if the appetite be defective and the assimilation of animal food, especially lean meat, be correspondingly impaired. The instinctive choice of such persons is usually in favour of farinaceous and other non-nitrogenized food. At other times loss of appetite comes on, and so permits of the oxidation of the nitrogenized materials in the body, and consequently of their escape from the system. If these were permitted to accumulate, and instead of natural anorexia the normal appetite remained, the system would be imperilled, and uræmia would threaten; or some other affection, the outcome of lithiasis, would come on, and though essentially a cleansing process, might yet be fatal through its rigour. These losses of appetite in elderly persons with renal disease are often most beneficial, and are not to be regretted; neither should the patient be prevailed upon to drink beef-tea, soups, &c., measures which may be simply destructive. Rest in bed with slops, tea, arrow-root, and gruel, are infinitely preferable. Such rational practice, however, is unfortunately only too rare at present.

How often, too, in our attempts to hasten a convalescence which is progressing satisfactorily, do we not do harm in our well-meant efforts? One such case occurred to me in my early days of practice in Westmoreland. The following extract is

from a paper on "The Preservative Agency of Lowered Vitality," read by me at the annual meeting of the British Medical Association in Newcastle-upon-Tyne, 1870: "About a year ago I attended a young lady for an attack of acute nephritis, with dense albuminuria and general anasarca. Active purgation, the free use of the warm bath, and gentle diuretics (potash and buchu), were producing the most desirable amendment, and in the minds of the consulting physician and myself we felt we were securing a most rapid and satisfactory convalescence. We permitted a moderately free use of animal food. One afternoon the patient felt so well that she sat down to write to the physician to thank him for his kindness, but in doing so she laid the pen aside. She began to feel unwell the bath was resorted to, and active spontaneous catharsis came on, but, in spite of all, uræmic coma with convulsions appeared. I tried B. W. Richardson's plan of bleeding as a forlorn hope. All was in vain, and the patient was soon out of her troubles, leaving on my mind a most painful conviction that if we had only remembered the function of the kidneys and their duties, been more cautious in our treatment, and attempted a more gradual and guarded improvement, this unfortunate result might have been averted." The memory of that young lady often rises up and points the warning lesson very apt to be forgotten, viz., always to consider the physiological function of organs which are the subject of disease; and also never to hastily interfere with the progress of convalescence in well-meant but mischievous attempts to accelerate the rate of progress.

Whenever there is incurable disease in an organ whose function is very important to the microcosm, it behoves a wary medical adviser to "level down," to secure a new equilibrium by reducing the general condition until a balance of parts once more exists; in fact, to insist upon the habits of the invalid. If this can be done sufficiently thoroughly, then existence—an imperfect existence truly—may be maintained for some time (p. 11). If, on the other hand, the general condition bears no relation to the injured part, and that part is an important part from its physiological function, then some sudden catastrophe may be expected to occur at any time, and it may endanger,

and often even cut short, the existence of the individual. In the same way in convalescence from acute disease in important organs, the relation of the organs to the body generally, the condition of those organs, their capacity, the necessity for remembrance of their function, the danger incurred by forgetfulness of these different matters: all must be borne in mind vividly if the management of the case is to be satisfactory and disaster avoided. Very necessary too is it to remember the mutual relations of parts in function in the treatment of various maladies. If in uræmic diarrhœa, for instance, the condition of the kidneys be overlooked, and the diarrhœa be arrested without the normal channel for the excretion of azotised matter being reopened, a general explosion of uræmia may be expected with confidence.

It will not do in practice to aim at too high a general condition in certain systems. Where chronic disease lurks in an important organ it is apt to be overlooked, and that oversight may be fatal, especially when the different viscera are affected. If chronic renal disease or fatty degeneration of the heart be not detected, their importance carefully appraised, and the line of treatment laid down in accordance therewith, sooner or later the grim importance of the oversight will become apparent. Sometimes it is necessary to "level down," just as at other times and under other circumstances it becomes desirable to "level up" as far as is practically attainable.

§ 101. In a preceding section of this chapter the subject of acute disease becoming chronic has been discussed, and certain indications to be attended to in order to avert such result have been given. Now something may be said on the reverse, viz., on the tendency of chronic disease to become acute. This is a matter on which S. Wilks lays much and deserved stress. In his opinion it is a much more important matter than the question of acute disease becoming chronic. It is also when acute disease is the outcome of chronic conditions that it is most likely to be perpetuated, in a persistent if less active form. Thus, for instance, a condition of chronic renal disease may lead to an acute attack of a serous membrane—a common outcome of such a condition of the system—and that serous inflammation may endanger or terminate the existence of the individual. It

is obvious that if the chronic condition could have been so managed that the acute outbreak could have been averted, much suffering and no little danger might have been avoided. Or in another case the victim of constitutional syphilis becomes hemiplegic from a syphilitic tumour in his cerebrum. Now it is pretty certain that if the management of the syphilitic cachexia had been more efficient this acute manifestation of its presence might have been avoided. It is in the danger of chronic mischief assuming an acute form that the chief risk to life lies; and it is by such outbreaks, inseparable from the condition which obtains, and liable to occur almost at any time, that the patient commonly dies. Here I mean the acute manifestations which are directly and causally connected with chronic conditions, and not the inflammatory conditions, especially pneumonia, which are liable to break out in debilitated systems, and which are so extremely fatal. The termination of many chronic maladies in which there is no blood-poisoning is by intercurrent pneumonia, as in general paralysis, aortic valvulitis, locomotor ataxy, &c. In such acute affections, arising during the course of fixed maladies, the danger to life is extreme; and the most watchful attention, and the most energetic as well as skilfully-directed treatment, are often, indeed usually, insufficient to avert a fatal result.

It is obvious that the best plan of treatment of acute ailments arising out of chronic conditions is that of prevention. How this may best be done entails the consideration of the more chronic diseases to which we are liable, as to their nature, their course, and their outcomes. Firstly, we may consider those ailments all distinctly associated with assimilation, and so naturally arranging themselves into a group, viz., diabetes, rheumatism, and gout.[1] After their consideration, something may profitably be said about the two great cachexiæ—syphilis and struma; and the question of diatheses—a very important matter.

[1] Garrod points out that diabetes may alternate with attacks of gout.

CHAPTER XI.

DIABETES—RHEUMATISM—GOUT.

§ 102. THESE are three different affections more or less associated with the assimilative processes, and being so connected it is most profitable to consider them in a special chapter. The two first are connected with the assimilation and combustion of hydrocarbons in the body; the third is related to the excretion of waste nitrogenized matter, but is nevertheless very commonly associated with imperfect or modified nutritive processes (p. 154).

Diabetes.—As we have seen in Chapter II., the nutritive material taken up by the portal circulation is stored up in the liver in the form of glycogen. It is formed directly from the saccharine food of man,—or indeed any animal,—from farinaceous matter converted into grape-sugar by the action of the saliva and the pancreatic fluid; and also from nitrogenized materials which are split up by the liver into glycogen and azotised waste matters, which by uniting with oxygen become changed into uric acid and urea, and are excreted as such. In fact the liver is the great storehouse of fuel, where the products of food are garnered and given off according to the requirements of the system. This glycogen is gradually given off and is reconverted into sugar, and then burnt up in the body, producing in its oxidation carbonic acid and water, and evolving in its combustion mechanical results and heat. In ordinary and healthy individuals the sugar so furnished to the blood is perfectly consumed; but in others such is not the case. Persons may waste to death, and yet no sugar show itself

in the urine; at other times sugar may be found in the urine in persons in perfect health. The youthful reader must not imagine that because he has detected sugar in a patient's urine that therefore the sugar-producing individual is going to die, or even necessarily be ill. If a person be obviously very ill and wasting, and sugar be found in the urine, then its appearance is ominous.

In order to comprehend pretty fairly the importance of sugar-laden urine, we must review the circumstances under which glycosuria is produced. In many cases it is only found shortly after meals, and is absent during fasting. Here the sugar which should be stored up in a glycogenous form is but imperfectly restrained from entering the general circulation, and there is an excess at one time with deficiency following after. In such cases the liver is but imperfectly functionally operative. At other times there is some irritation at the roots of the pneumogastric nerves, as in Bernard's experiments of puncturing the floor of the fourth ventricle, or in the cases related by George Harley and Dickenson of diabetes the result of excessive brain-labour. The formation and garnering of glycogen is connected with the portal vein; its disengagement and restoration to the blood are associated with the hepatic artery. When the hepatic artery is dilated sugar is quickly given off in large quantities from the liver stores. By such mechanism irritation of the vagus produces an excessive amount of sugar in the blood. Conditions of high arterial tension, causing a rise of pressure in the hepatic artery, give rise to an excessive disengagement of sugar. Consequently glycosuria is very common in persons suffering from Bright's disease, and in conditions where the blood-pressure is raised temporarily, as in the accession of cold in early winter. In this last form it is usually connected with a sedentary occupation; if active exercise be taken in the cold the sugar is burnt up, and in doing so raises so much body heat. In other persons again glycosuria is the consequence of simple excessive formation of glycogen beyond the necessities of the system, without conversion into and development of fat, in which case it drains away in the urine and is only discovered by accident. In some cases it follows the consumption of certain articles of diet and passes

away when they are given up. In all these cases the presence of sugar in the urine is comparatively unimportant.

A much more serious matter is diabetes, the result of loss of capacity to oxidize the sugar assimilated, from some peculiarity in the sugar itself, or other cause, or where there is defective assimilation. In such cases there is muscular weariness, the result of defective combustion of sugar in the muscles, where it is normally burnt up, after being broken up into lactic acid and oxidized as a lactate of the alkalies, chiefly of soda. There is much wasting, because the body temperature and muscular action (mechanical results) must be maintained by the combustion of other hydrocarbonaceous material, as the stored-up fat of the body. There is much thirst from the presence of sugar in the blood in large quantities; and the bulk of urine is large, for the sugar in solution by this means is got rid of. It is however much better that the sugar be so got rid of, when in the blood, than if it were not so eliminated. It is not the presence of sugar in the urine—though of course it is a waste of raw material—which should occasion anxiety; it is the circumstances under which sugar so shows itself that should excite our apprehension. The loss of body-weight is often more important than the presence of sugar in the urine.

There is much investigation yet required on the subject of the different *ferments* in the body by which, among other actions, the sugar given off by the liver into the general circulation is broken up into lactic acid. These ferments are found most largely in the pancreas, and probably thence find their way into the portal circulation. They also exist in muscle. Lauder Brunton thinks when diabetes arises from lessened combustion rather than from increased formation of sugar, it is caused by three different factors. "It is," he says, "due either (*a*) to insufficiency of the ferment which should convert the sugar into lactic acid and glycerine, (*b*) to an altered quality of the sugar, which enables it to resist the action of the ferment, or (*c*) to diminished circulation through the muscles, preventing the sugar from coming sufficiently into contact with the ferment."

At times sugar is found in urine that is albuminous. This

may be the result of some nerve irritation standing in a causal relation to both. At other times they are found together towards the close of chronic renal disease, where the patient begins to waste, and in such cases a fatal result is usually not far distant. Whether the elimination of sugar in the course of time produces organic changes in the kidney, or disease in the kidney permits of the sugar in the blood straining away and so being lost, it is not yet possible to say. Certain it is that the two are commonly found together. Sometimes the indications so given are of the worst import, at other times they form no serious omen. It is of much importance to examine the urine of patients in the latter stages of chronic Bright's disease for sugar.

§ 103. In the treatment of diabetes there are many points to be attended to. Too commonly it is thought sufficient to put the patient on gluten-bread, and cut down the consumption of saccharine and farinaceous material to the minimum. Doubtless it is very desirable to give the patient food that he can oxidize, and to relieve him from the sugar which is no longer useful to him, but which entails upon him thirst and other troubles; but there are other important points to be attended to. The skin should be kept warm, and the circulation of blood in the cutaneous vessels be well maintained. By such means the blood-pressure is lowered and the disengagement of glycogen diminishes. Exercise is a good means of securing this end, and should be combined with warm clothing. Exercise, too, brings the blood freely to muscles, and with it brings the sugar more in contact with the ferments in the muscle. The late Dr. William Richardson, who had a personal experience of diabetes, found exercise to be the most efficient treatment of his own case. It required great determination in the face of the existing languor to continue to make muscular efforts, but the results were very satisfactory. "To carry into effect regular and sustained daily exercise," he says, "requires great moral courage and energy, the languor and weariness are so great; but, if the exercise be only carried out patiently and perseveringly, the task will not only become more and more easy, but soon no longer a task, but positively a pleasure." The glycosuria of a sedentary, intellectual life may possibly

be nothing more than unconsumed sugar draining away. At the same time that exercise and a warm skin lower the blood-pressure in the hepatic artery, it must not be forgotten that the thirst of diabetes, while it secures plenty of fluids to wash out the sugar in the blood, also fills the blood-vessels with water, and so increases the general blood-pressure, and with it the pressure in the hepatic artery. It is certainly desirable that the consumption of fluids when very great should be moderated.

The diet should consist of meat, especially fat meat,[1] of vegetables not containing starch, of various breads and biscuits, prepared by several makers, of dry wines, and spirits and water instead of malt beverages. The different alkaline waters, natural or artificial, are also very useful. The skim-milk treatment suits some cases admirably, but butter-milk is even better; and in rural districts where butter-milk is procurable it should form a staple of the dietary. Koumiss is also a suitable beverage. The lactic acid of milk so treated is an oxidizable food, and so useful to the diabetic patient.

Of the remedial treatment of diabetes much may be said. The plans of treatment are various. Some give large doses of arsenic, others pin their faith on alkalies, while with most it is the practice to give opium, or its principle, codeia. Opium may be given in half-grain doses three times a day to commence with, and the dose may be gradually increased. Codeia may be given in similar doses, or even as far as five grains three times a day. These sedatives are specially suited to those cases which are dependent upon some nerve irritation. George Harley prefers conia as his remedy when the irritation is in the pneumogastric. It is quite possible that the action of opium upon the skin is very useful in many cases, and this action may be aided by Turkish or other warm baths. Attempts have been made to directly oxidize the sugar by giving peroxide of hydrogen (ozonic ether) with some success.

Iodide of iron, combinations of quinine and iron, and other tonics are often indicated; and the diabetic patient may be treated on general principles with advantage at times, while

[1] Especially in glycosuria in the lithæmic, where the waste products of nitrogenized foods will themselves be a source of trouble.

his special malady is met by appropriate diet merely. Tonics and cod-liver oil are as good for him as for others suffering from wasting disease. If the nutrition fails on a too restricted diet, modify it by all means. It is of no use to kill a patient or make him worse in well-meant but unfortunate attempts to do him good; and in the treatment of diabetes it is of the greatest moment to watch and follow the indications of each individual case.

§ 104. *Rheumatism.*—It is somewhat depressing to have to acknowledge that very little is known about the pathology of rheumatism. Considering how common acute rheumatism is, and how general it is to denominate all pains which are persistent and yet unaccompanied by general constitutional disturbance "rheumatism," it seems strange that we should have so little real knowledge as to its causation. As to acute rheumatism, it is a fairly well-defined disease. As to "rheumatism," it covers an immense range of pains, extending from the lightning pains of locomotor ataxy to the periostent affections caused by syphilis. The term "rheumatism" ought to be expunged from our vocabulary. It is a great comfort to those who are diagnostically weak, and has given a false sense of security in many grave diseases, and tended to hide the real nature of the malady. As to the use of the term by non-professional people, it is excusable; they are not expected to know better; they use it in ignorance, but with perfect *bonâ-fides.*

There are no means of ascertaining how much of so-called rheumatism, and especially articular and muscular rheumatism, is gout, or rather lithiasis. The people who have accumulations of uric acid in their blood and tissues, are persons who complain of rheumatic pains. After long and careful consideration of the matter, it becomes more and more difficult to distinguish any differential characteristics betwixt chronic rheumatism and lithiasis. In symptoms, in prognosis, and in treatment, they are identical, and the question resolves itself into a choice of terms; and in this respect rheumatism carries the preference. Lithiasis, and still more the term "gout," at once arouses a Philistine opposition; it savours of good living and self-indulgence—two things which every one instinctively turns away

from in speech and turns towards in practice. Any allusion to gout is in itself sufficient to cause many persons to seek another medical adviser, who will be discreet enough not to give objectionable names to painful maladies. Rheumatism is innocent and free from suggestiveness, and consequently holds its ground, indeed is rather a general favourite. Rheumatism as a malady is supposed to stand in a certain relationship to lactic acid.[1] When glycogen is given off into the general circulation, it is converted back again into sugar. This sugar is broken up into lactic acid, which unites with the alkalies in the body and forms lactates. Headland supposed that it is the oxidation of lactates which gives rise to the body heat, and these views are borne out by the researches of Ludwig and others. Each molecule of soda burns off many different relays of lactic acid during its residence in the organism. Prout evolved the idea that rheumatism was connected with lactic acid, and B. W. Richardson followed up the idea by giving lactic acid to dogs, injecting it into the peritoneum, and found endocarditis to follow. The proof is insufficient, but is enough to give an air of probability to the hypothesis; for Balthazar Foster found acute rheumatism produced by medicinal doses of lactic acid given to diabetic patients. Rheumatism must be considered in relation to its acute form and its chronic form.

§ 105. *Acute Rheumatism*, or Rheumatic Fever, as it is called, is a very common malady, and though rarely fatal at once, is very frequently the cause of early death from its effects upon the heart. The different joints and the outer and inner surfaces of the heart are the seats of inflammation in rheumatic fever. There are—as in gout—localized inflammations associated with a general condition. Another point connected with rheumatic fever is this, if the action going on in one part is checked, increase in the action elsewhere is very liable to occur; *i.e.* if the inflamed joints are wrapped in cold lotions the cardiac complications will be increased; or induced, if not already existing.

There is much difference of opinion as to the measures to be adopted in the treatment of rheumatic fever. Up to a recent

[1] That there is also a nervous factor is maintained by some, and the spinal arthropathies of Weir Mitchell would by most practitioners be unhesitatingly classed as rheumatism.

period this malady very commonly persisted for fifteen or twenty weeks, leaving the patient a wreck, and often a cripple as well, in spite of every measure: now it takes itself off on the slightest summons,—mint-water being sufficient to dislodge it, according to some writers. For my own part, the alkaline treatment appears to be the best one, and furnishes the best results. It is well to commence the treatment in this fashion:—

Pot. Bicarb. gr. xxx.
Tinct. Opii. ℥ xv.
Inf. Buchu, ℥ i.,

every four or six hours, varying the dose according to the patient's age, sex, and bulk. To this may be added:—

Pulv. Opii. gr. 1½,
Pulv. Al. Co. gr. v.,

every night at bedtime; or ten grains of Dover's powder. There is much doubt existing as to whether colchicum is of use in the treatment of acute rheumatism or not. There should be a liberal supply of milk and seltzer-water, as the thirst is great and the temperature often very high. Indeed, the high temperature and the profuse perspiration are often alluded to as sufficient to excite surprise. The question is really how much higher would the temperature be if it were not for the perspiration? Probably so high as to be incompatible with the continuation of the existence of the organism. The perspiration is often intensely sour, and this sourness is perceptible to the olfactory organs. The urine is often laden with urates, probably the results of the effect of the high temperature upon the muscular structures. There are some points to be attended to, and others to be kept in mind and avoided, in the treatment of acute rheumatism. The first is to keep the patient in blankets—no sheets. Nextly, to put him or her into a woollen garment, as a woollen night-dress—amidst the poor the flannel shirt of a male relative is a capital thing. Then all movement is to be avoided; consequently it is not desirable to cause free purgation. Nothing can be worse than exposure of the thorax, and unnecessarily repeated examination of the chest is to be

reprobated. Physical examination is not often productive of good, and turns the attention away from the real needs and necessities of the case. It is often directly productive of harm. In my experience diagnostic inquisitiveness has often stood in an inverse ratio to a rational plan of treatment: in Vienna it may be seen in its most highly-developed form. It is not confined to Vienna however, and the treatment of acute rheumatism in this country needs much modification. Every examination as to the condition of the heart should be conducted with the least possible disturbance to the patient, and with the very least exposure to the chest, and the search after obscure murmurs which may be proper enough in a teaching hospital is not often required elsewhere. The chest should be well covered, and if any pain be felt in the neighbourhood of the heart, or a murmur be heard, hot linseed-meal poultices should be placed over the whole of the front of the chest and kept there constantly, being repeated at frequent intervals; each change being effected with the least possible disturbance of the patient. The painful joints should be wrapped up in cotton-wool, or kept in flannel saturated with alkaline solutions, always as warm as can be borne, or as circumstances will permit. Such is the line of treatment to be pursued. Warmth and quiet are the two things to be aimed at. If there be pericarditis it is quite unnecessary to give calomel, or any preparation of mercury. Large doses of opium are tolerated, especially when given along with alkalies, and the action of opium on the skin is almost as important as are its analgesic properties.

When the pains are somewhat subdued the opium may be withdrawn. After a while the dose of potash may be reduced and a few grains of iron added:—

Pot. Bicarb. gr. xv.
Fer. Am. Cit. gr. v.
Inf. Quass. ℥ i.,

three or four times a day, is a good combination when the brunt of the malady is over. In one case, where the heart had been already injured in a previous attack of acute rheumatism, the addition of digitalis to the remedies produced an improvement

at once. Its use under such circumstances is clearly indicated, especially if the lips be blue.

If the subject of rheumatic fever be delicate, or of the strumous diathesis, it is a good plan to continue the combination of alkalies and iron for some weeks, and to give cod-liver oil, liberal supplies of food, especially hydro-carbonaceous, and to keep the body well-clad in flannel. A change to the seaside may be useful, but the diet and clothing must be doubly attended to then. By such means the troublesome affection of the small joints, known as rheumatic gout, may be usually avoided,—and that is no small matter for the patient. Next to the alkaline the blistering treatment of Herbert Davis is most worthy of confidence in acute rheumatism. If the mitral valve be injured, a course of digitalis and iron combined should be commenced with at once, general quiet being observed, and the plan should be continued for weeks or months. By such means the ventricle may be brought back to its normal dimensions, the valves may once more be competent to close the ostium, the murmur may disappear, and the patient may be to all intents and purposes cured—except that the mitral valve has lost its spare or redundant closing power, and in any future dilatation of the left ventricle will readily become insufficient. No amount of dilatation will render the mitral valve incompetent, if its valvular vela are not restrained by pathological connective tissue from themselves stretching along with the dilated ventricle (Rokitanski). Often the murmur is lost after rheumatic fever, and only reappears when dilatation of the left ventricular chamber with enlargement of the auriculo-ventricular ostium has revealed the insufficiency in the valves, which have been injured by the fever, but were equal to closure of the ostium prior to the dilatation.

§ 106. *Chronic Rheumatism.*—This term is applied to many forms of pain unaccompanied by general constitutional disturbance. In its more precise sense it includes a series of pains confined to the limbs and the shoulder and pelvic girdles. Lumbar pains are either gouty or myalgic usually. Rheumatic pains are felt in joints, in muscles or their fasciæ. They are persistent and unintermitting. In this they differ

from the gusty intermitting pains of true neuralgia. Frequently they cover a certain area, not being the part over which any nerve is distributed, nor possessing any natural boundaries.

Rheumatic pains also depend much on changes of temperature, and are common in parts that have been chilled by exposure. The thigh especially exposed to the rain during a stormy ride, or the shoulder which is in a draught, are the common seats of chronic rheumatic pains. If the pains are restricted to the collar-bone, humerus, and the shin, they suggest the probability of a syphilitic factor. When instantaneous they are ataxic.

When then we have such pains as come fairly under the category of chronic rheumatism, the next question is that of the remedial measures to be employed. One thing is pretty certain about the class of cases now under consideration, and that is, they are almost invariably accompanied by an inactive condition of skin. Consequently a distinct part of the treatment includes diaphoretic remedies, and especially stimulant diaphoretics. Guaiacum is perhaps the most typical of these. Muriate of ammonia is another. They form an excellent combination in the rheumatism of young men and women:—

Am. Chlor. gr. xv.
Mist. Guaiaci, ℥ i., ter aut quater in die,

often give excellent results. Whenever there is a history of exposure in elderly persons, especially when associated with florid complexions, guaiac with potash is good:—

Pot. Bicarb. gr. x.
Pot. Iod. gr. v.
Mist. Guaiaci, ℥ i., ter aut quater in die,

is a capital remedy. At the same time the skin must be kept warm and covered with flannel. Warm drinks are indicated, and should largely take the place of solid food. It is also desirable to give some diaphoretic at bedtime. The powder given in § 105 is often useful. If the liver be loaded, then a grain and a half of opium in four grains of Plummer's pill is indicated, to be followed by a draught of alkaline purgative water next morning.

By such means faulty assimilation is corrected. At other times the following may seem indicated:—

Pot. Bicarb. gr. x.
Pot. Iod. gr. v.
Tinct. Sem. Colchici, ℥ x.
Inf. Cascarillæ, ℥ i., ter in die.

In all cases a good draught of water should be taken after the medicine; it not only serves to wash it down, but it fulfils a very important function in the œconomy. Whenever, as remarked before, alkalies are given either along with, or without chalybeates, free dilution is ever desirable. In speaking of chronic rheumatism the late Dr. Fuller wrote:—"There cannot be a doubt that free dilution exercises a most important influence on the action of almost all the remedies which prove useful in this class of disorders, and that a dose which would excite nausea and irritation of the stomach when taken in a concentrated form, is often productive of excellent results when aided in its action by water. Hence, probably, the wonderful efficacy of the natural mineral waters; and hence, also, the superior effects which often ensue after taking the weak infusions or teas, which are the favourite remedies of the poor and the nostrum of so-called herbalists. I am firmly convinced that our medicines frequently fail in their operation for lack of sufficient dilution; and although I do not counsel their administration in an inconveniently bulky form, I do most strongly urge the taking of a copious draught of water, or some harmless diluent, after each dose of the remedy." The remembrance of this counsel has often stood me in good stead in practice, and amidst my out-patients it is my habitual practice to order and insist upon such draught of water after each dose. Whenever the means of the patient admit of it, natural waters should be freely taken—Vals, Vichy, Carlsbad, or Buxton waters are all suitable; and with them the bitter water of Fredericshall, or Marienbad waters, may be taken in the morning as laxatives. Very frequently barley-water and bitartrate of potash (℥ i. to the Oii.) may be drunk with advantage. In very chronic cases this combination may be

taken along with the well-known remedy, "the Chelsea Pensioner." Its formula is as follows:—

"Flowers of Sulphur, ℥ ii.
Cream of Tartar, ℥ i.
Powdered Rhubarb, ʒ ii.
Guaiacum, ʒ i.
Clarified Honey, lb. i.
One nutmeg finely powdered.

Mix the ingredients. Two large teaspoonfuls to be taken night and morning." (Fuller.) When in practice in Westmoreland, where chronic rheumatism is very prevalent, it occurred to me to combine arsenic with guaiacum instead of the sulphur, whose diaphoretic powers are unquestionable. The results were very satisfactory. My formula runs so:—

Ac. Arsenic, gr. iii.
Pulv. Guaiaci, ʒ iii.
Pulv. Capsici, ʒ ss.
Pil. Al. et Myrrh, ʒ iii.
In Pil. cxx. div. 1 bis in die.

This is a convenient form in a chronic case. The value of fatty food in the treatment of these cases should never be forgotten, and if necessary cod-liver oil even should be given. The combinations of iron with alkalies given before (Chapter II. § 21) may often be resorted to with advantage when the pains are distinctly diminished, and improvement of the general health is indicated.

In addition to the general measures it is customary to use local applications in the treatment of chronic rheumatism. The most favourite of these consists of the application of hot irons, plaisters, and liniments. The Emplast. roborans, Emp. opii, or Emp. ammoniaci c. hyd. are good plaisters, which the shrewd practitioner will do well not to discard. At other times liniments, as the lin-sapo. co. with iodide of potassium, are far from useless, When the pain is chiefly confined to the sciatic nerve, whether it be rheumatic, gouty, or truly neuralgic, the following is very satisfactory:—

Lin. Aconit. ʒ ii.
Lin. Belladonnæ, ʒ ii.
Glycerine ad ℥ ii.;

or it is even better if treacle be substituted for the glycerine. This should be spread upon a V-shaped piece of lint, and placed upon the thigh. Over it should be laid a piece of oil-silk, large enough to overlap the lint, and then the whole should be kept in its place by a bandage, or a stocking from which the foot has been removed. This should be done every night at bedtime. The lint should not be removed every night, the repeated saturation of it by the liniment renders it more powerful and efficacious. In using this potent measure care must be exercised to see that the skin is whole, else dangerous absorption may take place. One great object of our aim in the treatment of chronic rheumatism is to excite the action of the skin. By this means the lactic acid is got rid of. Alkalies are very useful in uniting with it and so procuring its elimination, by oxidation or otherwise. The use of local analgesics is obvious. When these measures fail or are but partially successful, change of air is most desirable. The effects of such change, especially when it can be combined with alkaline waters, both as beverages and as baths, are often very satisfactory.

It is always desirable to maintain the action of the skin by the use of warm clothing; and the rheumatic person should be clad from top to toe in flannel, or even in what is termed "fleecy hosiery," or in chamois leather. By these measures an existence may be rendered tolerable which would otherwise be simply insufferable.

§ 107. *Gout.*—This affection is much better understood than the immediately foregoing complaint. Its nature is however much obscured, and the proper comprehension of it hindered by preconceived impressions and prejudices. From its association with good living and the habits of "the Regency," there is a very decided impression in the minds of many persons that gout indicates some self-indulgence; if not ostensible, all the worse; or a descent incompatible with their surroundings—a still more objectionable matter. It is highly desirable that the term "gout" be confined to ostensible ailments in the upper and

lower extremities, and that the term "*lithiasis*"[1] be preferred for other maladies taking their origin in the presence of lithic or uric acid. "Irregular," "suppressed," or "latent" and "retrocedent," are adjectives which are applied to gout, and which explain, to some extent, the peculiarities of each case. It is obvious enough that when ailments depend upon a certain *materies morbi* circulating in the blood and fluids of the body, they will be both numerous and Protean. Consequently it would be much better to use the term lithiasis to signify the general condition on which the malady depends. Being a comparatively new term, it will not possess the disadvantages of having any preconceived opinions about it to create objections or wrong impressions. It will carry a correct conception of the condition, viz., that it is a saturation of the body fluids with nitrogenized waste, in its most persistent form—lithic or uric acid. Such being the case, it may manifest itself as muscular rheumatism (so-called), as a skin eruption, as dyspepsia, bronchitis, or inflammation of a serous membrane, as well as affecting the articulations.

We are much indebted to Professor Garrod (late of King's College) for a more accurate knowledge of the nature of gout. Uric acid calculi, and the composition of "chalkstones" (urate of soda) had prepared us for the announcement that in gouty conditions the blood contains uric acid. The amount of uric acid in the urine previous to and in the early stages of an acute attack of gout is much diminished. "At the time that the urine is deficient in this principle it exists in the blood in abnormal quantities." "In chronic gout the blood, even in the intervals between the exacerbations, was always rich in uric acid." Such are the expressions of Garrod. Since the pathology of lithiasis, or gout, has been cleared up, a great improvement has taken place in our remedial measures. As yet, however, we do not quite know how far the accumulation of uric acid in the blood is due to imperfect oxidation, to impaired renal activity, or to diminished action of the skin. Recent observations would tend to lead to the opinion that defective action of the skin may not be without effect in the accumulation of nitrogenized waste in the system where there is

[1] Murchison uses the term "lithæmia."

inadequate renal action (p. 55). In the subjects of chronic renal changes it is quite common to find an inactive and dry skin. Potash, especially, as iodide of potassium, passes off by the skin as well as by the kidneys. It also renders uric acid highly soluble; and as uric acid has a stronger affinity for potash than for soda or ammonia, its administration converts sparingly soluble urates into a highly soluble urate of potash. When so dissolved, uric acid finds its way out of the body by every emunctory of water. Lithia alone excels potash in its power to render uric acid and urates soluble.

§ 108. Before, however, we can proceed further in the consideration of lithiasis, it becomes absolutely necessary to run over its most common manifestations. The matter has been alluded to before, in Chap. III., but it must be considered again at the risk of some reiteration, as its right comprehension is a matter of the utmost importance in the proper recognition of the multitudinous ailments of advanced life.

Firstly, excess of uric acid does not necessarily depend upon very high living. This idea must be dispelled. At the same time, it can be, and very often is, so originated. At other times it takes its origin in imperfect oxidation of the nitrogenized matter which results from the splitting up of peptones in the liver into glycogen and waste azotized matters. Very commonly it is the consequence of impaired functional activity in the kidneys; not, perhaps, necessarily due to structural changes, but still commonly so associated.[1] Consequently, lithiasis may show itself in a working woman (as in a patient long under care at the West London Hospital) as well as in a wealthy squire. Whatever the difference in the causation the result is the same, viz., an excess of uric acid in the system. It will not necessarily follow that the treatment will not be modified by the mode of origin: far from it, it will vary very much with the causation of the condition. In the squire, colchicum, partial starvation, and free purgation with alkaline salines, will

[1] Garrod "noticed the constant occurrence of a morbid state of the kidneys in advanced gout," and from a series of observations "was then enabled to speak more positively on the subject, and to show that, even in the slighter forms and early stages of gout, the renal organs sometimes become seriously implicated."—pp. 195-199, 3rd edit. 1876.

probably form the first line of attack. In a working seamstress potash with iron, well diluted with water, and cod-liver oil, will be the measures most indicated.

Nextly, lithiasis may manifest itself in the articulations. This is its best known form. Not uncommonly the local deposition of uric acid as urate of soda, leads to much deformity, and not rarely to the formation of abscesses where the pus is highly charged with urate of soda. At other times there is effusion into joints, especially the larger ones, with modifications of the synovial membrane. At other times the ligaments become infiltrated with lithic acid, and become rigid and immoveable, entailing much loss, or even abolition, of movement in a joint. At other times, tophi, or chalkstones, form elsewhere, as on the helix of the ear. Microscopically these consist of crystals of uric acid in combination with a base, usually soda. These external changes, recognisable by the eye, often furnish the diagnosis of the malady before any more special investigation is commenced, and always give indications for treatment. Not uncommonly the lobe of the ear gives evidences of a tendency to lithiasis; it is full, glistening, and red, and seems, in very marked cases, to be on the point of bursting, so tight is the skin. Affections of the respiratory organs are very frequent, bronchitis being the most common manifestation of gout next to arthritis. In winter there is usually more or less of it, and the bronchial lining membrane becomes an excretory organ when the fall of temperature checks the action of the skin. Attacks of dyspnœa, the result of bronchial spasm, are also not unfrequent. Even pneumonia may have a gouty origin. The organs of the circulation are very commonly affected, and attacks of palpitation and intermittency of the pulse are commonly the result of lithiasis. The changes in the circulation are so distinct and well marked in chronic renal disease, where a condition of lithiasis almost necessarily obtains, that the affections and the symptoms pathologically associated with such renal change, will be given at length in a future chapter (Chap. XIV. § 143). The brain and nervous system generally are also affected in lithiasis, and vertical headache is often very suggestive in atonic cases. There are also psychical changes very commonly found in

chronic latent gout. They consist of a certain amount of brain activity with irritability out of all proportion to the exciting causes, together with depression. These mental symptoms are usually present and should always be inquired into, and when found are very suggestive. Neuralgia is very common in lithiasis. Such neuralgiæ are found in advanced life, and are very intractable, especially if their systemic associations be forgotten. Serous membranes are very liable to become inflamed in latent gout. At times there is no effusion as in the dry pleurisy, often denominated pleurodynia. Mucous membranes, bronchial, intestinal, and vesical, are all apt to become inflamed from the presence of uric acid in excess in the fluids of the body. Affections of the skin are frequently of gouty origin; eczema, prurigo, and psoriasis, are the forms most commonly met with. Boils and carbuncles are supposed by the Germans to be common in the subjects of lithiasis. The changes in the kidneys are the causal associations very commonly of lithiasis; and in well-marked cases the kidneys are always involved. There is a liberal elimination of water, which is, however, usually of low specific gravity. It may at times contain small quantities of albumen. In fact we may see that such a condition of the fluids of the body can originate the most varied ailments, and of all maladies lithiasis is undoubtedly the most Protean. No matter what the outward form, the inward thing is ever the same, and the line of treatment is to remove the uric acid, though the necessities of different cases may call for modifications in the plans for doing so. Again and again in out-patient practice has it fallen to my lot to be successful in the treatment of cases of dyspepsia and bronchitis which have resisted all attempts to cure them by such measures as bismuth mixture and expectorants, but which have yielded readily to fifteen grains of bicarbonate of potash three times a-day in a bitter infusion, or infusion of senega. At other times cardiac troubles of an apparently alarming character have vanished at the solicitation of potash and buchu. Skin affections of an obstinate nature have likewise passed away on the adoption of remedial measures which struck at once at the causation of the affection. In affections depending upon the presence of uric acid more than in any other—unless, indeed, it be syphilis—is

the mere recognition of the ostensible malady subordinate and of secondary importance to the clear comprehension of the causal relationships, for success in treatment. Careful attention to the external indications, or what Laycock calls physiognomical diagnosis, will enable the student, especially if he be fortunate enough to see the matter practically illustrated by some of Laycock's pupils, to distinguish for himself by the eye many of the patients who are the subjects of lithiasis. Such knowledge, when acquired, will often light up the nature of a case otherwise most obscure, and give indications for successful treatment which would not, and could not, be furnished in any other way. Of course those who have not learned to see these indications do not see them, because, as the Italian painters say, "the eye can only see what it has learned to see;" it is, however, of much importance that the teaching of the eye in these matters be at once commenced, and the special education perseveringly pushed. The knowledge is well worth the trouble of acquiring it.

Surmising that such knowledge exists, or is about to be acquired, by the reader, and that diagnostic power will enable the observer to select his cases—the question of the treatment of them will next engage our attention.

§ 109. *Treatment of Lithiasis.*—This is a matter which is now much more simple than it was in the days of Sir Charles Scudamore, for instance; though his work is well worthy of perusal yet by those whose practice furnishes them with many cases of lithiasis, especially in its rarer manifestations. There is present in the fluids, and often too in the tissues, a distinct and well-known product of retrograde tissue-metamorphosis and of excess of peptones, viz., uric acid, possessing equally well-known properties. For some time before an outbreak of acute gout the amount of uric acid passed off by the kidneys is distinctly diminished: but it is still formed and retained in the body, especially in the blood.[1] It saturates certain tissues, especially the articulations, and then ensues a condition of heightened temperature accompanied by severe pain. These acute conditions are rather the cure than the disease, however. The effect of the high temperature is to reduce the uric acid into urea and carbonic acid, and so to get rid of it. In the language of the

[1] Garrod, *On Gout and Rheumatic Gout*, 3rd edit. 1876.

late Bence Jones, for the time being the joints are converted into supplementary kidneys. There is a process of oxidation going on in the tissues, which results in the perfect elimination of the morbid product and the restoration of the action of the joint in its integrity. Again and again will such inflammatory storms pass over a joint, leaving it unscathed and uninjured thereby. In time, however, distinct structural changes result. This consideration is an important matter in relation to treatment. Experience has long pronounced against repressive measures, having found them harmful and pernicious. The uric acid must be got rid of; and the more quickly the better, the more slowly the worse. The inflammatory action, the high temperature, and the increased amount of oxygen furnished in the highly vascular condition, is really essential to such removal. Cold applications, though giving relief at the time, purchase it at the cost of future suffering. Local blood-letting, as by leeches, is still more reprehensible. Garrod says: "I have frequently seen great toes stiffened after a few attacks, when local depletion has been resorted to: and within the last eighteen months two remarkable cases, in which the patients have completely lost the use of both knee-joints from two or three attacks only: in both instances leeches had been applied very freely; in one, more than thirty to each joint. I can with confidence warn those engaged in the treatment of an acutely inflamed gouty joint never to have resort to this mode of combating the disease. It would seem that the abstraction of blood from the joint allows or favours the free deposition of urate of soda in the tissues, and thus the ligaments become rigid, and anchylosis results" (chap. x., 2nd ed.). How different is this from the practice requisite in an ordinary inflammation of a joint! There local bleeding and cold applications are most desirable; in gouty inflammation they are to be strenuously avoided. The only local treatment of service is to keep the joint at rest—the pain occasioned by movement usually secures that pretty well—to keep it warm in cotton-wool or flannel, and, in addition, the application of warm solutions of potash or lithia may be resorted to.

In acute gout this local treatment is of comparative unimportance; the general treatment is the great matter. It is

usual to commence with purgation of an active character. This gives relief to the general disturbance and lowers the pyrexia. For such purpose it is usual to resort to alkaline salines. If the tongue is laden, the secretions foul, and the liver congested, a pill containing mercury with vegetable aperients may be given at bedtime, and be followed by a sharp cathartic in the morning, as a black draught, a seidlitz powder, or a dose of mineral water. It is requisite, however, to be cautious about the use of mercurials; in chronic renal changes there is much intolerance of both mercury and opium. Consequently other sedatives are given in lieu of opium, and other cholagogues than mercury. The following is a good measure:

℞ Mag. Sulph. ℥ ij.
Pot. Bicarb. gr. xv.
Tinc. Sem. Colchici, ♏ x.
Inf. Buchu ℥ i.

every four or six hours. It should always be followed by a large draught of water, not too cold. After free catharsis is induced, then the sulphate of magnesia may be omitted in favour of a cathartic at intervals. The action of colchicum is a mystery yet. It does not increase the amount of solids in the urine, as has been thought:[1] but it is agreed that it is most efficacious in the relief of acute paroxysms of gout. The potash renders the uric acid or the urates soluble, and so they can leave the inflamed parts and enter the blood-current. The buchu probably increases the excretion of the solids by the kidneys. The large doses of fluids help to wash the soluble matters out at the different emunctories in the excretion of water.

Such is the treatment of a gouty inflammation, whether in the articulations or elsewhere. It is the gout, not the local manifestation, that we have to treat: and consequently the measures most effectual against the gout are the most suitable, no matter what the part affected. Very frequently it is desirable to use iodide of potassium, especially in the less acute forms of the attack. It would seem to arouse absorption from the tissues: at least it has fallen to my lot to see it, and feel it too, make a wonderful difference in the progress of a case; and the urine,

[1] Garrod, *loc. cit.* 3rd edit. p. 334.

which was very pale-coloured under the use of bicarbonate of potash and colchicum, grew deeper coloured and had a stronger odour when the iodide was added; at the same time the symptoms were very much ameliorated. When the outbreak is but subacute, instead of the sulphate of magnesia in the above formula, five grains of iodide of potassium may be advantageously substituted for it, and an occasional seidlitz powder given.

The diet should consist largely of warm fluids, as milk alone or with arrowroot, gruel, &c., and but small quanities of beef-tea. Milk and seltzer-water, Vichy, or Carlsbad water should form the staple diet.

In subacute cases, rousing the action of the skin by warm baths, &c., is desirable. This may be done in any of the inflammatory actions of acute gout. It is very serviceable in gouty bronchitis, where the mixture of iodide of potassium, potash, and colchicum with senega is indicated. Gout is very apt to linger in a subacute form, as well as to manifest itself primarily in the form of bronchitis. Here this formula—

Pot. Iod. gr. v.
Pot. Bicarb. gr. x.
Tinc. Sem. Colchici ℥x.
Mist. Ammoniaci ʒ i.

three times a day is very useful. Where the acidity is slight—as is found by testing the saliva with litmus paper—five grains of carbonate of ammonia may be substituted for the bicarbonate of potash. Where there is a gouty dyspepsia the following mixture is indicated :—

Pot. Bicarb. gr. xv.
Inf. Calumbæ ʒ i.

three times a day before food, and followed by a draught of water. This simple combination has done me yeoman's service many a time and oft.

In certain cases local applications are useful, as in the effusion which occurs in joints ; and here the Viennese plan of combining tincture of nutgalls with tincture of iodine in equal parts, or the nutgalls preponderating, is capital. It gives much relief, and does not usually, indeed rarely, blisters, and thus the application

can be continued. When the joints of the hand are thickened, iodide of potassium in soap liniment is very useful. At other times there is an acute affection of the skin, usually eczematous. In such cases the use of alkaline lotions is indicated, and often gives great relief.

The question of soporifics in lithiasis, acute or chronic, is one of much practical importance. Opium and morphia, either by the mouth, rectum, or subcutaneously,[1] are to be avoided. If there be much restlessness from the suffering in lithiasis, other remedies are indicated. These are hyoscyamus, cannabis indica, and tincture of hop. They may be combined with the mixture, or given at bedtime merely.

Pot. Brom. gr. xx.
Tinct. Hyoscyami ʒ ss.
Tinct. Lupuli ʒ i.
Mist. Camph. ℥ i.

is a good draught at bedtime; or tincture of cannabis indica (fifteen drops) may be substituted for the hyoscyamus, and the dose increased if necessary. We have not improved much upon the measures of the past generation in finding a suitable hypnotic in gouty states, and it is not yet certain that hydrate of chloral, or even croton-chloral hydrate is the agent desired.

§ 110. In the more chronic forms of lithiasis, otherwise called latent or suppressed gout, our treatment varies no little with the patient presented to us. If he be a high-coloured, "old-father-Christmas" sort of a man, with a strong pulse and a powerful heart, it will be desirable to administer potash freely, and to resort to steady action on the bowels by mineral waters. At the same time the amount of nitrogenized food consumed must be diminished, and fish without rich sauces substituted for it. The amount of generous wine and malt liquor must be looked to, and the consumption limited. If these measures produce much depression, as they are apt to do even in stalwart men at times, the patient must keep quiet for a few days, until

[1] The reader may perhaps wonder that I do not allude more commonly to the subcutaneous administration of morphia. My line of life and practice has not been favourable to personal experience of it. It is, in my opinion, a most excellent measure, especially when the stomach is irritable—where it is invaluable.

the more active part of the treatment is over. The treatment doubtless has some effect, but the withdrawal of the stimulating food and the supplies of alcohol has more. If the vascular depression be marked, squill or digitalis may be given with the other remedial agents.

At other times there is a much less sthenic type of patient to deal with. Here it may be necessary after a brief course of pure alkalies to combine iron and potash, or even to give both with a little arsenic.

Fowler's Sol. ℥v.
Pot. Bicarb. gr. v.
Ferri Pot. Tart. gr. v.
Inf. Quass. ʒ i.

three times a day is a capital combination. If it rather irritates the stomach when given before meals, it may be given when digestion is well advanced, say two hours after a meal.

When gout is prominently atonic, it is sometimes very desirable to give cod-liver oil and good nutritive food along with alkalies and chalybeates. Very often indeed is it necessary so to proceed; the waste nitrogenized matters being met by the constant resort to alkaline waters and occasional purgation. The iron and guaiac pill given in § 106, together with the use of Vals or Vichy waters, will often give excellent results in chronic and atonic conditions of lithiasis. When there is much debility in the heart, and the circulation is languid, digitalis in small doses may be given continuously with advantage. The arsenic and guaiac pill may contain half a grain of digitalis powder, the guaiac being diminished to admit of it, and chalybeate and alkaline waters used at the same time in such cases. A residence at Vichy, Ems, Saratoga, and similar spas would admit of this.

The treatment of lithiasis, in its pronounced and chronic forms, is a matter as complex as is the malady to be treated; and no written instructions can do more than point the direction in which the medical attendant must proceed, in order to think out for himself the treatment of each case. Many cases will often give much trouble, but will amply reward the practitioner for the trouble so taken. In my personal experience there is

no more satisfactory practice than that afforded by the careful and honest study of the multitudinous and varied conditions assumed by lithiasis; not only to recognize them, but to treat them with a good knowledge of their nature, and to know how to vary the treatment to the exigencies of each case.[1]

§ 111. *Rheumatic Gout.*—This is an affection whose nature is very obscure. The name would imply a hybrid betwixt gout and rheumatism. It is scarcely that, however; and no special product either of malassimilation, or of histolysis can be found in connection with it. If this is the case as to its pathology, we are at no loss as to the circumstances under which it manifests itself. It is the offspring of debility. It may show itself in the form of rheumatoid arthritis, first attacking one joint then another, until the individual is most effectually crippled; or it may linger around and permanently attach itself to one joint in particular.

Under these circumstances it is a very serious matter; and forms an obstinate and intractable malady. Very commonly however it forms a sequel to acute rheumatism in persons of strumous diathesis, or where the general health is impaired. When so associated it is chiefly confined to the small joints of the hands and feet. It also is found in the subjects of atonic gout, especially when they are placed under debilitating circumstances. No matter how originated, it has ever to be met by measures calculated to improve the general health. "Our great object throughout the treatment should be to restore or maintain the health of the system" (Garrod). There is a certain class of persons in whom, when the subjects of acute rheumatism, this aspect of matters may be anticipated, and then iron must be added to the alkalies employed at an early period, and the combination must be exhibited for several weeks. At the same time good food in liberal quantities, cod-liver oil, and sound malt liquors must be given. Garrod is very confident that alcoholic beverages are harmless in rheumatic gout. He goes so far as to say, "Whichever kind of alcoholic beverage causes the patient to eat with most relish and digest with most comfort should be selected."—(Second Edition.) When the case

1 "The treatment of gout, founded on Cullen's aphorism of trusting to patience and flannel, is to be highly deprecated."—GARROD, 3rd ed. p. 298.

goes on, and cannot be arrested by these measures, it becomes desirable to resort to the iodide of iron, either the syrup, or Blancard's pills, or the combinations of arsenic and iron given in earlier sections of this work may be used instead. Fresh air, especially at the seaside, and other means of improving the general health, are very useful. If the general health can be improved the local malady will be improved. As to the local measures to be used, iodide of potassium in soap liniment is the favourite method; or the iodide may be dissolved in glycerine, and then gently rubbed in. The question of motion in the affected joints in a complex one. Often gentle passive motion is highly desirable, at other times active motion may be permissible. The best rule in reference to motion is to desist from that amount which makes the part painful next day. If this rule be carefully adhered to no mischief will be done, and much good may often be effected.

Such are the constitutional or general diseases associated with assimilation and excretion. Very frequently they are to a certain extent inherited, or more properly speaking, the tendency to them is transmitted by descent. At other times they may be acquired.[1] Their progress too will often depend much upon the individual in whom they are found. It will tend to elucidate matters briefly to discuss in the next chapter the questions of inherited constitutions, or diatheses, and of acquired modifications or cachexiæ; as they are of the very greatest importance in practice, and ever give a direction to our remedial measures.

[1] "According to Dr. Quarrier, negroes serving as sailors in the British Navy are apt to become gouty."—GARROD.

CHAPTER XII.

DIATHESES AND CACHEXIÆ.

§ 112. GREAT importance has ever been attached to that acquaintance with families and individuals which is summed up as "knowing their constitution." There is some ground for a sceptical doubt as to whether this form of knowledge has not at times been made a great mystery, and been utilized accordingly. Still nevertheless there is much in such knowledge when it exists—and that is very commonly. From long experience the medical attendant has learnt, slowly and by degrees, that there are certain tendencies in a family; that in their ailments certain peculiarities are apt to show themselves; that their convalescence is liable to modifications, and that they suffer from allied or recurrent disorders. Empirically he has recognized the necessity for certain methods of treatment to meet these family tendencies and idiosyncrasies, and learnt when and where to make a special movement to counteract a known modification in his patient, and by doing so to benefit him very much; in fact, often a life is thus preserved that under another practitioner, perhaps much better informed generally, but lacking this particular information about the patient and his family, would have been endangered. The widespread confidence in the old family practitioner is a proof of the existence of a belief in such special knowledge, and it is often of real importance to families when selecting a new medical attendant to feel assured that he will remain among them, and that the special knowledge acquired by long acquaintance with them shall be available as long as he shall live. When the medical attendant is a shrewd, clear-sighted man this experience is truly valuable,

and even where these two adjectives can scarcely be applied to him, he always learns something which is not altogether without value. Granting that "a knowledge of the constitution" is an important matter, it becomes all the more necessary to have some means of acquiring information as to the peculiarities of a patient, when circumstances render a consultation necessary with a medical man, who has no previous knowledge of the family, and the best must be made of the matter. If "the knowledge of the constitution" possessed by the family doctor were always as genuine an article as it is assumed to be, and did not quite so often confine itself to a thorough acquaintance with the mental peculiarities, each large and wealthy family would find it almost indispensable to have their medical attendant always with them. It is found, however, that such a practice is not necessary, and that a perfect stranger may be quite competent to undertake the management of their ailments and to conduct them to a successful issue. That is ordinarily; at other times it becomes highly desirable that the old family attendant be called in, no matter at what inconvenience, nor how able the medical man in charge of the case.

So truly important is this matter of recognizing the family or individual characteristics that systematic attempts to classify diatheses and cachexiæ, and to give the characteristics of each, have been made. The most notable attempts in this direction are those of Professor Laycock, of Edinburgh, and of Mr. Jonathan Hutchinson, of London. The researches of this latter gentleman as to the modifications produced by inherited syphilis, especially in the development of the teeth, are well known. The more extensive work of Laycock is less familiar to the bulk of practitioners. Yet there is no more valuable acquisition for a medical man than a fair acquaintance with the physiognomy of disease. The hue of anæmia, the facial œdema of chronic renal disease, the florid complexion of plethora, the nose of the drunkard, to say nothing of the cutaneous indications of the exanthemata, on which indeed their classification rests, are all well-recognized, and their diagnostic utility admitted. Finer outward indications of internal changes reveal themselves to the watchful observer, and when years of close attention have developed the faculties, the knowledge acquired by a careful observation of the patient

is sometimes almost incredible. Of course what becomes obvious enough to the eye so trained may remain unseen, and therefore incomprehensible, to the eye which has not yet learnt so to see. The negative evidence thus furnished by ignorance weighs but little in the scales compared with a little positive evidence. Very often indeed the youthful reader will find himself brought face to face with sick persons of whom he knows nothing and from whom he can learn nothing: say, for instance, when called in to a case of uræmic coma; and yet it is highly desirable that he should make a diagnosis, and if possible distinguish this form of unconsciousness from other similar conditions. Highly important indeed as regards line of treatment. If he have paid some attention, so far indeed as his opportunities will permit, to physiognomical diagnosis, suspicions will flit across his mental horizon as to the possibility of the causation of the unconsciousness, and a microscopic slide moistened with hydrochloric acid held under the patient's nose will usually render the diagnosis clearer, until he has time to put it under the microscope, when crystals of hydrochlorate of ammonia, characteristic and distinct, will clear up the matter. But very probably slides and hydrochloric acid, to say nothing of microscopes, are not among the armamentaria of his ordinary walk, so he must forego this evidence, and act upon what is revealed to the unaided senses. If those senses are uncultivated they will not tell much; if they have been sedulously educated they will give most valuable indications: in Professor Laycock's case there is almost something wizard-like about his powers of diagnosis from external indications merely, and no pupil of his questions his remarkable ability in this direction. He himself writes:—"Study well the physiognomy of disease—that is to say, all those external characteristics in the patient that reach the unaided senses, and which are associated with morbid states, whether they be sounds or odours, or visible and tangible modifications of form, complexion, expression, and modes of functional activity; taking cognisance of minute modifications as well as of the more obvious, for they are only minute in a popular sense. Technically, a shade of tint of the skin, a quickly passing change in the expression, an almost imperceptible modification in the breathing or mode of speaking, the ring of a cough, a

local, and in itself trivial development of a capillary network, a slight twitching of a muscle, or a tremor, may be as clearly significant of structural disease as the most characteristic and undoubted physical signs." By such education, persevered in for years, the eye becomes enabled to assist or even to direct the physical examination in a wonderful manner. It is often of itself sufficient to exclude a large number of sources of error, and to give a valuable clue to the right direction in which to go. In chlorosis, for instance, the eye makes the diagnosis, and with it embraces the pathological conditions existing, and sketches out the line of treatment to be pursued. A limited number of questions as to certain minor but not unimportant points is amply sufficient to complete the survey, and physical examination as to hæmic murmurs and *bruits de diable* rarely gives anything but corroborative information.

The application of such trained vision to the question of the outward indications of inherited peculiarities has revealed groups of diatheses, distinct and characteristic; each possessing characters and tendencies of its own, well worthy of the careful study of the medical observer. By painstaking observation of these matters, as a general rule of practice, and quick application of the knowledge to each individual case, together with a searching examination into the family history, an approach can often be made to that knowledge of the family constitution which has been supposed to be the peculiar property of the family attendant alone. In fact very often such investigation will reveal much that the family doctor never thoroughly comprehended, and lighten up much that hitherto has lain in comparatively unillumined darkness. Such being the case, it is eminently desirable that all students of medicine should for their own sakes, as well as their patients', familiarize themselves with those external indications which are characteristic of constitutional conditions; or in other words, of those inherited peculiarities which, grouped together, form the diatheses. This knowledge is ever at hand, and can neither be forgotten at home, nor found out of order on an emergency. It will endow its possessor with information that is otherwise unattainable, and will often strengthen his hands very materially.

§ 113. Diatheses may be divided into five large groups,

which may be found either as typical forms, or in every stage of blending. These five forms are, (1) the gouty, (2) the nervous, (3) the strumous, (4) the bilious, and (5) the lymphatic. Very frequently persons are to be found who are distinct and typical instances of each form; while in other cases there is one diathesis forming as it were the foundation, and another superimposed upon it; for instance, the nervous or the strumous often possess gouty characteristics. At other times the diathesis will determine the direction of a general cachexia. In those of a nervous diathesis lithiasis will commonly manifest itself in nervous affections, and especially so in the neuralgiæ of advanced life. In the bilious person a cold will be apt to induce biliary disorder, even to catarrh of the bile-ducts. The strumous are liable to glandular troubles, and their articulations are apt to become the seat of disease from slight provoking causes. To be able indeed to recognize the strumous diathesis when called in to an apparently trifling injury of a joint, is often to be enabled to guard against an otherwise most erroneous prognosis, and further to take proper measures for the successful treatment of the subsequent changes which will in all probability follow the immediate consequences of the injury. In the bilious it is commonly advantageous to attend specially to the liver in any form of disorder or ill-health which may occur in persons of this diathesis. The lymphatic are specially liable to low forms of adynamic ailments, are listless, unenergetic, and very commonly require a pronouncedly stimulant line of treatment.

Some description of each form of diathesis is now desirable, and in each case the typical form will be delineated—the crossings and blendings cannot be followed out here, and the reader must learn to decipher such forms for himself from his acquaintance with the several component parts.

§ 114. *The Gouty Diathesis.*—Persons of this diathesis are commonly well-made, with a tendency to breadth. The osseous and muscular systems are well developed: the teeth are even, well-shaped, and remain "undecayed in advanced life."[1] The vascular system is highly developed, the vessels are numerous, and the

[1] The large, massive, heavily-enamelled front teeth of the gouty will often give a direction to the diagnosis of the greatest service, as well as suggestions as to the treatment to be adopted.

heart strong and large. The nervous system is very stable, and not easily disordered. The digestive powers are very good, and the reproductive powers are active. They are usually healthy persons until the changes of advanced life become pronounced. This class furnishes those hale individuals who at sixty years of age can boast that they never took a dose of medicine in their lives. Nevertheless in advanced life they are apt to have some acute ailment which either carries them off somewhat unexpectedly, or leaves them in a much impaired general condition.

In persons of this diathesis affections usually assume a sthenic type: lowering measures are generally indicated early in the ailment, and in convalescence the recuperative powers are usually active. In acute ailments depressants are commonly indicated, and the vascular tension is usually high, and the pulse incompressible. Purgation by alkaline salines, low diet and slops are the measures best suited to these individuals. When advanced in years they become more liable to ailments than they are in early life and in maturity; they are the subjects of lithiasis in its varied forms, and whatever their ailment its probable association with uric acid must never be forgotten. Even if the malady has a distinctly separate origin, the diathesis is apt to modify it, and by so modifying the functional activity of the part to maintain the ailment in a chronic form, especially if it be situated on an eliminating surface. All that has been said from time to time before about lithiasis applies with much fitness to persons of this diathesis.

§ 115. *The Nervous Diathesis.*—Persons of this diathesis are rarely of great bulk. Their osseous framework is small, but well proportioned, their muscles are not large, but they possess more power than the mere size would indicate. Usually such people are small, active, restless, and unwearying. Their skulls are well formed, and at times comparatively large and well vaulted, and the development of the nervous system exceeds that of any other part. Their senses are usually acute, and they are indefatigable and energetic. They always seem able to do something more than they are doing, no matter how heavy their duties; in any emergency they are usually prominent, and not only are active themselves, but inspire others to exertion. Very frequently they require but few hours of sleep, and usually they

can thoroughly overwork themselves without having resort to stimulants. In them the highly-developed nervous system tyrannizes over the body in reiterated demands: while the chylopoietic viscera are not rarely unequal to supplying the calls upon the nutritive processes. Tea is their favourite stimulant. In persons of this diathesis rest and sedatives, or tonics, are chiefly indicated in their maladies, which are largely associated with over-exertion. Some of them are singularly susceptible to small doses of narcotics, while others again require unusually large doses to produce the wonted effect. This class too furnishes a large number of the persons who display what are called "idiosyncrasies," and who are consequently a very difficult class of people to treat, and constantly defeat the most carefully-laid therapeutic schemes by their peculiarities. There is no class of beings about whom it behoves the young practitioner to be more cautious: the more so that they are apt to preserve a singularly clear remembrance of everything, mistakes as well as hits, and are therefore either good friends or awkward enemies of the practitioner. This diathesis is commonly found blended with others—except the lymphatic, which is its antithesis. It is found not rarely with the bilious, and very frequently with the gouty; but most largely with the strumous. Whenever it exists it gives a direction to maladies. It furnishes, according to Laycock, predisposition to insanity, anomalous hysteria, to eccentricity, to vinomania,[1] to epilepsy, and to chorea. In practice the recognition of a nervous element in the constitution is a great step towards appropriate and successful treatment.

§ 116. *The Strumous Diathesis.*—Under the name of scrofula, with its numerous modifications, this diathesis has long been recognized and its importance appraised in the treatment of disease. In such persons the vitality is weak. The circulation is defective and liable to disturbance. Assimilation is imperfect, and nutrition is deficient. The osseous system is far from being highly developed, and according to Laycock it is "of a retrogressive type, either towards the infantile or a lower ethnic form, both as to cranium and other bones." The epiphyses are often

[1] Usually, as said before, persons of this diathesis prefer tea to alcohol, but if once drinking habits become formed, they grow, and many of the most hopeless inveterate drinkers are furnished by members of this group.

excessively large in the young, and are specially liable to disease. Even when healthy there is a tendency in these epiphyses to be large and unsightly in adult life; especially is this the case with the small joints of the hands and feet. Very frequently the extremities contrast strongly with the *petite* and beautiful features found in the strumous. In consequence of the imperfect osseous development it is rare to find a thoroughly well-shaped thorax in persons of this diathesis; the chest is apt to be flat, the ribs are drawn downwards in inspiration; and the configuration is one that one learns to dread, as being so closely associated with the development of tubercle, whenever there is any inflammatory action going on in the thorax. The muscles are usually soft, and contract without energy, except when this diathesis is blended with the nervous. The functions of organic life are far from active. The appetite is capricious, and the assimilation, especially of fatty matters, is defective. Circulation and respiration are feeble, they are prone to precocity,[1] while the nervous system is irritable, and is often imperfectly developed, and if the mental powers are good they are usually easily exhausted. This diathesis furnishes those children who are too good to live, the bright precocious little angels described in Chapter VII. Most of the troubles, especially of the chronic troubles of infancy and of growth, are furnished by the tendencies of this diathesis. Any blow to a joint is apt to be followed by arthritis of a suppurative character. The exanthems, though perhaps less severe at the time, are extremely liable to be followed by low chronic maladies of an intractable character. Persons of this diathesis are commonly the subjects of rheumatic arthritis after an attack of acute rheumatism unless the greatest care is exercised, and iron, iodine, cod-liver oil, nutritive food, good air, and all other preventive measures restored to. Indeed the recognition of this diathesis is perhaps of more importance than that of any other form in actual practice. The injured joint, which in another person would merely require a cooling lotion and temporary rest for its repair, will, in persons of this diathesis, demand prolonged rest in splints, together with all the measures mentioned in the sentence immediately above. Even with all care an imperfect repair alone is often all that is practicable.

[1] In this they seem to revert to primitive and early ethnic forms.

If these persons have any mischief in their thorax it is very apt to assume a tuberculous character, instead of undergoing normal resolution. It is from them that the recruits of the ranks of the consumptive are largely drawn. In infancy the glands of the chylopoietic viscera are apt to become diseased, while inflammatory affections of the serous membranes are common, and also assume a tubercular form. There is a persistent tendency to set up lowly forms of cell-growth, which call for energetic and sustained treatment. Indeed the majority of the chronic diseases of early life is furnished by individuals of a strumous diathesis. There is a marked inclination to the formation of uric acid; and vesical calculus is the not infrequent result. It is in the families of this diathesis that syphilis mostly shows itself as a congenital affection, and produces those modifications which are recognized as the syphilo-strumous diathesis. In fact where there is a strumous diathesis the tendency to degeneration in every form is marked and decided.[1] Consequently when the subjects of syphilis they are very liable to have growths of a lowly form of cell life in their lungs, little removed from tubercle histologically; in other parts these growths are known as gummata or syphilitic tumours. One curious matter illustrating the imperfect nutrition which goes along with the strumous diathesis is this, the formation of tubercle is commonly in abeyance during pregnancy—a period of amplified nutrition. Another matter of moment is that an organism with but a slight tendency to struma, if placed under unfavourable circumstances, will give birth to children in which this diathesis is pronounced; and in a similar way the process may be reversed by placing the strumous under more favourable circumstances. Struma grows up in town-bred families, and Lugol asserts that scrofula was rampant in the third generation of those who entered Paris as perfectly healthy provincials. There is a tendency to variation in every organism, and when placed amidst unfavourable surroundings, especially if, at the same time, there be any insufficency of food, the modification so induced is towards the type termed strumous.

[1] "A gouty inflammation in a man who has scrofula by inheritance may drift into true scrofulous inflammation. . . . It may be doubted whether syphilis implanted in any other than a tuberculous or scrofulous person will ever produce destructive ulceration of the soft parts of the nose."—SIR JAMES PAGET.

From what has just been said it is abundantly demonstrated that in persons of the strumous diathesis the thing to aim at, in their ailments, is to keep up and improve the nutrition; and to obviate the tendency to chronic disease, with exuberant growth of lowly forms of cell life—no matter what the form of ailment, or wherever seated.

§ 117. *The Bilious Diathesis.*—This is not quite so much a distinct type as the forms we have just been considering, but is often rather a modification found along with one of the former. It consists essentially in a tendency towards biliary disturbances from causes which would in others be regarded as slight. It is not yet possible to say why this is, whether or not it is an excessive production of bile; but certain it is, bilious persons are not usually inclined to be corpulent, though that is by no means a rule absolute. These persons often grow stout when they cease to be bilious. It would seem that there is some antagonism betwixt biliousness and the deposition of hydro-carbons as fat. There is a dark complexion usually in persons of this diathesis, and the skins lacks transparency. When engrafted on the typical gouty diathesis, the product is a large, tall, energetic individual of a somewhat gloomy temperament.[1] At other times it is found along with the nervous diathesis, and then we have the small, dark, active beings with whom we are all familiar. Very commonly it is found associated with struma; and of all strumous persons, who go steadily and swiftly downwards under tuberculosis, the bilio-strumous are the most marked. Whenever tubercle shows itself in uncommonly dark persons with jet black hair, very marked eyebrows and long black eye-lashes, it will run its course speedily; in a manner much resembling its career in the dark races. Whether it is that the bilious tendency interferes with that assimilation of fat and other hydro-carbons so desirable and even necessary to the strumous, when tubercle is threatening or not, it is impossible to say. Nevertheless the fact remains. This diathesis may also be blended with the next form—the lymphatic.

In all maladies in the bilious, attention must be paid to the

[1] These individuals are by some writers classed as energetic forms of the lymphatic diathesis, which implies a contradiction as marked as if one were to speak of listless individuals of the nervous diathesis.

functions of the liver, and a good discharge of bile into the bowels is desirable. Alkaline purgatives are usually advisable, and they may be combined with rhubarb and aloes with advantage. Such medication is more or less necessary in all maladies in the bilious, especially when it becomes desirable to improve the general nutrition. Bilious persons can assimilate more nutrition, and more thoroughly too, if they are kept on liberal supplies of food combined with purgation, than if they attempt to avoid biliousness by starvation. This should never be forgotten in the treatment of persons of a bilious diathesis. There is a large amount of waste in their furnace, no matter how small the quantity of fuel; and the only effective plan of treatment is to keep the flues swept, and at the same time to be liberal with the fuel.

Whenever the bilious diathesis is found combined with another diathesis, the treatment of it must be blended with the treatment of the associated diathesis. To recognize such combination in practice and in the selection of remedial agents is often more practically useful than an elaborate physical diagnosis; and is especially useful where physical diagnosis is not readily attainable.

§ 118. *The Lymphatic Diathesis.*—This is the last of the forms of true diathesis. It gives large, unenergetic, phlegmatic and listless persons. It is the exact antithesis of the nervous diathesis. It is most commonly found in women. It gives a marked tendency to passive hæmorrhages, especially uterine. Such women suffer from chronic menorrhagia, associated with persistent leucorrhœa, and they usually have heavy losses of blood after each parturition; it is not flooding, but a draining loss, analogous to the bleeding in the hæmorrhagic cachexia. They also often have large supplies of lacteal fluid, but it is of indifferent character.[1] Indeed all their secretions are free, and the use of astringents is often indicated in the treatment of ailments in persons of this diathesis. They are liable to suffer from dilatation of the heart, with palpitation, especially about the menopause, and are most difficult patients to treat satisfactorily. These large, unenergetic beings of either sex require active treat-

[1] Consequently they do not make good wet nurses, though to the eye apparently admirably adapted for that purpose.

ment in their maladies, and especially active stimulant treatment, without which, if they do recover, they are liable to make a slow and unsatisfactory convalescence; and are very subject to remain invalids for a long time, with some low form of chronic ailment, or with general adynamy. Depressants are rarely indicated with them. These persons are much affected by locality, in low-lying districts they are scarcely ever well; in high-lying, bracing localities they are much better. This is especially seen where the lymphatic diathesis is blended with the bilious. Persons of the lymphatic diathesis are often said to be good-natured, when they might with equal truth be described as indolent; if listless, however, they are not capricious, and often furnish the steadfast, unwavering friend. There is one type of the lymphatic diathesis which is most troublesome in practice. The patient is usually a woman, broad-faced and corpulent, and not rarely pallid; there is a large development of fat over the abdomen, and a tendency to flatulence, and almost always some uterine affection is present, either hypertrophy or misplacement, with menorrhagia and leucorrhœa. They are chronic invalids, who complain much, probably not without reason; they are always grateful for what is done, but they never improve much. I have tried several plans with them, chalybeates with stimulants; astringents, with and without chalybeates, vegetable tonics, &c., without any results worth mentioning. The reader may perhaps be more fortunate. Change of air at a chalybeate spa is worth trying.

§ 119. Such are the leading classes of diathesis. They constitute distinct groups of individuals, and, perhaps less often, pronounced groups of families. In some cases the family presents a very marked type of one or other diathesis. At times the type is not so pronounced in some members of the family as in others; while occasionally one individual will differ considerably from all the rest. When the tendency towards a certain diathesis lurks in both parents it will come out very strongly in their offspring. In this lies the sting of intermarriages. It is very undesirable that two persons of like diathesis should marry, and especially is this true of the strumous.

There are few things of more importance in actual practice

than a fairly good appreciation of the varieties of diatheses, and of the tendencies given by each, together with a knowledge of the therapeutic indications so furnished.

To the above list of diatheses some add the *hæmorrhagic* diathesis, classed by Laycock as a cachexia. It really may be found along with any diathesis, single or blended. It consists in a tendency to passive hæmorrhage, which may render the most trivial wound a very grave matter. It gives no outward indications of its existence, and is only found out empirically. Whenever it is discovered it then behoves the individual to constantly be on guard against any solution of tissue continuity, and it also puts the medical man on the *qui vive* in any surgical interference. Usually the hæmorrhage is not arrested until the system is blanched and the blood-pressure brought very low, and, at the same time, until some very energetic measures for the repression of the bleeding have been resorted to. The French also speak of a dartrous diathesis; but of this I am not yet in a position to say anything either way, except that it has not yet forced itself upon my attention.

Cachexiæ.

§ 120. Allied to diatheses in their modifying power over the constitution, and in their tendency to give a direction to maladies, stand the cachexiæ. A cachexia is an acquired modification, as compared to a diathesis, which is inherited or congenital. Or the two conditions may be combined, as in gout, for instance, where we have both a gouty diathesis and a gouty cachexia. The gouty cachexia may, however, be found along with any form of diathesis. Wherever a cachexia is found it behoves us, as practitioners, to attend to its indications. Syphilis also may exist either as an acquired cachexia, or an inherited diathesis: in either case its presence is most important in a therapeutic sense. Hitherto little allusion has been made to syphilis, but now it must engage our attention. Other cachexiæ, as the malarious cachexia, the cancerous cachexia, &c., have been considered from time to time in other sections; now it is the turn of syphilis to become prominent—as the most striking illustration of a cachexia.

A cachexia, as said above, is an acquired modification of the constitution which may or may not be outwardly apparent. Except, indeed, in the anæmia which is so frequent in the course of cachexiæ, there are no pathognomonic indications. The modifications may be most profound, however, and may exercise a distinct influence over the most trivial as well as the most important maladies. Its presence is indicated rather by such effects than by visible signs. Syphilis, as just said, may be either acquired or inherited. It is the effect of an animal poison usually communicated by impure intercourse. Its origin is shrouded in mystery which no application of intellectual energy has yet been able to penetrate. It at first shows itself by a local ailment, usually a hard chancre. The soft chancre, so called, terminating in inguinal bubo, may be pretty well excluded from the present inquiry. This local sore is characterized by a hard cartilaginous base. Within a few weeks ordinarily there follow general evidences of constitutional infection. There is ulceration of the throat, together with characteristic copper-coloured eruptions on the skin, sooner or later becoming scaly, while the hair usually falls off, but grows again. In some instances the poison seems to be eliminated by this eruption, usually termed "secondaries," and no other evil consequences follow. More commonly, however, another series of ailments sooner or later show themselves, which are termed "tertiaries." These are very commonly osteal or periosteal affections, but not rarely the nervous system is the seat of disease, usually a neoplasm or growth of connective tissue in the neuroglia, which affects the nervous tissue by its pressure; or new growths (gummata) may form in the muscles. Rheumatism, paralysis, cutaneous ulcerations of an eczematous, or of a serpiginous character, as well as conditions of profound anæmia, &c., all are the direct outcomes of syphilitic infection in its remoter manifestations.

It is no part of my scheme to go into the minutiæ of syphilis in its varied manifestations: they are to be found in many books, and are amply illustrated in every one of our medical charities. What I do wish to insist upon is this:—Wherever an ailment can be discovered to have a syphilitic origin, then it becomes our bounden duty to treat the cachexia in the first place, and to relegate the local mischief to a subordinate place in the remedial

measures. Empiricism has declared in clear and unmistakable accents that it is useless to treat syphilitic sequelæ without directly treating the syphilis. Chlorate of potash and cinchona gargles are all very well in the pharyngeal ulceration of secondary syphilis, but they are not curative; while a mercurial course is. Tar ointment may palliate the syphilidæ, but it is inadequate to their cure. Hæmatics are indicated in the treatment of anæmia, but in the syphilitic cachexia mercury must be added to the chalybeate, if it has to be truly effective. Whenever and wherever it manifests itself, syphilis must be treated by its specific measures; modifications and additions however being made according to circumstances and the exigencies of each case. The specific remedies of syphilis are mercury, in all its forms, and iodine. How these agents act we do not yet truly know.

§ 121. That they do act, and most efficiently too, is admitted by the most confirmed sceptics, and their remedial power no competent authority would think of disputing. Though we do not yet know how they produce their effect, we know empirically how to apply them. In the earlier manifestations of syphilis mercury is the chief agent employed, either in continuous small doses by the mouth, or by repeated inunctions. For the first it is desirable to select some soluble solution of mercury, as the solution of the bichloride, or of the biniodide; for the latter blue ointment is preferred. There is one fact which will soon strike the most careless observer, and that is the protection against the evil effects of mercury which syphilis confers upon the system. Doses of mercury, which would assuredly produce havoc in other systems, are not only tolerated by the subjects of syphilis, but seem positively to do great good. Under them rashes disappear, ulcerations heal up, paralyses pass off, and morbid growths melt away. No matter what the malady, from rheumatic, nocturnal, persistent pains, to masses of lymph on the irides, it yields to mercury. It has been laid down as a general rule that syphilitic growths need mercury, and syphilitic ulcerations require rather iodide of potassium in full doses. This may be a good general rule, but it has fallen to my lot to see many undoubted cases of syphilitic ulceration, in which full doses of iodide of potassium have exerted but little influence, clear up after the administration of mercury combined with iron. I was

led to this combination by first noticing that many cases of anæmia, which were entirely unaffected by chalybeates, at once began to improve on the addition of mercury. In these cases there were evidences of the presence of syphilis, inherited or acquired. It has now become a regular practice with me to give mercury in cases of anæmia or imperfect evolution associated with syphilis. Not rarely, if the nutrition be very imperfect, cod-liver oil may be given at the same time with advantage. It has fallen to the lot of many to see the subjects of syphilis commence to fatten under a mercurial course without any chalybeate remedy being exhibited. As soon as the syphilitic virus is met and neutralized by the mercury the processes of nutrition begin to improve forthwith. At other times it is desirable to meet the original disease by mercury, and the marasmus or anæmia by iron.

The combination which seems to me the most generally serviceable is the following:—

℞ Liq. Hyd. Bichlor. ♏ xxv.
Tinct. Fer. Perchlor. ♏ x.
Inf. Quass. ℥ i ter in die.

It may be given before or after food according as it is desirable, or not, to give a fillip to the appetite. It may be continued steadily for months not only without ill effect, but with advantage. By such combination we secure the good effects of a mercurial course, and yet protect the system from the effects of the mercury itself. While it is quite true that patients do sometimes fatten under mercurials given alone, it more commonly happens that some of the ill effects of a mercurial course manifest themselves sooner or later. The administration of a chalybeate along with the mercury obviates these evil consequences, and while the mercurial is engaging the syphilis, the iron supports the blood-formation, and protects the system against the evil consequences of the mercurial. At other times it is desirable to give the mercury in the form of pill, especially when the bowels are somewhat constipated. Every one familiar with out-patient work must have noticed again and again how much better the Pil. Cal. c. Col. Co. has agreed with anæmic women than a pill not containing mercury. Rheumatism ordi-

narily does not require mercury for its successful treatment; but when it occurs in subjects not of a rheumatic character, is nocturnal, and is found along the collar bones, in the upper arm, and in the shins, then mercury at once is beneficial; for this form of rheumatism is a syphilitic affection of the periosteum, usually worst at nights on getting warm in bed.

Whenever, too, hemiplegia occurs in young and healthy subjects, or any symptoms of interference with a nerve tract, the more irregular the better, show themselves, the syphilitic nature of the malady at once is suggested, and under appropriate treatment the most apparently formidable maladies pass away. This is a point of much importance for the young practitioner, and he should ever bear in mind the nervous affections produced by syphilis; by so doing he may not only save himself from falling into error, but he may be enabled to be of much service to patients whose ailments have hitherto not been properly comprehended, and so to gain much *kudos* for himself.

In children, where syphilis is congenital, as shown by affections of the nasal bones with "snuffles," or skin affections, especially copper-coloured nates, mercury, chiefly in the form of grey powder, has been found most serviceable. Here again we get a capital illustration of how important is the constitutional condition, and how comparatively insignificant the local ailment, when syphilis underlies the ostensible malady. When children, whose teeth indicate the taint they suffer from, are anæmic, stunted, or arrested in their evolution, the addition of mercury to the ordinary measures will produce all the difference possible, and convert an eminently unsatisfactory treatment into a very gratifying one.

It is no part of my business here to teach the youthful reader how to distinguish syphilis in its thousand varied forms: that he must learn by the sweat of his brow; but in telling him by what principles he must conduct its treatment, it may not be out of place to insist that the diagnosis of syphilis must rest but little, if at all, upon any statements of the patient, and in no way upon the position in life of the sufferer. If these influences exist, the vision will often be clouded to the prejudice of the remedial measures. The coppery tint of a rash,

or the serpiginous nature of an ulceration, must outweigh the bluest blood or the most perfect walks in life; in comparison with such witnesses the noblest descent and the most far-reaching of genealogies are trifles light as air. The austere life of an archbishop or a cardinal is not incompatible with early self-indulgence, with its consequences. Such being the case, it must never be forgotten that the purest and best of women may be the unwitting and unfortunate sharers of the taint. The inexorable laws of nature know nothing of extenuating circumstances; and syphilis may be the lot of a princeling as well as of a pauper's bantling. Hebra is right in insisting that the diagnosis of syphilis shall rest upon its objective phenomena alone, and that the question of past history must be excluded,—if we wish to be correct. The importance of a right diagnosis is made all the more manifest from what has just been said about the necessity for treating the cachexia, irrespective of the form of the leading outward manifestation.

§ 122. *Lead Poisoning.*—Still more vividly even is the importance of the cachexia in proportion to the local malady brought out in the case of lead-poisoning. Once the diagnosis made, then it is of small moment what the peculiar manifestation of the poison; the treatment is the same. No matter whether it be the well-known colicky pains, the wrist-drop, or paralysis of the extensors of the wrist, or the less-known forms of cerebral disorder, general tremor, amaurosis, albuminuria, or even of uterine disorder; if the blue lines on the edge of the gums be present the diagnosis of lead-poisoning is rendered probable.[1] In this cachexia the past history is valid and valuable; here there is nothing calling for concealment, and it may fairly be admitted as evidence. If the association of the malady can be clearly traced, and there has been contact with lead, then it behoves us to treat the cachexia. One plan much in vogue is the administration of sulphuric acid in order to form in the system the insoluble, and therefore inert, sulphate of lead. The acid is usually given along with the sulphate of magnesia either with syrup, or in some bitter infusion. This forms a common draught in manufactories where lead is much used. A more favourite plan in medical practice is to dissolve

[1] Garrod thinks the gouty especially sensitive to lead, p. 474, 3rd edit.

the lead out of the body by giving iodide of potassium. This forms a combination with the lead, and the resultant, iodide of lead, passes out of the body in solution, chiefly by the kidneys. It is desirable to combine with it a course of purgation. Very commonly attacks of gout, of various forms, are due to the action of lead, which appears to arrest the elimination of uric acid. But the form of malady matters little; it is the cachexia,—the lead-poisoning that we have to treat. The importance of recognizing a cachexia when present, no matter whether syphilitic, lead, or other poisoning, gouty, strumous, malarial, &c., can but be imperfectly conveyed by words; the student must observe it for himself in practice. All that can be done here is to sketch out the matter in outline, and leave it to be filled up as experience dictates. It is not however a trivial matter to sketch that outline correctly; and the sketch is as correct—it is hoped—as it can, in the present state of our knowledge, be made.

CHAPTER XIII.

ACTION AND INACTION.

§ 123. In this chapter will be considered the various measures by which we act upon the nervous system, and the means by which we can control that system, or excite action in it, when it becomes desirable to do so. That we possess such agents is familiar to every one; but how they exert their influence, how they produce their action, or, in other words, their *modus operandi*, is not so clear. Physiological research and experimentation are doing much to dissipate the darkness which has hitherto shrouded this subject. Of the agents which control nerve-action we have several classes, as sedatives, depresso-motors, analgesics, anti-spasmodics, and agents which check secretion. The different members of these groups possess varying degrees of potency. The action of some is very pronounced, while others again are useful rather as adjuncts to the more powerful members. Of the neurotic agents which diminish action in the nervous system, opium, chloral hydrate, and bromide of potassium are the chief in common use: calabar bean, conium, and others are potent, but not so commonly resorted to; while hyoscyamus, camphor, &c., are less powerful, except in doses far beyond those of the pharmacopœia, and are chiefly used as adjuncts to other remedies. Another class of agents, as belladonna and cannabis indica, lie across the borderland of depressant and excitant neurotics, and had best be considered under the latter heading. Even opium is not free from excitant properties, which counterbalance and even preponderate over its sedative properties with some individuals. Much depends, too, upon the manner

in which it is given: if administered in frequently repeated but small doses its excitant properties are brought out; if given in full doses its sedative action is most pronounced. By habit and long indulgence in it opium may be converted into a nearly pure excitant, as in the well-known instance of De Quincey.

This combination of properties in a drug of so pronounced a character as opium demonstrates how difficult it is to form any arrangement or classification of neurotic agents which shall not at some point or other clash with acknowledged facts. In the present state of our knowledge a strictly accurate classification is unattainable: still it is possible to adopt an arrangement which will so group neurotic agents as to make their action somewhat clearer than before, and, to a great extent, to elucidate their use in actual practice.

In order to clear up this complex subject, to some extent at least, it may be as well to commence by reviewing a few of the leading facts already gathered in reference to the recognized action of certain neurotic agents which control nerve activity.

§ 124. Opium first claims our attention. The effect of a moderate dose of opium, in ordinary individuals, is to induce sleep after a brief period of excitation. Max Schuler found that opium first produced a slight dilatation of the vessels of the pia mater, followed by contraction and brain-collapse; the vessels recovering their calibre, with slight dilatation even, when the narcosis was over. If a larger dose be given a death-like coma is produced, with a fast, feeble pulse, and irregular respirations. If the dose be fatal, "death occurs generally by failure of the respiration, but amid an almost complete extinguishment of the vital functions." (Wood.) The action which in moderate doses controls and diminishes nervous action, in lethal doses abolishes functional activity in the nervous system. First the higher cerebral faculties are acted upon, leaving the lower, but, as regards mere life more vitally important centres at the base of the brain, but little affected. In larger doses these, too, are involved, and respiration and circulation are arrested, causing the death of the organism.

One of the difficulties experienced in attempting to trace out the action of opium upon the nervous system has arisen from the fact that in frogs opium excites convulsions. This is

accounted for by the comparatively high development of the spinal cord in frogs and the imperfect evolution of the cerebrum; while in man the cerebrum attains its highest development. Consequently in the frog the effect is to produce convulsions, chiefly the result of excited reflex irritability; while in man the resultant phenomena are sleep and stupor, the evidences of the effect upon the cerebrum. Opium, however, acts upon the spinal cord of man, as seen in its influence upon the centres which regulate the emptying of the bladder; and retention of urine is not uncommon after a full dose of opium. Here opium probably acts by blunting the sensibility of the centres which are connected with the reflex relaxing of the vesical sphincter, to sensory impressions created by the full bladder.

But opium, and its derivative, morphia, do not act only upon the cerebro-spinal system, but upon every nerve-cell, and probably every nerve-fibre. Gscheidlen found that morphia acted upon both the respiratory centres and the intra-cardiac ganglia. In its influence upon these centres it displayed the same action as it produces over the cerebro-spinal system, viz., a brief period of excitation, followed by diminution and final abolition of all action. Opium, too, as is well known, arrests action in the intestinal canal, at the same time checking the flow of gastric juice and the intestinal secretion, causing constipation. Thus it is useful in certain forms of irritable dyspepsia and in diarrhœa; especially in that form where, from hyperæsthesia and irritability of the intestinal canal, the food is swept away before it has had time to be digested and assimilated. In colic and other spasmodic affections of the intestines opium, especially in combination with carminatives and stimulants, is very useful. In peritonitis opium is the favourite remedy. Not only does it deaden the receptivity of the nerve centres to impressions, including, of course, pain, but it also has a powerful effect upon the bowels, limiting peristaltic action and lessening the friction of the inflamed membranes. In uterine diseases, and after operations in the neighbourhood of the intestines, opium is very serviceable from its effect upon the movements of the bowels. Opium, too, limits the activity of the viscera, and is useful in diabetes and azoturia; probably in each case even more by its action upon the liver than upon the kidneys.

Opium is used to limit motor action, but not nearly to the same extent as it has been resorted to to relieve pain. This last opium does most effectually, and in this respect it differs markedly from chloral hydrate, though they are both powerful hypnotics. In many cases where the dose of opium is insufficient to produce sleep, it will so far diminish the receptivity of the sensory centres as to relieve the sensation of pain in painful conditions. Thus opium is an analgesic as well as an hypnotic. In all forms of pain, except neuralgic states, opium is our favourite remedy and our most trusted analgesic. How it exercises this action we can inquire after we have reviewed its hypnotic action, which will next engage our attention.

In the production of sleep there are two factors requisite: (1) an action upon the vascular system which will permit of cerebral anæmia, and (2) an effect upon the cerebral cells, which results in their diminished activity.

The vascular conditions requisite for sleep may be taken first. At one time it was supposed that sleep was due to congestion of the brain, and that opium produced its somniferous effects by inducing cerebral congestion. But as it became more and more clearly evident that functional activity of any part is strictly related to its blood supply, that is, its supply of arterial blood, careful observations and experiments were made, especially by Mr. Arthur Durham, which resulted in modifying very materially our views as to the conditions under which sleep occurs. Sleep is a condition of cerebral anæmia: coma one of venous congestion. Sleep passes into coma when venous fulness is superadded to arterial anæmia within the cranium. In poisoning by opium there is much venous fulness. In moderate doses opium produces sleep: in fatal, or even in large but not necessarily lethal doses, it induces coma. The chief effect of opium in the production of sleep is upon the cerebral cells, but nevertheless there is also an influence upon the vascular system. At first opium increases the pulse rate and the arterial tension; but afterwards both are lessened below the normal point. (Nothnagel, Gscheidlen.) The first action of opium, then, is that of the production of excitement, during which there is also increased vascularity of the encephalic arterioles. (Max Schuler.) Then follows contraction of the

cerebral vessels, a fall in the blood-pressure generally, and, with these, lessened activity in the nervous system takes the place of excitement. This lethargy following activity was at one time attributed to exhaustion of the stimulated nerve-centres. (A. Todd Thomson.) We should scarcely say so now; but we know that this diminished functional activity is accompanied by distinct reduction in the cerebral vascularity—partly the consequence of the fall in the blood-pressure, and the contraction of the encephalic arterioles; partly the outcome of the effect upon the cerebral cells, so that they do not attract blood so actively. When we wish to procure sleep in conditions of vascular excitement with a full and bounding pulse, it becomes necessary to administer opium in combination with some distinct vascular depressant, as tartar emetic, aconite, or chloral-hydrate; otherwise those changes in the circulation indispensable to sleep cannot be procured. From its very decided effects upon the circulation, chloral is to be preferred to opium in conditions of vascular excitement, either inflammatory or febrile; or they may be given together if pain also be present.

Both opium and chloral-hydrate act upon the cerebral cells,—the second part of the action of hypnotics. We cannot yet speak very explicitly about this action; all we may say is that they produce their effects, we have every reason to believe, by an action upon the cerebral cells, lessening their functional activity, and, with it, their demand for arterial blood; at the same time that the blood-supply to the cells is diminished. By this combined condition—of arterial anæmia and lethargy in the cerebral cells—sleep is brought about.

From this consideration we may now pass on to the examination of the action of opium as an analgesic. We are all familiar with the fact that pain puts away sleep until sheer exhaustion wraps the sufferer in oblivion. It is said that Damiens slept during the intervals of the rack. The activity of the cerebral cells is maintained and kept up by impressions of pain coming in by the afferent nerve-fibres. The arrest of pain, the cessation of these painful sensations conveyed by centripetal nerves, as by the extraction of an aching tooth, or the opening of a whitlow, is at once followed by sound, dreamless sleep. A state of exhaustion is induced by sustained persistent pain, and relief

from these painful impressions is followed by a state of quiescence in the cerebral cells, the evidence of which is furnished by long, sound sleep. Several days indeed may elapse after a period of sustained acute pain, either bodily or mental,[1] ere the cerebral cells recover themselves, and the normal sensations of vigour and elasticity in the nervous system are again experienced. An analgesic is an agent which diminishes painful sensations. This power opium possesses very markedly. If, in conditions of acute pain, it be given in moderate doses, it will merely palliate the condition, reduce its intensity, and no more. A larger dose, however, will subdue the sense of pain, though it may not be sufficient to produce sleep under these circumstances; *i.e.*, the impressions coming in by the afferent nerves, though no longer equal to producing painful sensations, are still powerful enough to maintain a condition of activity in the cerebral cells. A still larger dose of opium will annul these last remaining effects upon the cerebral cells, and procure sleep.

There are some direct experiments (C. Bernard and others) to demonstrate the analgesic action of opium; but the bulk of evidence is furnished by the conclusions which may be drawn from careful clinical observation of its action. It is abundantly evident that the effects produced by opium are in a manner antagonistic to the action by which pain is manifested. The sensation received in the brain as pain—say in onychia of the great toe—has passed from the periphery, along a nerve-tract of cells and fibres, until it is received in the sensory cells of the grey matter of the brain, probably in the optic thalami. It would appear that opium lessens the conductivity of nerve-matter, of fibres probably as well as cells, and so diminishes the force of each impression—as seen in the lessened pain produced by a comparatively small dose of opium, even when not equal to arresting entirely the transmission of the impression. In larger doses the impression becomes so lost in the transmission that it is no longer felt as pain, though still sufficient to maintain a condition of wakefulness in the cerebral cells. Pain raises the blood-pressure generally (Von Bezold)—except when amounting to shock. It would seem that the effect of opium is felt in the

[1] Such was the case with Audubon, the naturalist, after discovering that mice had eaten all his drawings of birds, the fruits of years of labour.

receptive nerve-centres as well as in each and every part through which the pain-producing message passes; and the force of the original excitant is so diminished that it falls below a pain-producing point when ultimately received in the brain. A still larger dose of opium is sufficient to neutralize all consciousness of the pain-exciting impression, and to arrest the unfelt perturbations in the cerebral cells, and then sleep is secured.

In this analgesic action opium is markedly superior to chloral. In conditions of sleeplessness due to pain chloral is of comparatively little or no value, and opium is the agent to be relied upon. The Easterns print "Mash Allah" (the work of God) upon the cakes of opium (Pereira), in consequence of its special properties. When, however, the painful state is due to an inflammatory condition, then the addition of direct vascular depressants is indicated (p. 92). If the painful state be due to inflammation of the brain itself, the depressant must be given without opium.

As said before, opium is not much used to subdue morbid motor activity, as tetanus, chorea, epilepsy, or paralysis agitans. In these conditions other sedatives are more useful. In conditions of spasm, however, especially in the intestines or bladder, opium is very effective, and its action on the muscular fibre of the gastro-intestinal canal is pronounced.

§ 125. The effects of opium are felt in other parts of the nervous system than the intra-cranial centres—in the periphery as well as the centre. (W. Baxt.) This is shown by the relief furnished when opium is applied locally, as to a blistered surface, a painful ulcer, or to piles. It seems to exercise an anæsthetic effect upon the terminal distribution of nerve-fibres in the tissues, and not only affords relief, but, by lessening the irritability of the part affected, aids in repair and recovery. Thus, in affections of the pelvic organs, the local application of opium, or its use as a suppository, is to be preferred to the administration of it by the mouth. In localized pain the application of opium endermically, or, better still often, hypodermically, is very desirable. In cases of gastric irritability, where the stomach rejects everything, these means of administering opium are invaluable.

Opium possesses another action often very useful, and that is

its power to arrest excessive secretion. Thus in diarrhœa we find it not only controls the peristaltic action of the intestines, but it checks secretion. How far it achieves this effect by action upon the peripheral nerve-fibres in the glandular structures solely, or whether it also acts through the blood-supply, is not quite clear. There have not yet been a sufficient number of observations and experiments made to decide the matter. Lauder Brunton found that opium exercised a very decided effect in weakening or destroying the effects of a stimulus to sensory nerves, thus diminishing the blood-supply to the part. From this he was led to suppose that a part of the good effects of opium in inflammations is due to such action; for limiting the blood-supply to an inflamed part will give the same relief as raising the hand does in lessening the pain of an inflamed finger. This action of opium is important, especially in such an inflammation as peritonitis. If, indeed, to the analgesic effect of opium, on the periphery as well as the centres, be added its effects in controlling the vermicular action of the intestines, and so limiting motion; and, beyond these actions, opium restricts the vascular dilatation of an inflamed part; then there can be no difficulty in estimating its utility in the treatment of peritonitis.

Brunton has also found that when a large dose of opium is given to an animal it completely abolishes the secretion in the sub-maxillary gland, which is excited reflexly by irritation of the lingual nerve. Not only so, but he is inclined to the opinion that opium acts upon the secretory nerves themselves in the gland. If the narcosis be deep it appears that unusually strong electric currents are necessary to excite secretion, and the quantity of fluid obtained under the circumstances is less than that which is furnished when woorara is employed instead of opium. From this it would appear that opium exercises some direct effect upon secretion by an influence over the nerve elements of a secretory organ: and this action explains the utility of opium in the control of excessive secretion. This matter will be referred to again when considering astringents. (§ 128.)

The activity of one secretory apparatus, however, is stimulated rather than arrested by opium, and this is that of the sudori-

parous glands. Excessive perspiration is one of the effects of a full dose of opium; and opium is in many cases a valuable diaphoretic, especially in combination with other members of that class of remedial agents. In this its antagonism to belladonna is well seen; for belladonna is as useful in arresting excessive perspiration as opium is in exciting it.

§ 126. Chloral hydrate is a drug which stands second to opium only as an agent which depresses nervous action. There are differences, however, betwixt the actions of these two agents which are far from unimportant. We have just seen that for the induction of sleep two factors are requisite, viz., cerebral anæmia and a quiescent state of the cerebral cells. Opium acts more pronouncedly upon the cells than the circulation; whilst the effects of chloral are most markedly felt by the circulation, and to a less extent by the cells. Thus in old days a depressant, as tartar emetic, was combined with opium in conditions of sleeplessness due to vascular excitement. In such conditions chloral is the hypnotic *par excellence*. As an analgesic, chloral is far below opium; but in conditions of sleeplessness due to arterial fulness, chloral is far superior to opium. Where vascular excitement and pain coexist, then chloral and opium should be combined. It must not, however, be supposed that chloral does not possess a very decided effect upon the nervous system. In fatal doses it arrests both respiration and the circulation by its effects upon the nerve-centres of these systems. It also acts upon the cerebrum and the centres at the base of the brain; whilst it has a decided effect upon reflex irritability. From its double effects upon the nervous system directly and upon the circulation, chloral has been found very useful in the treatment of mania—much more useful than opium. Chloral, too, is an excellent remedy in cases of cerebral irritability from overwork, giving calm, refreshing sleep. There is much room, however, for anxiety as to this last use of chloral. For such end it is often taken without professional advice, and great mischief has followed its abuse. Properly used, no doubt, it is of the greatest utility, and by its means serious injury has often been averted; but it can cut both ways, and it is not an agent to be trifled with with impunity. By its combination of qualities, as a powerful vascular depressant and a sedative to the nervous

system, chloral is indicated in all cases of cerebral irritability with encephalic vascular activity, especially with a tense radial pulse. Chloral, too, exercises a powerful influence over the body-temperature, and is distinctly indicated when the above condition is associated with pyrexia. (p. 91.)

In consequence of its powerful effect upon the heart, Da Costa advises caution in the administration of chloral in cardiac debility; and this caution is well worthy of attention, especially where a muscular chamber is struggling against a tight stenosis. Chloral has been found to diminish the pain which accompanies uterine contraction.

Choral is useful very commonly in the treatment of convulsions in children, and in some cases of chorea; and even in tetanus it has been found to furnish some relief.

Altogether chloral is a potent remedy, and as an hypnotic, in certain conditions, it is unequalled. In cases of sleeplessness it is by no means a matter of indifference whether opium or chloral be chosen as the hypnotic. The choice in each case ought only to be made after a careful consideration of the indications, which we have just seen may differ considerably; under certain circumstances these agents are best given together.

As illustrations of the evil effects of chloral we may refer to its employment in the sleeplessness of melancholia, where it seems to still further starve the anæmic brain, and tends to transfer the condition from that of temporary melancholia to the more advanced and permanent condition of chronic dementia (Crichton Browne, Hammond); and to the intellectual prostration which ensues from resort to it in the sleeplessness of overwork; especially in those persons whose circulation is not very vigorous.

§ 127. Another powerful remedial agent is Bromide of Potassium. This agent has been used both as an hypnotic, and analgesic, but still more largely in order to control disorders of motility,—whether direct or the result of reflex irritation. It unquestionably exercises a powerful influence over the nervous system, and in cases of poisoning by bromide of potassium the chief symptoms have been cerebral,—such as loss of memory, confusion and torpidity of thought, a tardiness of comprehension and answer, with lethargy. (Nothnagel.) The

symptoms produced by toxic doses of this agent are those of a diminution of cerebral activity. But other portions of the nervous system are affected by bromide of potassium. The nervous arrangements of the circulation are affected by it; the action of the heart is lowered by large doses, and the heart is brought to a standstill in diastole by fatal doses. (Here the action of potash as a muscle-poison must not be overlooked in the production of these results.) Toxic doses of bromide of potassium lower the body-temperature, but whether this is solely due to the effect upon the circulation, or in part to some arrest of tissue change, is not yet determined. Though the bromide does affect the circulation and the temperature, it is rarely if ever given as an apyretic, but is mainly used for its direct action on nerve-tissue. It exercises a decided effect upon sensation, even when applied locally, as to the pharynx; but still more when administered internally; and Waring refers to a case where a sclerotic and cornea, into which some grains of gunpowder had been blown, were thus rendered so insensitive that the grains could be removed. In cases of hyperæsthesia, or irritability of the reproductive organs, the effects of bromide of potassium are well known. Where the system is suffering from suppression, or repression of the sexual instinct, as in involuntary celibacy, this drug possesses an almost unique power. Consequently it is very useful in the treatment of menorrhagia in girls and young women, and again at the menopause, where there is often much sexual excitement, indeed a recrudescence of the generative instinct; but in other forms of menorrhagia, and in flooding from uterine tumours, it is useless. (Ringer.)

In convulsive disease of all kinds it is most valuable, and especially when associated with some distant irritation, or of reflex origin. According to our best authorities it has entirely changed the prognostic aspect of epilepsy. In small doses it usually exercises but little influence; but in half-drachm doses three or four times a day it is a powerful remedial agent, often keeping the fits away for months. The return of the fits after its use is discontinued, and their suppression again by resort to it, demonstrate its unquestionable utility. Its action is, in the experience of the writer, most marked in cases of epilepsy linked with excitement about or in the reproductive organs.

It is also especially useful where convulsive movements are the result of habit, as for instance in the cough which remains after pertussis, when the specific element has vanished. It is of service in the treatment of laryngismus stridulus; and is often effective in the treatment of chorea. Not only does it produce these fairly generally known effects, but it exercises a powerful influence over secretion the result of reflex irritation. Thus Ferrier found it arrest a diarrhœa in a pregnant woman, where all ordinary measures had signally failed. I have myself found it useful in arresting profuse salivation from a decayed tooth; and in the salivation often met with in pregnancy it will probably be found to be of similar utility. As to the vomiting of pregnancy, so intractable to ordinary measures, it usually yields to the bromide quite readily; and, in my experience, the vomiting ceases not unfrequently within twenty-four hours from the commencement of the use of this agent; any passing excitement in the generative organs may however induce a temporary return of the vomiting, even when the arrest of it by this drug is well marked. Thus we see that bromide of potassium, or ammonium, possesses a very marked power in diminishing nerve-activity; and even still more in arresting nerve-conducticity, so that in all cases of action of reflex origin it is invaluable. That portion of the cord which receives and transmits reflex impulse seems especially under its influence. (Wood.)

The effects of bromide of potassium upon the cerebrum are also very decided. In the irritability of young children, where there is general hyperæsthesia, so that the peristaltic movements even give pain; in night-terrors, night-mare, and night-screamings it is very useful. In all cerebral excitement, either in children or adults, it is of service. Ringer says, "Sometimes in the later months of pregnancy a woman becomes at night the prey of the most frightful imaginings, labouring under the impression that she has committed, or is about to commit, some great crime or cruelty, as the murder of her children or husband. The bromide dispels these illusions, and induces calm, refreshing sleep." In cases of cerebral excitement, as in the delirium of febrile affections in children, where there is some vascular excitement also present, the bromide may be combined with

chloral hydrate with advantage. In the insomnia of overwork, or of mental tension, the bromide, if less potent, is infinitely less dangerous than chloral; and, along with camphor or hyoscyamus, is to be preferred to that hypnotic.

Finally, there is another action of bromine which is very valuable, and that is its power to check the headache, and other uncomfortable feelings in the encephalon, which are produced in many persons by the use of quinine, or of iron. The potassio-tartrate of iron and bromide of potassium together can often be tolerated where iron alone disagrees; and by giving bromine, in the form of hydro-bromic acid, as a solvent of quinine, instead of some other acid, quinine can be borne by those who, under other circumstances, would prefer their malady to the effects of the quinine.

§ 128. Such are the most notable and energetic members of a very important group of remedial agents. There are other members of this group possessed of similar properties in a less degree, as, for instance, the hop, which in the form of tincture is often very useful in insomnia in gouty conditions, when opium is inadmissible. Commonly the less potent members of this group may be used as vehicles for the more energetic forms with advantage. Thus an excellent anodyne is formed by combining the tincture of opium with the tincture of hyoscyamus, one part of the former to two of the latter.

A few practical combinations may now be given. In cases of cerebral excitement with vascular fulness, as in acute pyrexia or inflammatory affections, not being situated in the brain itself, opium may be given with antimony, and

Tinct. Opii. ℥xv.
Vin. Antimon. ℥xx.
Mist. Camph. ℥i.

every four or six hours, will be found a good combination; or a grain, or a grain and a half, of powdered opium may be given with five grains of James's powder at bedtime usefully in many pyretic affections.

According to Fuller, opium acts more powerfully in the presence of acids than of alkalies; consequently in rheumatic

fever, where the alkaline plan of treatment is adopted, opium may be freely given without fear. Opium, too, may be administered in toxic quantities in severe pain without danger, and in chronic painful maladies, usually, huge doses alone are of any service; but on the removal of the pain the opium must either be totally withdrawn or greatly diminished in quantity. A full dose of opium may often advantageously be administered half an hour before any painful operation, such as dressing a wound, passing a bougie, &c. When given at bedtime, as Graves has pointed out, opium should be taken half an hour or so before the usual hour of sleep, so that its primary stimulant action may get over, and its secondary sedative action be in force, when the natural desire to sleep comes on; and thus the soporific effects may unite with the force of habit. By attention to this rule the action of the opium and the natural inclination to sleep will harmonize and not clash, and the minimum dose will so secure sleep.

The forms in which opium may be administered are legion. As a fluid, as a powder, in pill, as a suppository, hypodermically or endermically, it, and its derivatives, may be used. The plan of giving morphia hypodermically is now very general, and the effects of the drug when so given are very certain and withal very speedy. Opium may be applied locally by this means, or by blistering a surface and sprinkling it with powdered opium or morphia, or as a liniment, or plaster applied to the general surface. Opium and chloral may often be combined with advantage, and

Tinct. Opii. ℥x.
Chloral Hydrate, gr. xv.
Mist. Camphoræ, ℥ i.

three or four times a day is an excellent combination in painful conditions, where there is also a febrile temperature. In cerebral excitement, where the pulse is not very feeble, such combination would be useful. Either opium or chloral may be combined with bromide of potassium in certain cases with good results, especially in cerebral excitement in children, as in the delirium of the exanthemata. Thus—

Pot. Brom. gr. x.
Chloral Hydrate, gr. v.
Aq. Menthæ, ℥ ss.

may be given to a child of sixty pounds weight, at intervals of four or six hours, for twenty-four hours, with good effects in acute febrile delirium. The effects of combining two agents of allied action are often, indeed usually, very satisfactory. In cases of excitement about the generative organs bromide of potassium may be given with hyoscyamus, with good expectations.

Pot. Brom. ʒ ss.
Tinct. Hyoscyami, ʒ ss.
Mist. Camph. ℥ i.

given at bedtime in chordee, in nocturnal orgasm, and sexual excitement, usually produces excellent results. Dr. Clouston has found tincture of cannabis indica, of hyoscyamus, and the bromide of potassium, in half-drachm doses each, at bedtime, a satisfactory means of inducing sleep in restless talkative mania.[1] In cases of chorea Ferrier prefers the bromide of potassium to all other remedial agents. Where there is co-existent anæmia, the addition of iron is indicated; and in my own experience bromide of potassium and the potassio-tartrate of iron in ten-grain doses each form a useful measure, even where chalybeates in other forms have failed.

These are but a few examples of the combinations which may be used to control nervous activity.

§ 129. We may now proceed to discuss the subject of morbidly active secretion, and the most successful means of allaying it. We have already seen how neurotic agents will affect a secretion excited reflexly by far-away irritation, and how opium arrests certain secretory actions. Consequently the use of opium in hyper-activity of the secreting surfaces becomes quite intelligible, and its use is rational. In all cases of catarrh from mucous membranes opium is serviceable, except when it is bronchial, where this agent is to be shunned, except under watchful intelligent care. In free secretion from the intestinal canal opium is ever of service, except where the diarrhœa is a

[1] *Fothergillian Prize Essay*, 1871.

vicarious, compensating discharge in renal inadequacy, as shown in Chapter III. (§ 29), or excited by an irritant mass.

Astringents.—This group of agents arrest the action of secreting organs, and also check hæmorrhage. Up to a recent period it was asserted that astringents exercised their power by virtue of their action upon muscular fibre, producing contraction of it; while others held that their action depended upon their capacity to coagulate albumen. Neither of these hypotheses is now entirely accepted, and the action of astringents is at present thought to depend chiefly upon some yet undiscovered action upon the soft tissues. Like tonics, their practical application is far advanced beyond our knowledge of their *modus operandi*, and the actual efficiency of both these groups of agents is well-established and notorious. Astringents are of two kinds—mineral and vegetable. The vegetable astringents are tannin and gallic acid. Tannin is converted into gallic acid in the system; and both are excreted by the kidneys as gallic acid. They both coagulate albumen. In gastric catarrh the combination of tannin with opium, as in the form of compound kino-powder is ever of service. Tannin will at times check the loss of albumen by the kidneys. In hæmorrhages gallic acid and opium are commonly resorted to, as in menorrhagia, in melæna, in hæmoptysis, or hæmatemesis. In the uterine hæmorrhages of anæmic and atonic individuals, especially in those of the lymphatic diathesis, such combinations are frequently indicated. In intestinal catarrh, opium—with catechu, with sulphuric acid and hæmatoxylin (an excellent measure), or with acetate of lead, or sulphate of copper in pill—is our universal remedial agent. In regarding the action of opium in the various forms of diarrhœa, or rather intestinal fluxes, as they should be called here, its effects upon the cutaneous vascularity and the sudoriparous glands must not be overlooked; the derivative action may tend to lessen the flux as well as its direct action upon the intestinal canal. (§ 123.) Be this as it may, opium in conjunction with astringents, vegetable or mineral, is signally useful in all excessive secretion from the bowels. Mineral astringents are of various forms. Most of the bases form astringents in union with sulphuric acid—the astringent action of the acid being preserved in the sulphate. Glauber's salts (sulphate of soda) and Epsom salts

are, though purgatives, not without astringent properties, and may often be most advantageously combined with other astringents. Thus in menorrhagia they are very useful, the action on the bowels here being an advantage when added to opium and sulphuric acid. Even hæmorrhage from the bowels does not contraindicate sulphate of magnesia in small doses, especially in passive rectal hæmorrhage. In this troublesome affection, not rare in women, where without warning they find a gush of blood from the bowels, either at stool or just on leaving it, a small quantity of sulphate of magnesia along with dilute sulphuric acid is indicated.

Mag. Sulph. gr. xv.
Ac. Sulph. Dil. ℥xv.
Inf. Cinchon. ℥i.

three times a day will usually arrest this loss, as well as other forms of passive hæmorrhage. Some very active astringents are formed, however, by the union of bases with other acids than the sulphuric, as the perchloride of iron, acetate of lead, &c., &c.

In the arrest of secretion belladonna possesses peculiar properties, especially over the salivary, the mammary, and the sudoriparous glands. Dryness of the fauces, too, is the most marked symptom of balladonna poisoning. The arrest of the secretion of the sub-maxillary gland by belladonna is due, Schiff thinks, to its paralysing the chorda tympani. It has long been an empirical practice to paint belladonna over the mammary glands when the lacteal flow is excessive, and satisfactory results often ensue therefrom. Recently Ringer has advocated the employment of atropine in excessive perspiration. He uses from a sixtieth to an eightieth of a grain of sulphate of atropine hypodermically. It may also be given by the mouth, or applied as an ointment. The tincture of belladonna has yielded good results in my hands, both in phthisical and other severe perspiration, given at bedtime in fifteen-minim doses. (See p. 186.)

The antagonism of belladonna and jaborandi, as regards their action over the different secretions, is very marked.

INACTION.

§ 130. Under other circumstances, especially in general debility, and, still more, when the activity of the nervous system is impaired, we administer a class of agents of totally different character to those just described. The neurotic agents now to be briefly considered are those which excite nervous action. They consist mainly of the deliriant poisons, of quinine and strychnine. There is a large amount of evidence pointing in the direction that these different agents increase nervous action and stimulate the cerebral cells to attract more blood, so that their functional activity is increased and maintained. Probably, to some extent, they also act upon the heart and increase the activity of the circulation. In belladonna poisoning there is extravagant delirium of which no memory remains; but there is no sleep, because the brain is rendered hyperæmic rather than anæmic by this agent. (J. Harley.) The delirium of belladonna poisoning, Handfield Jones holds to be due to arterial dilatation and afflux of blood to the brain. Belladonna has been found useful in the treatment of some cases of melancholia where there is cerebral anæmia. Crichton Browne holds that its effects are most marked in the early stages of emotional melancholia. In conditions where the amount of arterial blood passing through the brain falls below the norm, belladonna certainly seems indicated; for it also increases the ventricular contractions and raises the blood-pressure. In this it is the antagonist of the calabar-bean, which lowers the heart's action, and so is given in conditions of cerebral excitement—as in the exalted stage of general paralysis, as well during the paroxysms as in the intervals of comparative quiescence—with very powerful effects. In these different and opposite effects upon the encephalic circulation we see two classes of agents shadowed out which will exercise a profound influence over the therapeutics of the future. Balladonna acts powerfully upon the heart, increasing its contractions at the same time that it contracts the peripheral arterioles in many parts of the body. This contraction has been seen in the frog's foot under the microscope. By these means combined the blood-pressure is raised, as it is by digitalis; with this difference, however, that digitalis is not a deliriant poison.

Digitalis is not, however, without an influence upon the brain, and Lauder Brunton found visual disturbances among the phenomena induced by toxic doses of this drug. In many respects there is a similarity betwixt the action of belladonna and alcohol; only that alcohol ultimately dilates the arterioles of the body generally, and so leads to cerebral anæmia as a sequel to the cerebral hyperæmia first produced by it. No such secondary action has been demonstrated to belong to belladonna. We are not yet, however, sufficiently acquainted with the effects of belladonna upon the intracranial circulation to lay down exact rules for its administration in cerebral anæmia. As a remedy in certain neurosal affections belladonna has long enjoyed an empirical reputation, especially in the treatment of whooping-cough and in the nocturnal incontinence of urine in children. In the latter case it is supposed to affect those centres in the spinal cord which are associated with the vesical sphincters. Possibly it affects the susceptibility of the centre which relaxes the sphincter, so that stronger stimuli, or impressions received by the sensory nerves of the bladder are requisite in order to induce it to relax. However this may be, spasmodic contraction of the vesical sphincter has been found in cases of belladonna poisoning. The value of belladonna in painful states, especially neuralgic, is variously estimated. Ringer, following Trousseau and Anstie, regards it as serviceable, while Wood holds that it is of little value in such conditions. As a local application its analgesic properties are much more certain and marked.

A similar diversity of opinion obtains as to the analgesic and hypnotic properties of cannabis indica. Our experience of this drug as a therapeutic agent does not do much to explain its action; though it is well known in the East as a deliriant poison, and is alike used by the Malays when "running an Amook," and by the Dacoits of India, who give it in sweatmeats, by means of which they can commit offences without the poisoned person being able to remember anything, and so being unable to give evidence against them. As such, it is largely used to rob persons of their personal ornaments with impunity. The temporary condition into which persons are thus thrown by haschish is identical with that produced by belladonna poisoning, as practised

by thieves in the middle ages, viz., a condition of which no memory remains; and that brought about by stramonium, where assaults upon the person may be practised with impunity.[1] Medicinally it has been used to limit the flux of menorrhagia and to relieve neuralgic pains. It is also often serviceable in advanced phthisis, relieving the cough and the perspiration, though my experience of it in such cases is not yet extensive enough to enable me to classify the cases in which it will be found useful. It is often resorted to as an intoxicant, the intoxication produced by it being of a singularly agreeable character.

The whole question of deliriant poisons is yet *sub judice* as regards their use as remedial agents: and there is too much diversity of opinion about the action of conium and hyoscyamus to warrant their consideration here.

§ 131. A somewhat less difficult subject, though far from clear or simple, is the action of these two prominent members of the pharmacopœia—quinine and strychnine. That these agents possess a powerful influence over the nervous system is a fact too well-known clinically to admit of any question being raised as to the facts; though we are not yet quite clear as to the interpretation of them. Further, we have learned empirically what are the conditions which indicate their administration, at least fairly well. We use them in certain adynamic conditions as tonics. (§ 23.) Here we are concerned with them only in so far as they are neurotics, and with their action upon the nervous system.

To take quinine first: It is well known that this agent possesses the power of giving a sense of fitness for exertion, of energy, to persons lacking these feelings, which it probably effects by some invigorating effect upon the nervous system. Thus it is most useful in cases of nervous debility, in convalescence from low forms of fever; it is also resorted to in conditions of fatigue and exhaustion, as a species of dram, only its effects are more enduring and persistent than those induced by alcohol. For such purposes it is largely consumed by persons on their own responsibility, without medical advice, as the large sale of

[1] It is also used in Hindostan when cruel and painful operations are about to be performed.

quinine wine testifies. It forms a nervine stimulant and tonic of no mean properties, and is free from several drawbacks which attach to alcoholic stimulation. When given in full doses, quinine produces marked effects upon the contents of the encephalon called "cinchonism." In this state there are disturbances of hearing, notably the ringing of bells, and disturbances of vision, as flashes of light; delirium, and headache with a sense of constriction, often relieved by epistaxis. In fact these are the evidences of encephalic hyperæmia. The action of quinine has been subjected to much observation and experiment, and any remaining doubts as to its action have been dissipated by the experiments of Hammond. (*The Psychological Journal of New York*, October 1874.)

After long and careful experiment it was conclusively demonstrated that quinine dilates the cerebral vessels and produces vascular congestion of the contents of the encephalon. There was increased action in the carotid and temporal arteries, heat of head, with congestion of the retina, and tympanum. These results were such as might have been anticipated from our previous acquaintance with quinine, as furnished by our clinical experience. In cases of cerebral anæmia accompanied by a craving for alcohol—often quite irresistible—quinine is very useful, and combined with iron and strychnine often puts away the craving entirely; but it commonly returns in its pristine intensity when the action of the quinine wears off. It is also a potent remedy in cases of nervous exhaustion or of overwork, but if resorted to merely to whip on a flagging brain its use may be detrimental; and if it postpones the collapse, may make it all the more severe when it does come.

In strychnine we possess an agent of unquestioned power as a neurotic. In toxic doses this drug produces severe and prolonged spasms, in which the body is arched, resting upon the head and the heels. So terrible are these convulsions, that death is commonly induced in an hour or so. It is noticed, however, amidst all this motor perturbation, that the intelligence is unclouded and that consciousness is unaffected. This leads to the conclusion that the spinal cord is the part chiefly affected by strychnine. In conditions of degeneration of the spinal cord, especially when of an anæmic character, strychnia is very

valuable; and in certain conditions of adynamy, as in incontinence of urine, it is very useful, and most so in the dribbling of elderly persons. In this it contrasts with belladonna, which seems to diminish the susceptibility of the vesical centres in children; while strychina appears to stimulate these centres, connected with the sphincter, in elderly persons. Its effect upon the cord too is to stimulate the nervi-erigentes which inhibit the ganglia of the penis. Ordinarily these centres, which seem little detached pieces of the vaso-motor centre—centres which have retained their original locality while the others have travelled up to the medulla oblongata—keep the vessels of the penis contracted, and then the organ is flaccid; but when the nervi-erigentes are thrown into action the influence of these local centres is subdued, or inhibited, and the vessels of the corpus cavernosum dilate, and the penis becomes turgid and erect. After the administration of strychnine in many persons this state of erection is persistent. Strychnia, too, seems to possess a decided action upon the heart, and from this action is often given along with quinine.[1] It also induces contractions of the uterus; and is used by some practitioners instead of ergot; while its effects upon the intestinal muscular fibre is such that it is largely added to cathartics in cases of constipation allied with inertia of the bowels, and in cases of intestinal dilatation with partial paralysis of the muscular fibre. From the rapidity of its action, strychina is regarded as lying midway betwixt stimulants and tonics. Personally I have found strychnia in the form of the tincture of nux vomica (fifteen drops), and carbonate of ammonia (five grains), three or four times a day, a capital substitute for alcohol in the treatment of adynamic conditions, and in commencing convalescence. Strychnine is often administered along with quinine and iron, either in the form of Easton's syrup, or in the following well-known formula:—

Cit. Fer. et Quin. gr. v.
Liq. Strychniæ ℥iv.
Inf. Quass. ℥i. ter in die.

The action of stimulants proper has been given in Chapter X.

[1] Strychnia acts powerfully upon the vaso-motor and respiratory centres, increasing their activity. (Prokop Rokitanski.)

(§§ 95–98), and need not be referred to again here. We saw there that alcohol increased the vascularity of the nervous system, both cerebro-spinal and organic; and that other stimulants (as ammonia and ether) acted in an allied manner. Alcohol even stimulates the movements of protoplasm, in which there is no trace of nerve.

§ 132. We have now seen that we possess agents which depress or lower nervous action, as well as an opposite series which will exalt nerve action. It is true the review here given is but brief, and that the action of the agents is sketched in outline merely. Many more experiments are required, not only for what they may directly reveal, but for the information they may furnish indirectly in giving aim to clinical observation. Much indeed has to be done before we can venture to say definitely what are the exact actions, often complex and sometimes apparently contradictory, of these powerful neurotics whose aid we have so often to invoke. We can see that we possess one group by which we can simultaneously depress nerve action and lower the circulation, and which consequently we can wield with effect in cases of abnormal and undesirable activity in the nervous system; while we are equally clear that there is also another group which excites nervous action, while at the same time the supply of arterial blood to the nervous system is increased, and so the action is maintained. As yet our employment of these neurotics has been rather empirical than rational; but, as our knowledge as to the physiological actions of these remedies becomes more precise, so we shall be able to wield these agents in practice with more definite aim and greater certitude. Even now we can calculate with some certainty the effect that will be produced by several agents, as in the case of the ordeal bean of Calabar in the wild paroxysms of general paralysis; of bromide of potassium in epilepsy and other affections the result of reflex irritation; and of quinine and strychnine in debility and anæmia of the cerebro-spinal centres. Further, we can already combine agents possessing opposite or even antagonistic properties with advantage, by differentiating the exact action of each remedy: thus in delirium tremens, where there is a rapid feeble pulse with insomnia and agitation, digitalis may be combined with the bromide of potassium with excellent results; while in cases

where quinine produces headache, often of a very distressing character, the addition of bromine, in the form of the hydrobromic acid, will usually give entire relief; so that the good effects of the quinine may be secured without this unpleasant drawback.

The above consideration of neurotics will not be regarded as exhaustive by any reader; it is very undesirable that it should: but it is hoped that what is written here will enable the reader to classify and arrange his own views on the matter; and then perhaps instigate him to inquire into and examine more critically the action of these powerful agents,—and in doing so not only to inform himself but to instruct others.

§ 133. *Irritation and Counter-irritation.*—It has long been a practice in the art of medicine to resort to agents capable of exciting activity, and especially vascular activity, in a part, when applied locally, to relieve abnormal action going on elsewhere. This artificially-excited action was supposed to relieve and reduce the pre-existing malady, and this line of treatment has been denominated variously, according to circumstances, irritation and counter-irritation. It took its origin probably in observations of the following kind: in the exanthemata the more copious the eruption the less the internal complication, ordinarily at least; and that any retrocession of the eruption was followed by gravescence in the internal affection; in the metastasis of gout, of mumps, &c., as soon as another part became affected the part originally implicated was relieved; and in the relations of cutaneous maladies to internal diseases in chronic disease, the disappearance of the rash often being followed by a distinct exacerbation in the visceral ailment. By a far from unintelligible induction our predecessors concluded that to set up artificially some irritation elsewhere would exercise a beneficial effect over the disease they were essaying to treat. There was an element of truth in their conclusions, and unquestionably hot pediluvia do often relieve head symptoms, and blisters to the legs are found useful in diminishing congestion of the contents of the cranium. The advocates of blistering could also take a pretty firm stand on the ground that such treatment did relieve and diminish accumulations in the serous sacs, as of the thorax, the abdomen, and the articulations. The good effects here are

distinctly intelligible by the law of Schrœder van der Kolk, that the vascular supply of the deep-seated parts is derived from the same arterial trunks as that of the superficial parts. Any dilatation of the cutaneous branches and increased blood-flow in the superficial distribution will diminish directly the current in the deep-seated vessels. Thus in inflammation of the pleura for instance—the costal pleura, that is—the application of dermal irritants, either heat or vesicatories, will dilate the cutaneous terminations of the intercostal arteries, and diminish the blood-supply to the pleural arterioles, and so lessen the vascularity of the inflamed area. This is clear enough. In the same way dilatation of the cutaneous vessels of an articulation, say the knee, will be followed by a lessened blood-flow in the deep articular branches of the arterial trunk common to both. Further, Brown Séquard found that the renal arteries contracted on irritating the skin over the kidneys. This indicates that there is something more in this matter than the mere hydraulic side of the question. Max Schuler has found that the application of large mustard blisters to the cutaneous surface produces first a passing dilatation of the vessels of the pia mater, and then a more persisting contraction of them; the latter being so prominent that the contraction withstood the effects of agents which normally produced dilatation of these vessels. We all know that plunging one hand into cold water will lower the temperature of the other hand; and that "cold applied to part of a bat's wing causes contraction of the vessels of the corresponding part of the opposite wing." From all this we can comprehend how it may be that counter-irritation may exercise a beneficial effect in cases of inflammation where the vascular supply of the inflamed part is not derived from the same arterial trunk as is that of the cutaneous surface operated upon. But, while admitting this, we must own that the *modus operandi* here is far from being so clear as it is in those cases where the common vascular supply exists, as in counter-irritation in inflammations of the pleura, peritoneum, or the serous sacs of the articulations; or in those more chronic affections of joints where there is deep-seated hyperæmia, which not rarely produces elongation of the diseased limb from the continued vascularity of the epiphyses.

The law of Schrœder van Kolk also holds good of the nervous distribution, and as the costal pleura and the skin of the thoracic parietes are alike supplied with blood from the intercostal artery, so are they furnished with their nerve supply from the intercostal nerves. Thus in the articulations, the deep-seated and the cutaneous nerves spring from common trunks. Consequently the application of analgesic agents to the peripheral extremities of the superficial distribution exercises an effect upon the deep-seated terminations. That such is a fact is unquestionable, but it is not yet clear how the end is brought about. Either there is some reflex action induced, or some deadening effect is achieved which counteracts the pain-producing irritation of the deeper-seated terminal fibres, possibly in the common trunk. Be this as it may, there is no question as to the utility of the application of sedative and analgesic agents to the surface over an affected part—in practice. In neuralgia, gout, rheumatism, as well as structural lesions, the application externally of opium, aconite, belladonna, chloroform, and even chloral hydrate, produces desirable effects. It is, indeed, by first recognizing the fact that good does actually result from these therapeutic measures, that we shall be led to investigate the working of them, and then perhaps some day even understand how the results are achieved.

As well as these more localized effects of external applications, there are wider and more general consequences of their employment which may well occupy our attention for a moment. The application of epispastics to large areas of the surface for a brief time, so that they are rubefacients rather than vesicants, in cases of collapse, shock, or even the typhoid condition, is a well-established practice. The results are scarcely the consequences of the pain inflicted solely—for pain, when not too excessive, produces a stimulant action—there is probably some effect produced upon the vascular system generally. "Dermal irritants," writes Wood, "have a direct tendency to arouse or excite the system, and may be used as general stimulants." When so used as passing rubefacients, probably the action upon the intracranial vessels is limited to that dilatation, which, Max Schuler observed, occurred in the vessels of the pia mater on the first application of blisters; but which was followed by subse-

quent contraction on the persistent application of the vesicant. There is nothing in such view inconsistent with what we have seen as the primary and then the secondary effects of several neurotic agents, as opium and alcohol for instance. The use of dermal irritants as stimulants is indicated in states of depression rather than advanced exhaustion; their application should be brief, and be accompanied by the exhibition of other stimulants somewhat freely.

That cutaneous irritants will affect the circulation generally is admitted by many men, and some even go so far as to use blisters in the treatment of irritable conditions of the heart. In this case, however, there is no attempt at reasoning made, it is pure empiricism; and the practice obtains most strongly amidst those whose physiological knowledge and acquaintance with the circulation least entitle them to form positive opinions. In the following case, dermal irritants were used with an intelligent idea of what they might achieve, and with satisfactory results. B. W. Richardson, F.R.S., in speaking of intermittency of the heart, a subject on which he is entitled to be listened to with every respect, says, "In one instance of intermittency with palpitation, where morphia could not be tolerated, owing to the nausea and depression it produced, and where quick relief was demanded, it occurred to me to apply a blister over the whole of the front part of the neck (the throat), so as indirectly to influence the sympathetics. The effect in this case was simply immediate for good. So soon as the counter-irritation began to be felt, the action of the heart became quieter, the intermittency was reduced, and sleep, which had for several nights been absent, became the welcome visitor. In a second case a sinapism applied to the throat was instantly beneficial. 'I passed,' said the patient, 'as the sinapism took effect, from incessant restlessness, owing to the irregular action of the heart, into deep sleep, and that so insensibly and rapidly, I was not conscious of going to sleep.'" In these cases the good effects might be explained on two separate hypotheses: (1) direct stimulant effect downwards to the heart, increasing its power; or (2) an effect upon the peripheral arterioles, dilating them and lowering the blood-pressure in the arteries, and thus enabling the heart to contract more easily in the face of a lessened resistance. Either

of these effects, and still more their union—an hypothesis far from incredible—would account for the relief experienced.

This brief survey will somewhat clear the ground and render the adoption of irritants less a matter of sheer empiricism when their use is recommended in the ensuing chapters.

Here terminates the first half of this work, which so far has consisted of the inculcation of general principles—either derived from the laboriously accumulated stores of empiricism, or the direct outcomes of physiological research—which principles will be applied in a distinctly practical manner in the consideration of the various maladies of the different systems and their treatment, which will next engage our attention.

CHAPTER XIV.

THE CIRCULATORY SYSTEM.

§ 134. In considering the different systems of the body and the ailments of each—the practical application of what has been written before—it is obvious that the affections must be regarded rather according to their indications as groups than as individual maladies. If the latter plan were to be adopted, the second half of this work would become a mere brief practice of physic, and that is not the design at all. It will, it is believed, be much more instructive to the reader, and tend more to make his treatment rational at least, if no other advantage should arise therefrom, to take groups of maladies and give their treatment as a class. By this means, the reader will have but to relegate the case before him to its proper class, and then its treatment, as regards its coarse adjustment, will unfold itself. How to enable anyone to recognize the peculiarities of a case, and its individual as compared to its generic characteristics, and so to attain the fine adjustment of the treatment, except by the sweat of his own brow, is, to me at least, unknown. But there are good reasons for believing that by grouping maladies, the individual reader may be assisted to perform a series of generalizations, not in every case attainable single-handed.

Before considering the ailments of each system, it will be necessary to review briefly the physiological action of the different parts of such system, and the relations existing betwixt one part and another. For many reasons it is desirable to commence with the vascular system; and in considering its maladies, they will be found to form natural groups, and to illustrate the propriety of the principles (just announced), upon

which the latter half of this work will be carried out. The treatment of each group will follow, and by this means there is a reasonable hope that the treatment of diseases of the vascular system will approach, to some extent at least, our present knowledge of these maladies as regards their diagnosis.

§ 135. The vascular system consists of a central organ, a hollow muscle—the heart. By the rhythmical contraction of this muscular chamber so much blood is thrown into the aorta at each ventricular contraction, and this blood is prevented from regurgitating into the heart by the aortic valves. The arteries are elastic and contractile. The larger arteries are rather elastic than contractile, while the walls of the smaller arteries are very decidedly contractile, or muscular. This arrangement permits of the blood thrown at intervals into the large elastic arteries being given out by the recoil of the vessels in a steady and continuous flow; while the muscularity of the small arteries regulates their calibre, and with it the blood supply to the different parts. Thus for instance, when food passes into the stomach the gastric vessels dilate, and so permit of that free flow of arterial blood which is indispensable to good digestion. Under certain circumstances these peripheral and muscular-walled arterioles may become generally dilated, as in acute pyretic conditions, where we find dilated compressible vessels with more or less rapid action of the heart. The blood easily escapes out of the elastic arteries by these dilated terminal vessels, and the pressure of the blood within the arteries is low, while the ventricular contractions are rapid. By these frequent contractions more blood is passed into the elastic arteries, and so they are kept partially filled in spite of the quick outgoing. On the other hand, in certain conditions, we find the terminal vessels contracted, the outflow of the blood from the arteries much arrested, and therewith a high blood-pressure within the elastic arteries, and a slow but powerful ventricular contraction. As a broad rule, generally true, it may be said that the rate of the pulse and the blood-pressure are in inverse proportion to each other: the higher the blood-pressure the slower the pulse. At the same time a more powerful ventricular contraction is required to force the blood into the arterial system when the blood-pressure is high, than when there is less resistance to be overcome.

Consequently we find that a persistent high blood-pressure will induce cardiac hypertrophy, and will also occasion palpitation —a laborious effort of the heart—as a symptom. It is very necessary to bear this in mind—palpitation may indicate a fairly strong heart struggling against a heightened blood-pressure, as well as a partially disabled heart fighting away with a normal or even low blood-pressure. The treatment in the two cases, however, will be widely different.

The blood escapes from the peripheral ends of the arterial system into the veins, and so returns to the right heart, by which it is pumped out into the pulmonary circulation, where the blood is oxygenized; from whence it once more finds its way into the left heart. It is at once obvious, that when the arteries are well filled with blood the veins will be less full: when the arteries are comparatively empty, the veins will be proportionately full. Venous fulness then indicates arterial anæmia, and our line of treatment, under such circumstances, is to fill the arteries and so to empty the veins. In order to accomplish this we administer an agent which will increase the vigour of the heart, while restraining the outflow from the arteries, by diminishing the calibre of the arterioles: such an agent we possess in digitalis. Consequently, when from any cardiac impairment the blood is insufficiently pumped out of the veins, and the arteries are unfilled and compressible, the administration of digitalis tends to restore the lost balance. It is obvious that this is not the agent to be chosen when we desire to lower the action of the heart, or to decrease the pressure within the arteries. Yet, from mistaken notions, digitalis is still used by some for the latter purpose. No wonder is there, then, that the use of so powerful an agent should be followed by disastrous results if it be given in the very cases where its use is contra-indicated; or that the drug often gets a bad name, when really it is the knowledge of the administrator that is at fault. When we desire to lower the circulation we must select such agents as aconite, tartar emetic, &c., which dilate the terminal vessels while lowering the activity of the cardiac movements (p. 85). These latter agents are never necessary in disease of the heart, unless it be in some of the complications of aortic regurgitation, in its

earlier stages of massive hypertrophy. In actual disease of the heart, what we must ever strive to attain is a restoration of the normal condition of the circulation, or an approach to it, by increasing the capacity of the crippled heart.

The ordinary forms of primary disease of the heart, *i.e.* where the heart is itself at fault, are those of valvular disease and muscular failure. The valves are folds of the lining membrane of the heart, which prevent regurgitation of the blood on the contraction, or recoil, of the walls of the chamber in front of them. If these valves become incompetent to arrest the regurgitation, there follows a certain obstruction to the blood-flow, and if this is not met by increased muscular growth—carrying with it an accession of power—the circulation is so much retarded. Or, on the other hand, if from agglutination of the free edges of these valves the ostium is narrowed, also an arrest in the circulation is established; and muscular hypertrophy can alone restore the lost balance, and enable an equal quantity of blood to be driven through a narrowed orifice in an equal time: an operation absolutely necessary to maintain the working of the organism unimpaired. This is well seen in aortic stenosis, where there is usually hypertrophy of the left ventricle, by which a new balance is attained. If the ventricle is faltering before the obstruction, digitalis will give relief.

In aortic regurgitation the hypertrophy is rather to arrest the dilatation of the left ventricle than to overcome any resistance offered to the flow of blood (p. 169), and in the early stages is usually sufficient for this purpose. But this hypertrophy has the effect of causing an unusually and abnormally large bulk of blood to be thrown into the arterial system at each ventricular contraction, with the consequences of overdistending the arteries and establishing in them atheromatous changes. Here digitalis, and its allies, are contra-indicated. But in the later stages, when the muscular structure is being cut down by fatty degeneration, and the power given by the hypertrophy is melting away, then digitalis may be given as a palliative, and an agent giving temporary relief, with advantage. By attention to the action of digitalis, and a careful consideration of the course of aortic regurgitation, the administration of the drug in this form of heart disease should not be the subject of such diverse opinions

as at present exist. Whenever the arteries are insufficiently filled with blood and the heart is faltering, digitalis is indicated, no matter what the form of cardiac lesion—unless it be in aneurism, either of the arteries or of the heart itself.

§ 136. In mitral disease we never have the arteries too fully distended with blood. Here the tendency is ever towards arterial anæmia; no matter whether the flow of blood into the left heart is obstructed by mitral stenosis, or there is regurgitation through incompetent valves at each ventricular contraction. In regurgitation the left ventricle is very commonly enlarged and hypertrophied through the rush of blood into it from the gorged pulmonic circulation and the hypertrophied right heart. In mitral stenosis such enlargement of the left ventricle is never found. In mitral disease the compensatory changes consist in hypertrophy of the muscular walls of the right heart with thickening of the walls of the pulmonic vessels. Where the heart is fairly hypertrophied, much capacity to undergo exertion is furnished thereby; where there is dilatation without hypertrophy the condition is serious, and the capacity for exertion is lacking. Our indications for treatment are then to reduce, if possible, the demands upon the right heart, and, at the same time, to encourage its growth. The same holds good of right side changes, induced by disease in the respiratory organs, obstructing the blood-flow in the pulmonic circulation. It is obvious that if the tricuspid valves become the subject of disease then little can be done; any action upon the right auricle is comparatively useless, and there is no efficient muscular chamber behind the right auricle, *i.e.* that is strong enough to be made practically available.[1] Here we may relieve the venous congestion by appropriate measures, and improve the quality of blood entering the right heart, but our powers are limited by anatomical conditions which we cannot modify.

§ 137. At other times there are conditions of cardiac debility without any valvular failure. Here there is simply muscular atony with dilatation of the heart-walls from inability on the part of the chambers to contract efficiently, and to overcome successfully the resistance offered by the blood already in

[1] There are strongly contractile muscular fibres in the vena cava, especially the ascending branch.

the arteries. At each contraction a quantity of blood remains in the chamber unexpelled, and gradually a condition of dilatation of the chamber is induced. In these cases the muscular failure is due to imperfect nutrition, not uncommonly combined with an insufficient amount of rest, and often with habits which increase the amount of daily demand upon the heart. At other times there is some myocarditis, usually associated with peri- or endo-carditis, and the softened muscular fibre stretches and yields before the demand upon it. Under the circumstances hypertrophy will often arrest the dilatation and endow the dilated heart with power. (Chapter VIII. §§ 71-72.) In these muscular conditions the same line of treatment is indicated as in imperfect muscular growth in valvular disease.

In acute affections of the heart, the same line of practice is clearly to be adopted—for acute affections are ever conditions of adynamy. These affections may be either conditions of acute heart-failure, as syncope, or inflammatory states, as pericarditis. In the first division no one would dream of resorting to any other than restorative measures, alcohol, sal-volatile, &c. In the acute inflammatory states of the heart, depletory or depressant remedies would not now suggest themselves to any unprejudiced mind. To be sure it is possible that the question of meeting the rising inflammation might suggest itself to the mind; but a little reflection will tell us that, as a matter of fact, inflammatory conditions of the lining or external membrane of the heart are never, or almost never, simple inflammations, but rather local expressions of general conditions, as acute rheumatism, pyæmia, or lithiasis. Their treatment then belongs to, and is a part of, that of the general condition; so far as they are affections of the heart only do they call for anything especial; and in so far they demand the treatment proper to cardiac adynamy, and what such treatment is we may now inquire.

§ 138. In the first place, in an organ acting so purely mechanically as the heart it is absolutely necessary to reduce to a minimum the demands upon it. In order to do this most efficiently a brief rest in bed for a day or two is desirable at the commencement of the treatment in most cases. If the case be an advanced one, the rest in bed must be more prolonged, and all exertion avoided, including straining at stool; this last is of great

importance. The gradually failing heart, losing ground day by day under the necessity for exertion, will commonly, when the individual is put to bed, commence to regather strength and force, as is often seen in hospitals, without any other treatment being adopted. If the condition be such as to permit of exertion, and the sufferer must make a living, then the lightest form of labour should be chosen. But in making the selection it must not fall on a form of labour which, though light in the main, is apt at times to call for severe effort. That is very pernicious. The effect of rest in heart affections is such that there is a very painful difference in the prognosis according to the circumstances of the patient: the inequality between rich and poor is here very vividly demonstrated.[1]

Not only is labour to be avoided, but anything which tends to tax the powers must be shunned. A debauch is very objectionable, and the question so frequently put to one, about a sufferer from organic disease of the heart, "may he, or she, marry?" must ordinarily be answered in the negative. Mental strain and anxiety are also to be avoided, and the cares of business are injurious. If the disease be pronounced, the sufferer should be ordered to quit business; and this may be insisted on with less compunction, as any grave disease of the heart enfeebles the intellect, and renders the brain incapable of sustained effort.

All intercurrent maladies should be carefully attended to, and much less is sufficient to kill the patient than is the case in healthy persons. Thus all acute ailments test the system, especially if they are affections of the respiratory organs, in which case the right heart is very apt to become exhausted. All and every form of disturbance and source of irritation must be done away with as far as possible. Botkin, of St. Petersburg, says that the severe Russian winter is very trying to patients with heart disease, and recommends a milder climate in winter. A similar change would be good in the case of the inhabitants of the colder regions of North America. The same writer tells of the

[1] A very common cause of strain upon the weakened heart is that of running to catch a train or omnibus, especially with a bag in hand. With elderly persons such exertion is frequently fatal at the time. In other cases persisting dyspnœa on effort is so produced, and the effects remain often for weeks.

irritation caused by a floating kidney, and insists strongly on the disturbance in the heart's action occasioned by any co-existing ailment. In females, affections of the reproductive organs should always be attended to, and they are common in sufferers from heart disease.[1] Herniæ should be kept well attended to by trusses, &c. The condition of the intestinal canal should always be carefully watched, and any disturbance of the health should be attended to at once. There is one point, however, to be well minded, and that is not to interfere with discharges too diligently, if they are modes of relief to the congested venous system. Thus hæmorrhoids often are a means of much relief, and the absence of bleeding is, in many subjects, accompanied by attacks of dyspnœa, which pass away on the return of a little bleeding from the piles. Also a certain looseness of the bowels is often to be encouraged rather than checked; it relieves the portal circulation. No rules of thumb can be dogmatically laid down for the treatment of such intercurrent ailments; each must be made the subject of deliberate thought, and the decision formed accordingly.

§ 139. As has been said before, in disease of the heart the tendency is for the veins to become too full of blood while the arteries are but insufficiently filled. The more marked the disease the greater the tendency to venous congestion. This, however, varies much, according to the form and locality of the disease. In aortic disease, as long as the walls of the left ventricle are sufficiently hypertrophied and structurally sound, and the mitral valve is not secondarily affected, venous congestion is not present, and the mode of relief now under consideration is not indicated. But under all other circumstances much relief may be afforded by unloading the venous congestion. This is often done by spontaneous catharsis, and purgation is a much more valuable measure in the treatment of heart disease than is commonly credited. The relief afforded by free catharsis more than compensates for any exhaustion that it produces, and the different effect of several copious discharges from the bowel in a healthy person and one suffering from venous congestion is

[1] In a case at Victoria Park Hospital, the attacks of palpitation are more constant and more severe during the time a prolapsed uterus extrudes beyond the vulva.

very marked. Two scruple doses of compound jalap powder at frequent intervals, or some cathartic equivalent, produce excellent results.[1] The possibility, however, of partial syncope should be kept in mind, and alcohol and diffusible stimulants should be at hand, in case of any emergency.

Relief is often furnished by diaphoresis, and this means of relieving venous congestion may be resorted to at times with advantage. The form of diaphoretic best adapted to heart cases is that of the application of heat externally. The bath, however, should be such as not to include the head and nostrils. Consequently Turkish baths are objectionable as a rule. Those baths by which a patient may be sweated in bed or in the bedroom are the best; and Sir James Simpson's bath may be used in the humblest households (p. 88). But diaphoresis is best suited to those heart cases which are complicated with renal disease—a very large class—and in this respect it resembles puncture, or tapping. In pure heart cases I have never seen punctures do anything but harm; in the dropsy of combined heart and kidney disease they are often useful.

Diuretics have always been held in high repute in the treatment of dropsy, and an increase in the bulk of urine passed is ever hailed as a good indication, not only by the scientific physician (like the late Traube), but by the laity generally.

The question of diuresis in cardiac dropsy is so bound up with an increased arterial tension and a more powerfully acting heart, that it must be included in the consideration of the means of acting directly upon the heart—a subject to be reviewed at some length immediately.

In the attacks of dyspnœa which are so common in the course of disease of the heart, and especially valvular disease, large hot poultices of linseed meal faced with mustard, and applied over the front of the chest and betwixt the shoulders, are often most serviceable. The good effects are produced in two ways. One doubtless is the effect of the heat and mustard together in dilating the cutaneous vessels of the trunk, and in so doing lessening the venous congestion and engorgement of the right ventricle,

[1] It has not fallen to my lot to see any evil consequences follow from this plan of treatment. The patients all take digitalis and iron at the same time—a not unimportant matter.

and so practically affording the same relief that is obtained by venesection, without, however, the loss of blood. The second is the effect of the warmth upon the heart directly. All those who have seen the effect of warmth upon a frog's heart when becoming motionless in diastole will have no difficulty in understanding this second factor.[1]

§ 140. We have now come to the means of acting directly upon the heart—one of the most important matters of modern therapeutics. By increasing physiological knowledge and careful clinical research, combined with more accurate observation, we are beginning to learn something of the means of acting directly upon the heart and increasing the vigour of its contractions. The chief agent which we use for this end is *digitalis*. This drug has a notable history, and perhaps more than any other marks the passage of therapeutics from the regions of empiricism to the surer ground of the domains of rational medicine. Additional interest has gathered round it from the antagonistic opinions which have been and are still held by some as to its real action. In past days, when palpitation of the heart was held to be over-action of the organ, and hypertrophy was a disease to be subdued by active measures, digitalis was held to be a cardiac sedative, because it allayed the palpitation. It received the name of "the opium of the heart." Nothing can be more assured than the fact that palpitation may usually be subdued by its use. But we now know that palpitation is usually the outward visible sign of cardiac embarrassment, an active indication of debility indeed; and that hypertrophy is a conservative and compensatory growth, to be encouraged rather than otherwise. Consequently the old ideas of the way in which digitalis produced a quieter action of the heart have been abandoned, and truer views of its action have taken their place. So early as 1785, Dr. Withering had observed that as a diuretic it was of little avail in persons with a tight and cordy pulse. "On the contrary, if the pulse be feeble or intermitting, the countenance pale, the lips livid, the skin cold, the belly swollen, soft, and fluctuating, or the anasarcous limbs readily pitting under the pressure of the finger, we may expect the diuretic effects to follow in a kindly manner." While Sir Henry Holland found

[1] Hot poultices are good in the palpitation of muscular failure.

that "the enlarged and flaccid heart" was the condition in which digitalis was valuable. More recently digitalis has been made the subject of numerous observations and experiments at home and abroad. Drs. Fuller and Handfield Jones maintained strenuously that digitalis acted as a tonic to the heart, and their views are corroborated by Ringer, Lauder Brunton, Balthazar Foster, in this country; by Traube, Ackermann, and others, in Germany; Wood in America; and indeed by a host of other authorities. When administered experimentally to animals it is found to bring the heart to a standstill in systole; and in my own experiments I have found that in the hearts of frogs paralyzed and flaccid in diastole, from the effects of aconite, the administration of digitalis brought back the contractions; and, if the dose were large enough, produced the opposite condition of firm contraction in systole. About this time an opportunity occurred to my friend, Dr. Wm. Dobie, of Keighley, of trying digitalis in a case of aconite poisoning with complete success. Digitalis produces its effects upon the nerves in the heart itself, as Eulenberg and Ehrenhaus ascertained by an experiment made on a frog's heart removed from the body. Opinion has been, however, divided as to whether the results are attained by a stimulant effect upon the intra-cardiac ganglia, or to a paretic effect upon the terminal fibres of the vagus nerve in the heart—probably both factors are in action.

No doubt, however, exists now but that digitalis excites more perfect contraction of the muscular walls of the heart. The ventricular systole is more perfect, and the beats of the heart are reduced in frequency. "The diminution in the frequency of the heart's beat under digitalis always means an increase of the period of the dilatation of the ventricles. Pulse traces readily show this." (Balthazar Foster.) The consequence is that the heart's brief sleep is lengthened, and the addition thus given to its aggregate rest in twenty-four hours is considerable. This is one point of much importance. Another is, that by its effects upon the peripheral arterioles the outflow of blood from the arterial system is checked, and the arteries are better filled with blood. This arterial fulness produces a general effect on every part; it fills the brain with blood, while it increases the blood-pressure upon the glomeruli of the kidneys, of which the

increased flow of urine is the outward visible sign. The heart itself partakes of the advantages derived from the arterial fulness, especially as the aortic recoil is the propelling power into the coronary arteries. The increased arterial tension produces a better flow of arterial blood to the heart itself: and betwixt a longer sleep and a better nutrition the heart often recovers its lost power and regains its normal condition. By such means, together with hæmatics, we can build up artificially a conservative hypertrophy where nature, single-handed, is unequal to the effort. Reducing the call upon the heart by enforced rest, improving the quality of blood by appropriate measures, and procuring for the heart a longer sleep and a better supply of arterial blood, are the means by which we can enable a failing heart to recover itself; and postpone the evil day when recovery is no longer possible.

In no class of diseases has there been so much improvement wrought in treatment by physiological research as in the diseases of the heart. In valvular affections we can do much to compensate the mischief done by fostering muscular hypertrophy. In stenosis, by increasing the driving power, we can have an equal quantity of blood passed through a narrowed opening in an equal time, and thus the equivalent of a cure reached,—as long as that hypertrophy can be maintained in structural integrity. In regurgitation we can partly arrest the backward flow by increasing the blood-pressure, and by developing the muscular walls of the chambers behind the lesion. In cases of simple dilatation of the heart we can often restore the chambers to their normal size, and even when that is not attainable we may induce hypertrophy, and so stay the dilating process; we can build up hypertrophy, and so endow the dilated heart once more with power. These are not day-dreams, nor the creations of a vivid imagination, but the sober facts of real life.

§ 141. There is one apparent objection to be raised to the use of digitalis in cases of cardiac debility, and it is this: If digitalis contract the peripheral arterioles, and so raise the blood-pressure in the arteries, the weak heart has a greater resistance to overcome. This seems a grave objection, but in reality such objection does not exist. One of the sensory nerves of the heart is the vaso-inhibitory or depressor nerve, and when the

heart becomes distended in its adynamy, this nerve is, in all probability, thrown into action and the terminal arterioles are dilated. If this latter condition were not affected by digitalis, the blood pumped more vigorously into the arteries by the renovated heart would still very readily escape out of them, and the condition of arterial fulness would be unattainable—which after all is what we chiefly wish to obtain. Consequently the action upon the peripheral vessels is as important as the action upon the heart; and the effect of the digitalis is to restore the dilated arterioles to their normal calibre, not to set up a condition of arteriole spasm. The digitalis probably only counteracts the condition produced by the vaso-inhibitory nerve being thrown into action.

Another ideal objection is that of the cumulative action of digitalis. We hear comparatively nothing of it now in the works of those who have given attention to digitalis: it figured conspicuously in the writings of those who gave digitalis as a cardiac depressant. It is quite conceivable that by repeated doses of this powerful agent, in conditions of cardiac hypertrophy, dangerous, and even fatal, toxic symptoms might be induced. But surely it is rather hard that the drug should bear the blame which really attaches to lack of judgment. It has never fallen to my lot to see any evidence of the cumulative action of digitalis. If a drug be given in such doses that it is taken into the system faster than it is given out, there will be an accumulation of it in the system, and toxic symptoms induced; but that surely is no unique action pertaining to digitalis.

When this agent was given freely in the very cases to which it was unsuited, or where its administration requires the greatest caution, it can be no matter for surprise that the consequences of its use, or rather of its abuse, should be now and then unpleasant. In several instances known to me, notably in a case of my own, where digitalis has been taken uninterruptedly for eight years, nothing bearing any resemblance to what has been described as the cumulative action of digitalis has ever been seen. The cumulative action of digitalis, as ordinarily described, has been greatly exaggerated.[1]

[1] If the administration of digitalis do not overrun the capacity of the kidneys to eliminate it, all risk may be avoided. The continuous use of small doses is the best plan of treating chronic disease.

§ 142. Digitalis is very useful in cases of cardiac adynamy for the relief of the symptoms and consequences of such heart failure. This is well seen in the relief afforded by it in the free bronchial flow found in advanced mitral disease. In no class of cases is there such unanimity of opinion as to the good effects to be secured by digitalis as in mitral disease: and yet if this flux were really the measure of the congestion of the pulmonary vessels, digitalis ought to increase it. As a matter of fact, however, it does not do so; indeed, it is a most efficient measure for the relief of this condition. The flux comes from the distended bronchial veins—is part of the general venous congestion: the inosculations betwixt the pulmonary and bronchial veins being not nearly so complete as some suppose.

In cardiac dropsy digitalis is very serviceable when given in full doses. In conditions of heart-failure and unfilled arteries, where the small bulk of urine is the indication of a low blood-pressure, then digitalis becomes a most powerful diuretic. Here it acts rather by its effects upon the circulation than by its action upon the vessels of the kidneys. As the falling off in the bulk of urine is one of the gravest symptoms of increasing advancing heart failure, so increase in its bulk is hailed as an indication of improvement. Even those who have still their doubts as to the action of digitalis upon the heart admit that its effects are most gratifying when there is a good flow of urine induced by its administration. The explanation is obvious. In many cases real and true diuretics may be required, as in cases where the action of digitalis in increasing the blood-pressure is also absolutely necessary; and then digitalis may be combined with compound spirits of juniper, or nitric æther, or buchu, with advantage.

In simple cardiac debility with scanty flow of urine the following is a pleasant combination:

Tinct. Digitalis, ℥ x.
Sp. Æth. Nit. ʒ ss.
Inf. Buchu, ℥ i. ter in die.

At other times potash in any of its forms, but especially the citrate, may be added to this mixture. In cases where there is

atonic gout combined with heart disease, or with debility, potash and iron with digitalis are indicated.

Pot. Bicarb. gr. x.
Fer. Pot. Tart. gr. v.
Tinct. Digitalis, ℥ x.
Inf. Buchu, ℥ i. ter in die,

to be followed by a good draught of water, and taken half an hour before meals, is a prescription in constant use in my hospital practice. In acute anæmia, with palpitation, digitalis may be given with ammonio-citrate of iron (grs. v), with or without five grains of carbonate of ammonia. At other times digitalis may be given with astringent per-salts of iron, the per-chloride, the per-nitrate, or the per-sulphate; the little discoloration which follows forming no valid objection to the combination. In the complex condition of cardiac debility, gastric catarrh, copious eructations of wind, and inactivity of the bowels, so commonly found together in chronic heart disease, digitalis may best be given in pill.

Pulv. Digitalis, gr. xxx.
Fer. Sulph. Exsic. gr. xv.
Pulv. Capsici, gr. xl.
Pil. Al. et Myrrh, ℥ ii.
In pil. lx. div. 1 bis in die,

is a favourite form with me, and is a good and yet not cumbrous combination of agents. In coated pills the medicine may be continued for months without the stomach rebelling at the nauseous medicine, which digitalis and iron in mixture really are; in this form it can also be carried about without observation, and does not readily spoil; while in such form the iron does not affect the teeth. A pill can be quietly swallowed twice a day after food without trouble or inconvenience.

In cases of advanced dropsy it has been found desirable to apply digitalis externally, as a poultice of the leaves over the abdomen and thighs; and excellent results have followed this use of the drug. In such cases powerful but unmeasured doses of this agent may be absolutely necessary, and there may be no choice; but, for my own part, the cautious and yet persistent

administration of the remedy in small doses, along with hæmatics and nutritive food, appears the most satisfactory on the whole.[1] Nevertheless, in certain conditions of acute asthenia or anæmia it must be given more freely. In states of cerebral anæmia it raises the blood-pressure, and so fills the cerebral vessels. The symptoms of cerebral anæmia, including even delusions, will be relieved by its use. In delirium tremens it has been found useful in full doses; but it is when the pulse is fast, irregular, and feeble that its good effects are most apparent. Where there is insomnia and much restlessness it may be advantageously combined with full doses of bromide of potassium.

The correct understanding of the action of digitalis, of the class of cases to which it is suited, and those where its use is contraindicated, form a subject upon which every practitioner and every student ought to have definite and distinct ideas; that is, if he wish to hold his own in the present arduous struggle for existence.

§ 143. The different measures detailed above for the relief, and even, in more fortunate cases, cure of primary heart diseases must all be supplemented by a liberal supply of nutritive and easily digestible food. This combination is most necessary. The food must be nutritive, else the improved tissue-nutrition—we wish to bring about—will not be secured, and our good intentions will fail to attain permanent benefit for the sufferer; the good we succeed in doing will be temporary and evanescent. If nutrition be defective cod-liver oil may be given with advantage, when the stomach will tolerate it. The food should be given in small quantities at once, and at frequent intervals, and the appetite, if defective or capricious, may be stimulated by vegetable bitters, either taken in addition to, or as the vehicle for, the other remedies. Digestion may be aided by small doses of alcohol, but the rule of T. King Chambers had better be followed, viz., to regulate the amount of alcohol by its power to aid in the assimilation of food; so long as it increases assimilation, it is good, when it diminishes it, it is injurious. Broadly stated, we may say that alcohol is rather indicated during the times of

[1] It is well, too, to give hydrogogue cathartics in persisting dropsy. They do not exhaust, but really give great relief. It has appeared to me that in many cases of cardiac dropsy the temporary cure has hung on the administration of cathartics.

acute failure than as a permanent part of the dietary in heart affections.

Then the food should be easily digestible. Little need be said upon this head. If it be not so, then indigestion is readily induced, and added to the other troubles. It must be ever borne in mind that in heart-failure there is a marked tendency to venous congestion, and that is especially felt in the valveless portal circulation. The viscera in connection with the portal circulation share in the venous congestion, and amongst others the stomach. There is a flow of mucus, which forms gastric catarrh, and gives rise to that sense of fulness of which heart sufferers so constantly complain. The venous congestion, too, obstructs the flow of blood through the stomach when the arterioles dilate in the act of digestion, and so interferes with the free secretion of gastric juice. Consequently the food should be of such a quality and in such a form that it shall tax but little the enfeebled stomach. It is further obvious that any improvement in the circulation generally will be felt in the stomach. There is also another matter in connection with the question of food in heart disease, and it is this. The heart is only separated from the stomach by the thin diaphragm, and any accumulation in the stomach, no matter whether solid, fluid, or gaseous, presses up the diaphragm, and, diminishing the thoracic space in which the heart beats, gives rise to very unpleasant sensations, not rarely forming grave attacks of dyspnœa and palpitation. Especially is this the case when the right side of the heart is taxed and failing. In the same way distension of the colon affects the heart. These attacks are most common when the patient is in the recumbent posture; apparently because then the contents of the abdomen press more against the diaphragm, from which they tend to fall away by their own weight when the erect posture is assumed. Supper with such patients should ever be light, and taken some hours before going to rest. The morning meal may be more substantial in character with impunity; or a small quantity of fluid food may be taken towards morning.

Such are the broad principles of the treatment to be pursued when the heart is itself affected primarily. A large portion, however, of the cases of heart affection, for which relief is sought,

are not true ailments of the heart, but really secondary affections of it—consequent upon some disturbance in the circulation. They can now be considered after the actual affections of the heart have been reviewed.

§ 144. The secondary affections of the heart may be defined as more or less complete heart-failure, due to a rise in the arterial tension. It is clear enough that a rise in arterial tension may occur where the heart is not structurally sound, and then the effects are very serious, as in angina pectoris; which is often fatal when it occurs in a patient whose heart is structurally unsound, and whose coronary vessels are much diseased. But the complaint itself is due to an increased arterial tension (as demonstrated by the sphygmograph), occasioned by arteriole spasm. This was first shown by Lauder Brunton (in 1866), to whom belongs the further merit of clearly inferring how the attack was produced, and by what means it would be relieved—viz., an agent which would dilate the peripheral arterioles. From the physiological experiments of B. W. Richardson and A. Gamgee he knew that we were already in possession of such an agent in nitrite of amyl. In a severe case of angina pectoris in the Royal Infirmary of Edinburgh, which was unrelieved by any measure which empiricism could suggest, the administration of amyl gave immediate relief. This correct application of physiological knowledge to the needs of practical medicine by Dr. Brunton is one of the best marked and best known instances of the services scientific research has rendered to the art of medicine. But the line of thought so opened up was destined to bear fruit in a much wider sense than at the time was anticipated by that therapeutic pioneer. This observation of how to dilate the peripheral arterioles, and by doing so to lower arterial tension, and thus relieve an embarrassed circulation, came at an opportune moment. The early observations of James, of Exeter, and of Bright, that in chronic renal disease there was a well-sustained and incompressible pulse, together with hypertrophy of the left ventricle, both of which were due to obstruction to the blood-flow in the arterioles, had been further elaborated by George Johnson in this country and Traube in Berlin; both of whom, independently of each other, had found that in these cases there was hypertrophy of the muscular wall of the arterioles. Here then

was the secret of the obstructed blood-flow. The well-known but mysterious "gout at the heart"[1] stands now unveiled before us—it is cardiac embarrassment owing to spasm of the arterioles, which in its turn is due to the accumulation of nitrogenized waste in the blood. Not only so, but the frequent occurrence of aortic mischief in chronic Bright's disease becomes at once comprehensible; the increased arterial tension closes the aortic valves with unwonted force, and valvulitis is the consequence. The forcible closure of the aortic valves gives rise to an abnormally loud aortic second sound; and that accentuated second sound is a diagnostic sign of the very greatest value. Gout at the heart and gouty inflammation of the valves of the heart are no longer the mysteries they have been, since empiricism first detected their associations. In the form of angina pectoris this effect of an increased arterial tension upon the heart produces a terrible and well-marked disease. In the less perfect and more obscure forms the effects upon the heart are much more frequent, though less readily recognizable, and consequently less generally understood. Now, however, that the secondary affections of the heart have come within our diagnostic ken, they are found to form a large portion of the heart-affections in which no organic disease is present. The evidences of cardiac embarrassment are exhibited, but without the witnesses of organic change.

It is needless to say that up to a very recent period these cases were but imperfectly recognized; and though the vague diagnosis of gout at the heart led to a fairly correct line of treatment in those who were obviously gouty, in those whose gout was not apparent an imperfect diagnosis led to a less successful practice. These cases formed a class of their own, very troublesome and very intractable until their nature was detected and their pathology correctly interpreted. Now, however, it has become possible to recognize these cases, and, what is more important to the patient, to treat them satisfactorily. Here the palpitation, the irregularity, or intermittency, with their subjective symptoms, are not to be treated so much by measures

[1] The persistent presence of uric acid in the blood of the gouty, even when free from manifestations of gout, is amply demonstrated by Garrod in his work, chap. vi. *op. cit.*

intended to invigorate the heart, as by the removal of the condition on which they causally depend.

In this class of cases the cardiac troubles are the consequences of a heightened arterial tension interfering with and opposing ventricular contraction, and the removal of this abnormal tension is indicated. It again rests causally upon an obstruction in the peripheral arterioles, taking its origin in the presence of excessive nitrogenized waste. To remove this waste is our obvious duty, and forms the only means of approach to successful treatment. For this end two things are requisite:—(1) To remove the waste and (2) to prevent its production. For the attainment of the first end we resort to agents which increase the activity of the kidneys and the other depurating organs, the skin and the bowels. These ends may be attained by the use of diaphoretics, cathartics, and diuretics. The diuretic here to be selected is not an agent which will increase the bulk of urine so much as one which will increase the amount of solids in the urine. We desire to cleanse the blood of its nitrogenized waste, and in doing so, must remember that the most permanent form such waste assumes is uric acid, or the urate of soda or ammonia. These are all but imperfectly soluble salts, whereas the urates of potash and of lithia are freely soluble. Consequently we must administer these agents, and, by so rendering the waste soluble in the blood serum, permit of its escape by every water emunctory. The various natural waters which contain potash are here very valuable, and especially if they are purgative as well. As medicines, the *potus imperialis*, and the bitartrate of potash in barley water, are very useful, and may be taken freely to the point of purgation. When more concentrated medicines are prescribed, it is a matter of the first importance that each dose be accompanied by large draughts of water, so as to imitate the natural waters; this makes them much more effective. A good form of mixture is furnished by the following combination:—

Pot. Iod. gr. v.
Pot. Bicarb. gr. xv.
Inf. Buchu, ℥ i. ter aut quater in die.

This should be taken on an empty stomach, and washed down with a tumblerful of water. If the pulse be strong and incom-

pressible, and the first sound of the heart good, then ten drops of colchicum wine may be added with advantage. If, however, the pulse be compressible and the heart's contractions lacking in power, as where there is dilatation and not hypertrophy of the left ventricle, then as many drops of digitalis may be substituted for the colchicum; this will maintain the vigour of the heart under the depressant action of the alkalies. Under a line of treatment of this kind secondary affections of the heart will progress more satisfactorily, both for patient and practitioner, than under the plan of strengthening the heart by the usual measures. When digitalis and iron are given alone for the treatment of affections of the heart which are really secondary in their nature, the results are either no relief, or even a more marked condition; not uncommonly a hard hammering of the heart against the chest walls, the consequence of its inability to struggle successfully against the opposing arterioles and the obstructed blood-flow. The treatment here rests very obviously upon a clear and distinct diagnosis. The use of amyl inhalations in such cases is indicated; and jaborandi may be found very useful, especially in connection with hot baths, purgation, and the measures just mentioned.

The relief afforded to the heart by the line of treatment just given is often most marked; and the combination of the iodide and bicarbonate of potash may often be changed to that of iron and potash given in § 141 with advantage after a few days. In my own personal experience it has seemed very clear that the gradual progression from an alkaline to a purely chalybeate and tonic treatment, by means of a compromise, is very desirable, and furnishes the most satisfactory results.

In addition to these measures, alkaline purgatives, as Seidlitz powders, Pullna water, or, better still, the bitter water of Fredericshall, or the Hunyadi Janos water, or that of Marienbad, or Saratoga, or Hathorn water, are very useful adjuncts, especially if there be any overt evidences of gout manifesting themselves. Such purgation, along with colchicum, is often very advantageous.

To fulfil the second indication, it is necessary to regulate the diet. Slops, bland fluids, as milk and seltzer water, or arrow-root, or sago, variously flavoured, should form the dietary.

Nitrogenized foods, as meat, soups, and beef-tea, whose use often passes into abuse, are to be withheld, during the early part of the treatment at least. Nowadays it is fashionable to resort to beef-tea in season and out of season, and to ignore the fact that its nutritive power is low, the amount of nitrogenized matter comparatively high, while most of it is too far advanced to undergo anything but retrograde changes. Of extract of beef, this last is still more true, and its value as a food is almost nil—it is an agreeable stimulant. Light puddings, as tapioca or vermicelli, and white fish, with vegetables or fruits, should form the diet for some time; and it is only when the brunt of the affair is over, and the consequent debility is the chief matter to be attended to, that a more liberal dietary is indicated. For some time, however, the alkaline, and often the mixed alkaline and chalybeate treatment, must be continued after convalescence is established.

The reader may refer to Chapter III., §§ 31, 32; Chapter XI., §§ 107–111; and to Chapters XVII. and XXIII. in connection with this subject.

The success which attends the treatment of secondary affections of the heart by measures which would prove but simply disastrous in primary affections of that organ, being, as they are, direct depressants, is all that is required to vindicate the diagnosis, and to justify the separation of heart affections into the divisions made above. Of course if there be also present some primary debility, or organic disease of the heart, then a complex treatment must be adopted to meet a complex malady.

It is much to be regretted that the division here given is not more generally and universally recognized. Not only would patients benefit thereby, but those differences of opinion as to the existence of actual heart disease in these cases, which constitute one of the opprobria of our profession, would be avoided. In cases of secondary disease of the heart, exercise and effort, so objectionable and injurious in primary heart disease, may be indulged in not only without injury, but with advantage. The attacks of cardiac embarrassment in these cases are not associated with effort; while exercise, by leading to more perfect oxidization, tends to diminish the amount of uric acid in the system.

§ 145. Another division of affections of the heart is that which may fairly be denominated the neurosal.

Many conditions produce an abnormal working of the heart, especially in persons of a nervous diathesis, or in those reduced to an anæmic or debilitated state; there are other conditions which also give rise to palpitation and disturbed action of the heart.

In persons of a nervous diathesis hysterical palpitation is common. It is due apparently to a contracted condition of the arterioles, and in some persons there is a certain amount of hypertrophy produced in time. The subjects of this class of ailments are usually women, mostly spinsters, and but comparatively rarely mothers, and there is not unfrequently an erotic element in the case. Bromide of potassium with iron, and the external application of a belladonna plaster, are the measures best suited to this division of heart ailments. The occupation of the mind in some useful work is also very desirable.

It, however, happens that in some cases the affection is distinctly neurosal, and yet it is in no way related to what we term hysteria. Here quinine and iron, with strychnine, as in Easton's syrup, form a suitable measure to be adopted. Such an affection is often associated with constipation or abdominal fulness, and this should be attended to forthwith. Botkin, of St. Petersburg, advocates the use of nitrate of silver in cases of cardiac irritability, and recommends, at the same time, the relief, or better still, the removal of every form of co-existing or intercurrent malady which may possibly form an exciting cause of this irritable action. The palpitation which co-exists with prolapsus of the womb is at once greatly relieved on the womb being properly replaced, and without it the ordinary treatment is inefficacious. This has occurred to many of my patients at Victoria Park Hospital.

It must never be forgotten, however, that irritability of the heart is most commonly associated with indulgence in two neurotic poisons, tea and tobacco. The first is very common in women, very common indeed; while the second is far from uncommon in men; indeed, the ailment used to be denominated in the Edinburgh Royal Infirmary "smoker's heart." For the

successful treatment of these neuroses the removal of the exciting cause is the first and most necessary step. A little careful attention to the case will usually determine it to belong to neither of the preceding divisions, so that it falls by exclusion into this last class. The action of the heart in these cases is irregular in force and rhythm, and there are attacks of palpitation at intervals, as also times when the heart's action seems to be temporarily arrested. In these cases the favourite neurotic must be abandoned, or its use much restricted, and the general health must be attended to. The results of treatment will usually speedily allay any apprehensions which may exist as to the possibility of actual organic disease of the heart.

At other times a similar condition of the heart will be found in connection with much indulgence of the generative instinct; and here restriction, with attention to the general health, is necessary.

In all these cases the rules and principles of treatment are to be arranged according to the exigencies of each individual case. In the treatment of neurosal affections of the heart Clifford Allbutt, Da Costa, and others have spoken highly of opium. Unfortunately they have not sufficiently discriminated the cases in which it may be resorted to with advantage to furnish any rules for its use, and I cannot supply them; the more that my own experience goes strongly against the use of opium and morphia in heart affections, except in the less pronounced conditions of functional disturbance of the heart. In actual disease its use is inadmissible, and the late Hyde Salter denounced, with much eloquence, the administration of opium in the distressing insomnia of advanced heart disease. Here its use is simply fatal: it is all the patient can do to maintain respiration by the most energetic voluntary efforts: arrest those efforts by opium, and the patient will sleep—but it will be the long, dreamless sleep which knows no awakening.

§ 146. "Irritable heart" is the term Da Costa has aptly applied to a large series of cases of disturbance of the heart which first attracted his attention in the recent American civil war. He says: "The general clinical history of many of these cases was this:—A man who had been for some months or longer in active service would be seized with diarrhœa, annoying, but

not severe enough to keep him out of the field: or, attacked with diarrhœa or fever, he rejoined, after a stay in hospital, his command, and again underwent the fatigues of a soldier's life. He soon noticed that he could not bear them as formerly; he got out of breath, could not keep up with his comrades, was annoyed with dizziness and palpitation, and with pain in the chest: his accoutrements oppressed him, and all this though he appeared well and healthy." It was not connected with indulgence in tobacco or the injurious agents just alluded to above; though they aggravated the mischief, and kept it up. It would appear that the ailment was induced by some intercurrent depressing affection, showing itself in a person previously subjected to excessive demands upon the powers. In such cases the heart becomes disturbed and enfeebled, and this condition of it is apt to be persistent and intractable to treatment. Da Costa has carried his investigations on this subject into other fields of inquiry, and has found that excessive exertion is apt to induce a disordered heart. This is especially the case amidst those who lead a high-pressure life, and who are also mentally much engaged. Consequently we cannot be surprised that heart ailments—if not actually heart diseases—are growing more and more frequent, and that they will continue to grow in frequency. These are important subjects for our consideration in the matter of prevention as well as cure: this class of ailments is a growing one, as well as a difficult one to treat successfully. In cases where there is little or no anæmia, digitalis, especially with bromide of potassium, is indicated in small but continued doses. A belladonna plaster might be employed externally, or even some counter irritation resorted to. Da Costa says "the treatment is never a short one." Rest, quiet, good food, bracing atmosphere, and cheerful surroundings are all desirable adjuncts to the strictly medical treatment in these cases. Much of the cardiac disorder we are called upon to treat presents many of the features of this "irritable heart,"—often associated with the consumption of much lean meat, under the impression that there is debility present which must be met by nourishing food—and the treatment must be directed to the different factors of the case. When the case is complicated with imperfect blood-depuration, this last must be attended to and corrected.

§ 147. At other times there exists a tendency to palpitation, especially on effort, with accompanying dyspnœa, in young persons, mostly females. In this class of cases there is also pronounced anæmia. There are venous hums and very often a systolic bruit, aortic, or more often pulmonary. The hæmic murmurs cause these cases not uncommonly to be mistaken for organic disease of the heart; and much uncalled-for anxiety and alarm are occasioned thereby. Whatever the cause of the anæmia, whether imperfect food, impaired assimilation, or an exhausting drain, the exciting cause must be removed, and good food, tonics, and chalybeates must be given. The treatment of the anæmia is the treatment of the cardiac trouble; and the heart itself is not to be treated, unless a belladonna plaster be indicated by persistent palpitation.

Such are the different morbid conditions of the centre of the vascular system and their indications for treatment, so far as they permit of being sketched out in this brief manner. In no ailments whatever does the successful treatment rest more distinctly upon the accuracy of the diagnosis—not only as to the exact pathological condition, but as to its why and how, and as to the general conditions with which it is associated. Take the condition so commonly found, viz., dilatation with some hypertrophy. It may occur in a young man who has persistently overworked himself, where it is readily amenable to treatment. It may be found in a middle-aged woman, who has had it for years, and in whom palliative treatment is fairly successful; but where anything like cure is out of the question, though life may be preserved for a long time. Finally, the dilatation may indicate the yielding of an hypertrophied heart, whose structure is being cut down by advancing fatty degeneration, and the indications so furnished point to a hopeless downward course, but little affected by treatment in most cases, with the inevitable end not far distant. Now it is obvious that it is of the utmost importance to discriminate betwixt these similar but really unlike conditions, to be able to distinguish those cases which admit of being benefited by treatment from those that do not. In palpitation, too, how different are the measures to be adopted in the palpitation of muscular failure and in the neurosal palpitation with unfilled vessels which is common in girls, and

where there seems to be a discharge of accumulated energy in the cardiac ganglia. The man whose creed is that heart diseases are not to be improved by treatment is not likely to be successful in his practice; the man who does not discriminate his cases will also bring much discredit upon measures which are signally useful when properly employed, but powerless, if not actually mischievous, when misapplied. It is to be trusted that the reader will belong to neither division, but will be one of that rapidly growing class who recognize that the treatment of heart affections is often most satisfactory; and who further develop their usefulness by educating themselves to detect and distinguish those cases which admit of treatment, and who are also learning how best to treat them; and so are enabled to separate a large class of affections admitting of beneficial treatment from another class of maladies for which little or nothing can be done except in the way of euthanasia.

§ 147*a*. The only ailment of the vascular system, not cardiac, of which it is necessary to say anything here, is aneurism. Here a certain portion of the wall of the elastic arterial system is weakened and impaired, and a sac is formed which sustains the same pressure as the arteries generally. If the blood-pressure be high, the aneurism is prominent and pulsates powerfully; if the blood-pressure be lowered, the aneurism recedes and its pulsations are less distinct. It is obvious then that the best means of avoiding rupture of the aneurismal sac is to keep the blood-pressure low. The well-known plan of Albertini and Valsalva was to starve the patient by hunger and venesection. This lowered the blood-pressure and the patient both. Now we can lower the blood-pressure by aconite or hydrate of chloral. This is an important part of the treatment. The other part of the treatment is directly curative—to procure layers of fibrine within the sac until it is filled and the aneurism is cured. For the attainment of this end it has been found useful to administer iodide of potassium. To Dr. Balfour belongs the credit of strongly advocating this plan of treatment first suggested by Graves, in addition to a restricted diet and general quiet. The importance of the latter is obvious. If to this be added small doses of chloral hydrate, a treatment will be adopted which

is theoretically perfect; and further it is practically useful.[1] In defiance of what we now know of the action of digitalis and its effects upon arterial tension, unreflecting persons still give it in cases of aneurism, and so spur on the natural efforts to rupture the sac.

[1] The utility of such union is well seen in a case of thoracic aneurism for many months under care at the West London Hospital. It is in the ascending aorta in a hale, muscular man with a powerful heart, and by these combined measures a cure is apparently being brought about.

NOTE.—At p. 329 it is stated that the use of nitrite of amyl is indicated in secondary affections of the heart. This is not a mere surmise. After the inhalation of five drops of amyl the hard, slow stroke of the heart and incompressible pulse of such conditions are converted into the rapid, light stroke and compressible pulse of pyretic states. This change continues two or three minutes. In the treatment of palpitation so associated, and in imperfect attacks of angina, the inhalation of amyl will, there is every reason to believe, be as effectual as it is in well-marked anginose attacks.

CHAPTER XV.

THE RESPIRATORY SYSTEM.

§ 148. By means of respiration the system gets rid of most of its carbonaceous waste, and of a quantity of water, while at the same time oxygen is freely taken up by the hæmoglobin of the red blood corpuscles. In order to admit of these interchanges air is drawn into the thorax, mainly by the sucking power of the diaphragm and intercostal muscles, through the trachea, which divides ultimately into myriads of terminal air tubes with alveolar dilatations at their termination, over which are spread the pulmonary capillaries. In animals who live in water the respiratory organs float in the fluid, and often are protrusions outwards of the pulmonary vessels. When the respiratory changes are wrought in air, the air is sucked in. In consequence of this the respiratory organs are affected by the temperature of the inspired air, and are also liable to mechanical irritation from minute particles in that air. From the first we get colds, and in the second we find a very effective provocative of tissue changes. The mucous membrane of the respiratory organs is also liable to be affected by general conditions, as the presence of gout-poison in the system. Such are some of the reasons why the respiratory organs are so often the seat of disease. The constant necessity for motion and functional activity in the organs of this system furnishes an explanation why diseases in them are persistent and often intractable. If the parts could be rested their repair would be wondrously facilitated. When laryngeal disease is about to asphyxiate the patient, tracheotomy not only gives immediate relief, but commonly leads to the cure of the laryngeal disease. This it accomplishes by the rest it furnishes. That

the rest is the curative agent is shown by the fact that if the person upon whom tracheotomy has been performed is a talkative person, the repair is much slower than where more perfect rest is given by taciturnity. The application of the principle of rest to the treatment of disease within the thorax has been successfully attempted. Dr. F. Roberts advocates the strapping of one half of the thorax, in cases of unilateral disease, so as to render it more immovable; and the results of such treatment are satisfactory. The plan is eminently rational, and has long been practised in the case of a broken rib, where the fractured portion, in the movements of respiration, rubs the pleura into an inflammatory state. The painful or unpleasant sensations produced by exertion in extensive disease of the respiratory organs usually secure for them the modified and partial rest of general quiet.

The irritation caused by inspired particles is the cause of most of the chronic interstitial pneumonia, with dilatation of the bronchi, we so commonly meet with, and which is often mistaken for phthisis with cavities. As we have seen (Chap. VIII. § 74), tubercle is but a lowly form of tissue-growth, and this condition of cirrhosis differs from that of pulmonary tuberculosis chiefly in the better chance of life it gives. In each case, whether a miller with chronic inflammatory changes in his lungs, or a needle-woman in a garret with phthisis, where smuts, &c., are inspired to the great irritation of the diseased surfaces, we insist upon a change of air. It is not only that an atmosphere largely charged with oxygen in an active form is to be preferred to one which has been breathed and rebreathed until its active oxygen is exhausted, for its general tonic effect; but also that the air of the country, and especially of the sea-side, is comparatively free from the organic particles which act as direct irritants to diseased lungs. Where change of air is not practicable, respirators of cotton wool, which arrest these particles, are very useful. The hopelessness, which hangs over diseases of the respiratory organs in the poor in towns, is due very much to the nature of the air they breathe, laden as it is with irritant particles—sometimes, too, also irritant by their chemical qualities, as well as to their systemic deficiencies. Everything is against them!

In consequence of their being the means by which air is respired, the organs of respiration are specially liable to be

affected by changes of temperature. We see in the glowing hands of the snow-baller the consequences of a sustained application of cold in the resultant hyperæmia, and when cold air is respired the lining membrane of the turbinated bones, &c., becomes turgid with arterial blood. By this means the air is warmed in its passage into the thorax. The importance of this warming of the respired air is seen in the tendency to pneumonia in persons upon whom tracheotomy has been performed, unless a warm temperature surrounds them; and also in the tendency to thoracic inflammation in infants after exposure to cold, if they cry and so breathe the cold air through their mouth. Who has ever watched an unhappy infant crying with cold, and seen the unwarmed air entering its thorax, without feelings of keenest apprehension as to the consequences? It is also seen in the fact that when nasal catarrh—itself the consequence of acute hyperæmia—has obstructed our ordinary channel of respiration, and we breathe through the mouth, then inflammation of the lining membrane of the thoracic portion of the respiratory track is commonly instituted. The exact point when hyperæmia of the air passages passes into inflammation cannot be defined, and there is a difference of degree only betwixt the rheum from the nose, occasioned by breathing very cold air, and the catarrh of inflammation. The normal hyperæmia occasions the one, the more pronounced condition of inflammation furnishes the other. In the same way the condition of the individual often determines whether of these two results shall be produced by a certain amount of exposure. If the individual be perfectly healthy, and the organism, be in good condition, then only hyperæmia with its consequences will be induced; if the person be out of health and the system impaired as regards its resistive and self-protective power, then inflammation and its sequels will be the consequence. The question is one of degree in different individuals, or of times and states in the same individual. If the body be heated by long exposure to a high temperature, combined with exercise, the cutaneous vessels are full of blood, and heat is rapidly lost on exposure to cold. If that exposure but dissipates the accumulated heat, it is pleasant, and not injurious; but if it be carried further, then such heat-loss may be induced as shall depress the body-temperature, and cause a

cold, with the subsequent rise of temperature—the catarrhal pyrexia. If the tone of the cutaneous vessels be lost by reason of general exhaustion or tire, such a result is more likely to follow than in the case of an unexhausted person. One who is not quite well, or who has been overworked, will be more likely to undergo much heat-loss on such exposure than a perfectly healthy individual. The general lowering of temperature will determine often whether the hyperæmia of the air passages shall pass into inflammation, or not. Hence the readiness with which the weak and those unaccustomed to exposure catch cold as compared to the strong and inured.

§ 149. The treatment of an acute catarrh must be conducted on principles which are founded on a knowledge of the pathology of the affection. At first there has been an abnormal depression of temperature, a lowering of the body-heat; then follows a rise of temperature and a pyretic state; this gradually defervesces, and the wonted health is recovered. In our treatment, then, we must aim at aiding these natural processes. If the catarrh could be caught at the outset then some hot fluids, more or less alcoholic, and a full dose of paregoric, or Dover's powder, at bedtime, and a warmed bed might be sufficient for the restoration of the patient. More commonly, however, we are not consulted until a more advanced condition is reached, and there is a dry, imperspirable skin, a pyretic state, with a congested condition of the lining membrane of the respiratory track, in some part of it. There may or may not be any cough. There is always, however, some difficulty in breathing. For the relief of this condition of vascularity, it is necessary to relax the skin, as the old phrase ran, or, in more recent phraseology, to excite cutaneous action, and dilate the cutaneous vessels. It is well to commence with either five grains of James's powder or of Plummer's pill, with or without a grain of opium, at bedtime, and in the morning a seidlitz powder, or some of the bitter water of Fredericshall, until a gentle action of the bowels is set up. But much purgation is to be studiously avoided, especially if the patient be weak, or the attack severe; in these cases the powers must be husbanded, for they may come to be severely taxed, especially if the catarrh be intrathoracic. There are many patients who catch still more cold from the exposure during purgation,

especially in country districts, where there is not a night-chair in the house; this is a matter the young practitioner will do well to heed. The next measures usually adopted in these cases are something of this kind,

℞ Vin. Antimonialis ℥ xv.
Liq. Am. Acetat. ℨ i.

every four or six hours, and to give hot slops. At other times it may be desirable to give the following:—[1]

℞ Pot. Iod. gr. v.
Liq. Am. Acet. ℨ i.

instead of the first, especially where the patient is weak or the system impressionable to depressants. The best household remedy is ipecacuan wine, which is infinitely less hazardous than antimonial wine; for the latter may be given beyond its emetic action, while large doses of ipecacuan are free from such danger. If vomiting be induced, especially in children, it is useful. After free action of the skin has been induced then something like the following mixture may be given:—

℞ Ac. Hydrochlor Dil. ℥ x.
Sp. Chloroformi, ℥ xx.
Syr. Scillæ ʒ i.
Aquæ ad ℨ i., ter in die.

or

℞ Ac. Phosph. Dil. ℥ xv.
Inf. Cinchonæ, ℨ i.

if there be nasal catarrh only; and when more convalescent, some of the numerous combinations of iron and vegetable tonics already given may be prescribed.

It is often desirable to inhale steam in affections of the lining membranes of the respiratory track; and for this purpose an inhaler may be used, or in humbler homes a jug of hot water. How far the good effects of the steam may be aided by adding medicinal agents to the hot water it is scarcely possible to say.

[1] Probably in jaborandi we shall find a most efficient agent in reducing temperature and exciting cutaneous action in the early stage of catarrh.

In croup the room should be filled with hot vapours, which produce excellent effects.

§ 150. It may tend to facilitate the consideration of the thoracic affections connected with the respiratory system if the subject be separated into three divisions: (1) the air-tubes; (2) the lung structures; and (3) the serous coverings; and the ailments of each described generically.

Affections of the air-tubes may be acute or chronic. The acute forms differ but little from the sketch just given of an acute catarrh, and vary from a mere cold to a most dangerous illness. In acute bronchitis, in addition to the measures just mentioned, it is of great importance to keep the chest enveloped in large and hot poultices. They should be repeatedly changed, so as never to be allowed to become cool, let alone cold. They should be large and thick, so as not to require very frequent changes; and the best material for retaining its heat long is linseed meal. In severe cases, where there is much exhaustion, the surface of the poultices may be dusted with mustard. The heat keeps up the action of the heart, especially the right ventricle, which is apt to become exhausted, and by dilating the cutaneous vessels of the trunk relieves the vascular system. The great danger in bronchitis is exhaustion, and in persons at the extremes of life it is a very fatal affection; in strong adults the most severe attacks are compatible with recovery. In addition to these measures it is desirable to resort to some form of expectorant.

The Theory of Expectorants. — Anyone who suffers from bronchitis realises for himself quickly the benefit to be derived from expectorants. These agents have been arrived at empirically, and are used because they do good. What they achieve is a loosening of the phlegm—that is, the secreted mucus is more easily dislodged, and so expectorated. There is no doubt about that fact. But it is not a matter of indifference which one of the agents known as expectorants be resorted to. In the first stages of the case the bronchial mucous membrane is swollen, congested, turgid, and dry; it is hyperæmic, but secretion is arrested, and the mucus is scanty and tenacious, and got up only with the greatest difficulty. It is obvious that here one part of the treatment must be to relieve the vascular system,

to reduce the turgescence, without which free secretion cannot be attained. To give ammonia and senega would not achieve the desired end. The agent to be used must be one which will affect the circulation; which will relax the cutaneous vessels and depress the circulation. Such an agent we find in tartar emetic, in iodide of potassium, or ipecacuan. The administration of these agents is the line to be pursued until turgescence passes into free bronchial secretion, and a moist condition of the skin is secured; then, and after then only, are the stimulating expectorants to be resorted to. The effect of these remedies, where the first stage is strongly marked and intractable, will be much aided by producing an eruption on the chest: this may be done by tartar emetic ointment, or croton oil liniment, which are powerful measures for good when skilfully wielded. Even venesection may occasionally have to be resorted to when these depressant measures fail, as my experience has taught me.[1] Whatever the amount of pains required to procure relief, the first stage must be got over before the stimulating expectorants are of any avail. I well remember a case recorded in one of the journals many years ago. A man had attended at a London hospital with bronchitis, and had had carbonate of ammonia and senega prescribed. After many days he tried another hospital, as he was utterly unrelieved. His lips were blue, his face congested, his breathing very difficult, and his expectoration scanty. He was then given some tartar emetic, ipecacuan, and acetate of ammonia; in a few days he was much relieved, the first stage gave place to the second, and then carbonate of ammonia and senega did him great good. The case impressed me much. The treatment was wrong in the first place—because it was mistimed. This was a lesson always strongly insisted upon by my late father when I was assisting him to dispense in the country. Whenever the bottle of syrup of squill appeared instead of the ipecacuan wine: "Never give squill until the skin is moist and the phlegm loose—it will do no good; you must give ipecacuan and relaxent expectorants as long as the skin is dry and the phlegm tough: squill is very

[1] In one man no efforts of my father's, or afterwards of mine, could procure relaxation in the turgid bronchial membrane, until a few ounces of blood were drawn from the arm: after that the case moved on satisfactorily.

useful in its place, and will be all right in a day or two," was the phrase which greeted my youthful ear, much to my benefit. The principle was sound, and the maxim is worth remembering. When secretion is free, then squill, senega, carbonate of ammonia, benzoin, &c., may be given with advantage. The indications for treatment now are to sustain the system during the exhaustive process of breathing through the obstructed air-tubes and expelling the phlegm. This taxes the powers greatly, and milk, beef-tea, wine, &c., must be given in no stinted quantities. The prescription of squill, acid, and chloroform given in the last section is a very palatable and withal powerful expectorant, and is easily rendered more stimulant, when required, by increasing the dose of spirits of chloroform. Another still more powerful but disagreeable mixture is the following :—

Am. Carb. gr. v.
Sp. Chloroformi, ℥ xxx.
Inf. Senegæ, ℥ i.

It may be given every four or six hours. If the circulation be failing, the tincture of digitalis must be added to the mixture. If the heart be already the subject of structural disease, the bronchitis will usually go very hard with the patient, and digitalis must be given early and continued throughout the case, else the patient will probably die. As convalescence proceeds, the carbonate of ammonia may be continued along with the ammonio-citrate of iron and bitters.

It is far from being a well-ascertained fact how expectorants act. Many agents, especially the liliaceæ, are found in the breath after being taken by the mouth : they are thus partly given off by the bronchial membrane. That they cause a certain hyperæmia of this membrane and stimulate secretion in it is more than probable, so that the secretion is freer ; and then under the cover of this layer of mucous cells the bronchial membrane recovers itself. But free secretion must precede repair, and so depressant expectorants must precede the stimulating and restorative members of this group.

Sometimes, however, an attack of acute bronchitis, instead of passing away, persists as a chronic affection. If there be a

history of gout or rheumatism, potash, iodide of potassium, and balsamic remedies, as benzoin, ammoniacum, and guaiac must be given. The use of astringents is of doubtful desirability. If there be anæmia and debility iron must be given, and astringent forms of it will be found preferable. In many cases change to a warm climate may be distinctly indicated, and cold air is found to keep up and aggravate the lingering mischief. A respirator is a most comfortable and effectual means of aiding the convalescence. In those who suffer from winter cough the resort to a respirator as a preventive measure will be found to often preserve the wearer from the wonted trouble. When bronchitis remains in a chronic form from sheer debility in the patient, then cod-liver oil (often simply invaluable), chalybeates, tonics, and good food are the measures which will be found most satisfactory in enabling the diseased mucous membrane to recover its normal condition. Where the right ventricle is much distended, as is the case when chronic bronchitis is accompanied by emphysema, then digitalis is indicated, and is of much service. In accumulations of phlegm emetics are often followed by great relief.

§ 151. Inflammation of the bronchi and bronchiæ may be complicated with spasmodic action of the muscular fibre of these tubes, and then the case is very severe and distressing. When this complication occurs, lobelia or the bromides are the remedies in most favour. Lobelia is, however, a powerful depressant, and must be used cautiously.

At other times the spasm of the air-tubes comes on without any connection with inflammatory changes. Here it is known as asthma. The spasmodic nature of genuine asthma renders its treatment very different from that of the dyspnœa of heart-failure, of bronchial inflammation or thickening, or that of anæmia. It comes and goes in the individual, leaving him well in the interval; it may show itself once or twice, or persist through a life-time; usually it disappears while the system is under the influence of any intercurrent malady. It is very difficult to approach rationally the question of what is to be done in asthma. Inhalations of nitre fumes, of nitrite of amyl, the smoking of datura tatula, are direct applications to the affected parts. At other times depressants pushed very far are

the best means of relief, and tobacco, taken until its toxic symptoms are induced, is a favourite measure. Sometimes it must be met by agents which lower nerve action, as bromide of potassium. Finally, it is well to avoid those exciting causes which experience has shown to be provocative of an attack. In hay-asthma, for instance, flight from the pollen of the anthoxanthum odoratum is absolutely necessary. Yachting where permissible is an excellent preventive. At other times the attack is found to follow intestinal derangement, or to be preceded by a thick and high-coloured condition of the urine. The treatment of the patient during the interval is no unimportant matter; but this depends on the peculiar necessities of each case. Thus in asthma occurring at the catamenia the bromides are indicated; where each attack is preceded by a voracious appetite, moderation in diet is as effective as in epileptic attacks of like associations.

§ 152. Affections of the lung structure—the second division—furnish—whether in the acute or chronic forms it matters not—perhaps the most complete debatable grounds of medicine. In the acute form our immediate ancestors bled to death's door, while Rasori gave huge doses of tartar emetic; more recently Hughes Bennet has advocated the expectant treatment, with liberal supplies of food. Every new remedy almost is tried in turn for pneumonia, and found to be followed by a large proportion of recoveries; but in how many cases the recovery is rather in spite of, than in consequence of, the treatment employed, may be open to question. It is now, however, generally recognized that pneumonia presents in itself no especial indications for treatment; and consequently it must be treated according to the indications of each case, and of the system in which it occurs. If the patient be stout and strong, and the pulse full and incompressible, a depressant line of treatment is indicated; and as the pulse becomes softer relief will be experienced. On the other hand, where there is obvious debility, and the pulse is small, compressible, and fast, then stimulants, tonics, and liberal supplies of easily assimilable food are the measures to be adopted. It is very questionable, however, how far by any measures we can hasten the natural processes of pneumonia, or exercise any influence over the progress of the ailment. But it is certain

that we can aid the system to tide over the attack, and also that we can moderate its severity, by attending to the different indications furnished to us in each case. We can give aid in each stage of the malady: in the first stage we can moderate the inflammatory rise, and control to some extent the pyrexia. In the second stage we can attend to the general indications, and can, at any rate, treat symptoms if we can do little for the malady itself. While in the third stage stimulants and tonics will often enable the patient to pass through a period of peril, and to round in safety the critical point. This may seem but little, but in reality it is much. By moderating the pyrexia, &c., of the early stage we lessen the amount of exhaustion which may come to constitute the prominent danger of the later stage. In that later stage we may give such aid as shall enable the patient to survive till the disease has run its course into convalescence. It is also equally certain that by injudicious measures the natural efforts may be thwarted or opposed, and so the patient's life may be imperilled, as a consequence of our well-meant but ill-designed measures for his benefit. If both lungs be affected so that the pulmonic circulation is much obstructed, it is good treatment to bleed freely, so as to diminish the bulk of blood, and secure a nicer adjustment of balance betwixt the blood and the respiratory powers, than existed before. Such practice is neither inconsistent nor incompatible with the administration of stimulants even at the time of bleeding; the bulk of blood must be reduced at all risks, and the hazard involved in doing so must be met and obviated by all means in our power. It is the standard practice now in pneumonia to resort to that modified form of bleeding involved in the application of large hot poultices to the trunk. The jacket-poultice of the French is the best thing. It reduces the blood-pressure in the veins and right heart, its heat stimulates the heart, while the blood is conserved and is useful for future needs, when the powers of the system may be strained to the utmost limits of endurance. The utility of blisters in pneumonia is doubtful. The advocates of such plan have failed to furnish convincing evidence of the beneficial effects produced thereby. The use of venesection, either general or local, as by cupping or leeches, is merely to reduce the congestion of the right heart and the veins, and this

can be done, without removing the blood from the body, by means of the jacket poultice. In sthenic pneumonia I have seen venesection, as practised by my father, followed by good results in severe cases; but it is a measure obviously unsuited to the large majority of the cases of pneumonia that come under our notice.

Especially is this the case in those low forms of pneumonia which are so prone to show themselves in conditions of great debility, or in the course of continued fevers, &c. Why and wherefore the lungs should under such circumstances become subject to inflammatory change it is not for us to inquire here. The fact remains that it is so; and the treatment of pneumonia here is the treatment of the condition on which it depends. Consequently free stimulation is often imperatively called for, and the patient must be tided over the danger of the hour even if the treatment necessary for this end be not entirely free from some risks of its own.

Pneumonia is a common cause of death in chronic maladies, which are themselves but slowly fatal, and all our efforts in these cases are commonly unsuccessful. At other times pneumonia is associated with the development of a lowly form of tissue-growth, and then it forms a tubercular pneumonia, or acute tuberculosis, which is fatal in three weeks or less.

If this work were chiefly pathological pneumonia would call for a very long and elaborate description, but as its aim is mainly therapeutical, a brief consideration is all that can be given to it. There is no treatment for pneumonia in itself. Its treatment in each case is a good touchstone of the general information and skill of the practitioner, and of his power to observe and to apply general principles. No description of pneumonia or lengthy survey of our remedial measures will, or can take away the necessity for resort to individual thought. The treatment of pneumonia is the application of the principles laid down in the preceding chapters, and especially Chapter V.

§ 153. If these remarks hold good of acute pneumonia, they apply still more aptly to those chronic conditions of limited inflammation of the lungs which in their course and conclusions vary so much. In acute ailments careful examination will reveal in many cases a patch of pneumonia. This may be of no moment whatever, or it may be of the most serious import;

its existence must be noted, and its progress watched. It may quickly disappear, as is doubtless the case in most instances, but it may persist, either as a limited area of chronically thickened lung from growth of connective tissue, sufficiently elaborated to maintain its vitality unimpaired; or it may consist of a too lowly form to live, and then fatty degeneration of the neoplasm may be accompanied by ulceration around its periphery; in which case the patient usually has to swim for his life. The hectic fever which may co-exist with this ulcerative process may wear out the patient, assisted by the terrible and persistent cough excited by the presence of this foreign body in the lung, this "thorn of Van Helmont," and aided by the sleeplessness, the exhaustion, and expectoration with night sweats, which mark this condition. Not only so, but the inflammatory margin of lung along the ulcerating process may itself no longer furnish a healthy pyogenic membrane; the connective tissue here may be of so lowly a form that it must in its turn soften and necrose, entailing another period of hectic fever with its terrible associations.

It is obvious then that in chronic pneumonia it is of the utmost importance to prevent if possible the inflammation from becoming tubercular, to ward off as far as may be any tendency to degradation in the cell-elements of the neoplasm. Such must be our first aim; and in all cases of disturbance of health, especially in young persons, the lungs should be carefully examined again and again for these localised patches of parenchymatous inflammation. When they are found they must be noted and their progress carefully observed, and at the same time the general condition, and especially the temperature and pulse, must be watched. The general nutrition is the point to be attended to, for if it be defective the repair of the inflamed area will be but imperfect. Consequently food in liberal supplies and of an easily assimilable character must be given at frequent intervals, the appetite must be whipped up by bitters, if there be any irritability about the stomach it is well to give

Bis. Trisnit. gr. x.
Mist. Acaciæ, ʒ i.
Inf. Calumbæ, ℥ i.

three times a-day before food. Some practitioners prefer the

mixture of calumba with compound tragacanth powder, in these cases. There can be no doubt that in many cases the first matter is to keep the stomach in good condition, so that the assimilation of food is sufficient and effective: by this means the necessary nutrition is secured for the growth of healthy connective tissue. The other measures, as the arrest of the hydrosis, moderating the cough, correcting the bowels, and securing sleep are secondary to this—though important enough themselves. For the securing of sleep and the alleviation of the cough, the measures described in the earlier half of Chapter XIII are to be applied here—as are also some remarks upon cough, which will be made further on in this chapter. The regulation of the bowels, the relief of constipation, and the arrest of diarrhœa, are of much moment. If the patient be but temporarily reduced, and the patch of chronic pneumonia is the result of passing adynamy in a healthy person of good family history, the prognosis is good; though there may be no arresting the process until the mass be expectorated and a cavity formed. In some cases the walls of the cavity fall in, and a puckered cicatrix is all that remains of what was once a dangerous mass of degraded tissue, whose expulsion had almost exhausted the powers of the patient.

At other times there may be found a condition of numerous small masses of tubercle surrounded by healthy connective tissue, so that the encapsuled mass softens, its organic matter is absorbed, and ultimately small mortar-like masses—the inorganic constituents of tubercular growths—are either expectorated, or are found in the midst of hardened lung tissue after death. These are the cases over which young practitioners are so apt to trip. They discover that there is an area of dulness, where the breath sounds are altered, but they fail to distinguish whether the mass is that of new growth, or the remains of some long past mischief. Yet it is most important prognostically and therapeutically that such diagnosis be made; and correctly made too. By a sufficient amount of care and knowledge this may usually be determined. If, however, the patient's health be thoroughly broken, or the family history tells unquestionably that there has been a strong tendency to the formation of tubercle, especially on the father's side, then these localized

patches of pneumonia must excite the most apprehensive attention; and no stone must be left unturned to avoid the degenerative changes which will be accompanied by so much danger to life.

§ 154. When the diagnosis has been made, that there is present in the lungs a certain amount of pathological connective tissue of a degraded character, the treatment divides itself into two lines. The first is directed to the cure of the patient; the second is that of relief in incurable disease and the procuring of euthanasia. As long as hope remains, the first is to be sedulously pursued, and it is a complicated matter. For there are two points to be attended to which are somewhat antagonistic. These are the maintenance of the general health and the securing of an atmosphere which is agreeable to the diseased lungs. The pursuit of the latter has studded the shores of the Mediterranean with villas, where the Anglo-Saxon and the Sclave stay during the winter season, and so avoid the severe winters of their own lands; the necessity for the former has established health resorts in high-lying tablelands, and filled Swiss chateaux and Californian sierras in summer with phthisical patients. It is not caprice or fashion merely which has determined two such apparently antagonistic lines of practice. The choice depends upon the case. In one, a hot summer so ennervates the patient that the benefits of warm air are more than counterbalanced by the general depression and loss of appetite, and consequently summer must be spent in a bracing situation at a high altitude. In the other the irritation of cold air overrides the good effects of the low temperature upon the general condition; here a warm winter resort is indicated. In some phthisical patients quiet exercise in the open air is all that can be undergone, while others are the better for pretty severe exercise. In these latter the good effects of exercise outweigh the evil effects upon the lungs of their increased functional activity: while in the former, rest, as far as it is practicable, is sought for the impaired respiratory organs. Some persons again must lead an outdoor life if they wish to survive, and a return to an indoor life in town is at once followed by a return of the ominous symptoms.

In others, again, there seems to be a certain intolerance of

ordinary foods, which are not assimilated, and in these persons certain preparations of milk are often of great service. Here we find the koumiss cure, the whey cure, &c., &c., in many cases, undoubtedly useful. In North America it is found that a youth who is inclined to be phthisical is often much benefited and even cured, by "lumbering," in winter. This means long hours in the open air, with the steady use of the axe, and unlimited supplies of fat pork, no longer repugnant to the whetted appetite. Under these circumstances many consumptives recover. Fresh air, a keen appetite, liberal supplies of food, largely hydro-carbonaceous, and sleep, the result of exercise, are the measures by which the first line of practical treatment is to be secured.

When, however, it becomes apparent that the malady is not to be conquered, the second line of treatment is to be followed. An agreeable temperature, gentle exercise in the sunlight in a carriage, or a brief seat in the sun during mid-day in winter, and at morning and evening in summer; a cheerful bedroom and pleasant surroundings, to be accompanied by the administration of narcotics, analgesics, and anhydrotics, for night sweats, are what must be secured as far as possible.

§ 155. When there are good grounds for the opinion that the connective tissue in the lungs is of fairly good character—of a sufficiently high vitality to maintain its existence, the prognosis as to life is much better than when it tends to degenerate into tubercle. In such cases there is generally a history of exposure to the inhalation of dust, as in masons, especially in the more highly-paid fine hewers, in potters, in colliers, and in steel grinders; the finer the articles ground the worse for the grinder. In a large majority of these cases, where the disease is a form of chronic broncho-pneumonia, the result of mechanical irritation by the respired particles, a brief respite from their ordinary employment will give much relief. In all, however, the adoption of some other form of industry is very desirable. Emigration, the army, or police force, game preserving, or agricultural labour are the lines of life to be aimed at; and such changes of occupation often give the most gratifying results. Persistence in their pursuits will have the effect of anticipating or pre-

cipitating the final change. Good food, cod-liver oil, out-door exercise are as necessary for these cases as they are for the tubercular.

There is one point which may be raised about all chronic diseases of the respiratory organs, and that is the desirability, or otherwise, of the use of wind instruments. Where there is an imperfect chest development the use of such instruments has often produced a very satisfactory change; but, on the other hand, such functional activity of the lungs has too frequently but baneful consequences. Where acute mischief is going on rest and quiet rather are indicated; when a growing youth has a badly developed chest a cornopian may not be out of place.

§ 156. The third division—the serous coverings of the lungs and their affections—now demands our attention. The serous sacs are dilatations of the lymphatics, they are lymph-sacs, whose smooth surfaces glide easily upon each other, lubricated by their fluid contents. They usually contain but a slight amount of fluid, just enough to keep the surfaces moist; but under certain conditions the balance betwixt the outpour and the absorption is disturbed by disease, and then there are accumulations of fluids, and diminution of the thoracic space. Such effusion, as the accumulation of fluid is termed, may be either active or passive. The first is the result of inflammation, the second usually of venous congestion. In the simplest form of pleurisy, viz., that occasioned by the friction of a broken rib, there is first acute hyperæmia with sharp pain, aggravated by motion and relieved by rest, and then effusion of fluid, by which the pleura and its source of irritation, the sharp point of bone, are separated. By this last means physiological rest is secured, the cause of the inflammation in the pleura is removed, while the effusion limits the movements of that side of the thorax, and the rest so secured admits of the broken rib becoming united. Surely such action is rather a reparative process than a disease *per se*. It is obvious, however, that if we place that fractured rib at rest by a firm bandage, which limits thoracic movement, and leaves respiration almost abdominal; and at the same time relieve the irritated pleura by full doses of opium, so as to bring out both its analgesic action and its effects upon secretion; we may secure a

better line of treatment than that which is instituted by the unaided efforts of the system.

At other times, from some cause or other, the pleural surfaces become inflamed. Secretion is arrested, and instead of gliding smoothly, these dry serous surfaces rub upon each other at every respiratory movement; there is acute pain, and arrested thoracic motion gives partial relief, while sooner or later effusion and separation of the inflamed surfaces follow. At other times there is pleurisy without effusion. Especially is this the case in the apices of the lungs when the subject of tubercle. A little mass just underneath the visceral pleura irritates the costal pleura on every respiratory movement, a localised inflammation binds the two pleuræ together, and then relief is obtained. Such are the sharp pains about the clavicles so often complained of by the phthisical, often long before there is any serious perceptible disease.

The line of treatment to be pursued here is to check the hyperæmia, which may be done by the use of depressants; to ease the pain by the use of opium—antimonial wine, fifteen drops, and twenty drops of laudanum every four or six hours—and to affect the costal pleura, at least, by the use of external applications. These may be of two kinds. One is that of the application of some agent which will divert the flow of the blood in the intercostal arteries into the cutaneous vessels, and so tend to starve the inflamed pleura beneath; and this end will be secured as well by hot poultices as by blisters. If such combination be boldly followed out venesection will rarely be needed, and local depletion will be avoided. The other external application is that of analgesics. By the same law that regulates the blood supply of the deep-seated parts and the surfaces over them—the law of Schrœder van der Kolk—is the nerve supply regulated, and by applying analgesic agents to the cutaneous peripheral distribution the pain is diminished: either a reflex effect being produced upon the nervous distribution below the surface, or a condition of impaired conductivity in the nerve fibrils being effected. In painful dry pleurisy an opium plaster, aconite liniment, or subcutaneous injection of morphia will give relief. A third measure, that of strapping the chest, so as to procure physiological rest, is worth trying.

When acute pleurisy is the consequence of some blood poison, the special measures must be kept subordinate to the treatment of the causal condition.

§ 157. When there is fluid in the pleural cavities there are several plans of treating the case. Of old it was the rule to use blisters round the diseased side, repeating them as often as was necessary, and to give absorbents, together with diuretics; and these diuretics were those which affect the circulation, as digitalis and squill. By such means good results were often attained. At other times the lung became bound down by adhesions, and instead of expanding at each respiration as the effused fluid is absorbed, the thorax falls in, until great deformity with accompanying loss of respiratory power, results. If blisters succeed in producing rapid absorption, good and well; but if they make little or no impression, then the more direct means of getting rid of the fluid, viz., tapping the chest, must be resorted to. This is now easily and pleasantly performed by the aspirator. Commonly the removal of some of the fluid is followed by absorption of the remainder. In other cases the operation has to be repeated, may be, several times. If the pleural contents become purulent, then a drainage tube may have to be inserted, and the case treated as an abscess.

When, however, the accumulation of fluid is of passive origin, then these active measures are not indicated. Passive effusions are usually due to venous congestion in heart failure, to advanced renal disease, or conditions of great debility, and to scarlatina. In such cases the treatment of the pleuritic effusion is involved and embraced in that of the general condition. (§ 61, Chapter VI., and § 205, Chapter XX.)

In diseases of the mediastinal spaces, as tumours, hydatids, &c., the treatment of the case must be conducted on general principles.

§ 158. In affections of the respiratory organs there are two chief phenomena produced, viz., cough and dyspnœa. So important are these two symptoms, and yet often so different in their causations, and consequently their importance and their indications for treatment, that they must be considered at some length. By such special consideration the lines of treatment to

be followed will be more clearly marked out than by the arrangements usually adopted—at least it is hoped so.

A cough is usually an attempt to remove some irritant matter from the thorax by means of the respiratory tract. When a foreign body gets into the larynx, or air tubes, violent and convulsive cough ensues, until either the intruder is expelled, or, in rare cases, till the parts have become accustomed to its presence, and the efforts to expel it subside, and are no longer evoked. The cough is a reflex act set up by some exciting cause, the irritation so excited putting in force the complex muscular actions called a cough. In doing so the chest is well filled with air, and then a strong expiratory effort follows which may carry off the irritant cause; if it is unsuccessful, another cough follows. Sometimes there is induced a fit of coughing. Here there is imperfect inspiration and futile efforts at expulsion, often until exhaustion is produced. Such is especially the case when the exciting cause is of such a nature that it does not admit of expulsion. Under these circumstances cough is often teazing, persistent, and exhausting. As regards affections of the organs within the thorax, cough is usually associated with the air-tubes, the lung-tissue, or the pulmonic circulation. The simplest form of cough is that associated with the air-tubes when there is something irritant present whose expulsion gives relief. This is well seen in the common expectoration on getting out of bed in a morning. During the hours of sleep mucus has accumulated gradually upon spots which have become accustomed to the presence of this growing mass. In the movements of dressing, especially in stooping, these masses of mucus slide on to other parts of the air-tubes. In this new locality the irritation induced is sufficient to cause a series of expulsive efforts until the mass is got rid of. After a cold this is very well shown, and repeated series of coughs are required to dislodge one mass of phlegm after another. If the mucus be dry and tenacious, great and repeated efforts are requisite for the expulsion of any accumulations: here we give expectorants which increase secretion, or loosen the phlegm, as it is termed. Where there is a considerable secretion, brief sleep is followed by expulsive efforts, which clear the air-tubes, and then sleep follows, again to be disturbed. This is one of the sources of

danger in bronchitis; the patient may became worn out by the disturbed rest and the exhaustion so induced. At other times there is much cough with but little or no expectoration, and yet it is one phase merely of cold. Instead of increased secretion there is rather an irritable or "raw" condition of the lining membrane of the air-tubes induced. Here cough is useless, though often very distressing. Consequently it must be met by sedative neurotics, as Tinct. Camph. Co. (℥ xx.) and Pot. Brom. (gr. x.) in Mistura Ammoniaci (℥ i), or Inf. Serpentariæ, three or four times a day; or a morphia pill with benzoin may be given. This is one of the few forms of cough where opium is not contra-indicated. Where there is much secretion, opium tends to arrest the secretion. When the irritation is in the larynx it is often possible to reach it and apply remedies directly to the irritated surface; thus nitrate of silver may be applied in the form of spray, or morphia with powdered starch may be blown in upon the diseased laryngeal surface.

At other times cough is due to an alteration in the lung-structure, and especially to the growth of a mass of tubercle. Here there is an ever-present source of irritation to some of the terminal ends of the pulmonary nerve-fibrils, which excites the reflex action—cough. Consequently a persistent dry cough has ever been held as one of the heralds of consumption. Even when too small to be detected by physical signs, a tubercular mass may declare itself by the phenomena which it induces. The hacking cough of such a state of affairs is well known. Here morphia gives much relief; but to be efficient it must be given constantly, and so becomes itself harmful, as it may destroy the appetite. When the mass has softened, then cough is useful in expectorating the foreign material and relieving the lungs of its presence. Cancer nodules will also give rise to futile cough in consequence of their presence, acting as foreign bodies in the lung structure.[1]

Cough is not rarely induced by pulmonary congestion, by an hyperæmic condition of the pulmonic circulation. Here the fulness of the blood-vessels is the causal irritation which sets up a dry, hard cough. It is readily recognizable as the cough of

[1] The agents which check reflex action, given in Chapter XIII., may each and all be tried in such cough. The bromides have the least after ill effects.

heart disease. Most persons can induce it by running up stairs. The characteristics of this form of cough are not lost by its being accompanied by free secretion in advanced cases. In this form of cough morphia must never be administered, as it too often is. This cough much resembles in character the cough of dry bronchial irritation, for which paregoric has just been prescribed. But as it differs from this cough in causation, so its treatment varies. Heart cough should be met by relief of the vascular condition, and not by sedatives. Again and again it has fallen to my lot to see great mischief done by the administration of opium and morphia in the cough of pulmonic vascular fulness. The cough must be left alone if possible; and certainly it must not be allayed by repeated doses of morphia.

The less common intrathoracic causes of cough are aneurism and mediastinal tumours. In such cases there is no prospect of the expiratory efforts succeeding in expelling the irritant cause, and here again it is possible to give opium, bromide of potassium, chloral, or camphor with advantage.

At other times cough is excited by irritation, which is not intrathoracic, as in the well-known stomach cough, ear cough, liver cough, &c. The commonest of all of these reflex movements due to comparatively distant irritation is that of pharyngeal follicular ulceration, so well described by the late Dr. Horace Green, of New York. This observer found that a large number of cases which were put down as phthisical, were really cases of pharyngeal ulceration. By the application of local measures, and especially nitrate of silver, the ulcerations were induced to heal up, and the symptoms then disappeared. Doubtless when unrelieved these cases have often led to a gradual death by wasting. In all cases of pharyngeal irritation the use of local sedatives is indicated. Lozenges of various kinds—demulcent, opiate, or astringent—are largely used. Then there are household remedies, as linseed-tea, &c.; jujubes, acid-drops, &c., are useful. By increasing the flow of saliva they cover the irritable part and lessen the irritation, and with it the consequent cough. There is also the further matter of adding sedatives or astringents to the soluble mass, which increase the efficacy of the flow of moisture over the affected part. If the irritation be excessive, and the paroxysms of cough distressing,

then something of this kind is indicated, Acet. Morph. gr. l. Syr. Rosæ ʒi. Mucilag. ʒss. ℥ss. at repeated intervals. This should be slowly swallowed, so as to be as long as possible in contact with the sensitive membrane. In the same way the cough of gastric irritation is to be met by putting the stomach in order; and especially is this the case where the gastric irritation is associated with dram-drinking. Unloading the liver thoroughly will also relieve the cough, which takes its rise in hepatic congestion. Peripheral irritation will often give rise to cough, as in chest exposure for instance. Here any cold playing upon the chest will excite cough, while a warm poultice will relieve it, and a chest-protector will give great and continuous relief. In addition, however, to these measures, we may resort to those remedies given in Chapter XIII. for the lessening of nerve conductivity and the checking of reflex action with decided advantage.

At other times cough is a true neurosal affection, and must be met by the ordinary measures of chalybeates, tonics, &c., and occasionally by the union of these measures with bromide of potassium. There is often a brazen or ringing character about a neurosal cough. Sometimes the neurosal cough has certain especial surroundings, as in the so-called hysterical cough. This is common in girls and young women. It is very frequently associated with the changes of puberty, and again and again does such cough excite unfounded apprehension, being mistaken for the cough of tuberculosis. It is a cough which is almost incessant: it is often a dry "hemming" cough. Its origin is either central in the deeper-seated portions of the basal cerebro-spinal ganglia; or it is due to some peripheral irritation, as uterine or ovarian excitement. It is often found with hysterical paralysis or spinal irritation. In all cases of persistent cough with little or no expectoration it is ever desirable to examine the uvula, to make sure that the cough is not due to the tickling produced by this organ when elongated. If necessary the uvula should be amputated.

A distinctly characteristic cough is that of pertussis, or whooping-cough. It is distinguished by the long inspiration, recognized as the "whoop," which terminates the repeated violent expiratory efforts that precede it. In these efforts the

stomach is commonly emptied of its contents, and the great danger looming is death from inanition. Here the best thing to be done is to feed the little sufferer immediately after the attack, so that the food may be assimilated ere the next attack of coughing comes on and empties the stomach. The treatment of whooping-cough is very unsatisfactory. Sometimes the reflex action can be stayed by bromide of potassium in a magical manner; more frequently, however, it fails. At other times quinine seems useful; or steel or zinc may be tried. (P. 208.)

Such are the leading varieties of cough which come before us. It is clear enough that cough has to be met by different measures, according to its causation and the conditions with which it is associated. The elixir which is all powerful in one form is useless in another.

§ 159. Dyspnœa is the other phenomenon so commonly met with in diseases of the respiratory organs. It, however, is often due to enlargement of the abdominal viscera, which, by pressing the diaphragm upwards, diminishes the thoracic space. It does not matter whether the disease which diminishes the breathing space within the chest be thoracic or extra-thoracic, the result is the same. The intra-thoracic causes of diminished space are pneumonia, pleuritic effusion, congestion, mediastinal growths, aneurisms, &c. In such cases the only measures which will give relief are those which will remove the cause of the diminished space. At other times there is obstruction to the passage of air in the larynx, the trachea, or in the bronchial tubes. These are mainly constant, as when an aneurism presses on the trachea—though this may also give rise to intercurrent severe paroxysms—when there is laryngeal cicatrization following ulceration, or when there is thickening of the bronchial lining membrane. It may be continuous, but temporary, in bronchitis, especially if capillary. In such cases there is little to be done except the general measures of stimulants, with inhalations of steam. At other times the dyspnœa is paroxysmal, and due to spasm of the bronchial tubes. Here the affection is neurosal, and has been spoken of before in § 150. Dyspnœa is often cardiac in its origin, and associated with congestion of the pulmonic circulation. Consequently it is common when there is mitral disease and the right heart is failing. These attacks

of cardiac asthma are often severe and always distressing; they must be met by the measures given in detail in the last chapter. In that form of dyspnœa where the patient can only breathe when propped up, known as orthopnœa, there is usually disease of the right side of the heart, with or without left-side disease. There have been many explanations offered as to the causation of this condition. The only one about which there is absolute certainty is an anatomical one, viz., that when the abdominal viscera fall away by their mere weight from the diaphragm, they give the heart more room to play in, as well as increasing the thoracic space for the play of the lungs; when in the recumbent posture the weight of the abdominal viscera presses against the diaphragm as well as against their other parietes, and pushes it up into the thorax. In such dyspnœa change of posture as well as the administration of digitalis and stimulants are indicated.

As cough may have an origin in which the respiratory organs have no share, so dyspnœa may arise from conditions not associated with lung disease. Thus poverty of the blood by its reduced number of red corpuscles and corresponding reduction of hæmoglobin, diminishing the chemical interchanges, may give rise to dyspnœa. This is easily increased by exertion. Chlorotic girls furnish the best and commonest forms of this "air-hunger," as the Germans call it. Here the relief of the anæmia is the most, and indeed only, efficient means of treating this phenomenon. (P. 127.)

§ 160. We must not altogether overlook hæmoptysis ere concluding this chapter. It is often a most alarming symptom of a most grave condition. At other times, even when not a vicarious catamenial flow, it is not to be regarded as a serious matter.

Ordinarily it is to be met by cold fluids, perfect quietude and silence, and astringents, ergot, sulphuric acid, &c., with opium. When dependent on cardiac disease, on disease of the mitral valve leading to pulmonic congestion, bleeding from the arm often gives immediate relief. Under one set of circumstances hæmoptysis occurs as a sort of leakage. In these persons there is a tendency to make blood rapidly, and then the weakest spot in the vascular system gives way. If this *locus minimæ*

resistentiæ be the lung, the recurrent hæmoptysis will go on for years; but if some other point become least resistent, as the uterus for instance, then the hemoptysis vanishes—to return, however, in the instance cited—on the occurrence of pregnancy. In such cases a most restricted diet will produce but little blood, and slow and retarded blood formation will lead to a gradual filling of the vascular system, by which hæmoptysis may be avoided. A remarkable case of this kind occurred in the practice of my friend the late Dr. Greene, of Kendal, and the patient is a very fine, stalwart gentleman, bearing no traces of the recurrent hæmoptysis, which kept his life in jeopardy many long years ago.

It is not the mere hæmoptysis—for loss of blood is loss of blood, no matter whence it comes—it is the circumstances under which it occurs which lend the gravity to this form of hæmorrhage (Chapter X. § 93). Hæmoptysis not rarely gives great relief to an acutely congested lung, and in so far is useful; though it may thus be a good form of local bleeding, it is always well to do away as far as possible with the necessity for such an alarming auxiliary. The cessation of the hæmoptysis can ever be hailed as a sign of better things, and of the success of the treatment adopted. The relief afforded by hæmoptysis is well shown in a lady at present under care. On two occasions, now, the cough, the uncomfortable feeling in the affected lung, the high temperature, and the rapid pulse, have been relieved by a free hæmoptysis. Each time, after this local depletion, relief of the general condition has been accompanied by a change in the lung, which forthwith commenced to clear up.

CHAPTER XVI.

THE DIGESTIVE SYSTEM.

§ 161. As the question of the assimilation of food, and the means of assisting in the production of good digestion, have been discussed at length in Chapter II., the reader may profitably refer to it again ere reading this chapter. Here it is designed to review the various affections of the digestive tract and to point out the means, rational and empirical, by which they may best be treated. A large section of these ailments is comprised under the head of indigestion.

Dyspepsia, or indigestion, is a term which covers a number of separate and distinct pathological conditions. As the term implies, there is present difficult, imperfect, or painful digestion. After food is taken there is a sense of discomfort, either immediate, or not for an hour or so. This is accompanied by general malnutrition, spareness, and general ill health. In some cases there is much toleration of some forms of food, with equally marked intolerance of other forms. Consequently the form of food, its manner of preparation, the quantities in which it is taken, are all important matters to be attended to. Whatever the exact pathological form of the malady and the indications for treatment as regards medicines, in every case the diet must be carefully regulated. What rules shall guide the youthful practitioner in the matter of diet shall be given after a brief consideration of the leading forms of gastric maladies, and of their remedial measures. In the first place, however, the importance of carefully chewing all solid forms of food cannot be sufficiently insisted on. Bad teeth are fertile sources of dyspepsia. The stomach may be able to do its own share of

work fairly well. But it may break down under the test of having to make up for imperfect mastication. If the food taken be not fairly prepared by mastication and admixture of saliva ere it enters the stomach, the act of digestion is rendered much more difficult.

When food is obviously unsuited to the stomach, or from some suddenly acting cause the digestion is arrested, as by some shock, then one of two things happens—sometimes both. The contents of the stomach are either immediately ejected by vomiting, or are passed into the intestines, and then got rid of by purgation. It is obvious that such a "sick fit," as this acute indigestion is not inaptly termed, is not to be arrested, but rather encouraged. After the brunt of the attack is over some bland and fluid form of food is very desirable, such as boiled sago, with milk or beef-tea. In milder cases these measures may be all that is required. In other cases, however, the suffering is such that it becomes necessary to resort to emetics to unload the stomach, by exciting vomiting.

§ 162. *The Theory of Emetics.*—Emetics are of two kinds, the direct and the specific. The first division comprises agents like mustard, sulphate of zinc, sulphate of copper, &c., which excite the act of vomiting as soon as they are brought into contact with the lining membrane of the stomach. The specific emetics are those which also excite vomiting when administered by other means than given by the stomach. Such agents are tartar emetic, apomorphia, and ipecacuan; they will produce emesis if injected subcutaneously. This division of emetics produces distinct impressions on the system generally. These so-called nauseant emetics are used rather in conditions where vascular depressants are indicated than for the mere purpose of unloading the stomach; for this last end mustard or sulphate of zinc rather are to be selected. By the administration of mustard in hot water, or the zinc in scruple doses, emesis is usually produced satisfactorily. It is not bad practice to give the zinc with ipecacuan wine—a scruple to the drachm of the wine; this forms a very certain and not too depressant emetic.

When, then, the stomach has in it an unmanageable and troublesome mass it is well to get rid of it at once. If there is any intestinal disturbance remaining, then a dose of castor oil, or

other gentle purgative may be given with advantage. It is well always after such acute disturbance in the digestive tract to be guarded about the nature of the food for some few days.

§ 163. Acute affections of the stomach are readily treated at the time, but the permanent conditions upon which acute derangements causally depend are often troublesome, and not rarely incurable. Gastric catarrh, ulcer, and cancer are affections whose treatment requires great consideration and much thoughtful application of physiological knowledge. Firstly, because the stomach is an organ whose rest is scarcely compatible with a prolonged existence: in those cases where the irritability is excessive, it may be necessary to give complete rest to the stomach by feeding the patient by the rectum; but this is a tiresome and unpleasant method of feeding. It becomes necessary then to give food in such form that it shall tax the stomach as little as possible. Nextly, it is of importance to give this viscus its proper intervals of rest, that is, brief periods when it is not functionally active. This is somewhat difficult, as in all cases of gastric debility it is very desirable to give food in small quantities, and consequently at repeated intervals. Nevertheless if the food be such that it readily passes into the intestines, these intermittent periods of rest may be secured. In gastric catarrh the food should always be fluid. If there are any solid particles in it, there is ever present the danger that in being rolled over and over by the stomach the mass will become covered with the mucus, too freely formed, and thus, being removed from the action of the gastric juice, rendered useless, because indigestible. Not only that, but the mucus-enveloped mass has to be got rid of either by vomiting or by purging. The food, then, must not be solid. In gastric ulcer the food should be of similar character for the following reasons. All movement of the stomach is liable to disturb the base of the ulcer, and so give rise to pain; consequently the briefer and slighter the movements required the more this source of suffering will be avoided. Then again the presence of the acid gastric juice offends the ulcerated surface, and consequently the briefer the act and the earlier the quiescent and alkaline condition is resumed the better; furthermore, repair goes on during the time the stomach is functionally quiescent, and the more such physiological rest can be secured

the better for the patient. All this holds equally good of gastric cancer; though unfortunately here all measures are but palliative.

Much may be done in these cases by proper therapeutic measures. First of these stands opium. We have seen in Chapter XIII. that this agent checks nerve action not only in the centres, but in the peripheral portions of the nervous system. It acts as a sedative to terminal nerve fibrils. In the stomach this is markedly seen. If opium for any reason be given continuously for some time, by the mouth especially, there follows loss of appetite and constipation. This latter is due partly to the arrest of secretion, and partly to checking the muscular movements of the digestive tract. The loss of appetite is due to a similar action. The sensation of hunger is simply manifested by the stomach, and in cases of disease of the lining membrane of the digestive tract the sensations of hunger are often so aggravated as to lead to bulimia. This is well seen in cases of muco-enteritis, often following measles, where a child is ever eating; a little only of the food so greedily consumed is digested, and the more the child eats the worse it thrives and the sooner it dies. This species of gastro-intestinal irritability is not rare in advanced phthisis, and the development of an inordinate appetite in these cases is a symptom of the worst omen. In such cases opium is clearly indicated. If there be much catarrh it may be given with astringents, as in the form of compound kino powder. It would at first sight seem that the opium and astringents would lock up the bowels too much, but in actual practice it is not so. These agents seem to act especially on the diseased surface and less upon the bowels, than would be the case if no gastric catarrh existed. We have seen before that opium also tends to check secretion, and is good for that action also when excessive. In gastric ulcer, by arresting the digestive movements, opium also gives physiological rest, and so is eminently useful. Its local action on nerve-ends soothes the ulcerated surfaces. It gives relief in gastric cancer locally as well as generally; but here it must be given in different doses, for we wish to secure its general analgesic effects as well as the local action.

The proper use of opium in affections of the intestinal canal

is a matter of much importance, and the youthful reader will do well to ponder over the subject at some length.

Alkalies are also of much service in the treatment of these various affections. They may be used with success in neutralizing the excess of acid in very acid digestion. In gouty dyspepsia potash is of the greatest service. In some cases it may be necessary to give alkalies during digestion to relieve the excessive acidity, even when acids and bitters are being administered before meals. There is nothing inconsistent in such practice, and it is often followed by the happiest results. Sometimes the acidity is found down in the intestines, and then fixed alkalies, and especially chalk, are indicated. If soda or potash be given they may be absorbed, but the various preparations of chalk not being rendered soluble, or but very partially so, are useful even when the acidity is in the colon. Thus milk and lime-water is a famous old-fashioned combination, especially useful for infants with gripings from excessive acidity: or chalk may be added to the milk.

Bismuth is a most useful agent in the treatment of all chronic affections, especially where there is excessive secretion with irritability, in the gastro-intestinal tract. This has long been known, but we are as far as ever from knowing how these results are brought about. Most of the bismuth passes out by the fæces, consequently one is inclined to the belief that it exercises some local sedative action upon the mucous tract. This view is confirmed by its use in gonorrhœa as a local application, and its good effects in some persistent ulcerations, especially of the face, in the form of bismuth ointment. In gastric ulcer it is useful, in catarrh it is also useful; it relieves gastric pain and intestinal irritation. Consequently it is of much service in all cases where there is irritative dyspepsia with malnutrition. The old form,

Bism. Trisnit. gr. x.
Mist. Acaciæ ʒ i.
Inf. Calumb. ad ℥ i.

three times a day before food is an excellent measure,[1] and is often to be preferred to the more modern soluble forms of bismuth.

[1] In middle aged persons it is often well to add ten grains of bicarbonate of potash to each dose.

Bismuth may be added in a dose of ten grains to an equal quantity of compound kino powder in gastric catarrh. In troublesome irritative diarrhœa ten grains of bismuth with an equal quantity of myrrh is a good combination. Indeed bismuth is a most valuable drug in many ailments. Hydrocyanic acid is also often of service. In some cases of irritative dyspepsia bromide of potassium is of great use. When there is much irritability of the stomach a mustard blister, or one of Rigollot's leaves, applied to the pit of the epigastrium every night at bed-time is an excellent measure. In cases of intestinal irritability turpentine stupes and similar applications to the abdomen are often of service. Subcutaneous injection of morphia, or the formation of a blister over the region of the stomach, and subsequent dressing with morphia, may be indicated in some severe cases. (Bitters have been referred to at p. 28.)

§ 164. The greatest matter in all these cases is the food. This must be bland, that is, pleasant and free from irritating properties, even when spiced food is craved after. It must be fluid, in order to pass readily through the stomach, and to call out as little functional activity in the diseased organ as possible. It must be nutritive and readily digestible, that is obvious. Consequently milk and seltzer water, especially where the milk is too constipating, or lime water, is an excellent form of food; or even prepared chalk, or magnesia in powder in other cases may be added to the milk. Or milk may be thickened by having the powder of a plain biscuit stirred into it; this is very nice in gastric ulcer. Or sago or arrowroot may be boiled and then mixed with the milk, or they may be thoroughly boiled and a little beef-tea or meat-juice may be added. Beef-tea or chicken-broth alone are not desirable; they contain almost no force-bearing food, but with sago, arrowroot, or biscuit powder they become suitable articles of dietary. The great thing to be aimed at is to procure a food which will readily pass through the stomach, either giving the stomach no trouble or very little. Nitrogenized food must always be in a fluid form; and the hydrocarbons, to be acted upon by the saliva and the pancreatic fluid, should be given in that form that shall least task the stomach, and be least likely to be covered by mucus in catarrhal conditions.

The food must be given in small quantities and at repeated intervals. If a tablespoonful of milk is rejected by an irritable stomach, a desertspoonful should be tried; if that is too large a quantity, a teaspoonful. Any one of much experience knows how desirable it is to so treat an irritable stomach, and of the hairbreadth escape of many a patient. Another point to be remembered in the treatment of these cases is this:—a fortnight's careful self-denial and strict dieting may be neutralized and thrown away by one single act of indiscretion, and all has to be done over again. Especially is this apt to occur when cases are doing well, and the patient is becoming too confident; after one or two mistakes the patient is more careful, but then the convalescence is apt to be very tedious. Another point bears upon what has been said a few sentences back, and that is to remember that the stomach is a hollow muscular viscus, and so not to distend its walls more than is necessary. In febrile conditions and in the thirst of advanced cancer the patient will, if permitted, gulp down considerable quantities of fluids, which are immediately rejected. Here pieces of ice relieve the dry pharynx and the consequent sensation of thirst, while the cold fluid, slowly trickling into the stomach, is grateful, and does not excite vomiting, but is absorbed as fast as it passes into the stomach.

Sometimes gastric irritability and vomiting are the consequences of distant irritation, as in the vomiting of pregnancy, or that caused by calculus in the kidney, or a blow on the genitals. In such cases it is desirable to treat the stomach carefully, but at the same time it is very necessary to resort to those agents which lessen nerve conductivity, as bromide of potassium. Also removal of the irritating cause is a very proper measure. All that has been said about reflex cough applies here to vomiting. Finally, no condition of dyspepsia or intestinal irritability will ever be relieved and got rid of if the bowels are not properly unloaded. As long as a constipated and loaded condition of the bowels, and especially the colon, exists, so long will the dyspeptic state persist. A pill at bedtime, some bitter water of Friedrichshall, or other laxative, on getting out of bed in the morning, or even a tumblerful of cold water alone, especially for ladies who habitually take too small quantities of fluids, are excellent measures; or an enema may be resorted to if preferred, or more

desirable. In women dyspepsia is usually complicated by vaginal discharges, which must always be energetically treated.[1]

§ 165. We may now proceed to consider those disturbances of the digestive canal which are associated with the liver. It is not part of my intention to go into the diseases of the liver, but merely to consider them so far as they furnish indications for treatment. If the bile circulating in excess in the intestines and liver be removed by spontaneous purging, or by mercurial cathartics, great relief is experienced in bilious conditions. Very often vomiting leads to bilious discharges by the compression to which the liver and gall bladder are subjected in the act of vomiting. Such bilious attacks of sickness and purging are frequent with certain persons, who are denominated by their friends "bilious individuals." They are natural curative efforts, by which the system is benefited. When these attacks do not come on, and there is malaise, headache, depression, a foul tongue with a bad taste in the mouth in the morning, and a high-coloured condition of the urine—partly due to excess of lithates, partly to bile-colouring matter—purgation with mercurials gives much relief, and brings away bile-laden stools. The action of the mercury is to sweep away this bile, going round and round in the intestino-hepatic circulation, and so at once to get rid of the offending matter. By its action on the duodenum and upper part of the small intestines we can understand its efficacy and the resort to its use by the bilious. But unfortunately it is not possible to secure one action of a drug, and evade its other actions; and the consequences of indulgence in mercurials render it desirable that the bilious should be chary about resort to them —though the relief given by them is decided and unquestionable.

Whatever the formation of bile and its uses in the economy, we know that it is intimately connected with the assimilation of food, and that indulgence in rich dishes, either fatty or sugary, produces a bilious condition.[2] Conversely, abstinence from such

[1] Unless this be done, no improvement can be achieved, that is, usually. The body-income is insufficient for improvement if the heavy body-expenditure be not checked. There is, as Mitchell Bruce happily phrases it, "poverty from waste, and poverty from want."

[2] It seems probable, however, that it is really the albuminoid food which produces biliousness. The nitrogenized waste gives the lithates, the sulphur waste is found in the bile acids. Rich hydrocarbonaceous food will interfere with the due oxidization of albuminoid matters.

dishes furnishes relief from the wonted bilious attacks; and if the European in India would live on the food of the native, in the same scanty proportions, he would know comparatively little of the bilious disorders so common in that country. Exactly the same occurs in England, and biliousness usually implies the possession of sufficient funds to produce the disturbance. In all cases there is an excess of bile; and it must either be got rid of by purgation, or its formation must be arrested by abstinence. In very many cases it is desirable to combine these measures. If the mercurial purgation be not accompanied by a restricted diet, the condition may persist, until organic changes in the liver will ultimately be set up. If the bilious individual be a spare woman, who says, in her own vernacular, "everything I take turns to bile," and whose speech is not very far from the mark, it is very desirable to purge this poor creature. It will be found, as a matter of fact, that to reduce the food in such case till bile is no longer freely produced, means a practical partial starvation of a miserable character. If food be allowed in fair quantities and at the same time free action upon the bowels be maintained, so as to get rid of the superfluous bile, the power of assimilation in the patient will improve, and the general condition will be benefited. For such purpose a pill at bedtime, not necessarily a mercurial one, and some alkaline-saline purgative in the morning, are the best means, and they may be continued for weeks with advantage.

℞ Mag. Sulph. ʒi.
Sodæ Pot. Tart. ʒi.
Inf. Cascarillæ, ℥i. ter in die,

will often produce very good effects. Indiscretions of diet, however, are to be avoided. Such are the measures most suitable in my experience to the needs of the habitually bilious. Nitro-muriatic acid is often of very great service; and strychnine best relieves the mental depression.

§ 166. My experience being limited to Europe, and altogether free from any of that special knowledge given by a residence in the tropics, it has occurred to me to consult Sir Joseph Fayrer, K.C.S.I., whose Indian experience gives weight to his opinion on tropical affections of the liver. He kindly writes me to the

following effect:—"In reference to the treatment of the functional derangements of the liver that arise from congestion, and I think more especially in that form in which it is somewhat chronic and accompanied by anæmia, such a condition, in short, as is so frequently seen in persons who have lived long in hot malarious climates like India, the West Indies, and the coast of Africa, I may say this. Beyond mere swelling of the liver from engorgement with blood, other changes—fatty or amyloid—will no doubt supervene, and it is often difficult to determine how far the functional is due to the structural change. The treatment I generally find most effective is attention to diet and drinks. Avoid much fatty, sugary, and alcoholic fluids. No beer. Claret and water for drink. Warm clothing, so as to keep the skin moist. An occasional dose of colocynth and calomel, or blue pill, and every morning or every other morning a dose of saline aperient, such as sulphate of magnesia, with quinine or gentian, sufficient each time to produce two or three loose motions. Counter irritation by tincture of iodine over the loins. *When the portal circulation is relieved* some preparation of iron may be very useful. The urine is a good test of the hepatic condition; it will improve under the above treatment, but it is well to give the patient some alkaline waters—Vichy, Vals, or Carlsbad. Albuminuria will be present at times, when the kidneys, like other abdominal viscera, are congested, or are irritated by lithic acid. In my opinion too much importance is attached to this symptom in some cases. Indeed I think the subject of albuminuria would bear rewriting. Albuminuria may be functional in such cases, and pass away like the other symptoms." Such practice is the result of long experience in a very careful observer; and the necessity for unloading the liver, especially ere iron can be given satisfactorily, is clearly laid down. It agrees entirely with what has been insisted upon so strongly in Chapters II. and III., viz., that in imperfectly depurated conditions of blood chalybeates are comparatively useless, and until such condition is remedied it is of little avail to give them.

The recent views of Lussana as to the accumulation of malarial poison in the portal circulation give an additional interest to the subject of purgation in biliary congestion, especially in malarial

subjects. Possibly even an occasional emetic might not be out of place in these cases.

The great matters in the treatment of the bilious are the regulation of the amount and the character of the food, and the systematic use of alkaline saline purgatives. By such means the headache, the langour, the sense of misery, are all relieved. The patient eats more, assimilates more, and becomes a new person by judicious yet energetic purgation, especially in the morning.

The above account of what is to be done in a large class of patients may seem unduly short, but there is no alternative betwixt a brief summary, which, if brief, is distinct however, and a lengthy dissertation, for which there is not space. Popular as well as professional experience has pronounced its verdict as to the association existing betwixt biliousness and the necessity for purgatives.

Ere leaving this subject it may not be out of place to describe a form of ailment often mistaken for biliousness. Prout says, "When acidity prevails in the lower portion of the intestinal canal, and particularly in the cæcum, the treatment must be modified to meet the circumstances. The soluble antacids in this case have comparatively little effect, from their being neutralized and absorbed before they reach the seat of the affection ; hence the insoluble antacids, and especially magnesia, will in general be found more useful in such cases. The shortest mode, however, of getting rid of the immediate inconvenience of acidity in the lower bowels is usually to inject a pint or two of warm water (or of soap and water), and thus of removing the offending cause. By this simple remedy I have often seen the severe nervous headaches and other unpleasant symptoms usually accompanying acidity in the lower bowels immediately removed. Those who suffer from such causes usually require the aid of purgatives, which in general are better taken at bedtime. Purgatives of a mild but effectual kind, such as the *Decoct. Aloes Comp.* with magnesia often suit well ; as do pills taken at a late dinner, if duly adjusted to the circumstances of the case." This class of case in adults is not sufficiently noted, Prout observes, and it is impossible to differ from him. All are

familiar with acidity in the intestines of infants, and of the numerous combinations of remedies to meet it. Gregory's powder, Dinneford's fluid magnesia, Pulv. Cretæ Aromat., and dozens of quack remedies of unknown composition, but all containing alkalies with carminatives, testify to the widespread acquaintance with acidity in the primæ viæ of infants, and of the measures best calculated to relieve it. In young infants bicarbonate of potash (gr. ii) with Cajeput oil (℥i) in dill water (℥ii) is my favourite measure, together with some fixed alkali in the milk.

§ 167. One of the commonest of maladies is constipation. This must be kept distinct from costiveness, which means merely scanty fæces, where forms of food furnishing more bulky waste material are indicated. Constipation is a troublesome malady. When present all the functions of life are languidly performed, the brain is sluggish, and the digestion impeded. It may be itself a consequence of brain disease; and all cerebral affections combined with obstinately constipated bowels are serious. In these cases an open state of the bowels is a *sine quâ non*, but sometimes it is very difficult to move them. Free action of the bowels gives relief even when cure is unattainable. Sometimes constipation is followed by diarrhœa, the inaction of the bowel being succeeded by a period of excessive activity, and this condition is apt to become permanent. Here the loading of the bowel must be prevented by laxatives, and then the diarrhœa will cease of itself.

Purgatives.—These are agents which act upon the bowels in such a manner as to increase peristalsis and cause a freer flow of intestinal secretion; the consequence of which is that the motions become more numerous and of less solid consistency. Much discussion has gone on as to whether purgatives merely increase peristalsis, and so sweep away the contents of the small intestines in their fluid state, or whether they increase the secretion from the intestines. It is now ascertained beyond doubt that they do both. To aid their action upon the intestines nux vomica is often added to purgatives. Purgatives are furnished by both the mineral and vegetable kingdoms. They may be given alone or together. They differ much in action, and therefore

it is not always a matter of indifference which is selected. Still the amount of dose makes up for much of the difference.

When it is merely desired to maintain the action of the bowels at about the normal state it is common to order a fig, prunes, oatmeal porridge, manna, and similar matters. All oleaginous bodies increase the action of the bowels, while milk and farinaceous foods have an opposite tendency. Consequently we eat starch and fruit together. Olive oil is a most gentle purgative, and the best of all in very irritable conditions of the bowels; next to it comes the universal castor oil, too often rendered more powerful by a certain admixture of its potent congener, croton oil. Other gentle purgatives are found in magnesia, and combinations of this agent with potash and soda in the form of mineral waters. These last can be so arranged that patients can find out what is the dose required in their own case, and regulate it accordingly. The sale of mineral waters is much on the increase. Such natural combinations may be simulated by medicinal agents; it is often found, however, that these artificial substitutes are not so efficacious as the natural waters. The explanation of this lies in the dilution—in the amount of water. If a good-sized tumblerful of water be swallowed with each dose the desired effects would more commonly be secured. Seidlitz-powders, citrate of magnesia, and many other pleasant laxatives are largely in use. These mineral purgatives are used rather to procure easy and regular motions, than for the purpose of producing catharsis. When this latter is sought, then the vegetable agents senna, jalap, scammony, colocynth, elaterium, gamboge, &c., are resorted to. In small doses these agents increase the action of the mineral laxatives, as in compound jalap powder, senna and Epsom salts, gamboge and cream of tartar, &c., &c., all excellent and useful measures.

There are, however, some points about the use of purgatives which are of importance in practice. Firstly comes the use of rhubarb. Of all agents to be selected for an habitual purgative this is the worst. If once resorted to, its use is necessitated in consequence of its secondary action, which is to cause constipation. It is an excellent purgative where any operation on the bowel, or pelvic viscera is to be performed, for it first opens the bowels and then locks them up. A full dose of rhubarb is

the thing here *par excellence*. Next, aloes has its peculiarities. Its action is chiefly upon the lower bowel, and, therefore, its use is indicated to unload the pelvic circulation in cases of congestion there. From this action too it is very useful in ordinary habitual constipation from inertness in the lower bowel; for which it should always be selected as one agent at least. It also has some action upon the duodenum, and so is useful in biliousness, and as a part of a dinner-pill. Aloes goes well with alkalies and with iron. It is always used in first bringing patients under the action of chalybeates; it being a well-known fact that slight catharsis is desirable at the commencement of a course of iron. In allaying excitement in the reproductive organs of women aloes with potash or soda is very useful.[1] Then we have mercury, especially calomel, the most subtle and dangerous of all laxatives. It is scarcely possible to write dispassionately on this subject. The freedom from pain in the action of calomel, its "toleration" by the youthful system, and the remoteness of its pernicious consequences, have caused it to be a constant visitor, and even occupant of the nursery. Yet it should be admitted under skilled medical supervision only. Mercury is invaluable in the treatment of congenital syphilis, no matter what the form of manifestation. But to the other ailments of infancy it is unsuited. Life-long misery, a hyperæsthetic nervous system, erethism, defective teeth, and a whole host of evils follow in the train of mercury, when administered freely to children. Calomel and grey powder are excellent in their place, but when improperly used they are very objectionable.

§ 168. Then again certain special conditions call for special treatment. For instance, in the acute suffering often found along with constriction of the bowels, when the pouched gut above the constriction is in great activity to force the contents through the narrow opening, the proper thing is to give a full dose of laudanum along with large doses of sulphate of magnesia. The opium soothes the active pains of forcible contraction, while the salts liquefy the contents of the pouch, after which they readily pass the narrow portal. This is rational medicine, and in practice it is successful. In cases of constipation

[1] The charge brought against aloes of producing piles is not borne out by my experience.

from ileus, the administration of purgatives is very reprehensible. In other cases catharsis is indicated to affect the general condition. It lowers the blood-pressure (Mahomed), it lowers temperature, it relieves venous congestion, especially in the portal circulation; while it is useful in defective renal action as a compensatory eliminative process. Lauder Brunton says of purgatives: "They prove useful in many ways. They hurry the food out of the alimentary canal, and thus lessen the injurious effects of over-eating. By expelling irritating substances from the intestine they arrest diarrhœa and remove headache and other pains, caused either by the abdominal irritation or by the absorption of poisonous matters produced by imperfect digestion and decomposition of food. They relieve biliousness by removing bile, and are most efficient aids in the treatment of chronic poisoning by lead, mercury, or other metals. It is probable that pepsine and pancreatic ferment are absorbed from the intestine, and circulate in the blood, where the latter assists in the production of animal heat. They are then secreted anew by the stomach and pancreas, and do their work again. Purgatives lessen their quantity as well as that of the bile, and they are thus useful in fevers; but they injure old and feeble persons, both by their diminishing their calorific power, and impairing their digestion. They relieve inflammation by lowering the blood-pressure, and thus diminishing congestion; and they prove beneficial in dropsies, both by abstracting water from the blood, and diminishing congestion in the kidneys."

In the administration of purgatives in the old and the feeble, it is of much importance to select the proper laxative agents; they should not be too depressing, and they should be combined with carminatives. Mineral laxatives do not suit the aged; old people say that they are too chilling. If given, say, as sulphate of magnesia, they should be given with spirits of chloroform, tincture of ginger, or cayenne, in cascarilla. Such also are the combinations best suited to the constipation common at the change of life in women. Carminatives—whatever their action—certainly take away griping, and for this end they are often to be preferred to hyoscyamus; though this latter is a pleasant adjunct to cathartic pills. Such carminative laxatives taken warm are good in aged people, and do not depress them too much. It

is attention to these comparatively trifling matters which helps to make the successful practitioner just as much as more solid attainments.

In many instances constipation is associated with an atonic, torpid, and dilated intestine, and then minute doses of strychnine or nux vomica are indicated. I remember well a case where Ol. Croton. ℥ i.; Gamboge, gr. 1½; Pulv. Capsici, gr. i.; Strychnia, gr. $\frac{1}{60}$; Ext. Al. Aquos. q.s., in each pill were taken twice a day for two months. Then the oil was reduced to half a drop, and the strychnine increased, for two months; after which the oil was stopped, the gamboge reduced to one grain, and a quarter of a grain of dried sulphate of iron added. This was taken for two months; after that the man ceased to be a pauper and hired off as a farm-servant, which he remains. Here there was great abdominal distension, implicating the small intestines, which unfitted the man for labour, and further impaired a limited intelligence: the relief of this condition restored the man to a state in which he could again labour. His mother took one of the first series of pills one night when not very well; but she did not do it twice, though she observed they suited her son "uncommonly."

In the ordinary economy of life the condition of the bowels is a matter calling for considerable attention. To many people constipation is the plague of their lives; it and its consequences embitter their existence. Constant and unintermitting resort to medicine is wearisome and objectionable, but nevertheless unavoidable. The numerous quack pills, from Cockle's downwards, testify to the general necessity for such agents. The introduction of granular effervescent salines has been a great boon to many. A teaspoonful of them in a morning, on getting out of bed, in half a tumblerful of water is to many an effectual laxative. To others, again, all that is needed is a tumblerful of cold water, and especially is this desirable for ladies, who for social reasons consume much less of fluids than is good for them.

Many persons take annual excursions to wells of purgative waters, at Harrogate, Carlsbad, &c., where they go in for a course of purgation to their great benefit and comfort. For many this is a good and useful practice, and enables them to live the rest of the year in comparatively good health. A course of mineral waters at home is a good practice for those who cannot get to

these wells, or when it is winter and it is not convenient to visit a spa. However attained, it is ever desirable that the bowels be kept open, and for this end it is well to have fixed times for defecation, so as to secure the advantages of the force of habit.

§ 169. One of the commonest troubles of life is the opposite condition of the bowels, viz., diarrhœa. It is not a chronic trouble, usually at least, like constipation; but it is frequent, and sometimes unmanageable, requiring for its successful treatment measures which shall be in accordance with its causation. It is desirable to consider the varieties of diarrhœa and the remedial measures suited to each form.

Diarrhœa may be a salutary process, or an ailment serious enough to endanger life. Even when commencing as the first it may eventually be fatal. The bowel is not only the means by which absorption of our food goes on, but it is also a means of getting rid of excrementitious material. Moreover, when a mass of objectionable or indigestible food is consumed diarrhœa is the natural means of getting rid of it. Such diarrhœa is very common among children, and is often preceded or accompanied by emesis. In the same way bilious diarrhœa is a natural means of removing superfluous bile. Here diarrhœa is decidedly a salutary, and not a morbid process.

Such is the diarrhœa which is occasioned in infants by the excessive curding of their milk; a hard, firm, indigestible curd being formed, which no infantile stomach can break down and digest. This morbid curding is at times the result of too hasty consumption of milk, so that it is not well mixed with saliva; at other times it is the result of a preternatural acidity in the little patient's digestive organs; while at other times, again, it is the consequence of some disturbance in the mother's economy. When the morbidly curdled milk is rejected by vomiting and by purging, it is wrong to attempt to arrest the diarrhœa by astringents, chalk, and opium; such practice is bad. This is commonly seen in the diarrhœa of calves, where the busy, interfering farmer's wife tries to check the discharge; and if she succeeds in doing so, locks up an indigestible mass in the intestines, and produces enteritis. The same occurs in human infants. Instead of checking the diarrhœa it is advisable to give a dose of castor oil, which sweeps away the offending mass. The administration

of such a purgative is often better than leaving the diarrhœa to itself, for this reason. The increased secretion excited by an irritant mass in the bowels is very often set up below the source of irritation, so that it is not successful in removing it; if a purgative be given it sets up increased secretion above the offending matter, and so sweeps it away. By such means a troublesome and ineffectual discharge may be at once done away with. Having so removed the indigestible curd, the next thing is to prevent its formation by the administration of alkalies; if necessary, to the mother as well as to the infant. If the child be bottle-fed it is well to stick to the milk of one cow, and by such a change good often results in intestinal troubles. The Swiss condensed milk is a great boon to the children of towns, where the cows are so fed that their milk is often unsuitable for the purpose of infant feeding. This milk may often with advantage be mixed with lime water instead of ordinary water, especially in infants where the excessive acidity is persistent and intractable; or milk with chalk, or magnesia may be tried. It sometimes happens, however, that the diarrhœa thus instituted continues as an intestinal catarrh requiring its appropriate treatment; but before this subject is considered it may be well to review another form of diarrhœa which may persist in a like manner.

Diarrhœa is not rarely the consequence of a chill. Instead of the ordinary cold a sharp action of the bowels comes on, most commonly in those whose intestinal canal is easily deranged. Frequently there is brief, brisk action, but at other times the discharge persists. This, like the catarrh remaining after the removal of offending matter, requires treatment. A dose of opium is often all that is required. At other times the action of opium is not sufficient alone, and then the favourite adjuncts are either alkalies or astringents. Where there is a condition of follicular ulceration of the bowels, and each motion is preceded by severe griping pains, ceasing with the evacuation of the acrid and offensive matter, then the old fashioned remedy:—

℞ Cret. Pp. gr. xv.
Tinct. Catechu, ʒ ss.
Tinct. Opii, ♏. x.
Aq. Cinnamomi, ʒ i.

after each motion is to be chosen, with a reduction of the dose for children; or some similar alkaline mixture with astringents. When the motions are loose and copious the union of opium with acids and astringents is to be preferred.

℞ Tinct. Opii. ℥x.
Ac. Sulph. Dil. ℥xx.
Inf. Hæmatoxyli ʒi.

four or six times a day is an excellent remedy, especially when diarrhœa has been persistent and profuse. Hæmatoxylin is a capital astringent and easily taken, but it possesses the drawback of being a decided dye. Nevertheless, when diarrhœa has run on some time it forms the best remedy to select, especially when others have failed. Some medical men prefer pills of acetate of lead and opium, which form undoubtedly a powerful astringent measure. Whatever the form of astringent selected, enemata of starch and opium are often very useful and grateful to the patient. Especially is this the case where there is follicular ulceration. Sometimes a little prepared chalk may be added to the enema with advantage. The food should consist of milk with ground rice, sago, or arrowroot in these cases; and all food which might give rise to irritation should be carefully avoided.

Very often in addition to the mixture given, a powder at bed-time is serviceable. This may consist of compound kino powder (gr. x), with or without ten grains of bismuth. Bismuth is often as useful in the treatment of intestinal disturbance as it is in gastric affections. In some cases of persistent looseness of the bowels, scarcely amounting to diarrhœa, bismuth with myrrh may be given with much benefit. Ipecacuan is a remedy of whose value we are all convinced. In dysentery it is found that ipecacuan in drachm doses produces a totally different condition of the intestinal canal to that previously existing; a normal motion, free from patches of morbid mucous membrane, taking the place of the dysenteric discharges, in twenty-four hours usually (p. 202).

Nervous diarrhœa is a variety with which we are all more or less familiar; an uncontrollable action of the bowels is an out-come of mortal terror in animals as well as in man. Increased secretion and activity in the intestinal canal is with many

persons the consequence of mental perturbation; in such persons diarrhœa takes the place of the palpitation experienced by others when under mental agitation. Thus with many individuals the necessity for a long journey will excite diarrhœa. This has become more markedly the case since the introduction of railways with express trains only stopping at distant intervals, and then making so brief a stoppage as scarcely to afford an opportunity to empty the bowels. In some persons the very idea of such a journey will excite diarrhœa even before the journey is commenced, so that railway travelling is abandoned. In less marked cases there is always diarrhœa as the hour of starting approaches, and some brandy and hot water with a dose of laudanum have to be taken; and repeated pulls at a flask are requisite during the course of the journey. In such persons a preventive plan may be put in force with advantage. The day before travelling the bowels may be well opened with rhubarb, and at bedtime a dose of opium with some myrrh or bismuth may be given, or a few grains of compound soap pill may be taken instead. The diet should consist of milk and farinaceous foods, or maccaroni *au gratin*, for those with whom cheese agrees. In such persons the combination of bromide of potassium with some vegetable tonic or chalybeate is a good measure, and might be taken for some time ere commencing to travel, or during a course of travel.

At times diarrhœa is the reflex consequence of irritation, under which circumstances it is to be treated by the means laid down before (Chapter XIII.) as best adapted to the arrest of reflex action. Such is the case related to me by Dr. Ferrier. A pregnant woman applied to him with diarrhœa, which remained unchecked after the administration of various forms of astringents. At last Dr. Ferrier thought of its being a reflex secretory action, due to some exciting cause in connection with the gravid uterus, so he gave bromide of potassium, whereupon the diarrhœa ceased. (§ 126.) This is a most instructive and suggestive case, and gives us a hint which may often stand us in good stead, as well as furnishing an excellent illustration of the power physiological research possesses to aid us in practical medicine.

In other cases diarrhœa is the consequence of congestion or obstruction in the portal circulation. It may arise from the obstruction offered by cirrhosis of the liver, with consequent ascites,

or it may take its origin in general venous fulness, the result of obstruction to the blood-flow through the right heart. In the first case the substance of the liver is bound down and compressed by contracting bands of connective tissue, and the circulation obstructed, which forms a chronic obstacle; while a passing phlebitis in the portal viens causes a sudden increased obstruction. Here the venules of the intestinal canal are turgid and full, and a serous fluid drains away from the mucous surface of the bowels. Very commonly at the same time there is an accumulation of fluid in the peritoneum from a like condition of the venules of the peritoneum. The diarrhœa which shows itself under these circumstances is a natural discharge affording relief, and instead of attempting to check it, it must be encouraged, and in some cases it may be desirable even to increase it by the administration of cathartics. The same rules apply to congestion of the portal circulation from heart disease. In both these conditions, indeed, it is our common practice to institute artificially a brisk action of the bowels where it is not set up naturally. With many people, and especially those who have not made much progress in matters medical, every discharge is a disease to be dealt with; just as they insist that if the bowels do not act purgatives must be administered, even if there be ileus. As purgatives do harm in the latter case, so will astringents be simply injurious in many forms of diarrhœa. Little can be done to relieve diarrhœa arising from the effect of a diseased liver upon the portal circulation; but when the congestion is due to heart failure, much may often be achieved by the administration of digitalis and iron, so as to improve the circulation generally.

It is said by writers that the diarrhœa of trichinosis should be encouraged by purgatives rather than arrested. There are still several forms of diarrhœa to be considered; these are tubercular, typhoid, uræmic, and colliquative diarrhœa.

In tubercular ulceration of the intestines diarrhœa often occurs. It is obstinate and intractable. Of course there is no chance of removing the cause here, and all that may be done is to give relief by opiates, combined with fixed alkalies and bismuth. Milk diet with farinaceous food should form the chief sustenance.

The diarrhœa of typhoid fever is not to be rashly interfered with. In ordinary cases where it is not excessive it is best to let it alone. If blood be passed in the stools, or the discharges become numerous in the twenty-four hours, then astringents, with some opium, may be given with advantage. Sulphuric acid, with opium, is a favourite form with some, the lead and opium pill with others, while cold is approved by all. There is little to choose in such cases, and the discretion with which the remedies are wielded is probably a much more important matter than the mere form of the drug. When there is a typhoid condition coming on in the course of any sustained pyrexia, then diarrhœa must be watched rather than interfered with. When slight, it may be encouraged; when excessive, it may require astringents.

Uræmic diarrhœa is a compensatory action, and not a morbid process. Throughout this book, in Chapters III. and XI. especially, great stress has been laid upon the capacity possessed by the different excretory organs to supplement each other's action when defective. Thus we saw that in conditions of uræmia the intestinal discharge was a useful and beneficial action, and that it was unwise to arrest it until some other excretory channel was established. In one case which I remember well, the back and forward play of the bowels and kidneys was well illustrated. The patient was an old man, and during a sharp diarrhœa no water was passed all day. Percussion said the bladder was empty, but to make perfectly certain a catheter was passed—there was no fluid in the bladder. In a few hours some water was made, the diarrhœa declining. After several days of most instructive oscillation, the diarrhœa gradually lessening, while the flow of urine became steadier, matters settled down to their ordinary condition. If this diarrhœa had been thoughtlessly checked, the man would in all probability have died, as one painful experience in my early days told me. In diarrhœa of this kind, a form commonly found in persons advanced in years as a recurrent ailment, it is desirable to excite free perspiration by the use of the bath, to apply large hot poultices faced with mustard to the loins, or even to cup. When the skin is well roused and the action of the kidneys is restored, then some astringent, especially an astringent form of iron, may be given. There is always a lurking danger that opium and vegetable astringents

might arrest the newly-restored action of the kidney, and the *nimia diligentia* be unfortunate. Better far is it to allow the diarrhœa to persist, than to be led to kill the patient in attempting to cure the ailment. When the action of the kidneys is once well re-established the diarrhœa will commonly die out of itself, if not, careful dietary and the pernitrate of iron will usually finish it off.

In that form of diarrhœa known as colliquative, where there is rapid emaciation, and where of old it was said that the solids of the body were melting away into liquids and taking the forms of diarrhœa, or in other cases of colliquative sweats, it is necessary to take measures as active, as in other forms of diarrhœa the measures are to be expectant. In colliquative diarrhœa the patient will soon become exhausted if the discharge be not arrested. Here opium must be given with astringents, as sulphuric acid and cinchona-bark—or opium, hæmatoxylin and carbonate of ammonia, together with wine, æther, beef tea, milk, and, indeed, everything calculated to sustain the patient. Sometimes it becomes a neck or nothing race, and heroic stimulation may afford the only chance of averting death.

In addition to these different varieties of diarrhœa, a new form has just been brought under notice. Drs. H. C. Wood and C. G. Comegys have described in the *Philadelphia Medical Times* a variety of diarrhœa due entirely to a very high surrounding temperature. Summer diarrhœa is, according to them, often really thermic or heat diarrhœa. In such cases while the purging persists the temperature keeps high. Drugs fail to give relief, but the application of external cold, so as to lower the temperature, is effective and curative. Enforced cold bathing every three or four hours is the best apyretic measure. "The sudden sweet sleep, replacing, after the bath, the fretful nights and days of unrest, is a thing never to be forgotten when once seen, and the arrest of the diarrhœa is certainly no less remarkable." When the thermometer records a temperature running up from 101° to 104° Fahr. in infantile diarrhœa in hot weather, then apyretic measures are to be adopted; either alone or in conjunction with astringents, especially the mineral acids. It is easy to distinguish thermic diarrhœa from other forms by the thermometer. Purgation lowers the body temperature as a rule,

and in other forms of diarrhœa the tendency is to a low and not to a high temperature.

§ 170. It now remains to consider the question of inflammatory conditions of the gastro-intestinal canal. Those of the mucous surface are pretty well included in the consideration of diarrhœa, except that of proctitis, or inflammation of the mucous membrane of the rectum. Here in consequence of the exquisite tenderness of the parts all expulsive action is reflexly arrested whenever set up, and then enemata must be resorted to in order to liquefy the contents of the bowel and to permit of their escape. After that the form of diet so often insisted upon in this chapter must be resorted to, with frequent enemata of bland and soothing character, and opium.

When there is inflammation of the serous covering of the bowels, the bowel must be kept empty—that is, have physiological rest—and be kept quiet by opium. Not only do we wish here to call out the general analgesic effect of opium and its sedative action, but also to secure its localized effect upon the intestines. It deadens sensibility as well as sensation; it keeps the inflamed parts at rest, and so diminishes their friction upon each other, thus limiting the necessity for effusions to separate the inflamed surfaces, or of bands of lymph to glue them together; while it soothes the system generally. No wonder then is it that in inflammation of the abdominal and pelvic viscera experience has decided in favour of opium given in full and repeated doses. In general inflammation of the peritoneum, visceral and parietal, to keep the patient on the verge of death by opium is often the only way to escape the fate which would otherwise lie before him. In the convalescence from any form of enteritis the greatest care in diet is to be maintained for some time, as the bowels remain sensitive and are easily disturbed. In piles it is well to keep the bowels regularly open, and after each motion to bathe the anus well with soap and water, next to apply some cold or even iced water, or astringent lotion (ointments are dirty here) and then return the mass. An astringent opium and gallic acid suppository may be used at bedtime.

In rectal hæmorrhage small doses (gr. xv.) of sulphate of magnesia with dilute sulphuric acid (℥. xv.) in inf. cinchonæ (℥i) three times every day are very effective.

CHAPTER XVII.

THE URINARY SYSTEM.

§ 171. In no part of this work do greater difficulties present themselves as to the drawing of the limits, than in this chapter. Anything like a complete sketch is simply out of the question, and consequently a brief review of the subject, as regards the principal indications for treatment, is all that can be essayed.

The chief matter of interest is the kidney and its function; the other ailments of the urinary system, however important surgically, are of comparative unimportance to the physician.

The function of the kidney as the chief means of removing nitrogenized waste, and the serious consequences of accumulation of such waste matters in the system, cause disease and disturbance in these important little organs to be matters of the deepest interest. The secretion of the kidney contains azotized waste, certain salts, especially potash, and water, together with numerous other matters in trivial quantities; while at other times it contains new and strange material which has been given medicinally. There are some points about the renal secretion which need special attention from the practitioner's point of view, and these are the origin of urea, and the relations of water excretion to the condition of the circulation.

To take urea first is the best method. Urea is said in the older textbooks to be the result of tissue metamorphosis, and it is asserted that the earlier products of histolysis, as creatine, creatinine, tyrosine, &c., are changed in the kidney into the more advanced substances, uric acid and urea. The presence of urea and uric acid in the blood and tissues was accounted for by the hypothesis of reabsorption from the kidneys. Then it was

found that urea was largely manufactured in the liver, by the breaking up of albuminous matters into glycogen and nitrogenized waste. Now we know that urea is largely derived from this splitting up of albuminous material in the liver, as well as its formation from disintegrating tissues. This knowledge has borne fruit practically in directing the dietary of persons suffering from renal inadequacy. It has enabled us to relieve impaired kidneys by diminishing the amount of work they have to do. It is of the greatest importance that clear ideas should exist on this head. A large amount of the nitrogenized food we take is unnecessary, and is not required for tissue building: a comparatively small amount only of nitrogenized matter daily is sufficient for that purpose. We take it because we like this form of food, and because the stimulating properties of nitrogenized substances render them agreeable. The energy of the meat-fed man as compared with the vegetable eater is distinct and marked; but gout and other troubles are the inseparable alloy. There is a Nemesis behind the force-manifesting animal food. Lithiasis in its Protean forms may be successfully cultivated, and though gout may be more readily induced in some persons than in others, it can be produced by persistent effort in all. The presence of large quantities of waste nitrogen in the blood maintains the kidneys in a state of high functional activity, and the hyperæmia of active function leads in time to the production of connective tissue in excess. Such is the origin of the majority of the cases of chronic renal disease; such indeed is the natural history of interstitial nephritis, of the contracting, granular, cirrhotic, or gouty kidney. Long before the disturbance of balance betwixt the waste to be excreted and the power of the eliminating organs to excrete it, is forced upon the attention, a silent, gradual process has been in action, slowly but steadily destroying the kidney, and rendering it less and less equal to the duties demanded of it. It is only when some of the evidences of imperfect depuration of the blood become manifest that we rouse up to the consciousness that the kidneys are no longer in their structural integrity, and that a slow and insidious form of disease has been stealthily undermining them. Further, too, we must clearly recognize the fact that the excess of duty thrown upon the kidney—the direct cause of the tissue changes in it—is

the result of indulgence in nitrogenized food beyond the absolute needs of tissue repair. About this there should be no doubt—no haziness of opinion.

§ 172. The excretion of water by the kidneys is a subject on which it is desirable that a more distinct knowledge should exist than generally obtains. It varies very much with the condition of the circulation. If a large bulk of fluids be swallowed, rapid dialysis increases the volume of blood generally, there is greater pressure within the arteries, and a rapid secretion of pale-coloured urine follows. If it be summer, or, from any other cause, the skin is acting freely, the accession of water to the blood finds its way off by the perspiration, and the bulk of urine is but little affected. When, however, the skin is not so active, then the imbibition of fluids results in free secretion of water by the kidneys, by which means the bulk of the blood is maintained at a normal point. When the blood-pressure is increased, as in hysterical attacks with contracted arterioles, and in the middle stages of Bright's disease, there is a free secretion of water: when the blood pressure is lowered, as in disease of the heart, the secretion is lessened; the gradually diminishing bulk of urine in a case of disease of the heart is a symptom of the worst omen. The relation of water excretion by the kidney to the condition of the vascular system is a subject too little insisted upon, though its practical value clinically is almost inestimable; it throws a flood of light frequently upon the course of a disease; while it not rarely furnishes the most pregnant suggestions for the line of therapeusis to be adopted. The arrangement of the blood vessels in the kidney is very interesting. "It would indeed be difficult to conceive a disposition of parts more calculated to favour the escape of water from the blood than that of the Malpighian body. A large artery breaks up in a very direct manner into a number of minute branches, each of which suddenly opens into an assemblage of vessels of far greater aggregate capacity than itself, and from which there is but one narrow exit. Hence must arise a very abrupt retardation in the velocity of the current of blood." (Bowman.) There is indeed rather an exosmotic than a vital action going on in the Malpighian tuft, and the flow of water through the thin walled glomeruli is almost a question of

hydraulics—the greater the pressure on one side the more rapid the flow; the lower the pressure, the slower; but if the pressure on both sides be equal, as when the flow of urine through the kidney is arrested by a calculus in the ureter, then the flow ceases, and there is a standstill of excretion.

The secretion of water and the excretion of renal solids have, speaking broadly, nothing whatever to do with each other; the urine may be scanty and of high specific gravity, laden with solids indeed; while at other times the flow is profuse, but the specific gravity is low and the urine is almost colourless, is indeed nearly pure water. As a matter of fact more solids are often eliminated when the bulk of urine is small than when the flow is profuse (Parkes on Urine, p. 385) in the subjects of chronic renal disease, where these variations in the urine are common, and so decided as to compel the attention of the individual. The matter of water flow and the excretion of solids becomes a subject of the greatest importance in practice.

§ 173. *Diuretics.*—By diuretics are meant a class of agents which increase the flow of urine. From what has just been said it will be obvious that diuretics are to be classed under two divisions. (1) Those which act upon the vascular system, and (2), those which act upon the kidney. Those of the first division are sometimes entitled hydrogogue diuretics. This division includes digitalis, squill, and broom. These are the diuretics we resort to in dropsy, when the vascular tension is low. They are diuretics by their action upon the circulation generally, rather than by their action upon the kidney or the renal circulation. They increase the force of the ventricular contractions, while they tighten the arterioles by diminishing their lumen, and so they increase arterial tension; while that increase in the pressure within the arteries produces more rapid exosmosis in the renal tufts, and an augmented flow of urine. This is the mechanism of the improved flow of urine which follows the administration of a series of doses of digitalis in cardiac disease, as in mitral regurgitation for instance. Such are the means by which the bulk of urine is increased in certain morbid conditions. When given to a person in health, digitalis produces but little increased flow of urine, in toxic doses there is suppression of urine. There is no notable increase in the bulk of urine solids after the

exhibition of digitalis: this agent is not a diuretic in that sense at all. It is often desirable to increase the secretion of urine solids at the same time that it is necessary to act upon the circulation; then digitalis may be given with some of the second division of diuretics. Consequently we can combine these agents, and the following is a very agreeable mixture:

Sp. Chloroformi, ℥xx.
Tinct. Digital. ℥x.
Inf. Buchu, ℥i.

The addition of potash, in the form of the citrate, to this mixture makes it a complete diuretic, combining the various forms of diuretics; especially when followed by a good drink of water. Such combination is indicated in suppressed gout with a feeble circulation.

By such a combination we get an improvement in the circulation, at the same time that we stimulate the functional activity of the kidney. Without the vascular diuretic the circulation would remain languid; this agent not only increases the exosmotic consequences of heightened blood-pressure, but it improves the circulation generally, and as part of it, the renal circulation. The buchu acts, it is held, upon the secreting cells of the uriniferous tubules, and increases the bulk of solids; while the potash dissolves the uric acid in the body, and, as the soluble urate of potash, the uric acid finds a ready exit in the renal fluid. Such combination of diuretics is rational in theory and successful in practice.

The second division of diuretics is that of agents which act upon the renal circulation, dilating the renal vessels and so permitting of a free flow of blood, while stimulating the secreting cells. Juniper, buchu, cubebs, turpentine, &c., form this group of diuretics. But as digitalis has some effect upon the renal circulation, as shown by the experiments of Brunton and Power, so the ordinary preparations of these drugs contain some agent which acts upon the circulation. Thus gin contains alcohol, which stimulates the heart; as well as the juniper, which produces renal hyperæmia, increased functional activity, and larger volume of urine, with an augmented bulk of solids.

These diuretic agents seem to have a soothing effect upon the

kidney, and to facilitate its working. Buchu, indeed, seems to possess similar properties over the urinary tract that bismuth has over the intestinal tract: though the action of each does not yet admit of an explanation. In conditions of vesical irritability its excellent effects are undisputed and indisputable. In conditions of excessive lithates and attacks of suppressed gout, all writers on therapeutics speak well of buchu. It may not be asserted positively, in the absence of direct observation, that buchu increases the solids in the urine, but the general impression produced by the use of buchu is pretty distinct, that the cases so treated do better than when the buchu is withheld. In my own practice buchu is almost invariably the vehicle in which other diuretic agents are given. It certainly is agreeable to take, it is well borne, and its volatile oil is readily found in the urine; showing the probability at least of its having some local action upon the kidney. Consequently citrate of potash and buchu form a pleasant mixture in lithiasis, and constitute an agreeable medicine in gently acting upon the kidneys after an attack of acute nephritis, washing out the blocked tubules; which Dickenson insists upon as the correct treatment of tubular nephritis, when the acute stage is over. With iodide of potassium (five grains), bicarbonate of potash (five grains), and ten drops of colchicum wine, an ounce of infusion of buchu forms an excellent remedial measure in suppressed gout or lithiasis, especially when followed by a draught of water. Here we require a combination of diuretics suited to the patient's needs, and forming a complete contrast with what is required in heart failure. In lithæmia there is commonly a large flow of urine, pale and of low specific gravity; here we wish to increase the bulk of urine solids: in heart failure the urine is high-coloured, dense, and laden with solids; here we wish to augment the bulk of urine. According to the circumstances of each case do we select our diuretic. A brief consideration of the physiology of the renal secretion will tell us that digitalis is unsuited to lithæmia; and that potash and buchu are equally unsuited to relieve cardiac debility. Of course in a case where both exist together a combination of the remedies may be indicated. But it is abundantly clear that it is not a matter of indifference what agent classed as a diuretic we select in our treatment of a case,

nor yet what combination even we choose. Certain members of this group are suited to certain necessities, and others to other needs. For successful practice it is necessary to know when to prefer squill to juniper, and broom to buchu. Unless the youthful reader makes himself perfectly familiar with the different actions of vascular and simple diuretics, he will often blunder in his selection of remedies; and fail in giving relief in a very large and important class of cases. He may by accident hit upon a successful combination by putting several diuretic agents into one mixture—a sort of practice which has no doubt often been followed by excellent results; but he will find a distinct and clear comprehension of the action of each agent a much better and surer plan, both for the patient's and his own interests. A diuretic which acts upon the circulation may often be added to diuretics which act upon the kidney itself with good effects; and such combination is easy if what has been written above is not only read but inwardly digested. For renal ailments form a large part of the diseases and troubles of the wealthy and the influential, as well as of the indigent; and the lessons learnt from the treatment of the one may be made very useful in the relief of the other. There is no surer nor more deserving road to success than a sound knowledge of those ailments with which the various classes of diuretics are associated; and the man who knows when a vascular diuretic is to be preferred to one of the other class, has a decided advantage over the man that does not.

§ 174. Acute nephritis is an ailment which commonly results from exposure to cold, or other sudden arrest of the action of the skin. A little reflection will soon demonstrate how this comes about. In the involutions of the general external surface, as evolution proceeds, none retains so completely as the kidney the functions of the general excretory surface; consequently, when the action of the skin is arrested an extra demand upon the kidneys follows. The action of the skin in blood depuration is very considerable, and when this is lost we have great hyperæmia of the kidney with increased functional activity; which not rarely passes on into a true inflammatory condition. That there is another factor, in the general congestion of the internal organs, which occurs when the cutaneous vessels are contracted, must be admitted; as is also the case in

pneumonia: but, nevertheless, the inflammations which most commonly result from cold are situated in those organs which have a similarity of function with the skin; and that this is an important matter cannot be doubted. When the kidneys are acutely congested or inflamed, their functional activity is so impaired that there is an accumulation of waste matter and of water in the system. The whole areolar tissue is not rarely filled with fluid, and there is general anasarca more or less pronounced. This accumulation of water furnishes the most prominent symptom in the altered appearance of the individual: but the retention of the nitrogenized waste is the really serious matter. When the kidney mischief is due to scarlatina (where the relation of the skin and kidneys is well seen in the pathological process of inflammation and desquamation) convulsions of uræmic origin are very common, but in all cases of nephritis they are liable to occur. At other times this azotized waste excites inflammation of serous membranes; which is very grave when the cerebro-spinal serous membranes are those chiefly implicated.

The indications for treatment in such conditions are as follows. Firstly to procure fair depuration of the blood by exciting the action of the skin and the intestines. The first may be attained by rolling the patient in blankets wrung out of hot water, or by the bath previously described as Sir James Simpson's bath (p. 88). This should be followed out vigorously; at the same time the bowels should be acted on briskly by two scruple doses of compound jalap powder at repeated intervals; or five grains of gamboge in two drams of bitartrate of potash, the griping being ameliorated by ten grains of black pepper. The sweating and purging are followed by a sense of general relief, while the kidneys are specially relieved. By such plan not only are the inflamed kidneys eased by lessening the demand upon them functionally, but the refilling of the cutaneous vessels lessens the blood pressure in the arteries; while the purging relieves the venous congestion, and especially that of the portal circulation, and so the renal hyperæmia is reduced. Such vicarious action and effect upon the circulation combined must be maintained steadily, according to the needs of the case and the changes in the renal secretion. If the case be slight, the urine will be smoky, from the presence of colouring matter derived from the

blood, and will be merely albuminous. If the case be severe, the urine will resemble blood. According to the appearance of the urine will be the activity of the remedial measures: in some cases gentle measures, in other cases heroic ones are to be adopted.

This relief of the kidney by acting upon the skin and bowels is self-evidently the plan to be pursued in acute nephritis, and about its propriety there exists no doubt. There is some difference of opinion about the use of diuretics during the inflammatory process. Many excellent authorities are in favour of the administration of potash in acute nephritis; the purgatives in most favour contain potash, and not only that, but it is found that citrate of potash is useful in addition to the cathartic measures. It forms a pleasant beverage, very grateful to the thirsty feverish patient, and seems to exercise a beneficial effect over the progress of the malady. W. Roberts writes: "In a disease which tends to spontaneous recovery under simple hygienic and prophylactic treatment, it is necessarily a matter of extreme difficulty to bring home the evidence of the curative power of drugs; but in a considerable number of cases of acute Bright's disease coming under treatment early, I have obtained almost invariably the best results by the free administration of citrate of potash. And in no instance where the urine has been rendered alkaline in the first week of the complaint have I observed the more severe uræmic symptoms, or secondary inflammations." This last sentence is very important coming from so cautious a writer as W. Roberts. My own experience goes to corroborate his statements as to the utility of citrate of potash in acute renal disease, especially when given in buchu.

Such are the remedial measures which call for our confidence in acute nephritis; while the dietetic measures are to give milk and seltzer water, lemonade, thin fluid preparations of farinaceous foods, and other forms of food and drink which shall not contain nitrogen; duly bearing in mind the function of the kidney, and the chief dangers surrounding the patient.

§ 175. Albuminuria is an indication of renal disturbance well deserving of our attention; the more so that its real significance is far from being clear. The urine may be laden with albumen in cases where no symptoms of ill health are present, and where

the morbid state of the urine passes away without any illness on the part of the individual; while on the other hand Grainger Stewart writes: "Albumen is rarely present in any considerable quantity, and its presence—fitful in its appearance, and varying in its amount—is also difficult of explanation," in cirrhosis of the kidney; which, he says "is the most hopeless of all forms of Bright's disease in relation to treatment." Certainly the amount of albumen in the urine is no measure of the amount of renal mischief; and my experience induces me to say that very often its appearance gives no occasion for alarm, and its absence in other cases confers no comfort. The simplicity of testing the urine for albumen, and so settling the question of the presence or absence of kidney disease is so alluring, that many forget that it is only one symptom of renal disease; and that, too, a symptom about whose value there is the greatest variety of opinion. It is not certain whether albumen is not normally present in the fluid which drains out into the uriniferous tubules, and is absorbed by the epithelial cells which line these tubes, or not; indeed the subject is shrouded in mystery. And yet there are many who would base their diagnosis as to one of the most complex matters in all medicine on the physical characters of the urine. The diagnosis of chronic renal disease during its quiescent periods (that is during the greater portion of its existence) is a matter involving much thought and care, much knowledge and observation, watchful attention, and thoughtful pathological research, ere an opinion entitled to any weight can be reached; and yet there are those who will at once decide the matter by testing the urine for albumen, and if it be not present throw over forthwith all the other evidences—a plan calling for stern reprobation.

Albuminuria is a valuable symptom when carefully appraised, but it will not settle the question of renal disease. It is a symptom not to be neglected, but it has been sorely abused; it has covered much culpable carelessness, and occasioned much mischief. The man who would make the diagnosis of chronic renal disease turn on the presence or absence of albumen is a man whose patient I should not like to be. The silent progress of interstitial nephritis is often without albuminuria for long periods; the absence of albumen, therefore, does not contra-indi-

cate the presence of disease, even when far advanced; at other times albuminuria is a temporary condition of no real importance. Albuminuria derives its significance from the conditions under which it occurs; and the great matter is to arrive at a knowledge of these conditions, after which only can we appraise the value of this symptom. This view of the matter is too little insisted upon, even by those who know well the value of the testimony furnished by albuminuria.

If its diagnostic import is surrounded by difficulties the treatment of albuminuria is no simpler matter. That the loss of albumen may impoverish the blood, if excessive, must be admitted; but the means of restraining its loss are far from deserving of confidence. It was once thought that astringents, as gallic acid, tannin, the astringent preparations of iron, and other metals, did good in checking the drain of albumen. Now much scepticism prevails as to the utility of astringents. More confidence is felt in feeding the patient and meeting the drain by quantities of albuminous food, and yet there are objections to this plan; for in the splitting up of albuminous bodies in the liver much nitrogenized waste is produced, which is a matter to be avoided. In obstinate cases of albuminuria in my own experience, hot baths have produced more effect than anything else, while cod-liver oil has improved the anæmia. The effect of opium in checking the flow of urine would indicate its use, were it not that albuminuria is often associated with uræmia, and there opium is strongly contra-indicated. Warm clothing, promoting cutaneous vascularity and functional activity, occasionally purgation with cathartics containing potash, a plaster over the loins, or frequent applications of hot poultices faced with mustard, or perhaps dry cupping; and potash, the potassio-tartrate of iron in buchu; together with a restricted diet, chiefly of farinaceous, fatty or fish food, are the remedial measures to be generally adopted. When the albuminuria follows scarlatina careful protection of the skin is of the utmost importance, especially in cold weather. In all cases the use of the cummerbund, or waist belt is to be recommended. Dr. Broadbent informs me that in the numerous cases of albuminuria in the London Fever Hospital, towards the decline of the affection, when only small quantities of albumen remain, mercury in

limited doses usually leads to the entire disappearance of the albumen. It is a remedy, however, which should be resorted to cautiously: while quite a safe measure in the hands of so careful a physician as Dr. Broadbent, it may be a very dangerous agent in the hands of some. If albuminuria persist, and there are other evidences of renal disease, the patient should seek a warm climate, and even then be warmly clad. Albuminuria is associated with anæmia, and in anæmic persons there is little resistive or reparative power; consequently colds should be carefully guarded against. The feet should be kept well protected. If the bowels require to be regulated, something like the following mixture might be given—

Fer. Sulph. gr. xv.
Mag. Sulph. ℥ii.
Pot. Bicarb. ʒiii.
Inf. Buchu ℥viii.

a tablespoonful once or twice a day in a tumblerful of water as required; or some of the chalybeate saline waters may be given instead.

Hæmatics must be combined according to the necessities of each case, and in the anæmia of imperfectly depurated blood, potash and purgatives are as valuable as iron. This much may be safely said about albuminuria, that its presence during the course of a chronic renal affection indicates the necessity for special care. It is not an outcome of the healthy portions of the kidney, ordinarily at least; neither is it the outcome of portions totally destroyed by interstitial growth of connective tissue: probably its presence indicates active change in some portion of kidney hitherto unaffected. Possibly at times it is an outcome of mere renal hyperæmia. It is questionable how far the drain of albumen is ever sufficiently serious to endanger life; and it is even more questionable if the drain can be checked by astringents, unless they be ferruginous.

§ 176. Bright's disease is a term used to designate a series of chronic changes in the kidney of the utmost importance in every way. Three very marked forms of morbid changes are found in the kidney, viz. in the tubules, in the blood-vessels, and in the connective tissue. It is a disputed point whether either of the

first forms ever exists long without the connective tissue being increased. Some remarks of Sir William Jenner's in the *Lancet* (1865) are well worthy of perusal on this matter. The purest and most chronic form of disease is interstitial nephritis. It is the excessive development of connective tissue, or basement membrane, which so commonly follows high functional activity, with hyperæmia of an organ. The other morbid changes are usually of briefer duration; the tubular form of the disease not rarely ending in recovery. When the vessels are affected in that form of renal disease termed amyloid, it is questionable if anything more than palliative measures are ever attainable. At other times the chronic changes take the form of fatty growth —not fatty degeneration, but interstitial growth of fat. This change gives but few indications of its existence. When the chronic changes are somewhat accelerated in certain constitutions, there is fatty degeneration of the albuminous casts, a symptom of evil omen. But whatever the form of change the great principles of treatment are the same in each case—modified by individual necessities according to the judgment of the practitioner.

Ere proceeding to the consideration of the treatment of chronic renal changes, it may be as well to review briefly the causation of the changes; as that will be found to furnish useful indications for the prevention of such changes, and the slowing of the morbid action when established. The first great point is that chronic renal diseases are commonly the outcome of indulgence in a highly nitrogenized diet; excessive functional activity leading in time to structural changes. Then the second great cause is exposure to cold and especially changes of temperature. The function of the skin is closely allied to that of the kidney, not only as regards water elimination, but also as regards the excretion of nitrogenized waste (p. 55). Repeated chills to the skin not only produce renal hyperæmia by the internal congestion which follows all contraction of the cutaneous vessels; but by the action of the skin being checked there is an accumulation of waste in the blood, and then there is furnished another cause of renal hyperæmia and increased functional activity—the two chief factors in the induction of interstitial changes. Careful thought over the relations of the skin and kidneys will not

only explain the association of acute nephritis with sudden exposure, but will also elucidate the connection which exists betwixt constant exposure and chronic renal changes; and illustrate an important part of the treatment of this affection.

Not only so, but the question may be raised as to how far the renal changes are involved in general conditions, and are modified by the general conditions. The gouty form of Bright's disease with florid complexion so common in England, is much rarer in Germany, where there is a marked tendency towards anæmia and œdema; and yet interstitial nephritis is the form of renal change in both cases. The tendency of present thought is too much towards making the kidney the starting point of all the changes found in chronic Bright's disease; and consequently of finding different sequelæ, requiring various treatment, according to the form of renal disease. Not that this is not good and proper if kept within certain and safe limits, but it may be overdone. How far renal disease is an outcome of constitutional changes in some of its forms, has been well shown by Basham. The very form assumed by the changes in the kidney depends to some extent upon the age, sex, and diathesis of the individual in whom they exist; and the treatment will be modified by such concurrent circumstances in each case. Then again the renal disease may be but part of a general break up of the system. "A certain number of cases of chronic Bright's disease present themselves," says Roberts, "in which the most searching analysis fails to indicate the exciting cause of the disease. In some of these the renal affection is only a part manifestation of some widespread cachexy, in which fatty degeneration co-existed in the heart, great vessels, brain, and kidneys." In this last series of cases little can be done, and that little is only palliative. In other cases again, more especially of the more acute forms and in young subjects, the starting point is clearly and distinctly in the kidneys; and if the measures taken are judicious and carried out firmly, much good may be done, indeed, an entire cure may be effected. What those measures are we shall see immediately. In order to comprehend renal disease clearly we must remember that "Chronic Bright's disease, in the great majority of instances, begins slowly and imperceptibly. It is rarely detected until it has already existed many

months—it may be years. The attention of the patient is at length awakened by the gradual failure of his strength, the increasing pallor or sallowness of his complexion, and his disinclination to exertion; perhaps his suspicions are aroused by a little puffiness under the eyes, a slight swelling of the ankles at night, unusually frequent calls to void urine, or shortness of breath. In other cases these premonitions are altogether wanting, or perhaps they pass unheeded. The fatal disorganization of the kidneys proceeds silently, amid apparent health, and then suddenly declares itself by a fit of convulsions, rapid coma, amaurosis, pulmonary œdema, or a violent inflammation. Or, again, the disease creeps on stealthily in the wake of some pre-existing chronic disorder—phthisis, caries, necrosis, joint disease, constitutional syphilis, chronic alcoholism, or exhausting suppuration. Or it may be a continuation or sequela of acute Bright's disease. Lastly, the disease may lie concealed for an undetermined period, and then reveal itself after exposure to cold, or a fit of intoxication, in the guise of an acute attack—with rapid general anasarca and scanty albuminous urine." (Wm. Roberts.) Dickenson also, in speaking of granular kidney, says: "The change begins in disproportioned growth, somewhat of a rank luxuriance, in the fibroid tissue with which the arterial channels are uniformly fringed. Hypertrophy of this part leads to atrophy of all the rest. Creeping along the arterial lines with slow and hesitating steps, involving the organ not all at once, but by little and little, the disease makes itself felt not suddenly, but with so gradual a departure from health, that its date is usually undeterminable, and its existence unsuspected until it has reached an advanced stage." The importance of understanding the silent, unobserved course of the disease ere it becomes apparent (here insisted upon) lies chiefly in the learning to distinguish and appreciate the indications of such changes in their earlier stages. This can only be acquired by the most careful and painstaking observations of all cases, a thorough investigation of the past history of the individual, and a minute registration of external changes, so that an acquaintance with the natural history of the disease may be attained. Having so learnt to form a "presumptive diagnosis," much may be done to prevent and arrest the morbid changes ere

undoubtedly established. It is in these earlier stages, of which there may be so few indications, at least of the certain signs and symptoms, that our measures will be most valuable and protective; and the power to recognize these earlier indications is only given to those who earnestly investigate and inquire.[1] It is a matter of much moment both to patient and practitioner that such knowledge exist, for then measures may be taken to avoid irremediable changes.

§ 177. Whenever there exists a suspicion of renal disease, the patient must be watched carefully for the less doubtful indications, which may be long in showing themselves; all the longer, indeed, if the treatment be justly and truly adapted to the case. It is not only the avoidance, as far as may be, of any aggravation of the already existing disease that is to be aimed at; it is the avoidance of any acute condition that we must strive against. In these acute conditions lie most of the danger to life. Wherever chronic disease pre-exists, there acute disease is most formidable. In the phthisical, acute pneumonia is ever to be dreaded; the old standing mischief is lighted up, as a fire, by the acute intercurrent disease. In chronic debility of the stomach acute indigestion quickly sets up grave disorder. In chronic disease of the liver acute hepatitis becomes most serious. And so in chronic renal disease the great matter to be avoided is those conditions of acute congestion, or even of nephritis, which are so apt to occur in the subjects of chronic renal changes: and to which pre-existing disease renders them so liable. The means to be adopted lie largely in the connections with the skin and with the diet.

It is of much importance to keep the skin warm; both from the effects of cold in producing internal congestion, and from the aid given to the kidneys by the functional activity of the skin. Consequently the subject of Bright's disease should ever be warmly clad. The tendency of this malady is to produce a dry and imperspirable skin, so that the impaired kidneys get little assistance from cutaneous activity. Indeed in many cases

[1] The reader, if so minded, will find a paper on "The Systemic Indications of Bright's Disease" in the *Brit. Med. Journ.*, Jan., 1875, by the writer, in which he has striven to give the means of forming "a presumptive diagnosis" of such changes.

of gout, and the other outcomes of lithiasis, in cold weather it may be made a matter of question how far the skin may not be the exciting cause of the outbreak, rather than the kidneys. From the large amount of oxygen respired in low temperatures more perfect oxidation goes on, and yet there is a large quantity of unoxidised waste in the system. There ought to be greater freedom from these manifestations of imperfect blood-depuration, and yet the opposite is often the case. Some gouty persons—I here use the term gout in its widest sense—are best in cold weather, while others again are best in warm weather. It is impossible to put away a conviction that the difference in these cases lies in the action of the skin *versus* more complete oxidation. At any rate it is of the greatest importance that the skin be well covered. Flannel from the neck to the wrists and ankles, or even "fleecy hosiery," must be worn in the day time, and flannel night-dresses must be used for bed wear. Changes of temperature must be as carefully followed as in India, where it is necessary at some seasons to dress three or more times a day—for the cool morning, the hot noon, and the chill evening. The shoes and boots must be stout and well lined, and contain an inner sole of cork, felt, or even fur. About the importance of stout shoes it is impossible to be too explicit. All exposure to wet must be followed by a change of boots, even when it is in no way necessary to change the clothes; but all damp clothes should be changed without delay. The subjects of chronic Bright's disease live as it were over a volcano: and the slightest carelessness may be followed by the most grave consequences; what would but produce a mere cold in others may induce a fatal attack of intercurrent inflammation in them. Not only that, but there is the danger of producing further destruction of those parts of the kidneys remaining sound, by each repeated attack of congestion; it is the silent, gradual destruction of the kidneys that is to be feared, as well as the general inflammatory attacks of various organs which immediately endanger life.

"The prospects of a patient suffering from confirmed chronic Bright's disease are exceedingly gloomy. The textural changes in the kidneys are of a kind that do not admit of reparation. The Malpighian bodies become enveloped in an exudation of low plastic material, of which the only tendency is to progressive

contraction, and the tubuli are either blocked up with fibrinous plugs or shrivelled into useless fibres. The gland, however, is not equally affected throughout all its parts, and the less injured portions carry on, imperfectly, the depurative functions. As the sounder portions become more and more involved—and there is an almost inevitable, though slow, tendency to this—the work done by the kidneys grows less and less, and the blood is more and more contaminated with histolytic and urinous elements, until at length a limit is approached which is incompatible with life. Long before this extreme limit is reached, however, death is brought about in a large number of cases by one or other of the numerous complications to which the subjects of renal degeneration are obnoxious." (Roberts).

This vivid sketch shows how each exposure to cold may result in the implication of another piece of the sound kidney; how its destruction will still further reduce the capacity of the kidneys to meet the work imposed upon them; and so how by each new congestion the gradual process of destruction is accelerated. Nothing could tell us more forcibly the necessity for the avoidance of all provocatives of further mischief. As the destruction of the kidneys proceeds the depuration of the blood must rest more and more upon the skin, and upon vicarious action. The more need then to maintain and preserve the functional activity of the skin! This part of the treatment is obvious enough.

§ 178. At the risk of being charged with repetition of what has been said before, both in this Chapter and in Chapter XI., it is necessary to be explicit about the relations of the food we take to the function of the kidney. As the chief eliminators of azotized waste, it is obvious that when the kidneys are undergoing the gradual destruction just given, it is necessary, in order to maintain a species of equilibrium betwixt the power of the organs and the work to be done by them, that the amount of nitrogenized food be reduced. As the renal disease progresses this must be done; else explosions of uræmia will be induced from time to time, which may act as temporary auxiliaries in blood-depuration, but which will distinctly endanger existence. Not only is there danger from the accumulation of nitrogenized waste, when the waste matter is too much for the excretory

power of the kidney; but the hyperæmia which goes along with excessive functional activity in the renal organs may proceed to acute congestion, or even inflammation, in those parts remaining sound; and so the destructive process be accelerated. Consequently the amount of nitrogenized food must be gradually reduced in proportion to the diminishing structural integrity and functional power of the kidneys. If this be not done then further mischief will result. It has been shown before, in § 171, that the great bulk of nitrogenized waste comes from the splitting up of albuminoids in the liver, and the production of glycogen. Small quantities only of nitrogenized matter are required for mere tissue repair—for the absolute needs of the system. For the formation of glycogen farinaceous foods will do equally well. The only difference is that the excess of nitrogen acts as a stimulant to the nervous system, and gives a sense of energy: this, however, is a small matter comparatively, but as many persons object very decidedly to any diminution in their sense of energy, they oppose the proper treatment and speak of it as too lowering. This is deep-rooted fallacy, which often calls for very firm and decided opposition. The patient is incapable of having any explanation given him in consequence of his ignorance of physiology, and must rest satisfied, or unsatisfied, with dogmatic statements;—while he remains distinctly conscious of the loss of energy. But, nevertheless, the plan must be insisted upon in his own interests—*i.e.* if he wish to preserve his life. The diet should consist largely of farinaceous matters, fish, vegetables, and fruit. Small quantities of lean meat alone may be safely adventured; and beef-tea and soups must be indulged in in very moderate quantities, the more so that their nitrogenized matter can but undergo retrograde changes. It is necessary to speak decidedly on this matter; beef-tea and the azotized matters of soups are rather stimulants than food, their quality as food ranks very low; they may form palatable adjuncts to boiled sago, arrowroot, and other farinæ, but they are otherwise of little use, and only embarrass the failing kidneys. At present beef-tea and Liebig's extract are the fashion, and it is almost heresy to have doubts about their unalloyed goodness; nevertheless, these doubts are well-founded. In fish we possess a

form of animal food which is, or can be made, palatable, and satisfies the cravings of the appetite; and the sufferer from chronic Bright's disease can make a hearty meal of fish, with melted butter or sauce, without overtaxing the kidneys. Fish then should form a large portion of their dietary. Farinaceous foods and puddings, or blancmange, will make with fish a satisfactory meal, especially if followed by salad and fruit. Such a meal will satisfy any but a gourmand. Doubtless it requires some ingenuity on the part of the caterer to prevent a certain amount of monotony in such a dietary; but it may be relieved by meats, which shall be taken sparingly, and be accompanied by much fat. It is not necessary to restrict the diet as regards articles, so much as to keep steadily to the principle that the food shall not be too highly nitrogenized. If this be adhered to, the dietary need never be felt to be too restricted.

In many persons who are stout, and who are also the subjects of chronic renal changes, the matter of diet becomes very complicated. If they consume hydrocarbons their obesity is increased; if they cut down their hydrocarbons in favour of albuminoids, then renal trouble is the consequence. For such persons a fish dietary with the more highly oxidized hydrocarbons, such as rice, &c., is admirably suited. They wish to have a certain bulk of food in order to satisfy their cravings, and in these forms of foods, together with many vegetables, they may find what they seek. When, on the other hand, renal changes are complicated with glycosuria, then the farinaceæ must be avoided, and the more concentrated hydrocarbons must be taken instead, together with bran biscuits, &c., and vegetables. Doubtless in some cases the absolutely correct diet is so limited in range that it is very difficult to adhere to it. Nevertheless it is the medical adviser's duty to put the matter plainly and clearly before each patient in every case, and to leave the responsibility of action with the person who is chiefly interested; urging, however, in season the adoption of the right dietary.

§ 179. The matter of drinks is not unimportant in the regulation of the dietetics of Bright's disease. It is well-known that alcohol, if taken in large quantities and undiluted, has a very pernicious action upon the kidneys; consequently, if alcohol

be taken, it must be in a state of dilution. If taken as spirit, it must be taken with potash or seltzer water, Vichy, Vals, or Apollinaris water, and the water must be in good excess; anything like concentrated drinks are to be avoided. The amount of alcohol consumed daily should never be large, otherwise the interstitial changes in the kidney may be stimulated. When wines are taken it is a matter of importance to choose the least deleterious forms. Sherry and Marsala, with a poor and plain claret, are the only wines at all safe. If a good Bordeaux, a rich Rhone or Rhine wine, port wine, champagne, or Moselle are indulged in the consequences are very disagreeable; especially when there exists a tendency to the accumulation of uric, or the production of oxalic acid. In consequence of the tendency towards the formation of oxalates in the subjects of lithiasis, articles likely to furnish these materials must be avoided. The sensations of a gouty man next day, after being inveigled into the taking of rhubarb champagne, form a good test of the quality of the beverage. A plain wine with mineral waters is the safest drink. As to malt liquors, they are mostly to be avoided; there are, however, some pale ales which are very free from objectionable qualities. The lighter pale ales, of which there are many excellent forms to be procured, and the Bavarian beers, are free from, or nearly free from any objectionable properties. They may be taken in limited quantities without evil effects. But drinks should be taken in very limited quantities in those cases where the filling of the blood-vessels with fluid is undesirable, as in renal dropsy; while in other cases the washing of the tissues with water is eminently desirable. Where there is some glycosuria, subacid fruits and alkaline waters are to be preferred; a limiting of the amount of fluids in these cases gives a counterbalancing relief from certain unpleasant sensations, and compensates for the self-denial exercised in resisting the temptation to indulge in fluids in inordinate quantities. A careful restriction in the matter of drinks as well as foods is desirable in the subjects of chronic renal changes.

§ 180. Having briefly gone over the proper clothing and dietary suited to these patients, something may now be said as to the indications for the remedial measures to be resorted to in cases of chronic renal disease. It is obvious that nothing

can be done to restore the structural integrity of the kidneys; the more need then to conserve what is left of them. How to diminish the call upon them, and to prevent them from sudden derangements, has just been given. If there be albumen in the water, and it is smoky or blood-stained, together with aching in the loins and other evidences of renal congestion, hot poultices to the loins, or dry cupping, hot baths, and alkaline purgatives are to be resorted to, just as in attacks of acute nephritis; indeed, there is no difference but that of degree, betwixt this condition and acute nephritis. All that has been insisted upon there is applicable here: it need not be repeated. Something, however, may be said about what is requisite more permanently in such cases, especially in the convalescents from acute attacks. It is highly desirable that they should take potash in its blandest and least irritant forms. It may be so combined with purgatives as to form a pleasant domestic remedy. When given with sulphate of magnesia and buchu it is eminently suitable for those cases of constipation which are accompanied by a dense mass of lithates in the urine. Whatever the form used, each dose should be washed down with a good draught of water. Where there is a tendency to anæmia this resort to potassic laxatives, freely diluted, should always precede the administration of chalybeates; and usually they should be given together afterwards. As convalescence preceeds the citrate of potash may give way to a combination of the bicarbonate of potash with the potassio-tartrate of iron, which must be continued some time: the amount of potash being diminished gradually, especially if mineral waters are also taken. One of the great points to be attended to in convalescence is to remember the function of the kidney, and to be very guarded in every step taken. The amount of nitrogenized food must be limited, iron must be accompanied by potash, the bowels must be kept open, and the action of the skin must be maintained, if dangers are to be avoided. When there are grounds for supposing that renal congestion is threatening, then quick resort to smart catharsis and the use of the hot bath will often avert the impending state of peril. Drs. Broadbent and Mahomed have found that the condition of high arterial tension (when the colouring matter of blood can be found in the urine by the guaiac test) which

precedes albuminuria in acute renal congestion, is relieved by brisk purgation and the use of the bath; so that the presence of albumen in the urine can often be prevented. It is probable that this vicarious depuration does away with the impending renal congestion, of which albuminuria is the external evidence.

In many cases of acute nephritis, and in cases of passing congestion in kidneys already structurally diseased, it is very desirable to be slow and cautious during the convalescence; "the more haste the less speed" is here very applicable: when the case is doing well young practitioners in their anxiety are often wishful to accelerate the progress, but it is not always desirable to do so. Great caution and thoughtfulness are the chief matters, and should be assiduously practised. (See p. 233.)

Having thus sketched in outline the great principles of treatment to be adhered to in chronic renal ailments, the reader must fill out for himself the details for each case from his acquaintance with what has been written before; and his power to do so will form a good test of how far he has read attentively, and thought intelligently over the subject-matter: for it is one of those matters where no explanations, however lengthy and detailed, can do away with the necessity for individual thought.

§ 181. When interstitial nephritis is the consequence, as it not uncommonly is, of valvular disease of the heart, it is obvious that the only treatment of any service will be that which will relieve the venous congestion. Obstruction to the circulation in the portal veins produces an arrest of the circulation in the kidney; there is venous congestion and albuminuria, together with growth of connective tissue. At the same time the bulk of urine falls; and the gradual diminution in the bulk of urine with the appearance of albumen in the fluid, furnishes a sign of the worst omen in the course of heart disease. Brisk purgation and hot baths, so as to relieve the venous fulness, and agents which act directly upon the heart (§ 139–140), are to be administered freely, so as to keep up the tone of the circulation and the fulness of the arteries. This last measure is of great utility in bringing the blood more steadily to the kidneys, and so of its being better depurated. The waste-laden condition of the blood in the more advanced stages of heart disease often leads to arteriole spasm, obstructed circulation, and ventricular failure—

to those attacks, indeed, which are so dangerous and fatal in advancing cardiac decay. The condition of the heart leads to changes in the kidneys, and these, in their turn, obstruct the heart, and so the vicious circle widens. Renal disease is also a cause of changes in the heart. (§ 143.)

§ 182. The other troubles of the urinary organs, not being renal, come but little within the province of the physician; they lie rather in the domain of a surgeon. The most troublesome is incontinence of urine in children; and that is rather an affection of the nervous system. Whether there is nocturnal incontinence of urine in the child, or great vesical hyperæsthesia in the bladder in adults, especially in elderly men, it is equally desirable that there shall be no local causes of irritation. Fæces in the rectum or descending colon, ascarides, piles, fissures, &c., are all fertile causes of vesical irritability, and their removal is very necessary. In all cases the bowels should be emptied at bedtime—a measure often giving much relief. Local irritation in connection with the generative organs also should be avoided, any irritability or excitement in them induces vesical irritability—*Nec castus frequens mingit* is an old proverb which holds good yet of both sexes. For the allaying of vesical irritability a combination of bromide of potassium with hyoscyamus and camphor, at bedtime, forms a most excellent remedy. In addition to these measures alkaline purgatives are desirable, as well as the constant exhibition of potash, which relieves efficiently the irritant qualities of acid urine, in combination with buchu, triticum repens, pareira brava, and uva ursi. These two latter agents also contain tannin, which makes them specially useful in cases of catarrh of the bladder, where they may be given with advantage. When the urethra is affected alkalies are generally given, together with cubebs or copaiba; both of which are more or less given off in the renal secretion, and exercise a beneficial effect over the urethral tract. This, however, brings us to the next chapter, on the affections of the reproductive organs, to which these ailments rather belong.

In great irritability of the bladder in catarrhal conditions the injection of opium or morphia with astringents is often good practice. Here, and in urethritis also, it is well to render the urine alkaline, and to give buchu with camphor and hyoscyamus.

CHAPTER XVIII.

THE REPRODUCTIVE SYSTEM.

§ 183. Partly in consequence of a certain feeling of repugnance to enter into the subject, partly in consequence of a consciousness that their inquiries would point to nothing, and elicit little of which they could avail themselves practically, a large majority of the profession are singularly ill-informed about the treatment of the affections of the reproductive system. They form, however, a large and important class of maladies, and cause not only local inconvenience, but excite disturbance, often of a serious nature, throughout the organism. How frequently does it fall to the lot of practitioners who have learned fully to recognize the importance of such maladies, especially in the female, to see patients sent up to them for grave ailments, accompanied by pallor and wasting, where a profuse leucorrhœa is the *fons et origo mali;* and yet not the faintest attempt to ascertain the real state of the case has been essayed. It is admitted universally that modesty is a great ornament to woman, and her privacy should not be intruded upon needlessly and unnecessarily; but at the same time it is worse than folly to permit illness and suffering to go on unrelieved, the profession brought to discredit, and money spent without return, merely because a certain sense of shame restrains the practitioner and binds his tongue, when a few well-directed questions will solve the mystery. To some men this is almost, if not quite, impossible; and, recognizing the fact, they should send their patients, for once at least, to some one who will make the necessary inquiries and institute the much-needed line of treatment. On the other hand, there are men who put their questions so coarsely and rudely that the instinctive modesty of woman rebels and makes her dumb, to

her own detriment. It is no unimportant matter to learn how to put interrogatories on these matters to women without making it awkward for them to answer. If the practitioner hesitates, then at once a difficulty arises: if he put his questions in the same tone and manner in which he asks after the digestive organs, then the answer will come readily, and with a sense of relief to the answerer. It is also very desirable that the questions should indicate that the inquirer knows what he is about, and is at home with the subject; if aimless and vague a woman quickly discerns their worthlessness, and answers accordingly. This is a little divergence from the matter immediately in hand, but it is not altogether unnecessary nor without value.

§ 184. There are peculiarities connected with the reproductive organs which need consideration, and which separate them from all other organs. These peculiarities are connected with the functions of this system. During a great portion of even adult existence these organs are quiescent; but nevertheless they are more under the influence of our thoughts than any other part of us. Loose or lewd thought will induce an increase in the vascular supply to these organs in both sexes. When the evolution of puberty converts the child into the man or woman, the development of these organs gives a new direction to the thoughts of the individual, and the mental horizon is crowded with vivid and novel images. The consequence of this is that in many cases an habitual unchasteness of thought is instituted, though this is by no means the rule. In all, except sexless creatures, there are general changes inaugurated which give ultimately the characteristics of the sex. Vascular excitement of these organs is often maintained to an abnormal degree, and endows the parts with an unwonted hyperæsthesia, far beyond what is normal; and this reacts again upon the nerve-centres until a condition of irritability is instituted of the most distressing character. This is communicated to the parts around, and, as the old proverb said, *Nec castus frequens mingit*, so I have known an incontinent out-patient to be incapable of retaining her urine, and obliged to partially empty the bladder while walking about in the streets in consequence of the irritability of the parts. Nor is it necessary that this should arise from coition or the substitutes for it; it is not unfrequently

found amongst females who work with the double-treadle sewing machine, and who become so distressed thereby that they often abandon this form of industry altogether. The exhaustion of the system generally, and especially the nervous system, by this hyperæsthesia and morbid action of the reproductive organs, is such that a most pitiable condition ensues; which frequently drives these sufferers to some medical adviser. They may come ready to reveal the facts, morbidly voluble about their condition; or they may come with some fictitious malady, or outcome of their state, and be resolutely determined to conceal the truth. Nothing but watchful, observant experience will or can guide the practitioner aright with the latter class of patients; and yet it is most important to recognize the primal mischief.

§ 185. *Anaphrodisiacs.*—When the truth is revealed, and it becomes apparent that the patient is suffering from debility or nervous erethism, the result of abnormal erotic excitement, it becomes necessary to have recourse to such agents as possess the power of reducing and allaying this abnormal state of matters. For this end certain local measures are necessary, and certain agents given by the mouth are desirable. As to the local measures, the cold hip-bath, the bidet, or cold sponging, are all useful; indeed they should form as much a part of every woman's toilet as the washing of her face and the brushing of her hair. The modesty of English girls often leads them to neglect hygienic arrangements of importance to which Frenchwomen are most attentive. Even injections of cold water in some cases would be conducive to comfort. All secretion permitted to remain becomes a source of irritation, which ought not to exist. The bowels, too, should be regularly and systematically unloaded, and all irritation in the rectum removed: accumulations in the lower bowel always favour pelvic congestion and excitement. There should not be too heavy skirts, &c., hung from the waist; they prevent the return of blood from the parts below the line of attachment, and also heat the pelvis and its contents. Soft, luxurious beds are also bad, and should be avoided. Horseback exercise, though otherwise healthful, in many girls produces vascular fulness in the pelvic viscera, and a condition of unwonted activity in the generative organs which is undesirable. (Mason Good.)

Having taken such measures as affect the parts locally, and relieved them from the various sources of excitation to which they may have been subject, the question then arises of what to do remedially. The first step is to unload the bowels, and especially the lower bowels, for which purpose aloes is specially serviceable. By its action, when given in purgative doses, upon the hæmorrhoidal vessels, it relieves the vascularity of the reproductive organs. It is desirable, however, to combine it with alkaline and saline purgatives. All saline purgatives are anaphrodisiac, and more especially when alkaline. In all cases, then, where there is erotic excitement with fulness and tenderness of the ovaries, it is desirable to give something of this kind—

Mag. Sulph. ʒi.
Sodæ Pot. Tart. ʒss.
Decoct. Aloes Co. ℥i.

once or twice a day. It should be given until the bowels are rather freely opened, and then continued so as to keep them open without actual purgation. In a few days the ovarian excitement will be much relieved, and with that an improvement in the general condition will be inaugurated. If it still persist with local congestion and erotic excitement, then bromide of potassium in ten- or twenty-grain doses may be added to the mixture; and this addition will be found sufficient to remove the most obstinate congestion, if the treatment be energetically followed out.

In many cases, however, the pallor and general debility contra-indicate any depletory measures, and then the bromide of potassium, or of ammonium, or hydrobromic acid, may be given with a bitter tonic three times a day; and the cold hip-bath, &c., be insisted on. If purgatives are inadmissible, then cold water enemata may be used to unload the bowels, especially at bed-time. If there be any ascarides in the rectum, then a weak infusion of quassia may be used as an enema, and an occasional dose of compound scammony powder may be given; this latter treatment is often necessary with young girls, where these seat-worms are often the exciting cause of irritation of the generative organs. Not uncommonly they are the cause of much erotic

excitement in elderly persons of both sexes. Bromide of potassium, or ammonium, are the best and most certain anaphrodisiacs we possess. Ere their introduction alkalies, colchicum, and other less effectual measures were in vogue. In addition to these physical measures, there are moral measures of no mean value. The avoidance of excitement and temptation, or removal of residence, or travel, are often necessary. The arousing of the moral sense is very important. In other cases idleness and French novels must give way to more healthful excitement and occupation, especially in those where the erotic feelings are rather central than peripheral in their origin. Matrimony is often prescribed for those who actually suffer from involuntary and constrained celibacy, but it is a questionable piece of advice to offer. If there be a perfect and thorough understanding betwixt the contracting parties, then the objections fall to the ground: too frequently there is an unjust reticence which bears bad fruit in the future.

§ 186. In consequence of the vascularity of the reproductive organs, their position, and their function, the mucous linings of these organs are specially liable to become atonic, and give forth more or less profuse discharges. In man this is rarely occasioned otherwise than by impure connection, either during the catamenia, or when the woman is suffering from leucorrhœa, or gonorrhœa. In all these cases there follows a form of urethritis, generically termed blennorrhagia, in which there is rather a difference of degree than of kind. At first there is swelling of the mucous membrane, with itching, burning, and smarting, especially on making water; then follows a secretion, which either gradually passes away, or remains for long in a chronic condition, known as gleet. The line of treatment of such cases combines local and general measures. Soothing emollient injections of warm water with a little laudanum are useful in the first stage; while the food should be bland and non-stimulating. The bowels should be kept open with alkaline purgatives, and invariably unloaded at bed-time—a great means of avoiding chordee, and other troubles in connection with the generative instinct. After each act of micturition the urethra should be washed out with warm water, slightly alkaline. It is desirable to render the urine alkaline by the administration of potash; and

also at the same time to give certain agents which pass out by the kidneys and exercise a beneficial effect upon the urethra, as copaiba, sandal-wood oil, or buchu. If there be much nocturnal excitement a morphia suppository in the rectum, or a draught of Pot. Brom. gr. xxv. Tinct. Hyoscyami ʒi., Mixt. Camphor. ʒi., may be taken every night at bedtime. After the secretion is established it is usual to resort to astringent injections. It must not be forgotten that the discharge fulfils one useful function, viz., it keeps asunder the inflamed mucous surfaces, which would otherwise rub on each other, and so cause much discomfort. The injection of a mixture of bismuth (trisnitrate) and Mistura Acacine, so as to form a soft plug in the male urethra, is in vogue in many of the continental schools of medicine, and forms a plan of treatment much less disagreeable than any other, while it is very effectual. When there remains nothing but a gleety discharge, astringent and tonic injections, with a liberal dietary, are the best measures to be adopted. In many cases where the secretion is profuse, antiseptic injections are often very useful.

Much more frequent, and more innocent in their origin, are those discharges from the female genitals known as leucorrhœa. When the result of specific contagion, then they require the same series of local measures as are requisite in urethritis in man. General measures, except cooling medicines, are obviously useless in women, as the urine does not traverse the affected surfaces;—women, however, themselves think differently. In both sexes the ectrotic treatment of applying nitrate of silver to the inflamed surface, either in stick or in strong solution, is undesirable, being fraught with untoward results. In the majority of women leucorrhœa is the result of carelessness, inattention to personal cleanliness, of excessive use or irritation of the genitals; or of labour in warm rooms, and of close, heated sleeping rooms. With many women the hip-bath, or any substitute for it, is probably never used. Industrious women inhabiting confined rooms have intercostal neuralgia, the frequent accompaniment of leucorrhœa; they suffer from perpetual depression, and at the same time they are spare and pallid. Such women almost invariably have leucorrhœa, and all attempts to treat them without local remedies are ineffective and futile. In

some cases the discharge is from the uterus, at other times it is vaginal. Sometimes it is profuse and persistent, scarcely affected by the catamenia, except to acquire a pink tinge; at other times it follows the menstrual flow, or comes on fitfully. In all cases it is necessary to resort to injections. If the discharge be slight, injections of cold water merely will often be sufficient to arrest it, or a weak solution of alum may be indicated. When at all profuse the vagina should be well washed out with cold or lukewarm water, after this the injection syringe should be filled with a solution of some astringent, of which alum is the favourite, and then the patient should lie down in the recumbent posture, inject, and lastly lie still two or three minutes. This last is important, as if it be not practised the astringent fluid runs out, and so does comparatively little good. There is no subject connected with themselves of which women are so ignorant as that of using an injection properly, and yet it is often very desirable that they should know. Such systematic injection, first of water and then of an astringent solution, should be practised twice daily, as long as any abnormal amount of secretion remains; and then the daily practice of injection with a weak astringent fluid should be continued for some time afterwards. The most scrupulous ablutions of the genitals should be practised by all. Many, however, do not know of its importance; some are filthy and indifferent, while others, as motherless girls, have no one to tell them, and no one to ask. To all motherless girls the medical man should ever be willing to give counsel, and to give them what they so much stand in need of, viz., information on these matters of personal hygiene. Not uncommonly barrenness is the consequence of leucorrhœa, and some women who find this out are more anxious to retain it than to do away with it. It is not desirable that the injections be used during the catamenia.

§ 187. The entrance upon her reproductive period of life in woman is almost invariably accompanied by a certain amount of disturbance of the general health; its cessation is not rarely, if not usually, accompanied by a considerable amount of erotic excitement, a period of active recrudescence of the generative instinct. Both periods commonly produce such disturbance as necessitates the calling in of medical aid. The first change, or

puberty, is frequently accomplished under the circumstances of rapid growth; and the double tax upon the system produces in many cases a distinct debility, which may lead ultimately to tuberculosis, or other wasting disease. Commonly there are recurring periods of lassitude, weight, and sense of dragging in each groin, before the menstrual flow is actually established. Under these circumstances it is advisable to counsel the patient to sit over a vessel containing hot water, or, if that be not sufficient, to stay in bed and have warm cloths applied to the vulva; this last is a powerful means of exciting a flow from the genitals, and is useful not only at puberty, but at other times when the catamenia have been checked, as by cold; and it is especially useful in any arrest of the lochia. (In the last case the application of hot cloths without delay, on the arrest of the lochial discharge, will often avert a grave condition.) If these measures are insufficient, it is usual to give iron with aloes. There is no doubt but that iron acts locally in these cases, as well as increasing the amount and improving the quality of the blood. In many cases the addition of savine oil is a satisfactory measure. Savine is a powerful irritant and oxytoxic agent, and is used in toxic doses to procure abortion—a result which it brings about, partly by its general action as an irritant poison, partly by its local action. In small doses it seems to maintain a condition of vascularity in the generative organs. It is usual to combine these measures in a pill as follows:—

Fer. Sulph. Exsic., ℈i.
Ol. Sabinæ, ℥i.
Pil. Al et. Myrrh. ℥iii.

to be divided into sixty pills, one to be taken twice a day after meals. This is an old and excellent formula. It is desirable to give such a dose of aloes as shall produce slight purgation, especially on commencing the course of iron. This last is an important matter for the attainment of success. These pills may be continued until the catamenia are established, together with warm hip-baths; and the employment of the measures mentioned above, whenever there are the usual premonitory symptoms of the catamenial flow being about to come on. The catamenia, not rarely at first, are irregular in appearance and in quantity,

especially in some delicate girls; in others, again, they soon are profuse, and too frequent. When the patient is a robust and plethoric girl, the induction of the catamenia is often difficult and protracted, and in such cases active general depletory measures, and the application of a leech or two locally are indicated.

In other girls, again, especially in those that are delicate, or anæmic, the delay in the appearance of the catamenia is rather beneficial than otherwise, and need excite no apprehensions. Mothers, especially of the humbler classes, are always anxious about the establishment of this function. They know that the non-appearance, or disappearance of the menses is often associated with the initiation of tuberculosis, or "decline" as they term it, and if the flux is initiated or restored it gives them much comfort. Important as the catamenial flow is in reality, women attach an undue importance to it and its derangements.

Where the pills given above cannot be taken, then the old mixture of Mistura Ferri and Decoct. Aloes Comp. may be prescribed; this is a potent but nauseous combination. No purgative is so good as aloes for its effects upon the reproductive organs of women. In small doses it excites the hæmorrhoidal vessels, and when so given with iron it is most useful in amenorrhœic states; when given in full doses it acts freely on these vessels, and when combined with other purgatives, especially cooling saline purgatives, relieves uterine and ovarian fulness famously.

§ 188. The decline of woman's reproductive life is termed "the menopause." It is a very important epoch in a woman's career. It is then that constitutional exhaustion, as repeated childbearing, &c., shows itself in broken, disturbed health. Then it is that constrained celibacy reveals the strain to which the system has been subjected; and nymphomania, or imprudent and reckless attachments are common enough at this time. The insanity to which so many spinsters become subject at this period is usually erotic in its nature. There is a flashing out of the sexual instinct before it is extinguished, and woman becomes once more almost a sexless creature.

At times the disturbed health precedes irregularity in the catamenia, at other times menstrual irregularity of variou

forms precedes any disturbance of the general health. If there is a suspicion that this change is at hand—and an inquiry into the history of the patient's family in this respect will often give useful information—then it is desirable to place the patient under strict orders, and to guard the health most vigilantly. Even if there be no actual ill-health, it is well to take all measures to prevent any breakdown; the better the health of every woman on entering this period, the less will she suffer during it; if the health be broken to commence with, then there will be much suffering and ill-health ere it be accomplished. In the majority of cases the most watchful care is desirable, and the avoidance of illness is as important as is its relief. If the catamenia be profuse, it is as well to restrain this by astringent measures, as a little gallic or sulphuric acid in infusion of cinchona, a few days before the flux is expected; if this binds the bowels, it is well to combine with it a sufficiency of sulphate of magnesia, to keep the bowels open. It is often more efficacious to restrain the loss of blood, than to make up the blood during the interval by ferruginous preparations. There is one thing, however, to be borne in mind about the use of purgatives during the menopause, and it is this: all cathartics and laxatives must be combined with carminatives in considerable quantities, else they will certainly disagree with the patient. There is a great tendency at this time to flatulency, and, unless the purgatives are accompanied by full doses of black pepper, cayenne, peppermint, or some similar agent, each dose of medicine will cause flatulence and griping: the latter often to a very troublesome extent. The remembrance of this fact will often stand the young practitioner in good stead with an important class of patients. There is very apt at this time to be much palpitation, best treated by a little digitalis and bromide of potassium, or a belladonna plaster; dyspepsia, requiring a well-regulated dietary; constipation, to be treated as above; and a good deal of mental depression and neuralgia. If there is also, as not rarely happens, a profuse discharge, then the measures to be shortly mentioned as appropriate to menorrhagia, should be employed. For two or three years, in many cases, the health at this time must meet with the most sedulous care, and the results will well repay the attention so

bestowed. There is often a long period of good health and enjoyment of life after this stormy epoch, well worth the purchasing by a little extra care at the time.

§ 189. Arrest of the menstrual flux is always an important matter, and needs looking to. Not unfrequently there is a vicarious flow, complete or incomplete, as in hæmoptysis, for instance, or in hæmatemesis; and much needless alarm is often created thereby. At other times it is the result of exposure to cold during the period, or perhaps even of deliberate stoppage by some foolish girl in order to go to a ball or some other amusement. (Dr. Dewees.) Under these circumstances the disturbance of the general health is often considerable; but whatever it is, and whatever the measures adopted to relieve it, it must always be borne in mind that the most effectual of all measures is to restore the flux. If consulted sufficiently early the practitioner will do well to advise hot hip-baths, hot cloths to the vulva, &c.; if the flow can be re-established all usually goes well. If too late, or the efforts are unsuccessful, then the case must be watched, and when the next period becomes due, the same measures are to be repeated. If this were only sufficiently well known and practised, much ill-health and suffering would be saved. At other times the arrest is due to general ill-health, or confirmed anæmia. At times the loss of the catamenial flow seems to leave the system undepurated, as it ought to be, and normally is, thereby; and these retained excreta cause spanæmia, or the anæmia spoken of in Chapter III. as the result of impaired excretion. Under these circumstances it is desirable to resort to the measures given above in § 187. In cases of pronounced anæmia it is often well to add arsenic to the ferruginous medicines, in the form of the ordinary white arsenic, to the pill (last given), about a fortieth of a grain in each; or in solution to the mixture. Small repeated doses of arsenic are often of the greatest value in a course of steel and laxatives; and if such course does not seem to be beneficial, arsenic should always be added. In many cases amenorrhœa is an indication of failing health, and its treatment then merges into that of the general condition.

Scanty menstruation is often a normal condition, which should not be rashly interfered with. During rapid growth, or

pronounced anæmia, the loss entailed by the usual catamenial flux forms a drain it is well to permit to remain limited; and attempts to restore the flux until the system generally is equal to it are unfortunate, when they happen to be successful. If the treatment by tonics, chalybeates, and a liberal dietary succeed in restoring the menstrual flow, by producing general improvement, good and well; the reappearance of the discharge is a sign of good omen. But any attempt to restore the discharge *pur et simple* without regard to the general condition with which it is associated is harmful where it is not futile.

If amenorrhœa be persistent in spite of well-directed measures continued for some time, then it is as well to examine the patient to see if she be normally formed. It occurred to a friend of the writer's to so examine a patient, who had been under treatment for three years for delayed menstruation under another practitioner. This at once cleared up the difficulty—the girl had no vagina.

§ 190. Menorrhagia is a serious as well as common ailment among women. It arises in a variety of ways. It is causally associated with soft, luxurious beds; with the hanging of heavy skirts around the waist; with labour in moist, warm rooms, as seen in laundresses, and with toil in warm or close rooms, as seen in mill-girls and maids-of-all-work, who are more subject to menorrhagia than the servants of large establishments, excepting cooks; it is found as one of the consequences of cardiac failure with resultant venous congestion; it is not unfrequently the consequence of erotic excitement in young girls, and of imperfect, or unattainable, as well as excessive coition in adults; or it may be the result of some more serious condition, requiring the manipulative interference of the obstetric physician. In all cases it must be regarded with relation to its causation, if we wish our medicinal measures to be successful. Amidst the bulk of the profession, especially of the past generation, the matter of menorrhagia was too commonly ignored, or women were taught to regard it as a condition against which the therapeutic art was powerless. Never did a more profound mistake exist: for this ailment is one of the most tractable of maladies ordinarily; provided the treatment be thoughtful and judicious. What the different lines of treatment are will now be given.

One of the commonest forms of menorrhagia in out-patients'

rooms is that furnished by young girls, from fifteen to eighteen usually, who are unwell, and freely so, from five to seven days. There is nothing about them to indicate the necessity for, or the desirability of, such a drain. It is the outcome of erotic excitement, and not rarely of evil practices resorted to in order to procure relief. Under these circumstances the use of the hip-bath and astringents are inferior in value to the use of anaphrodisiacs, and especially of the bromide of potassium, or ammonium. These remedies lessen reflex conduction, and act strongly upon the peripheral ends of afferent nerves. Consequently there is less local sensation and diminished erotic feeling, as well as less centric activity, and as a result of this, less vascular excitement of the generative organs, and a moderate menstrual flow. In fifteen or thirty-grain doses thrice daily, bromide of potassium will exert a most powerful effect over the menorrhagia of the young, especially if at the same time the bowels be attended to by sulphate of magnesia with alkalies, the vehicle being camphor mixture, or if desirable a vegetable bitter. Not rarely a perfect suspension of the catamenia is the result, and in cases of rapid growth, &c., such a consequence is far from undesirable. The withdrawal of the bromide is soon followed by the reappearance of the flux. In many cases of anæmia in young girls, associated with heavy monthly losses, it is desirable to give some chalybeate remedy together with the bromide. The potassio-tartrate of iron goes well with bromide of potassium in these cases; and the bromide seems to prevent too much action of the iron upon the reproductive organs, while the iron tends to improve nutrition; or hydrobromic acid with quinine may be given instead.

In more mature adults, and especially in married women, menorrhagia is more commonly the result of debilitating conditions, or occasionally of excess. Under these circumstances another line of treatment from that described above is necessary.[1] The leading idea here is to moderate the loss by astringent and other measures, not anaphrodisiac. In order to produce the best effects, it is well to divide the treatment into two sections, viz., the treatment of the period and the treatment of the interval. To commence with the treatment of the period: it is well for the

[1] Under certain given circumstances the bromide treatment is indicated in elderly women, especially at the menopause.

patient to avoid all exertion, to keep as quiet as possible, and certainly to avoid all straining at stool. Then all food should be taken as cold as possible; tea, milk, soup, everything should be cold, or even iced. It is the common practice of women to drink hot tea as a stimulant in the depression produced by the loss; and the consequence is that while they experience an immediate sense of relief of a brief character, in a few minutes there is a profuse flow. The well-known effect of heat upon the heart, increasing its activity, as well as its effect in enlarging the calibre of blood-vessels, renders this result intelligible enough, as well as explaining the good effects of cold fluids. In addition to these measures it is well to give an astringent mixture, as the following:—

Mag. Sulph. ℈ii.
Ac. Sulph. Arom. ♏xx.
Inf. Quass. ℥i. ter in die,

regulating the amount of the magnesia to the requirements of each individual.[1] If there be much suffering, a few drops of laudanum may be added to the mixture. If the loss be still profuse it may be desirable to add at bed-time this pill,

Cup. Sulph. gr. ½–1
Pulv. Opii. gr. 1
Ext. Al. Aquos. gr. ii–iii.

and even to take it again first thing in the morning, if necessary. It is a point of moment to so combine the astringents with laxatives as not to lock up the bowels. If the loss be very profuse and persistent, the application of cold cloths to the vulva may be indicated. Just as hot cloths so applied increase the discharge, so cold ones tend to arrest any flow from the genitals: it is not desirable to apply these cold cloths unless the discharge has persisted for several days, and is profuse. Even cold astringent injections may be found necessary. If the menorrhagia has existed for some time it may be found a good plan to commence the treatment of the period a day or two before its

[1] Sulphate of magnesia exerts an astringent action elsewhere than in the bowels. t can thus often be profitably combined with astringents.

actual appearance, whether the case be one for astringents or anaphrodisiacs.

Next, we come to the treatment of the interval. If there be leucorrhœa, astringent injections must be assiduously practised, as given in § 186, during the whole interval betwixt each period. The patient must sleep on a hard bed, with but light bedclothes; no treatment is efficacious if the patient lie in soft feather beds, which heat the pelvic organs extremely. The bowels must be kept open, and in many cases, especially where there is much neuralgia, facial or intercostal, chalybeates must be combined with laxatives. It is not improper to give iron in menorrhagia, but it is desirable to restrict it to the interval, and to use some astringent form.[1] In many cases a few drops of digitalis, or a dose of Liq. Ext. Ergotæ, may be added to the mixture, both during the period and the interval, with advantage. Dickenson found digitalis very useful in such cases. In the case of married women it is often well to forbid all marital intercourse; otherwise, the treatment is often inefficacious. By the union of these different measures, and a watchful attention to the case so as to make the different changes as soon as ever they are indicated, most cases of menorrhagia can be cured, or at least much relieved. When it is the result of heart-failure, then digitalis and tonics should be exhibited freely.

There is, however, one class of menorrhagic women whose malady is extremely intractable. They are usually stout women, with large and full abdomens. They are usually troubled with flatulence, and have either constipation or diarrhœa. They are either widows, or their husbands are either partially impotent, or away for long intervals. In some cases coition is imperfect from the use of the condom. In almost all these cases there is enlargement of the womb, always excessive menstrual flux, and usually leucorrhœa. That such cases should be intractable is no matter for surprise. The patients, however, are generally little benefited by treatment; they are pleasant patients enough, but, in my experience, there is but little to be done for them. The condition takes its origin in local derangements themselves, arising from causes which do not admit of removal. (See p. 273.)

In the treatment of menorrhagia, no matter of what form, it

[1] Aveling finds arsenic very useful in menorrhagia.

is always a good plan to relieve the anæmia and improve the general condition, by moderating the loss. If this be not checked the state of anæmia is perpetuated; the making of blood during the interval is rapid, especially under the spur of chalybeates, and thus a condition of alternating loss and swift repair is instituted. For such a state it is much better to substitute a more even and regular condition; and this is often best secured by checking the loss, and not spurring on blood formation in the interval. There is another point, too, worth remembering in the matter of menorrhagia, or any uterine hæmorrhage, and it is this: syncope is the natural treatment of hæmorrhage; and when there is profuse loss, this is not to be treated as an evil. The patient should be allowed to faint, and to come round again quietly. It has fallen to my lot to see such hæmorrhage met by lifting the patient up, or propping her up, and dosing her with brandy till she nearly died of loss of blood. The spirit acts upon the heart, more blood is pumped into the arterial system, and then drains away; and a much more profound blood-loss is so secured than if the patient were to be left alone, and nothing but iced water, or iced lemonade, with a few drops of dilute sulphuric acid, administered. The raising of the head induces cerebral anæmia, by the falling away of the blood into the unfilled vessels of the trunk and abdomen, while the blood drains away all the more from so falling away by gravity. The head should be left low and the feeling of faintess, or actual syncope, should not be relieved by the exhibition of alcohol. (P. 215.) This rule holds good of hæmatemesis and other forms of internal hæmorrhage. The injection of cold water into the bowels is often of service in the case of internal hæmorrhages. Astringents and cold are excellent agents, but these are much more efficacious when combined with thought and a fair knowledge of physiology.

§ 191. Dysmenorrhœa is a painful and distressing condition. It may precede or persist through the menstrual period. Usually it precedes the appearance of the discharge. The pain is often so acute as to cause the sufferer to roll about the floor in agony. The treatment ordinarily adopted in all countries is to give alcohol with hot water under these circumstances. The relief so afforded is often very great, so much so that the late Sir James Simpson asserted that this constituted the worst feature in the

treatment. The relief afforded by alcohol in this condition, he asserted, was one of the commonest causes of ultimate excessive indulgence in alcohol by women. Having learned to resort to it then, he declared they were led to resort to it at other times; and he advocated strenuously the use of any other stimulant than that which is at hand in almost every sideboard. Sal volatile, spirits of chloroform, anything, indeed, but alcohol, he advised, as being equally efficacious, and being free from the dangerous allurements of the other. Amidst women there exists a widespread belief in the virtues of penny-royal in painful menstruation. The Oleum Pulegii is a harmless remedy in ordinary doses, and a few drops at these times may be recommended with advantage, especially as orthodox medicine has nothing to substitute for it. Hot drinks, the warm-hip bath, or warm cloths to the vulva, are all useful, to some extent at least. When there is a membrana decidua thrown off at each period, a process like that of parturition is unavoidable. For its relief special obstetrical treatises must be consulted. At other times, dysmenorrhœa arises from too narrow a cervix; the treatment here also is beyond the sphere of the present work. Not rarely dysmenorrhœa is the consequence of latent gout—is one of its manifestations, indeed. Here the treatment for gout is necessary for the relief of the local malady.

There is much more that might be said about certain conditions of the reproductive organs in women, as about misplacements of the uterus, &c. It is obvious that when misplacement of the womb is the cause of any unpleasant symptoms, its replacement is the rational practice. How this is to be done, and what are the lines of treatment of many maladies incidental to pregnancy, the management of the act of parturition, and of the puerperal state, cannot be entered upon here. All that may be said is that in pregnancy many of the troubles arise from irritation caused by the enlarging womb, and then—the cause not admitting of removal—it is desirable to check nerve-conduction, and arrest reflex action by the administration of bromide of potassium, hydrate of chloral, or those other remedies which we have seen in Chapter XIII. to diminish action in the nervous system. In the vomiting of pregnancy it is also of moment to give the food in such small quantities at once that the stomach

will tolerate its presence, reducing the amount to what the stomach will tolerate, no matter to how small a quantity it must be diminished. By perfect quietude in bed much toleration is given ; as well as the wants of the system being thus reduced to a minimum, and the necessity for food thus being lessened.

The proper management of the troubles to which women are liable in consequence of their sex is of the utmost importance to all, and especially to young practitioners.

CHAPTER XIX.

THE CUTANEOUS SYSTEM.

§ 192. Before considering the diseases of the skin, it will be well to review some matters concerned with its physiological function as a secreting and excreting organ. The skin is not merely the sensitive covering of the body, but possesses great functional utility. We saw in Chapter III. that in lowly forms of life the outer surface is also the general excretory surface, and that the various specialised excretory organs of higher life are but involutions of the general tegument; preserving in the midst of their specialised action more or less of their primitive function, and so capable of supplementing each other's action when deficient or arrested. The skin aids the lungs in the excretion of carbonic acid when the lungs are disabled by disease. It also possesses, to a large extent, the same power to excrete nitrogen that is usually assumed to be the peculiar property of the kidney. The power of the skin to excrete urea has been alluded to at p. 55, and Carpenter says (§ 420, *op. cit.*) "There is reason to believe that at least 100 grains of azotized matter are excreted from it daily; and any cause which checks this excretion must throw additional labour on the kidneys, and will be likely to produce disorder of their function." Thus we act freely upon the skin when the kidneys are insufficiently active, or crippled by disease, and so unequal to their duty of blood depuration. It will not be necessary here to pursue further this subject of acting upon the skin as an excretory organ; it has been fully discussed in Chapter III.

In Chapter IV. the utility of the cutaneous surface in dissipating heat, in maintaining a normal temperature in health,

and in reducing pyrexia, was reviewed. The loss of heat in the evaporation of the water thrown out by the sudoriparous glands is very considerable ; and consequently in pyretic conditions we not only attempt to reduce heat-production, but we also essay to increase the heat loss by exciting further activity in these glands. For these ends we resort to a class of agents termed diaphoretics.

The Theory of Diaphoretics.—The means of acting upon the skin so as to increase the amount of fluid excreted by the sudoriparous glands, are various. They include the application of external heat and the administration of certain medicinal agents. H. C. Wood states, "The skin undoubtedly eliminates medicinal substances," but we do not administer diaphoretics so much on the hypothesis that these agents produce diaphoresis by exciting the sudoriparous glands into activity for their excretion (the mode of action of some diuretics on the kidney), as that they exercise some action through the nervous system, especially the vaso-motor system, and so excite diaphoresis. The nerve arrangements of the cutaneous vessels, and the sudoriparous glands, have not been sufficiently thoroughly investigated for any very positive statement on this head. There is, however, no fact in therapeutics better established than the diaphoretic action of aconite, antimony, opium, and guaiac, &c. Some diaphoretics are also nauseant and depressant agents, lowering the circulation as well as increasing activity in the sudoriparous glands. Under conditions of depression there is a tendency to perspiration, and in great anxiety there is an increase in the amount of water exuding through the skin ; as seen so frequently in candidates for examination when before the examiners. "The secreting action of the skin is influenced by general conditions of the vascular and nervous systems, which are as yet ill-understood. It is quite certain, however, that through the influence of the latter the secretion may be excited or suspended ; this is seen on the one hand in the state of syncope, and in the effects of depressing emotions, especially fear, and its more aggravated condition, terror ; and on the other, in the dry condition of the skin during states of high nervous excitement." (Carpenter.) In syncope and in angina pectoris beads of sweat collect on the pallid skin, and demonstrate that perspiration does not necessarily

depend on a highly vascular condition of the skin, but that it may be found where the skin is blanched and cold, from lack of arterial blood. The nerve arrangements of the sudoriparous glands have only yet been partially demonstrated, but it seems very probable that these glands possess secretory nerves which may be acted on, and excite secretion, without any necessary apparent increase of vascularity in the skin. The large plexus of capillaries at the base of each sudoriparous gland enables this to be brought about.

On the other hand, there may be great cutaneous vascularity without any action of these sudoriparous glands. Leyden found that there was no fluid given off by the skin in rising fever (Wunderlich's *Thermometry*, p. 190), and this loss of perspiration is one of the causes of the pyrexia. It is quite clear that vascularity of the skin and perspiration do not necessarily go together; though they usually do, as seen in the moist and glowing skin produced by muscular activity.

The most powerful medicinal diaphoretics are depressant agents. There are others which are not so depressant, as acetate of ammonia, ipecacuan, sweet spirits of nitre, and salts of potash. But in pyretic conditions with a dry skin these agents possess little power; there aconite and antimony are far more potent. When it is desired to utilize the action of the skin for the lowering of temperature we resort to these depressant diaphoretics; when we wish to excite it for excretory purposes, the warm bath is to be preferred. The application of external heat is the best mode of inducing perspiration with normal temperatures, and is not much resorted to in the treatment of pyrexia, except in children, and in conjunction with depressant diaphoretics. Diaphoretics are used in all conditions of pyrexia, especially with a dry skin, and are very useful in the acute diseases of the respiratory organs. Thus in bronchitis great relief is experienced when the skin acts freely. The state of turgescence in the bronchial mucous membrane is relieved thereby, and secretion follows. It seems necessary in all cases of vascular turgescence in secretory surfaces to give vascular depressants in order to secure secretion. This is alike seen in the dry, swollen mucous membrane of the air-tubes in the first stage of bronchitis, and the dry, burning skin of febrile conditions. The secreting

nerves of the sudoriparous glands seem to be most powerfully acted upon by depressants, whether emotional or medicinal.

Opium is a powerful sudorific, especially when combined with a depressant like antimony. In opium poisoning the skin is blanched, cold, and bedewed with perspiration. On the other hand, in belladonna poisoning the skin is vascular, dry, and burning. We saw in Chapter XIII. that opium and belladonna possess opposite properties in their effects upon the nervous system. It would appear that all agents which excite nervous action produce a condition of the system unfavourable to activity of the sudoriparous glands.

The application of external heat is a ready means of exciting perspiration; but George Johnson says that in the dry, imperspirable skin of some subjects of chronic Bright's disease, the application of cold is required to paralyse the contracted blood-vessels, and so lead to subsequent dilatation of them and cutaneous secretion.

The most remarkable sudorific, we know of, is the newly-introduced jaborandi. It would appear to be a true specific diaphoretic, possessing a special power over the scretory nerves of the sudoriparous and salivary glands. It is a most potent agent for the purpose of producing perspiration. Something further will be said of this agent in the Appendix.

Diaphoretics constitute a large class of remedies of much importance in practice. The depressant, or nauseant members of the group are those best suited for the treatment of pyrexia; while for other conditions the less depressant members are better fitted. Thus in chronic bronchitis of rheumatic or gouty associations, iodide of potassium, with guaiac or serpentary, is a very good measure. (This is one of the medicinal agents which have been found in the sweat.) In conditions of renal inadequacy salts of potash are always to be combined with diaphoretics; and with many persons potash salts are as diaphoretic in summer as they are diuretic in cold weather. They aid in the efficiency of the hot bath when required in conditions of uræmia, or lithiasis.

At other times the skin acts too profusely; and the excessive perspiration is objectionable, and a source of much exhaustion. Sweat is usually acid, but when profuse becomes neutral, or even

alkaline.[1] "With an increase in the quantity of fluid excreted by the skin there is also an augmented excretion of solids; and to the deficiency which is thus produced in the salts of the blood may be partly assigned the debilitating effects of profuse perspiration." We are all familiar with the great exhaustion caused by profuse sweating in hectic fever, and especially when associated with phthisis. In conditions of great debility profuse discharges, especially of the skin and bowels, are apt to show themselves, and are most serious. The term colliquative is applied to these discharges, and of old it was said that the tissues of the body were melted down, and discharged from the system in these profuse excretions or secretions. Even when not so excessive, sweating and purging are often troublesome matters, causing much exhaustion. In affections of the lungs nocturnal perspiration is one of the most serious matters we have to contend with. In very many cases the arrest of the profuse perspiration at once inaugurates an improvement in the general condition. This brings up the subject of anhydrotics.

Theory of Anhydrotics.—It is here necessary to make a word. (Hydrosis is profuse perspiration, and by the addition of the alpha (*a*) privative we readily reach the adjective anhydrotic.) The anhydrotics are a very valuable and important group of remedial agents. This group includes astringents, vegetable and mineral, both salts and acids, phosphorus in various forms, and lastly and chiefly, belladonna. We saw before (p. 296) astringents possess decided properties, but the explanation of their action is not yet furnished to us. They are soluble matters, and wherever there is a profuse flow there they are of course found, and exercise an arresting influence. Sulphuric acid, sulphate of copper, pernitrate of iron, acetate of lead, oxide of zinc, gallic acid and tannin, are all useful in checking profuse perspiration. The action of phosphorus is also pronounced, and as phosphoric acid, and in the form of hypophosphites, phosphorus is very useful in the treatment of phthisis. But the most pronounced anhydrotic we are yet acquainted with is undoubtedly belladonna. This drug may fairly be termed a specific anhydrotic; and it is almost certain that it exercises its effects by some special property and

[1] "That it is a true secretion and not a mere transudate, is shown by the entire absence of albumen."

influence over the secretory nerves of the sudoriparous glands. Atropia arrests secretion in the salivary glands, and acts specially on the submaxillary gland through its secretory nerve—the chorda tympani. Galvanization of the chorda tympani is powerless to excite secretion in the gland after the administration of belladonna. Heidenhain (Pflüger's *Archiv.* vol. v., p. 40) indicates that other glands, the secreting nerves of which have not yet been found out, may be affected by belladonna, as is the submaxillary gland. Certainly belladonna arrests the action of the sudoriparous glands, even when a red rash is produced by it; showing that even with increased cutaneous hyperæmia there may be not only no increase, but actually an arrest of perspiration. Ringer, to whom we owe so much of what we know on this subject, found in belladonna poisoning jaborandi did not act. The antagonism of action of these two drugs on the skin and salivary glands is alike interesting and instructive. So is the opposite action of opium and belladonna upon the skin. That belladonna possesses some direct action upon the sweat-glands is demonstrated by its utility as a local application, as in perspiring hands, &c. Belladonna liniment, or a solution of atropine, produces an arrest of the activity of the sudoriparous glands of the area to which it is applied.

Something here may be said as to the practical application of belladonna in hydrosis. During the intensely hot week, July 16th to 23rd, this year, at Victoria Park Hospital, out of a total of 300 out-patients, seventy-four were taking belladonna in the forms mentioned at p. 186. The effects were most marked, and any doubt that might remain as to the connection betwixt the use of this drug and the arrest of the perspiration, was dissipated by the return of the sweats in those who had omitted their attendance the previous week, and so were without their medicine.[1] The doses given were from $\frac{1}{75}$th to $\frac{1}{25}$th of a grain of atropine, and from xx. to xxx. minims of tincture of belladonna. The larger doses were not given at first, but where the smaller doses were found ineffective. Where there is an apparent tolerance of the drug, larger doses were required, and did not produce such

[1] The profuse sweat did not return for two or three nights after the medicine was suspended, showing that the effect of belladonna, as an anhydrotic, goes off slowly at pretty much the same rate as it comes on.

toxic symptoms as might have been anticipated. Out of these seventy-four patients one only complained of some dryness of the throat; one had some derangement of the pupils; and a third complained of some indistinctness of vision on first getting out of bed in the morning, but quickly wearing off. In the early stages of caseous pneumonia, belladonna appears to me to alter the whole aspect of the case in many instances; and to stand on an equal footing with digitalis in weak action of the heart. By cutting down the exhausting perspiration, the case altogether changes its features. In patients sinking in the more advanced stages, belladonna exercises much less effect; but further experience may show that in larger doses than used hitherto, it may be more effective—in giving partial relief at least.

It is not in the hydrosis of lung disease alone that belladonna is useful; it is equally effective in profuse perspiration with other associations. Hydrosis is always found with conditions of adynamy, which it distinctly tends to aggravate. Consequently the use of anhydrotics should always go hand in hand with the exhibition of tonics and hæmatics. Fuller counsels some food and an alcoholic stimulant at bedtime as useful in the nocturnal perspirations of phthisis.

Hyoscyamine in composition and action is closely allied to atropine.

§ 193. The diseases of the skin, from their ready appeal to the eye, have always rather been regarded as forming varieties, allied to each other by points of resemblance, than looked at from the point of view of their causation. It is only recently indeed that it has become the rule to investigate the causal associations of other maladies of the skin than those of syphilitic origin. And yet this is the only plan by which the student can ever get beyond the mere recognition of the form of the disease, and the proper application of one of the many synonyms which now exist for each form and even variety of skin affections; or the use of the routine remedies as mercury, tar, alkalies, sulphur, or borax. In order to comprehend the affections of the skin and the indications for the treatment of each, it is necessary to remember and to recognize the structure, the function of the skin; and its liabilities to injury, and to parasites in consequence of its being our external covering.

The skin is a very vascular organ and is thus liable to variations in its blood-supply, to anæmia or to hyperæmia, and as a consequence, to many maladies which take their origin in malnutrition, such as pemphyus; and to others the result of excessive nutrition as molluscum fibrosum, icthyosis, corns, &c. It is also liable to acute morbid conditions covering a considerable area, as erythema and erysipelas, or more specially localized as furunculus and carbuncle. As to these acute conditions they have to be treated on the general principles laid down in the preceding Chapters IV. and IX.; and, then, if a large surface is involved, either some agreeable external application, as cotton-wool, flour, or warm lead and opium lotion, or other soothing mixture must be adopted; or, if the disease be local, it is well to pass a knife through and through the inflamed mass, so as to relieve the different nerve fibrils from the pressure of the new growth, or cell accumulations, and the consequent pain. The acute affections of the skin present comparatively few points of difficulty for the student, or young practitioner. The more chronic maladies of perverted or defective nutrition, and of hypertrophic growth are much more troublesome affairs. They must be looked at from several points of view. Defective nutrition of the skin is commonly associated with general defective nutrition, but not necessarily so. On the other hand, local pervertions of nutrition, even of a hypertrophic character, are not necessarily incompatible with low general nutrition; nor are they always associated with a full habit of body. In all cases it is as necessary to take into consideration the general condition of the individual as it is to recognize the peculiar characters of the eruption, or to select a form of external application. It is simply impossible here to attempt to give any detailed account of the various affections of the skin; and to give a mere list of names under the headings of imperfect or excessive nutrition would be useless, if not absurd and often incorrect. The point here insisted upon is, that it will not be found a successful practice to merely refer the disease to its proper position in the classification of skin affections, and then to treat it by routine; according to what is said to be good in that particular malady in the text-book to which the practitioner refers, or in which he puts his confidence. Doubtless he will find there an account of what external

measures experience has found to be useful in each form of disease, and allusion to general measures, as tonics, alteratives, and cod-liver oil. But he will easily recognize the fact that this information is of slight value, unless he can see what portions of the general directions apply to the particular case before him. In impetigo, for instance, it is often well to give arsenic internally; but in many cases this will be found inoperative unless at the same time the diet be liberal and cod-liver oil be added. In other cases, repeated small doses of mercury may be requisite, especially if the ailment occur in the subject of congenital syphilis. The external application of some mercurial ointment here is probably proper enough, whatever the special form of general treatment indicated. In the out-patients of hospitals the skin-affections are exceedingly often the outcome of dirt, squalor, and malnutrition. Cleanliness and an improved dietary are as necessary to the successful treatment of a number of different skin affections, which are free from any parasitical origin, as in those whose ailments are so causally associated.

§ 194. A large proportion of skin affections are, as the Germans have long insisted, linked with disturbances of the abdominal viscera, and especially of the digestive tract. Tilbury Fox in his last edition of his work on Skin Diseases says, "There are four organs whose derangement excites or intensifies skin mischiefs. The stomach, the liver, the kidney, and the uterus. In the vast majority of cases it is rather intensification than excitation that the practitioner has to deal with. First, as to the stomach; of course, if the stomach fails in its work the general health will suffer, and so the skin will be less able to resist disease or to undergo repair; but there is a more direct influence upon cutaneous diseases than this. My own belief is that wherever there is excess of acid secretion, or where the secretion of gastric juice is altered from a healthy standard, there, probably, from the circulation of acridities absorbed by the intestinal tract, cutaneous inflammations and hyperæmias are intensified, as in the case of the simpler erythemas of children, which are thereby produced. But again, stomach irritation, especially in subacute dyspepsia, is reflected to the skin, especially that of the face, and excites glandular or erythematous changes, as in acne and erythema of the face. The face flushes

after meals where digestion is badly performed, and an exaggeration of this condition is observed in acne and erythema, in connection with marked dyspepsia. Of course a predisposition to acne, with exposure and irritation of the face by externals, are elements in the cause of acne, but practically, if treatment removes the dyspepsia, the disease often goes. It is not difficult to see that if the face of the patient is predisposed to acne, dyspepsial troubles reflected to the face may actually excite or determine the occurrence of the acne. Pretty much the same may be said, *mutatis mutandis*, as regards uterine irritation in women. It is a matter of very common observation that uterine troubles aggravate erythema of the face, urticaria, and so on. Now as regards the liver. It is needless to give proof of the truth of the statement that 'poisoned blood'—blood, I mean, charged with any effete products—when passing through an inflamed skin, say that of eczematous persons, or of an urticaria patient, will tend to still further derange the skin of that particular subject; and blood is often charged with bile products, and tends, as in urticaria and eczema, to intensify the inflammatory symptoms, and to retard the cure. This is often seen in children who have white stools and who suffer from eczema. In the connection between phlegmonous or carbuncular inflammation and the diabetic habit, it is possible again to trace the influence of a disordered liver—supposing that to be the organ directly concerned in the production of sugar—on skin diseases. Lastly, as regards the kidney, there are two ways in which this organ may influence skin diseases; the first, by the non-removal of watery fluid in proper quantities, whereby the occurrence of œdematous infiltration is favoured, as is often seen in eczema in the legs of the old; the second, by non-excretion of nitrogenous matters, leading to impurification of the blood, and the circulation of urea, uric acid, and the like, in unusual quantities, through the inflamed or diseased skin, giving rise to increased hyperæmia. The latter happens in psoriasis, eczema, and other diseases. Of course organic diseases of the stomach, liver, and kidney involve functional disturbances, and so far bring about modifications of skin diseases indirectly, as do purely functional disturbances of these organs. From what I have said the reader will have no difficulty in understanding that skin diseases

require to be regarded, not only from a purely surgical point of view, as some are wont to assert, but also from that of the physicians." (Third Edition, pp. 10—11.) This rather lengthy quotation expresses almost exactly the view it is desirable to impress upon the reader. Of the relation of the skin, and its affections, to the stomach and digestive canal there is no doubt, and our old empirical plans of treatment have always insisted upon attention to the *primæ viæ* in skin affections. Laxatives, alkalies where there is acidity, tonics, regulation of the diet, &c., all are of the greatest importance in the treatment of diseases of the skin. Where there is a cachectic condition, then arsenic, some preparation of mercury, or the excellent combination known as Donovan's Solution may be desirable, as well as ferruginous agents. In strumous conditions potash and iron with cod-liver oil are the best measures.

As to the relation of skin affections with disturbance or inaction in the liver and kidneys, one is inclined to hold that the affections of the skin are causally connected with the non-elimination, or excessive presence of nitrogenized matters in the blood. The skin has much to do with the elimination of these matters, and it seems very probable that many of the skin affections, especially eczema, found under these circumstances, are the direct consequences of this function of the skin. These matters either act as irritants (Dr. Fox's view), or the skin becomes affected by its functional activity in excreting them. In the latter case the skin disease finds its origin in the condition of the blood, laden with waste; and not merely that already existing skin affections are aggravated by the imperfectly depurated blood. As a matter of fact, however, the relief of the internal organs, and especially a reduction in the amount of nitrogen consumed, together with alkalies and chiefly potash, at once relieve these skin affections and often secure a speedy cure.[1] In some disorders of the liver there is an excess of lithates in the urine, and therefore in the blood first, and these no doubt irritate the skin; so that in reality liver disturbance may produce the same consequences as imperfect action of the kidney.

[1] Such are the measures to be adopted for the relief of the terrible itching found in many cases of jaundice, and in the prurigo senilis associated with imperfect renal action.

In each case the treatment usual in gout will relieve the skin affection—no matter whether it be eczema, an irritable ulcer, or prurigo. Very often alkaline applications, as in eczema, aid the general measures in giving relief. A large proportion of the visitors to such spas as Buxton, Aix-la-Chapelle, Carlsbad, Sarratoga, &c., suffer from skin diseases, and are relieved by the waters, as effectually as are any of the sufferers from the other forms of lithiasis. The habits of the rich lead to certain forms of skin affections, as certainly and surely, as the improper food and neglect of hygienic arrangements of the poor lead to other forms. In cases of biliary disturbance with lithates in the urine the following will be found very useful as an internal remedy :—

℞ Mag. Sulph. ℈ i.
Sod. Pot. Tart. ʒ i.
Tinct. Nuc. Vom. ♏ x.
Inf. Buchu ℥ i.

or

℞ Decoct. Aloes Comp. ℥ i. ter in die.

§ 195. The association of the cutaneous manifestations of syphilis with the saturation of the system with the syphilitic virus, forms material for a good deal of thought about the relations of skin affections to constitutional conditions. How far the disturbances of the tegument can be regarded as depurative measures calculated to restore the system to its integrity, is a matter about which we can not at present be certain. There is no doubt that syphilis is much milder in hot countries than in cold ones ; indeed, Hebra points out the excellent effects of a sojourn in hot countries over the progress of an attack of syphilis ; and also that hot baths are excellent measures during the secondary manifestations of this disease. When there is a good eruption in the secondary stage there is frequently less of remoter consequences than where the eruption is slight and fitful. Indeed it would almost seem that a good crop of cutaneous secondaries eliminates the poison thoroughly and leaves the system free. The cutaneous outcomes of syphilitic infection are seldom treated by local applications, but by general treatment almost entirely. No one dreams of applying mercury outwardly only, but saturates

the system generally with the drug. In no form of skin disease do we see so practically exemplified the dependence of these maladies upon a general condition, as in the treatment of cutaneous syphilitic manifestations. Of course it is not asserted that local applications are utterly without value; but no one would dream of relying upon them, or even of attaching much value to them, as compared to the administration of mercury by the mouth, or by inunction over a limited area. In the same way, in cases of congenital syphilis, where an infant will come out suddenly in almost one sheet of eruption, the treatment is to give mercury internally; and to leave the eruption alone as regards any external applications. In the remoter cutaneous outcomes of syphilis, the application of mercury locally is desirable; but in all cases it is subordinate and ancillary, and thoroughly so, to the general treatment. The lessons taught us by the treatment of syphilitic eruptions, ought to lead us to think more exactly about the treatment of other skin affections, and of their connection with general conditions.

§ 196. At other times skin eruptions are distinctly associated with the nervous system. This is most distinctly seen in herpes zoster which follows closely the distribution of an inter-costal nerve, or, in more severe cases, several nerves. This form of vesicular disease is not only preceded in many cases by severe neuralgic pains, or pleurodynia, which sometimes remain after all eruption has passed away; but Bärensprung and others have found distinct changes in the nerves going to the part affected. This association of herpes zoster, with changes in the nervous system, must always be borne in mind in practice; and while the eruption may be treated with a solution of the bichloride of mercury, or other external application, tonics, iron, and quinine, must be given freely, and the dietary must be liberal. If this general treatment be not followed out, not uncommonly the burning, stinging pain will survive the disappearance of the eruption, to the great suffering and annoyance of the patient. Herpes is not rarely found in ague, and is conjectured to be due to some disturbance in the spinal ganglia. It is also found under other circumstances, including the well-known association which exists betwixt herpes labialis and pneumonia, or catarrh. Clifford Allbutt is inclined to think that several other forms of

skin disease, as acne, eczema, lichen, psoriasis, and urticaria, are at times associated with visceral neuroses, and with asthma and gastralgia. He says, "We have learnt that in the higher animals nerve changes constantly precede changes of other tissues, not only in normal function and in normal growth, but also in abnormal function and abnormal growth." Many of the skin affections are doubtless at times the consequence of interference with nerve-nutrition rather than blood-nutrition; and then it is necessary to take into consideration, therapeutically, this association.

§ 197. In consequence of its being our external covering, the skin is liable to injuries and to the presence of parasites. These last are of various kinds, they may be animal or vegetable. Of the first, or animal parasites there are varieties; there are those which live outside the skin and are visible to the eye—the pediculi; a large class of articulata, which infest all varieties of creatures, fish, flesh, and fowl. There is one curious peculiarity about these objectionable and detested class, namely, that each species of parasite will only survive on its own peculiar hunting-grounds; the parasites of the Lascar will not live on a European seaman, and *vice versâ*. The other and larger visitors the pulex and the cimex, do not manifest this fastidiousness; still there are persons whom they avoid. Habits of cleanliness are destructive to these last-named parasites, and are hostile to the pediculi; but in the case of the pediculus pubis it is necessary to solicit their departure by the application of blue ointment, which, if applied effectually, leaves the whole host in the morning dead or dying. There is also another sadly common parasite, the acarus scabiei. Here the insect burrows in the skin and lays eggs along the channel. When the skin becomes vascular, as when exposed to heat, or in bed, then these creatures become specially active, while the vascularity gives greater sensitiveness: the result is intense itching. These animals have a decided intolerance of sulphur, especially in the shape of an ointment; and two or three complete applications of this unsavoury compound is usually sufficient for their annihilation. In all cases the clothes must be subjected to a high temperature in order to destroy the juvenile parasites, who are unusually tenacious of life, whether the eggs of the acarus or the pediculus;

and a temperature sufficient to coagulate their albumen is the only parasiticide which can be thoroughly relied upon. Some insect powders are most potent in their effects upon these small parasites. In other cases, as in that of the Guinea worm, the careful extraction of each invader is indicated.

At other times the parasite is a vegetable growth, as in favus, sycosis, tinea tonsurans, &c. In favus the scabs must be removed by poulticing, and then the hairs must be extracted and a parasiticide applied. The agents of all others destructive to vegetable parasites is sulphurous acid, either alone or in the form of sulphite of soda. In tinea tonsurans the destruction of the parasite by repeated applications of sulphurous acid is followed by the growth of the hair, which, however, may require some stimulation. In pityriasis versicolor, the parasite is the microsporon furfur, and it also gives way before repeated washings and the use of sulphites; but its most ready departure is induced by Goa powder, rubbed on with the finger in a little water; indeed the effect of Goa powder would seem almost magical. A curious form of disease connected with vegetable parasites is the Madura foot, or fungus foot, of India. The destruction of the foot so produced is such that amputation alone affords any substantial relief. This ailment is found only in certain localities, and in this respect resembles the Delhi boil (where, however, there is no parasite) and Pellagra, or Italian leprosy, which is due to eating maize which has become unsound or, rather, mouldy. Maize so changed produces skin affections in horses and fowls as well as man. A species of measles has been induced in America by mouldy straw.

At other times vegetable growths, and especially oidian forms, locate and flourish on mucous surfaces, as in the aphthæ or thrush, which forms in the mouth and on the fauces of debilitated infants; and which also finds a suitable home in the vaginal mucous membranes of neglected little girls, or of diabetic women. In the latter case these fungi keep up the discharge, and their destruction by sulphites is a necessary step towards the cure of the malady.

The whole treatment of diseases of the skin of parasitic origin is curious and special, and contrasts with those of constitutional origin in that external applications, often of a very special

character, are the chief measures to be relied upon, and the general measures are quite subordinate; while in the other class of skin disease, general treatment, often of a special character, as mercury in syphilis, is the great matter, and the local applications are comparatively inefficacious.

§ 198. One of the most curious and yet universal of skin affections is the corn. Few people who walk much are free from these growths. Their causation and growth are matters of practical interest, furnishing hints for their prevention or removal. They usually—that is the hard corn at least—appear at points exposed to friction, or to pressure. A growth of epidermal scales follows, like the growths on the labourer's hands, with this difference, in the latter case the thickened epidermis rises from the surface, and so protects the parts beneath, while it enables the hand to take a firmer grip; but in corns the surface is kept flat by the pressure, and so the epidermal growth is pressed inwards into the sensitive skin. There are two ways of getting rid of corns when established. One is to apply a saturated solution of sulphate of zinc to the mass until it is so dry that it peels off; the other is to dig out the conical mass with its little nutrient artery and vein, called by the vulgar "the root." By either plan the growth is got rid of; but if the pressure be still there the corn will grow again. Consequently, well-fitting, even tightly-fitting shoes of soft leather are indicated; by having them to fit closely the pressure is spread evenly over the whole foot; while if large, loosely-fitting shoes are worn the pressure necessarily falls on a few points. Relief may also be obtained by corn plasters, which are perforated circles, and are applied so that the corn may rise up in the central hole; and thus the tender part under the corn be relieved from pressure. A few weeks in bed, from any cause, is followed by relief from corns for a long while after. If the pathology of corns were only more thought over, they would be found much easier to remedy than is at present the case.

Another troublesome skin affection is the wart. Not the congenital wart of the face, but the wart which flourishes on the hands of growing children. This growth usually passes away when adult life is attained, but this is not always the case. The most effectual plan is to touch them with strong acetic acid, or

strong ammonia which soon destroys them. The secret of success, however, does not lie so much in the peculiar form of the different applications in favour, as in the method of applying them. The fluid should be applied with a glass rod or stick, so that half a drop or so of the fluid may be located on the wart. The hand should be so held also that the fluid can dry without running off. If too much be applied the fluid runs off, doing little or no good, and only irritating the skin around. If applied properly, warts can be destroyed most effectually by acetic or other acid, or strong ammonia.

§ 199. The skin is liable to solutions of continuity, or breaches of surface, known as ulcers. It is difficult to say anything briefly which is of any value about these maladies. They are essentially surgical matters, and require very special treatment; nevertheless, there are points about ulcers which come under the physician's province. A sore, or ulcerated surface may arise from almost any form of skin affection in debilitated constitutions, especially if much scratching has been practised. Such ulcerations are best met by tonics, by cod-liver oil, and good food. Occasionally a little arsenic, or mercury may be given with advantage. Of the ordinary ulcers there are several varieties. One is an indolent form where the raised edges of epidermal scales do not furnish ready growth. Here the removal of the thickened epidermal layer, by the application of a blister, is followed by renewed growth and formation of cicatrix. If there be a somewhat large surface to heal over, bringing the edges of the ulcer a little nearer together by strapping the leg, so as to take off the tension, will often induce further cicatrisation. The discovery of M. Reverdin of the transplantation of bits of skin, and their subsequent growth, has done much for the treatment of large ulcers. Good food, iron, fats, rest for the limbs, all are useful adjuncts. Sometimes the ulcer is very painful, and then it is termed an irritable ulcer. Here there is often a network of nerves at the base of the ulcer, which are very sensitive and interfere with repair. Their section with the knife gives relief and institutes repair. This is well known in fissure of the anus. At other times irritable ulcer is connected with lithiasis, and then it must be met by constitutional rather than local measures. When there is much standing, the veins of the legs are apt to

become dilated or varicose. An ulcer forming under these circumstances is very troublesome; but for the measures required for its relief the reader must consult some surgical treatise. There are minute attentions to details required, which do not enter into the scope of this work. In all cases keeping the skin warm is a matter of moment. The exposure of the legs to cold is as much a cause of ulcers as is their dependent position, and both these factors must be taken into consideration in any plan of treatment.[1]

At other times the skin, and especially that of the face, is liable to a persistent change in limited areas. Lupus is the term applied to this malady. It may, or may not go on to ulceration. If an ulcer forms, nitrate of bismuth ointment is often very useful. If the ulceration be persistent until a condition, not unlike a cancerous sore, is induced, then escharotics are indicated. If there be no ulceration and but a disfiguring blotch exists, it may be removed by caustics. Any one who has seen Hebra proceed to attack lupus must be convinced of the necessity for active measures. He first energetically rubs caustic potash on the epidermis of the mass. Then he removes the loosened epidermis with charpie, and having thus exposed the morbid growth, he applies lunar caustic in stick. As he remarks, it is of no use to apply the nitrate of silver until you have reached the disease itself.

Finally, skin diseases and their treatment must be learnt by actual practice; and arrangements are now made in most schools for their teaching. At the same time there is much to be done by rational therapeutics even in this domain, specially ruled over, though it be, by empiricism. Even in the matter of a scratch it is well to shave down the raised edges with a razor, so as to take off the projections which are sore to any touch; and by so removing them, and thus putting the parts at rest, the scratch heals more kindly.

A word, however, about fœtid feet. This is a very troublesome affection with some persons, and persists in spite of great personal cleanliness. Of the many plans of treatment in vogue, there is none more successful than that of washing the feet with soap and water night and morning, and then swabbing them

[1] Old persons often have ulcers from burning their shins before the fire.

with a strong solution of sulphite of soda, about an ounce to the quart of water. If this be accompanied by the changing of the socks, so that the same pair be not worn two days consecutively; and a similar arrangement be made with the shoes, taking care that during the time they are not worn to expose them freely to the air and still more to the sun; together with attention to the general health, and specially to the bowels, this repulsive affection may usually be treated successfully.

Affections of those modifications of the epidermis—nails and hair—scarcely permit of anything being said about them here.

CHAPTER XX.

THE LYMPHATIC SYSTEM.

§ 200. This system which is now to be considered is one of much importance; but it is one on which we do not yet possess a sufficient amount of information to be very explicit about the *rationale* of much of which we are assured by our every day practice. When there is an enlarged thyroid gland, a periosteal node, or an effusion into a serous sac remaining after an acute inflammation, we resort to iodine, with or without mercury, in order, as we say, to rouse the lymphatics. We all know that by these means we shall be able to remove, more or less completely, the abnormal matters. Early in the use of iodine it was asserted that the testes and the mammary glands were not unfrequently removed by the unusual absorption excited by the use of this agent. Nowadays we do not hear of these occurrences.

The system of lymphatics, by whose agency these ends are brought about, is a widespread system. It consists of multitudinous tubules extending over the limbs and permeating the tissues, which, at the axillæ and groins, have placed upon them glands, possessing, among other properties, a species of filtering action; after passing into the trunk the glands become more numerous, and the lymphatic vessels of the lower extremities open into the receptaculum chyli; and joining their contents to those of the chyliferous glands, the common fluid is poured into the venous system by means of the thoracic duct. The lymphatics of the left upper extremity and left side of head unite with the duct as it opens into the left subclavian vein. The right lymphatic duct, containing the fluid brought from the right arm and head,

opens into the right subclavian vein. Such is the anatomical arrangement of the lymphatic system. Why there should be collections of glands on the lymphatics at certain points, as the glandulæ concatenatæ of the neck, is yet unknown. Recent researches have shown that these lymphatics are evolved from mere spaces in the connective tissue of the body, which have become elaborated into a distinct system of vessels with definite coats, and an arrangement acting like valves. In reptiles there are pulsating sacs in this system, denominated lymphatic hearts. More recent researches have shown that the great serous sacs, the peritoneum, the pleura, the pericardium, and the arachnoid, are not merely smooth lubricating surfaces, admitting of movement without friction; but further are lymph spaces in intimate connection with the lymphatic system. There are also lymphatics in the sheath of each arteriole.

So much for the anatomy of the lymphatic system. To be equally brief, the physiology of this system is as follows:—It is by means of this system that the excess of nutrition to various parts of the body is restored to the general circulating fluid; instead of being wasted, or producing local anomalies of nutrition. Nutrition is furnished to the different parts of the body by the arteries, and still more intimately by the capillaries, from which last the nutritive fluid actually escapes. Some of this fluid passes back into the venous portion of the capillaries, another portion is taken up by the lymphatics. During this process the fluid has parted with some of its nutritive material for the support and repair of the tissues; and on the other hand has taken up the waste of these tissues. Part of the tissue-waste then passes away in the fluid which finds its way into the veins, the other part is carried off in the fluids of the lymphatics. In either case along with the waste there is much nutritive material; which is thus carefully economized and utilized to meet the needs of the system. It is obvious from this that in health, a balance must exist betwixt the supply of pabulum to the tissues and the removal of the excess remaining over after their wants are supplied.[1] The arrangements for maintaining this balance

[1] When there is venous congestion of organs, and the venous flow is retarded, the lymphatics cannot remove all the fluid effused from the capillaries, and so we get the development of connective tissue, so well seen in the viscera, in confirmed valvular disease of the heart.

are curious and interesting. They resemble, indeed, pumping arrangements. When a muscle is in great functional activity there is a free supply of blood to it, and the liquor sanguinis passes freely through its structure, supplying its wants and removing the waste; upon whose presence the sensation of fatigue depends. There is a much freer supply, indeed, than is the case in rest, and this extra supply passes off by the lymphatics in the sheath of the muscle; while the alternate contractions and relaxations of the muscle exercise a species of pumping action, by which the passage of the fluid in the lymphatics of the fascia is accelerated and aided. In the peritoneum the diaphragm acts as a pump, and the stomata found on the under surface of the diaphragm are the open mouths of lymphatic ducts, into which the fluid is forced. Similar stomata exist in the costal pleuræ, and every act of respiration—in one respect—resembles the stroke of a pumping-engine.[1] Such are the arrangements by which the nutrition of the system and the removal of waste are accomplished; the arteries supplying the nutritive fluid which finds its way back into the blood-current by means of the veins and the lymphatics.

§ 201. *Theory of Absorbents.*—These lymphatics then remove in a great measure the excess of nutrition, laden as it is with tissue-waste. Where there is a disturbance in the equilibrium, normally existing betwixt supply and demand, excitation of the lymphatics will tend to restore it. Such is the theory of absorbents. By means of iodine in its various forms, the most distinct and powerful absorbent with which we are acquainted, we excite the lymphatics into greater activity; and so reduce various tissue enlargements, especially such as consist of certain forms of connective tissue. Locally applied, too, these agents act powerfully, especially in connection with glandular enlargements. Thus in enlargements of the thyroid gland, especially those known as goître, or bronchocele, the hypertrophy is readily removed by the use of iodine in many cases. If, however, the enlargement be due to a cyst, or if it consist chiefly of enlarged blood-vessels, then iodine is of little use. But if it be mostly composed of adenoid elements, then iodine is efficacious. When, too, there is an accumulation of fluid in the great lymph spaces

[1] Ludwig and others.

after inflammatory action, iodine is very useful. But in the mere static accumulations of fluid in these spaces, from venous congestion due to cardiac failure, absorbents are useless; the disturbance of the circulation is too profound to be affected by acting on the absorbents alone. If the heart can be stimulated into greater activity, and the balance of the circulation be somewhat restored, then absorption may once more take place efficiently. Also in those perversions of nutrition in the direction of excess, such as we see in the periosteal node, iodine is very useful; but, as is well known empirically, it is of no avail to resort to iodine so long as there is much vascular activity in the part. As long as such activity exists it is useless to stimulate the lymphatics; the disturbance of balance in nutrition is not at that period to be remedied by acting upon the absorbents. But when the vascular activity has passed away, and the nutrition of the part has become once more somewhat normal, then iodine may be used with advantage; very frequently the absorption is very rapid, and a normal state of matters is once more reinstituted. Thus we can see the how and why of what empiricism has taught us. The action of the absorbents upon various forms of tissue is interesting and instructive. Over normal tissue they exercise but little effect; but over neoplasms they exert more influence. There is much difference in the neoplasms, however. Malignant forms of connective tissue are in no way affected by absorbent remedies. Cancer defies such action of the lymphatics. Ordinary growths of connective tissue, like fibroid tumours, resist the action of absorbents. But rapidly-growing masses of young connective tissue cells, such as we see in gummata and other syphilitic growths, are readily removed by means of these absorbent remedies. Nodes, gummata, growths in the nervous system, all disappear under the exhibition of iodine.

There is, however, one important matter in connection with the removal of these neoplasms by the use of absorbents, and that is the effect of mercury. Probably mercury acts upon the lymphatic system directly, standing in that respect next to iodine. But mercury has another action, which in the removal of such growths is most important, and that is its destructive action upon new growths. John Hunter of old

thought, and taught, that mercury acted upon abnormal and diseased parts with much energy, while it affected but little the healthy structures. There is a great deal in this, really and actually. Mercury does break down such growths, and the detritus is removed by the lymphatics. Especially is this the case where the syphilitic neoplasm is in intimate relations with lymphatics, or a lymph space. Witness the effect upon a sphilitic tubercle in the iris, produced by the administration of mercury. The anterior chamber of the eye is a lymph space, and under the effects of mercury this growth can be seen to melt away rapidly and thoroughly.

By the combination, then, of mercury, to break down structurally neoplastic growths, and iodine to stimulate the lymphatics, we can remove much excessive or perverted nutrition; which may be objectionable, either from the pain it produces, by the pressure it exerts, or from the abolition of nerve-function which its presence may induce by pressure, or compression of some part or portion of the nervous system. Such is the explanation, so far as the present state of our knowledge will permit, of the effects of iodine and mercury upon the glandular and lymphatic systems.[1]

We have long ago abandoned the idea, that by the use of iodine we can remove either hypertrophic muscular fibre, or the products of slow progressive parenchymatous inflammations. The reduction of hypertrophic enlargement of the heart by the use of iodide of potassium, which so moved our immediate predecessors, is now no longer thought attainable. That the hypertrophy, or rather its prominent objective phenomena, was removed by a course of iodide of potassium, combined with low diet, is intelligible enough. We have seen that most of the cardiac hypertrophy, unconnected with valvular lesions, is associated with a lithæmic condition, and the removal of waste nitrogenized matters by these means would lead to a lower arterial tension (§ 142), and so relieve the left ventricle: and then the objective signs of hypertrophy would pass away, and only a slight increase of bulk, no easy matter to determine even

[1] The old idea that there were no lymphatics in the brain is now known to be erroneous. Lymphatics are found alongside the arterioles in the perivascular spaces.

by careful percussion, would remain; just as the hypertrophy of pregnancy passes away after parturition. But we know well enough that this change did not, and does not occur by any action of the absorbents upon the muscular structure of the heart itself. In the same way the lymphatics are unable to remove the products of slow parenchymatous inflammations; and the recommendation to use ioduretted frictions in valvulitis, in order to remove the connective tissue which has distorted the valves of the heart, though met with even in some recent works, indicates not faith, but credulity. We now know that such statements are but the remains of that belief in the wonderful potency with which iodine was credited on its first introduction. In this respect iodine differs not in its history from that of other potent agents; the miraculous powers which are at first attributed to them, settle down in time into a sober estimate of the real value of each agent; and if iodine is unequal to procuring the reduction of a hypertrophied heart, or the restoration of crippled and injured valves, nevertheless it is an agent whose potency over young connective tissue growth (of syphilitic origin especially) no one would think of disputing.

As to the practical application of iodine little need be said. It is usual to prescribe it in the form of iodide of potassium in doses of from five grains up to half a drachm, or even a drachm, three times a day. It is also applicable in the form of an ointment, or a liniment of iodide of potassium in compound soap liniment, or in camphor liniment. Many add a dose of the liquor hydrargyri bichloridi to the mixture containing iodide of potassium, so as to produce a soluble biniodide of mercury. At other times the mercury is used as an inunction along with the iodine mixture, or is given in the form of a pill, chiefly at bedtime.

Such is the action of mercury and iodine in the reduction of abnormal growths; and a little experience will soon convince the student of their potency, if they be used in a suitable form of morbid product. If given in unsuitable cases they fail; but that is not any fault of theirs. The extraordinary effects of such combination upon the secondary eruptions of syphilis can be accounted for by the richness of the lymphatics in the vascular skin; while the mode of action of mercury and

iodine will readily explain to us their potency in the treatment of those affections of the skin, not being syphilitic, which take their origin in excess of nutrition. The local application of mercury and iodine aids in the effects produced by their internal administration.

§ 202. The lymphatics of the body are liable to acute inflammation. This usually occurs from some injury, especially a poisoned wound; or it may arise from some suppuration in a debilitated system, or one temporarily in an unhealthy condition. In these cases the lymphatics became inflamed by the material they have taken up. In certain forms of dissecting wounds the lymphatics become most gravely affected, and though usually the peccant material is arrested at the first gland, which acts as a filter; in such cases there is, not rarely, a general infiltration of the areolar tissue on the affected side of the body, general blood-poisoning, and death. In the case of soft chancre, there is absorption of the poison by the lymphatics of the penis, and arrest at the first gland, causing that suppuration known as the "bubo." There are two points then to be attended to in the ailments of the lymphatic system, and these are the treatment of the inflamed lymphatics, and the treatment of the affected glands. Ere mentioning these varieties of local treatment, it may be well to insist upon the lines of treatment to be pursued for the system generally. In cases of blood-poisoning by absorption, it is of the utmost importance to protect the system at large, and for this purpose it is usual to resort to antiseptics, often combined with tonics. Thus

Pot. Chlorat. gr. xv.
Inf. Cinchonæ, ℥ i.

every four to six hours, with or without five grains of carbonate of ammonia, or ten drops of tincture of steel, is an excellent measure. Others rely upon the sulphites of soda, alone or along with chlorate of potash, with liberal quantities of wine (p. 196). After the brunt of the attack is over, and there remains a condition of debility combined with an amount of putridity, then the chlorate of potash may be combined with the tincture of steel. As regards the local treatment of the inflamed lymphatic, the pink ribbon it forms on the skin may be painted with nitrate

of silver with advantage. If there be any local sore, or abscess at the periphery of the limb, this ought to be cleansed thoroughly with Condy's fluid, or carbolic or salicylic acid; and if irritable poulticed, some charcoal being dusted over the surface of the poultice. When a gland is affected here, it is undesirable to attempt to arrest the process of suppuration—a plan not undesirable under some other circumstances—but to poultice it, and lay it freely open as soon as fluctuation can be felt.

§ 203. The glands are liable to be affected by acute and chronic diseases. The acute form is found under the circumstances just referred to, but is most commonly the consequence of absorption of syphilitic poison from a soft chancre. In the latter case the attempt to induce resolution by painting the gland with iodine is rarely successful; and only renders the skin harder, and so increases the necessity for the use of the knife. When an inguinal, or other gland is inflamed from mere irritation, as in the case of the bubo found with gonorrhœa, then it may not be undesirable to attempt resolution.

At other times the glands undergo a more chronic form of suppuration, requiring its peculiar treatment. If the patient be scrofulous, no local treatment alone will affect the glands, and it is necessary to attend to the general health; to give iron, best combined with alkalies, and cod-liver oil with a liberal dietary. All drains upon the system must be looked to. In a patient at the West London Hospital some time ago, the necessity for this was very distinctly shown by the slow progress of the case, until it was elicited that the patient suffered from leucorrhœa; this was attended to, and then the case moved forward swiftly and satisfactorily. Very often a change of air to the country, and still more to the sea-side, is necessary. In other forms of chronic enlargement of glands, the use of iodine, and especially in combination with mercury, is indicated. Not rarely pressure by strapping, or otherwise, is useful.

§ 204. The great lymph spaces, the serous sacs, are commonly the seats of acute inflammation. Of old it was the practice to bleed freely under such circumstances; and where there are not many other appliances at hand, this is a practice which may yet be resorted to with advantage. In most cases, however, it is well to depress the circulation by other means, as by antimony, by

aconite, or by the use of the Calabar bean. By so reducing the vascular tension the hyperæmia may be affected in the inflamed part, and one element of the inflammation at least be somewhat controlled. At the same time opium must be administered freely. There are no longer two smooth and well-lubricated surfaces gliding pleasantly upon each other; but two dry, highly vascular surfaces, whose friction upon each other is exquisitely painful. Consequently opium in full doses is indicated. It not only affects the terminal fibres, and so lessens the actual pain of the friction; but by its action upon the nervous system, deadening conductivity, and also lessening the sensitiveness of the nervous centres (Chapter XIII.), it relieves the system from the effects of the pain. Such should be the plan of treatment of simple inflammation of a serous surface. If it be more specific, as in lithiasis or uræmia, two common causes of imflammation of serous surfaces, then the treatment must be directed to the general condition; and such a plan will be found most efficacious in the relief of the local ailment.

The local measures to be resorted to are such as reason dictates. In the case of the pleura and peritoneum, their parietal layers are fed by arterial twigs arising from the same trunks as the twigs which supply the skin; this is most clearly seen in the cutaneous and pleural twigs of the intercostal arteries. Consequently if the circulation through the cutaneous branches be increased, the blood-supply to the serous layer below will be diminished. The application of hot poultices or flannels to the skin effects this end nearly as well as if the surface were covered with leeches, after the old-fashioned plan. Free circulation through the cutaneous branches, or local bleeding by leeches, gives much relief to the inflamed serous surface beneath; and by such means, and the free administration of opium, with some depressant, much relief is usually afforded. Of course if peritonitis be the consequence of rupture of the intestine, of an abscess, or of an ovarian cyst, &c., no treatment will be very efficacious; but relief at least can be afforded by giving opium freely, and so better euthanasia permitted. The exhibition of opium in large doses in all serous inflammations, except those of renal origin, is distinctly indicated. As a rule these inflammations are not fatal, and it is very desirable that

the painful stage be undergone in a state of more or less perfect anæsthesia. The suffering may just as well be avoided as not.

In many cases such measures will be found efficient; but in other cases effusion takes place, as it is said—in reality the fluid poured out into the lymph sac is not absorbed again as quickly, and so accumulates. The fluid is useful in so far that it keeps the two inflamed surfaces asunder, and relieves them from further friction. This Mr. Hilton, in his valuable work on *Rest and Pain*, has clearly pointed out. When once there is fluid poured out, as we say, the active symptoms cease; and then we are left to engage and disperse this fluid, which infringes on and diminishes the thoracic space. The problem we have then to solve is the getting rid of this fluid; and for this end we usually resort to the internal administration of iodine, with small quantities of mercury. The local measures in most repute are blisters applied around the thorax, first one, and then, in a day or two, another. These produce a flow of blood to the cutaneous surface, and diminish the blood going to the serous surface beneath; and, by so lessening the vascular supply, permit of the absorption in the lymphatics taking up some of the accumulated fluid. In fact by checking the vascular supply, and with it the effusion of lymph, the absorption going on is able to reduce the bulk of fluid;—the absorption being then in excess of the outpouring. The blisters are to be repeated until a steady increase of the absorption over the influx is instituted; after that is established matters soon become normal again. If the fluid remains but little affected, it is well to remove some of it by the aspirator, after which absorption will usually set in. If the fluid be not removed at a comparatively early date, the lung is apt to be bound down by adhesions to the costal pleura; as the fluid is absorbed the chest-wall shrinks. As soon as ever the chest-walls begin to fall in, the opportunity for successful treatment has passed away—usually never to return.

If the pleuritis has resulted from a broken rib, it is obvious that the treatment of such a case, *par excellence*, is to put the parts at rest by limiting the movements of the fractured rib. This can be effected by putting on a form of corset, and lacing it tightly. These are the only circumstances under which tight

lacing is permissible. At the same time opium or some other analgesic may be exhibited with advantage. In the same way if the pleurisy be the result of a tubercle of the lung immediately under the surface of the visceral pleura, irritating the costal pleura, putting the parts at rest by checking the thoracic movements, and leaving the respiration for a time to be purely abdominal, is the plan to be adopted. In fact the acute ailments of the serous membranes demonstrate pretty distinctly how far medicine can be rational with advantage; and also how much aid physiology can afford to practical medicine.

§ 205. The more chronic and passive accumulations of fluid in the serous sacs are troublesome matters to deal with. The mere passive accumulations are most commonly seen in an acute form during scarlatina; and purgatives and the warm bath usually procure the speedy absorption of these fluids. In a more chronic form they are usually the accompaniments of a failing heart, with or without renal complications. In such cases the treatment to be adopted is that of the primal and causal condition, according to the rules laid down in Chapter XIV., local measures being utterly futile. In ascites, where there is accumulation of fluid in the peritoneum, purgation, free and repeated, followed by stimulating diuretics, is the best method of giving relief. Often ascites is the consequence of an obstructed portal circulation, due to cirrhosis of the liver. It may set in and be stubbornly persistent until the hepatic veins become inflamed, as not uncommonly happens in advanced cirrhosis. Under these circumstances all treatment is but palliative, and the condition does not admit of cure. At other times the ascites is due to some localized inflammation of the peritoneum, and yields readily to treatment.

The function and anatomy of the lymphatic system is of importance practically, and must be borne in mind in a large class of diseases whose connection with the lymphatics is not always at first sight very apparent.

CHAPTER XXI.

THE NERVOUS SYSTEM.

§ 206. THE functions of the nervous system are such as to render it liable to many maladies of various kinds, and of different characters, especially as to severity. Some of its derangements are sources of much discomfort rather than anything more; while others are fatal to life in the highest degree. The successful treatment of these maladies, that is of such of them as permit of treatment—and these are the majority—involves much reflection, and the application of physiological knowledge to a very marked degree. Thus in apoplexy—whether it be from rupture of a vessel, embolism, or sudden acute cerebral anæmia —most varied conditions, but often resembling each other with a closeness which only permits of their being distinguished by a specially-trained observer—the treatment involves a certain fulness of knowledge to be really successful. Of course in diseases of the nervous system, distinct and well-defined diagnosis is of the greatest importance, and yet this can scarcely be touched upon here for obvious reasons. Upon certain matters which are parts of a diagnosis, or rather a part of the data upon which a diagnosis is built, depends the line of treatment to be adopted. If the apoplectic patient be found to have a full, well-sustained pulse, an hypertrophied heart with forcible impulse, then it is eminently probable that depletory or depresant remedies are chiefly indicated, and best of all, their combination; while if the apoplectic symptoms occur in a poor old creature with a very feeble circulation, it is very probable that the condition is one of acute cerebral anæmia, where restoratives, to be followed by tonics, rather are indicated. So too in epilepsy, it is a matter

of much practical importance to discover if the attack, or series of attacks, be associated with some distant irritation, as a load in the intestinal canal, or is due to central instability merely; in the first case a pretty effectual purgation would be indicated, in the second case such treatment might be highly injurious. So too in neuralgia, a very decidedly different treatment is indicated in the neuralgiæ of young people, depending as they mostly do upon defective nutrition of the nerves, either from insufficient food or overtaxation of the system generally; and in the neuralgiæ of advanced life, which are mostly gouty or degenerative. In the first, good food and tonics are to be given freely; in the latter a poor diet with eliminant measures would commonly be required; in both, however, there might be an equal necessity for the liberal consumption of fat in any of its forms.

In the consideration of the nervous system, one important fact must ever be borne in mind, and that fact is its high vascularity. Not only is the supply of blood-vessels unusually large, and their calibre comparatively great, but the flow of blood through the brain is rapid and impetuous. Though the brain of man is but one-fortieth of his weight, one-fifth of the whole bulk of blood passes through it. Not only is the amount of blood in and passing through the brain very large, but there is also a great difference betwixt the vascular condition of the encephalon in sleep and in great functional activity of the brain. The amount of activity in an organ is in direct proportion to its blood-supply; and paresis of all the cerebro-spinal system, even including that of the medulla oblongata itself, is readily produced by cutting off the blood-supply. In sleep the brain is comparatively anæmic; in intense cerebral activity the vessels are dilated, and the flow of blood is large and swift. These changes of the calibre of blood-vessels are permitted by the perivascular spaces, or tunnels in the nervous structure, along which the blood-vessels run. A serous fluid fills these spaces when the blood-vessels are contracted, when they dilate the fluid is absorbed,[1] and the vessels fill their tunnels. By such arrangement the amount of blood in the brain varies without compression of the nerve-structure. The brain is also fed by two sets of vessels on each side. The cerebellum and the

[1] Probably by the lymphatic which accompanies the artery.

posterior, or occipital cerebral lobes, are fed by the vertebral arteries; while the anterior and parietal lobes are supplied by the carotids. The parts at the base of the brain are furnished with blood from all four arteries by means of the circle of Willis. These latter parts are thus protected in the most complete manner possible from conditions of pronounced anæmia, which would be fatal. It may, however, be seriously questioned if the anastomoses of the circle of Willis are equal to maintaining functional activity in the hemispheres; though they do maintain respiration, &c., by keeping the medulla supplied with blood. A glance at the distribution of the vessels over the under-surface of the brain will at once demonstrate how admirably the different structures at the base of the brain are fed with arterial blood; and the richness of that supply, not only as an aggregate, but in the numbers of vessels also; so that the blocking-up of one is of comparatively little moment. The pia mater is very rich in blood-vessels; and from it pass myriads of little arteries into the cortical substance of the brain, where lie the cerebral cells which are functionally so important. The grey matter, the active part of the brain, is more liberally supplied with blood than is the white matter.

The relations of the cerebral cells to their blood-supply are interesting. There is no doubt that a well-sustained blood-supply to the cerebral cells is a necessary factor in active or long-sustained thought; and that on warm, moist, relaxing days, the cerebral activity is much diminished, no matter how strenuously the will determines that action shall prevail. The opposite effect of cold, bracing weather in producing a sense of energy and of fitness for exertion is well known. The amount of blood in the cutaneous vessels affects the blood-pressure, and with it the amount of arterial blood in the encephalon,—perched as it is at the top of the vertebral column. In persons of the nervous diathesis, where the nervous system is comparatively excessively developed, and the brain bears an unwontedly large proportion to the general bulk, mental labour under unfavourable circumstances and surroundings is much more possible than with persons of other diathesis. The inhabitants of India are largely of the nervous diathesis; so are Arabs; and we know how comparatively active, both physically and mentally, these

creatures are under tropical heat, to those of a different type. The greater the brain in proportion to the body bulk, the greater its power; the richer the blood-supply the greater the activity: *cæteris paribus*, the larger (comparatively) brain has it; *cæteris paribus*, the more active the vascular supply, the greater the functional activity.

In the treatment of affections of the nervous system, we find then that there are two methods of acting upon the cerebral cells, either directly by neurotic agents, or indirectly through the circulation: often the two measures are to be combined. The different agents which act upon the nervous system have been grouped into classes, and their action contrasted in Chapter XIII., to which the reader may turn, and reperuse ere proceeding with this chapter. Such reperusal will render the following sections much more lucid and readily intelligible. It will be seen that neurosal sedatives are also more or less vascular depressants; and that nervous tonics also tend to raise the blood-pressure. The affections of the nervous system, however, are not to be approached from their vascular side only—that would be very absurd; but this means of affecting them must never be forgotten or neglected.

§ 207. *Hyperæmia.*—Hyperæmic conditions of the brain are very common, and mostly so in acute pyretic affections, and in forms of insanity with brain activity. As a more permanent form, great cerebral hyperæmia is often found in those who persistently work to excess with their brain; especially if there be also a condition of cardiac hypertrophy with high arterial tension. Hyperæmia of an organ means, really and truly, not merely a large amount of blood in that organ, but a large amount of arterial blood passing through it. Thus passive or venous congestion of the encephalon belongs rather to cerebral anæmia than hyperæmia.

Cerebral hyperæmia is found in maniacal conditions, in exalted conditions, and the delirium of acute pyrexiæ. There is an excited condition of the cerebral cells, in which they attract an unwonted supply of blood to themselves; and this increased blood-supply maintains the cell-activity. But the alteration in the cerebral cells here forms the starting point, and the hyperæmia is secondary. In addition to the exciting cause, whatever it

may be, whether a naturally unstable equilibrium, exciting circumstances, or an abnormal condition of the blood itself, there is often another factor, and that is the increased temperature. The hotter the blood and the brain, the more the cerebral functions are disturbed; while in great cold there is abolition of brain function. Consequently refrigerant and cooling measures are ever indicated in cerebral activity with a high temperature. Not only general measures, but the local application of cold is very useful. Then there are nerve sedatives, by which nervous action may be lowered. Chloral hydrate affects the nervous system generally, as well as having a powerful influence upon the circulation. Bromide of potassium acts readily upon the nervous system, and to some extent affects the circulation. These two agents then could be given in cases of cerebral activity, together with opium; or combined, with or without it. If the circulation be pretty quiet a little opium, from its action upon the nervous system, is fairly indicated; and by combining it with the other two remedies mentioned, a very certain and effectual action will be produced. Thus are ordinary states of excitement, or of insomnia—often due to cerebral hyperæmia solely—to be met.

When there is a pronounced condition of hyperæmia, as in meningitis, then direct vascular depressants may require to be added. Before the days of chloral and bromide of potassium, opium in small doses, together with full doses of such a vascular depressant as tartar emetic, or may be venesection, was the plan in vogue; local depletory measures also being practised. An emetic of antimony generally lowered the inflammatory changes; or a full bleeding was performed, and then repeated doses of antimony kept the circulation quiet. Nor were such means at all badly adapted for attaining the end in view. If practised thoughtfully and judiciously, great and pronounced good resulted from such measures. Often doubtless these measures were abused; and the abuse commonly arose from the treatment being too purely empirical, and because the practitioner thought too little of the *rationale* of what he was doing. By keeping the two factors of cerebral hyperæmia clearly before the mind's eye, the treatment will be guided and directed to what is required. When the circulation is effectually quieted, the pure

narcotics may be given to procure sleep. As long as the circulation remains active, vascular depressants must form an essential part of the programme. Thus in actual practice in moderate hyperæmia, something like the following prescription is indicated :—

Pot. Brom. gr. xx.
Chloral Hydrat. gr. xx.
Mist. Camph. ℥ i.

once, twice, thrice a day, or may be every six hours. If the hyperæmia result from over-work or over-excitement, and the circulation is rather quick, then opium might be substituted for the bromide. The exact proportions of each factor in the prescription would be determined by the requirements of each individual case. The bowels should be kept freely open in all cases; and smart purgation should be followed up by a slightly active state of the bowels for some time. In referring to my note-book for the treatment of a well-marked case of sub-acute encephalitis (resulting from an accident to the head, followed by a bout of drinking), excellent effects resulted from full doses of the bromide thrice daily; accompanied by James's powder, and compound scammony powder at bedtime. This was before the days of chloral. Now chloral would form at least one ingredient of all prescriptions for cerebral hyperæmia.

In all cases where the cerebral hyperæmia commences in alterations in the cerebral cells, the treatment will comprise two factors, but the agents calculated to allay cerebral excitement take the first position; vascular depressants and purgation being ancillary and subordinate, but nevertheless not to be neglected. The temperature too may be important.

§ 208. *Vascular Hyperæmia.*—Here another condition of matters exists, and our measures must be modified accordingly. There is usually a full and bounding pulse, forcible impulse of the heart, atheroma of the vessels, a state of general plethora, a florid countenance, and an injected eye. There is no actual delirium; but there may be some excitement in the intellectual functions, præternatural sensitiveness to all impressions, and abnormal acuteness of the special senses, together with headache. Old writers often spoke of the feeling being as if a

bolt were driven into the forehead. In such cases there is a high blood-pressure, and the great danger is rupture of some encephalic vessel.

Arterial rupture here is imminent, and the first thing to be done is, perhaps, to bleed. Then an ample purgative of potassio-tartrate of soda and scammony, jalap, or gamboge should be administered; to be followed by sulphate of magnesia, together with small doses of antimony, so as to keep up the action of the bowels and to depress the circulation. If there be much excitement bromide of potassium in full doses might be added. A low diet of rice-water and lemonade iced, and general quietude are indicated. A non-nitrogenized diet is most necessary (see Chapter XXIII.) for some time. The whole aim of the practitioner will be directed to moderating the vascular excitement and relieving the arterial tension. Such patients are usually the subjects of chronic Bright's disease, the relations of which to blood-pressure and the effects upon the circulation have been described at length in several chapters (XI. and XIV.); the hypertrophied left ventricle and the high arterial tension forming sources of imminent danger to the thin-walled encephalic arteries, no longer structurally sound. In lowering the vascular excitement venesection may be resorted to, especially if drugs be not at hand; but the tendency to reaction must be kept down by adding to it, as quickly as may be, vascular depressants and the effects of catharsis. In rural practice, and amidst the exigencies of travel, and of remote colonies, bleeding may be indicated; and it may be necessary to repeat it if other means of subduing the vascular excitement are unattainable.

The consequences of rupture must engage our attention in a subsequent section. (§ 214.)

A very well marked condition of combined cerebral cell activity with high vascular tension is seen in the earlier stages of the general paralysis of the insane. Not only is there much cerebral excitement, but there is hypertrophy of the heart, with loud accentuation of the aortic second sound, indicating high arterial tension. In the paroxysms of exacerbation to which such sufferers are liable, there is great excitement with a full pulse. Dr. Crichton Browne ingeniously applied to the relief of this condition the calabar bean; having noted that Dr. Thomas

Frazer in his experiments on this agent, had found vascular depression and muscular relaxation to follow its administration. This logical application of information derived from physiological research to the needs of practical medicine, has been quite successful as regards the immediate end sought. Not only that, but it has been found that the continued use of the physostigma tends to check the general progress of the disease, and in some cases even to bring about a distinct improvement. This is one of the most striking illustrations of applied physiological knowledge on record; and forms a matter of much interest outside its importance as a therapeutic measure of great value in the practice of psychological physicians.

Such are the means then by which we can control conditions of cerebral hyperæmia.

§ 209. *Cerebral Anæmia.*—This is the opposite of the above-described condition. It may be found in two forms; the one simple arterial anæmia, and the other arterial anæmia with venous congestion. The first is found well marked in cases of general anæmia and in simple dementia; the other is found most markedly in advanced cardiac disease. There are various circumstances under which cerebral anæmia may manifest itself; and these general conditions are of much moment in selecting the line of treatment to be adopted. The local condition of cerebral anæmia may be found along with general anæmia; and in chlorotic girls and delicate women a condition of cerebral anæmia, with drowsiness, vertical or even frontal headache, and depression of spirits, will often remain for some time after the general signs and symptoms of anæmia have passed away. At other times it is associated with spanæmic conditions in various forms of blood-poisoning, where the red corpuscles are broken down, as in malarial disease, lithiasis, amenorrhœa, &c. Here the blood poison must be met by the specific remedies for each form, as well as by the administration of iron. In cases of lithiasis cerebral anæmia is common; especially in the more advanced stages of Bright's disease, where there is arteriole spasm in the branches of the encephalic arteries, together with a failing circulation. In such conditions potash with digitalis is indicated. At other times cerebral anæmia is the outcome of heart failure, where the blood pressure is low and the vessels are

unfilled. Here digitalis, by acting upon the heart at the same time that it tightens down the arterioles on the blood-column, raises the blood-pressure and fills the cerebral vessels; and so is most useful.

In all cases there are two points to be attended to; they are the increasing of the blood-pressure, and the supply of liberal quantities of arterial blood of normal quality to the contents of the encephalon. Any deficiency in quality as well as quantity is felt by the cerebral cells. Whatever their potential activity, a free supply of healthy blood is requisite to their proper functional working. Consequently there are several points to be attended to in the treatment of cerebral anæmia. Firstly, in all cases the blood must be of normal quality and rich in nutritive material. Chalybeates are almost always indicated; and in cases of spanæmia from the presence of some poison the chalybeate must, as has been insisted on frequently before in these pages, be combined with some specific remedy; without which iron is often given in vain. Then, while giving agents which increase the blood-pressure, it is desirable to administer nervine tonics, quinine, strychnine, or belladonna. The two first all are fairly familiar with; but belladonna is not yet so well known, for this purpose at least. Yet belladonna acts powerfully upon the heart at the same time that it dilates the encephalic arterioles. Dr. Crichton Browne has found it very valuable in the treatment of emotional melancholia; where there is defective nervous activity, the result of some shock, which depresses alike the cerebral functions and the circulation. Its use, too, is indicated in that *stadium melancholicum* which so commonly precedes actual insanity. Alcohol has an identical action upon the circulation and the brain-cells; and it is the relief it affords to the miserable depression of cerebral anæmia which forms its irresistible allurement for many persons, especially females. If their cerebral anæmia be relieved by other measures the craving for alcohol is not felt; when the effects of other remedies wear off then the craving comes back with all its terrible resistless force.

This is one point to be attended to in the administration of tonics, and especially nervine tonics, in cases of cerebral anæmia. It is well put by Handfield Jones. "Nothing is more common than to find anæmic patients complaining of headache

from the administration of the necessary tonics, because their nerve-centres have been brought into such a state of hyperæsthesia by the impaired nutrition that they can hardly tolerate anything of a stimulating nature. A little excess, therefore, even of spanæmic blood, may cause distress to a feeble brain, which, after it has acquired a more healthy tone, will bear and be benefited by a larger amount of much better blood. The case is similar to that of the starved man, whose very preservation depends upon his being fed most sparingly for some time."

In such cases, and they are frequently met with, the administration of tonics and steel may be combined with bromide of potassium and, even still better, hydrobromic acid, with advantage. Such combination but very rarely disagrees, even where nervine tonics alone, or not so combined, are utterly intolerable. Often, too, it is well to keep up a gentle action on the bowels; as is so well known in connection with the commencement of a course of ferruginous tonics.

There is also another point to be attended to in connection with the treatment of cerebral anæmia, and that is its relation to the production of sleep. If the more strictly depressant hypnotics, as chloral and bromide of potassium, be given, the tendency is to retard recovery in the convalescent melancholic; and in many cases of melancholia to transfer it on to the more pronounced condition of dementia. Both Crichton Browne and Hammond are strong upon this point; and they arrived at this conclusion quite independently of each other. Opium and alcohol are either of them preferable; as not tending so strongly towards the production of chronic brain-starvation as these other two agents do. This point is of the more importance in that there is often persistent insomnia in cerebral anæmia. Whatever the medicines given at bedtime, nervine tonics should be given during the day.

§ 210. *Local Cerebral Anæmia.*—This is a subject of no slight importance in general practice, as well as in asylum practice. We have just briefly reviewed the circumstances of general cerebral anæmia; not, however, alluding to that form which is apparently the result of vaso-motor spasm—not being gouty. In many cases this spasm is the cause of cerebral anæmia, especially in the demented forms of melancholia. It is here where belladonna

is often so useful. But there is also partial cerebral anæmia, as in ordinary melancholia, when the intelligence is unaffected, and the patient merely seems to see everything through sepia-tinted spectacles. Conditions of depression in the sane are of like causation. Here there is, in all probability, an anæmic condition of the posterior, or occipital cerebral lobes, which, as we have seen, are fed mainly by the branches of the vertebral vessels after their fusion into the basilar artery. Schrœder van der Kolk and Laycock have long taught that these occipital lobes are in connection with the systemic sensations and the viscera—conclusions corroborated by the investigations of Ferrier. Consequently we can understand the melancholia of liver disease ; or even the more illustrative cases of melancholia attendant upon scybalæ in the lower bowels, or upon a misplaced uterus, coming on and passing away with these causal conditions. Not only so, but there is a point of much importance, hitherto curiously overlooked ; and that is the vaso-motor nerve supply of the carotid and of the vertebral arteries. They are quite distinct. The carotid arteries receive their nerves from the superior cervical ganglion ; while the vertebral arteries are supplied from the inferior cervical ganglion, which is in more intimate relation with the thoracic ganglia and the splanchnic nerves, which supply the abdominal viscera. Cyon and Aladoff have traced nerve-fibrils from the vaso-motor centre down the vertebral arteries, through the inferior cervical ganglion, the annulus of Vieussens, the thoracic ganglia, and down the splanchnics to the liver. This of course applies to efferent descending fibres passing from the centres to the viscera ; but, judging from analogy, the afferent fibres ascending from the viscera to the nerve centres follow the same route. Thus we now comprehend how disturbance in the abdominal viscera can produce melancholia, without the intellect being obviously affected. There is anæmia of the posterior cerebral lobes from arteriole spasm, the result of distant irritation ; and consequently the removal of this distant cause is necessary to the treatment of the case, as much as is the administration of nervine tonics and chalybeates. In simple melancholia, the motor centres—in the parietal lobes —are not affected ; in general cerebral anæmia, as in dementia, they are involved. This corroborates the view taken here.

§ 211. *Insomnia.*—Sleep is a condition of physiological cerebral anæmia; and insomnia occurs under two sets of circumstances: the one, a state of activity in the cerebral cells, as in conditions of pain, or in excitement; the other of sustained vascular fulness, as in the sleeplessness of lithiasis, of cerebral overwork, or after much tea-drinking. Of course it is not asserted that either form is found pure and uncomplicated, they are usually found together in varying proportions. It is of moment, however, to determine correctly which is the leading factor—as that gives the direction to the remedial measures. If there be much vascular excitement then depressant narcotic combinations are indicated. Graves laid down rules for the combination of opium and antimony with consummate skill. "Each drug appears to assist the action of the other; and the relative doses must be determined by the circumstances of each case. In furious delirium the tartar emetic must be given in full, and the opium in small quantities; while if wakefulness be the chief symptom, the delirium being not very boisterous, the dose of tartar emetic must be reduced and that of the opium increased." This is a most capital rule for practice. The general action of hypnotics has been given in Chapter XIII., and their action contrasted. There we saw that opium was essentially the hypnotic to be used in conditions of wakefulness arising from pain, unaccompanied by vascular excitement; while chloral was to be preferred in conditions where the circulation was active. In combined conditions, these two agents may be united with advantage; and, if necessary, more marked vascular depressants may be resorted to. Such is the management of sleeplessness in cases of cerebral vascularity.

But in cerebral anæmia the treatment of wakefulness is not so simple. There is rarely physical pain, often, however, acute psychical pain, which does away with sleep most effectually. The general condition is usually adynamic. Consequently if chloral or bromide of potassium be given in full doses, a more pronounced and marked condition of cerebral anæmia is directly fostered; and fatuity may be so induced. These narcotics then are to be avoided, and in their stead opium with alcohol is to be given; and the physiological aids to narcosis, as muscular exercise in the open air, and the meal of digestible food at

bedtime, are to be secured. By such means a temporary condition of brain quietude and cerebral anæmia is attained; which does not tend to maintain and even encourage the persistent brain-bloodlessness that we wish to exorcise, not to establish.

There is also the insomnia of overwork, of vaso-motor paralysis of the encephalic vessels, from over-exertion, or too prolonged activity. This has been well described by Niemeyer in his chapter on Hyperæmia of the Brain—a chapter worthy of careful study. Here the cerebral vessels have been kept dilated and full of blood, until a species of vaso-motor paresis is induced, which prevents sleep and keeps up a condition of excitement. In such cases there is too much general exhaustion to render chloral quite a safe remedy; and its use by such persons on their own authority and without medical advice is fraught with much disaster, outside the sudden deaths commonly so brought about. In slight cases, limitation of the hours of work, a good walk in the evening, and some sound malt liquor at bedtime will often be sufficient. In more pronounced cases drugs may be unavoidable; and then bromide of potassium in full doses, with some opium, hyoscyamus, or tincture of hop, in camphor mixture, at bedtime, is the best sedative. Some quinine and iron, with hydrobromic acid, during the day is not contra-indicated in these cases, but the administration of these agents must be combined with gentle purgation. The light supper with alcohol is not to be omitted.

It is of much importance that the lines of treatment to be pursued in these different vascular conditions of the contents of the encephalon be better understood amidst practitioners generally. If this matter were more familiar to the profession, a prescription, founded upon a thoughtful consideration of the different factors of the case, would take the place of the slipshod and off-hand recommendation to take chloral, or the scarcely less carelessly conceived narcotic mixtures so commonly met with.[1] It is in the more cautious treatment of what are too often termed mere functional disturbances of the brain, but which are too often the commencement, the initial stages of grave brain disease,

[1] Thus, for instance, in sleeplessness accompanied by cold feet, it is necessary to warm the feet, and then that sleep can be induced, which otherwise will not be wooed even by powerful narcotics.

that much insanity, much softening, and sclerosis are to be checked and arrested. Not only are these principles of importance in so keeping off these confirmed conditions of brain disease; but even when mischief is thoroughly established, and when treating symptoms alone is feasible, they are to be followed and adopted. It is in the correct application of these principles to the palliative treatment of organic brain disease that much good is to be done; and the capacity to apply these rules to the case before him is infinitely more valuable to the practitioner than any amount of empirical acquaintance with the management of such maladies.

In many cases the application of cold to the head, such as washing it well with cold water, will be of much service. It is only, however, when the insomnia is due to a heightened temperature that such remedy is very useful. In pyrexiæ, in hot and sultry weather in summer, the external application of cold, and the cooling effect of evaporation are indicated and are useful. In cold weather such measures would do no good; and probably would do some harm.

§ 212. *Delirium.*—This is a condition of cerebral disturbance often of grave omen, always more or less alarming. It is much commoner in children than in adults; and is very much easier induced in children, and by lesser exciting causes than it is in adults. It is more readily brought about in persons of a nervous diathesis than in those of other diatheses. It is very common in fevers, and still more in exanthemata, especially in scarlatina. It arises under these circumstances from the combined effect of the fever-poison, the excited circulation, and the increased temperature. When, however, it occurs in the later stages of continued fevers, where the typhoid condition is pronounced, then it is due in a great measure to the amount of tissue waste in the blood. In the early stages of fever delirium is scarcely serious in the young; though its import is grave if the person be an adult, and still more an old person, whose brain is usually not easily perturbed. When it occurs in the typhoid condition it is serious, and frequently passes into coma and death. In the management of delirium there are several points to be carefully attended to. One, and a very important one, is the partial prevention of the oncome of delirium by avoiding what is

calculated to excite it. This is a matter not sufficiently attended to by some practitioners. When a person is severely ill, and the brain has a tendency to wander, then little changes in the environment become very important. If the aspect of the wonted room be much altered, the wandering eye and unstable brain, especially when awaking from slumber, fail to recognize the altered surroundings. The first impulse is to escape from the strange place, and to get home—an instinctive feeling when very ill. Consequently an outbreak of delirious violence occurs, which leaves the patient exhausted and powerless. It is not this alone which is to be avoided—though it is not without its own importance—it is the uncomfortable feeling which remains in the patient's mind, that those around him are opposed to him and hostile to his interests. What the patient wishes to do is to him quite intelligible and perfectly proper to be done; and when he finds that instead of being aided by those around him—the friends and relatives in whom he has always fondly trusted—they thwart and oppose him, a sickening feeling of suspicion and misanthropy pervades the mind, which is most undesirable. Having passed through this condition himself, the writer has still a fairly vivid recollection of his sensations and feelings, distinct through the haze of delirium and the *débris* of confused and broken memories. If then it be impossible to accede to the patient's requests, the attendants must meet them by cajolement, rather than by active resistance and the force of brute strength. It is a matter of moment when adults are ill, and likely to be delirious not to change the aspect of the room much, even if the ailment be an infectious one; the exciting of delirium, and its ill-effects upon the patient, must be set against the possibility of infection being conveyed by the ordinary furniture of the room being permitted to remain in it. With children it is of less moment, and every removable and unneeded article may be advantageously taken away. So much for the psychical side of the management of delirium.

The actual therapeutic management rests much upon the circumstances of the case, and the conditions with which the delirium is associated. If there be cerebral hyperæmia, depressants and sedatives are clearly indicated. If there be also a febrile condition, apyretics and other means of lowering

temperature must be adopted. If the skin be dry and imperspirable, agents which excite free action in the skin may be resorted to; or the temperature may be lowered and heat abstracted by the external and internal use of cold. With the head on a pillow of cold water, and a bladderful of iced water on the head, sleep often can be induced in the excited and delirious patient. When the patient is packed in wet sheets, or placed in a bath and cooled down, the delirium passes away, and reason resumes her seat, showing that delirium is largely a question of temperature in the blood and brain; the return of the delirium along with a rise of temperature completes the argument. Another point is the state of the pulse. If feeble, fast, and intermitting, digitalis and bromide of potassium in combination are indicated. If full and bounding, or incompressible, chloral, or the bromide, together with depressants, are the agents to be resorted to. In delirium tremens, large doses, half an ounce, of the tincture of digitalis, have been given by Mr. Jones, of Jersey, and others. Such plan is only safe when the heart is very feeble or failing, and the cardiac ganglia are nearly exhausted; then it is good. When the delirium occurs in a typhoid condition, no matter whether connected with a specific fever or not (see Chapter IV.), then it is desirable to procure more perfect depuration of the blood by the use of bitartrate of potash, until the bowels are opened; or by acting sharply on the bowels or the skin, according to the circumstances of the case. Subcutaneous injections of chloral hydrate may be useful when the brown, furred tongue indicates that a layer of dead epithelial cells lines the intestinal canal, and hinders absorption through them; so that it is useless to give remedies by the mouth. Such injections should not ordinarily be stronger than ten grains to the ounce, on account of the local disturbance which stronger solutions so often give rise to; in emergencies, however, more potent solutions may be indicated.

At other times a form of delirium is met with after the acute pyretic stage is over. It seems rather a form of cerebral exhaustion than a form of active delirium. Dr. Stokes enumerates three such conditions: (1) where there is persistent wakefulness; (2) where an inflammatory condition of the brain has existed and been subdued, but delirium or other nervous symptoms

still remain; (3) where an excited state of the sensorium exists without heat of scalp or remarkable throbbing of the arteries of the head. To these Copland adds the condition of there being free discharges or unrestrained evacuations. In all these conditions opium is indicated. According to circumstances it might be combined with chloral. In coma vigil such combination is indicated. In children the chloral might be given along with bromide of potassium.

§ 213. *Headache.*—This is a wide subject, and can only be treated of in a general way here for lack of space. A bird's-eye-view of the matter is all that is permissible. In the first place, then, headache may be associated with vascular fulness and congestion, as seen in the injected eye, flushed face, &c. Here cathartics, hot mustard pediluvia, and vascular depressants are indicated. I have known aconite give perfect relief in obstinate congestive headache of a most intractable character, with cold hands and feet. Then there is the headache described in § 208 with its treatment, as part of a state of high arterial tension, and differing from the headache of localised cerebral congestion. Then comes the vertical headache, so characteristic of cerebral anæmia, which must be met by the measures adapted to its pathology; there is too the occipital headache of venous fulness in the region of the torcula Hierophili, indicating purgatives, tonics, and chalybeates. In cerebral exhaustion the pain may be frontal, parietal, vertical, or occipital. It yields to coffee, guarana, to a draught of generous wine, or some food; according to the peculiarities of the patient. In bilious headache, free purgation with alkaline salines, especially first thing in the morning, and continued every day, quickly gives great relief; while the patient soon can eat more, and improves generally. Hemicrania is often gouty or rheumatic; and brow ague has a malarial origin. Whenever frontal or temporal headache presents the characters of rhythmical recurrence, ague must be suspected, and the treatment is that of intermittent fever (Chapter IX., §§ 82, and 83). Headache may be due to some distant irritation, as liver disturbance, dyspepsia, especially acid dyspepsia, or some load in the intestines, especially in systems which are much debilitated. Poor women at hospitals commonly have headache and depression from imperfect assimilation. To keep the bowels

regular, and to lay down a system of diet, are here as necessary as are tonics. Alkalies with iron are desirable. Often there is a condition of acidity in the lower bowels which is the cause of severe nervous headache, and here insoluble antacids are indicated, as magnesia or lime; while the readiest method of giving speedy relief is to give an enema of warm water or soap and water, and so to wash the offending matter away. (Prout.) In headache from peripheral, abdominal, or pelvic irritation, bromide of potassium and regular unloading of the bowels are the best measures. In the headache of gout, oxaluria, or rheumatism, alkalies freely administered, especially alkaline purgatives, as mineral waters, or in other forms, are very useful.

Then there are the headaches of organic disease of the head. There is the persistent nocturnal headache of syphilis, which may be osteal and destructive. Here the treatment of the headache is that of syphilis. It may be gouty, and then requires the treatment of lithiasis; or there may be headache from organic diseases within the head. This form of headache is the all-absorbing, terrible headache, where the patient seems mad with pain. "The organic causes of great headache are never diseases of the proper nervous system, but always diseases of its enveloping textures." (Moxon.) This view grows upon one with consideration of the subject. The brain itself is very insensitive, and extensive disease in it, as softening, sclerosis, a tumour, or an apoplectic clot, exists often without pain at all, except the pyschical pain of mental misery. Affections of the meninges, however, produce pain very decidedly. Tubercle of the cerebral meninges, syphilitic diseases of them, or cancer, produce dreadful headache. Aneurism at the base of the brain produces acute pain. Abscesses produce pain when they reach the meninges, but not before. In all organic headache it is well to look out for other evidences of nervous disturbance; ptosis, a squint, a frown, a palsy, however slight, a twitch, are all instructive. The "choked optic disc" is even more indicative. In organic headache it is most important to make an accurate diagnosis; as on that diagnosis rests the treatment. If a syphilitic growth, in young persons especially, mercury and iodide of potassium must be pushed vigorously and without stint. Often the growth produces other grave symptoms, as paralysis of

various parts. They all yield to the specific measures. If there be an abscess, the trephine and the bistoury are indicated ; if there be a blood-clot or a tumour, little remains but to lower the vascular excitement, and to take off the results of pressure upon the brain tissue. Cooling purgatives, a non-nitrogenized diet, and the bromides in liberal quantities are the measures most likely to attain this end.

§ 214. *Cerebral Paralysis.*—Under this heading may be considered paralysis of cerebral origin, whether truly apoplectic, or from embolism, or thrombosis. It is impossible to enter upon these questions here further than as regards their treatment. In apoplexy the brain, or rather a portion of it, is ploughed up and destroyed, more or less completely, by a blood clot. In addition to the injury so actually done, there is a certain amount of anæmia of the brain substance in the neighbourhood, from pressure. In such case the anæmia becomes less pronounced as the blood clot diminishes, as it grows smaller and paler, until at last a few scales of hæmatoidin alone mark the seat of the primitive injury. Here a great point is to prevent another attack by a suitable regimen. In embolism and thrombosis, a vessel is occluded, and the part supplied by it becomes functionally inactive from loss of its arterial blood. In these cases the establishment of a collateral circulation until a vascular condition sufficient to admit of functional activity is attained, is the only thing we can look for. It is obvious that little can be done to modify these lesions themselves. Charlton Bastian thinks the nitrite of amyl might possibly be of service in helping the formation of a sufficient collateral circulation in embolism. In the various forms of cerebral paralysis attention to the general condition will do much to assist the natural process of repair. In apoplexy, if seen at once, and the pulse be full and hard, venesection followed by smart purgation and the administration of vascular depressants, might do something to limit the size of the blood clot. (In embolism little can be done to mitigate the original injury.) Afterwards the treatment would be conducted on rational principles. Where there is rupture of a vessel, the blood-pressure must be kept low by alkalies and purgatives, and the adoption of a non-nitrogenized diet. (See Chapter XXIII. for the full consideration of this subject.) In embolism a rich and

liberal dietary may be indicated, and tonics and steel be useful. As regards the general management it must be conducted according to the especial indications of each individual case. In all cases, however, it is most desirable to keep up the nutrition of the palsied muscles by kneading, shampooing, &c., and also by the use of electricity. Electricity cannot affect the causal injury, but it can keep up the muscles, so that they shall respond to the slightest nerve-order; and maintain them in good condition to resume work when the nerve-communications are once more established. The more readily the muscles respond to electricity, the graver the prognosis in each case, as showing the mischief to be purely cerebral. As well as these measures, the muscles may be firmly grasped and the blood squeezed out of them by an attendant every day, so as to keep up a better circulation in them. Many cases of imperfect recovery from paralysis are due to the muscles being allowed to atrophy, so that when the nerve messages once more reach them they can no longer respond. Such atrophy must be avoided by the measures mentioned above. Chalybeates, nervine tonics, &c., may be useful, and a liberal supply of rich blood may be necessary to enable the injured parts to thoroughly recover. A certain action of the bowels is ever desirable. Ludwig and Dogiel have found irritation of the intestine, as in response to the touch of the finger, to increase the rapidity of the blood-flow to the encephalon. In all cases of paralysis the greatest care must be taken against cold and intercurrent pneumonia, to which such sufferers are so liable, and which is often so fatal to them. (Bastian.)

§ 215. *Sunstroke*, or Heat-Apoplexy, is a malady of which little, or comparatively little, is seen in temperate climes; but in tropical regions, especially when exertion is called for, it is common. Mental depression predisposes to it. Conquering troops suffer less than those who are not succesful. I am indebted to Surgeon Major A. R. Hall, R.A., for a short account of sunstroke, as well as of a new and very successful method of treatment originated by himself. "There are two forms of sunstroke met with in India. The most fatal—which generally occurs in the field in those exposed for a long time to intense heat under the sun's rays, after long marches, often with much mental excite-

ment, and with insufficient food, or, worse still, alcohol instead of food—is marked by sudden pallor of the skin, and the patient dies at once from heart failure. In less severe forms there is redness of the face and surface, burning heat of skin, and a full pulse, often dilated pupils and complete coma—frequently with copious micturition preceding it. Such heat-apoplexy is more commonly found in buildings during hot afternoons when men move about absolutely gasping for breath. Here there is incomplete vaso-motor paralysis, with dilated vessels and really a feeble heart, so that bleeding and tartar emetic are distinctly contraindicated. Dr. Waller first suggested to me the use of quinine in large doses in these cases, a hint I adopted. Finding, however, in many cases that it was not easy to give it by the mouth, I resorted to the hypodermic syringe with the very best results. Even in cases apparently moribund this plan produced good effects, especially when combined with the cold douche and the free use of ice. On the march, cold douches and ice are not always at hand; but the syringe and a small bottle of quinine in solution can easily be carried about the person, and used at once. Ten grains of quinine, as many drops of dilute sulphuric acid, and one hundred minims of water form a good solution; and this amount might be injected in several places, rather than in one, with advantage. If the temperature does not fall somewhat in half an hour, other fifty minims had better be injected. Cold douches to the head are good as an auxiliary, but they often fail when employed by themselves. After consciousness has returned milk and beef-tea in small quantities at frequent intervals may be given. Ulceration does not take place at the seat of the injection." These remarks need no comment except that if the condition really be one of vaso-motor paralysis, as seems very probable, then digitalis or ergotin might be added to the quinine if necessary.

§ 216. Affections of the spinal cord are very difficult matters to approach from a therapeutic point of view. Inflammatory conditions must of course be treated in a manner similar to like affections of the intra-cranial contents. Conditions of congestion of the cord are to be treated by purgatives and by ergot, which exercises a decided effect upon the vascular system of the spinal cord, producing contraction of the vessels. The combination of

cathartics—which themselves tend very directly to unload the spinal vessels—with ergotin, contains the best potentialities of success. In cases of anæmia of the spinal cord, with resultant paralysis, more or less absolutely free from spasms, either tonic or clonic, strychnia is indicated. It has been found to increase the vascularity of the cord, dilating the spinal blood vessels, and indeed exercising an influence the opposite of ergot; and is consequently to be given with iron, good food, and general tonics. Other conditions of the cord, as locomotor ataxy, are very little influenced by treatment.[1] Iodide of potassium has been thought to exercise some influence, but everything is useless, or nearly so, in a curative sense; while palliative treatment is very unsuccessful, and even opium fails to relieve the terrible pains of this malady. Softening of the cord, like similar conditions of the brain, is a malady over which drugs exercise but little control; and the sole hope lies in improvement of the general conditions, and from that some local improvement. The application of various agents to the spine, as liniments, plasters, heat, or cold, exercises but little influence; but electricity is often of service in spinal paralysis accompanied by anæmia. In some conditions of spinal irritation commonly seen in unmarried ladies and less frequently in spinsters of humbler grades, counter-irritation along the spine, or large opium plasters from the sacrum to the nape of the neck, are often very useful. But their use is subordinate and but ancillary to measures calculated to reduce ovarian congestion and allay sexual excitement. Hysterical paraplegia is best met by alkaline purgatives and the bromides. Here it would appear that the impressions coming in to the lumbar portion of the cord arrest or inhibit the ordinary motor impulses; and the diminution of these sensory centripetal impressions, by the measures just mentioned, is followed by improvement in the paralysis. If the patient be plethoric it might also be desirable to adopt a low diet and to encourage the menstrual flux. Such at least are the measures which have been most satisfactory in the writer's experience. Aloes, which induces congestion of the pelvic vessels in small doses, acts beneficially in congestion of the pelvic viscera when

[1] Weir Mitchell thinks rest in bed gives the best results in this terrible malady. This plan is well worthy of trial.

given freely. Given with sulphate of magnesia and bromide of potassium, aloes is a capital remedy in ovarian congestion; that is if the mixture be pushed to the extent of well-maintained but not too profuse catharsis, so as to secure three or four full motions *per diem*. Affections of the spinal cord do not admit of such classification—therapeutically at least—as is possible in affections of some other organs; and each case demands long and careful thought, and the special application of the rules laid down here in this and previous chapters.

§ 217. *Epilepsy and Chorea.*—These are two common maladies, which are best considered by themselves. The first, epilepsy, consists of motor disturbances of the most varied character, from general and bilateral convulsions to a slight twitch, or the momentary arrest of consciousness, the *petit mal*. Truly epileptic mental discharges are also found. For long the pathology of epilepsy has eluded the search of those engaged in its pursuit; but at length a circle is being drawn around it which is gradually closing up. The thorough investigation of the vascular relations of epilepsy has done away with the theories which made epilepsy rest upon circulatory disturbance; it is found that there is a sudden rise of blood-pressure at the commencement of the fit, which passes off quickly. Probably there is some hyper-vascularity in the nervous matter involved in producing the fit; but the fit itself is an explosion of nerve energy in over-charged or unstable nerve-centres. "In each epilepsy there is an area of grey matter in some portion of the cerebrum which is so abnormally nourished that it occasionally reaches very high tension and highly unstable equilibrium. It occasionally discharges, or is discharged, by some excentric irritation, or during some general bodily disturbance, as, for example, that attending fright." (Hughlings Jackson.) The experimental researches of Ferrier corroborate the views formed clinically by Jackson, and the application of electrodes to motor centres in the brain produces a discharge of nerve force; which is preceded, however, by an instantaneous increase in the vascularity of the part, and followed by motor movement. Consequently we can understand that the nerve energy stored up in the cerebral cells may be discharged from some emotional cause, as fright; or from some irritation within the system, as a tapeworm, or a decayed tooth,

or as the convulsions of teething, or still more ovarian or uterine disturbance; or again the discharge may result from some high tension, from excessive or abnormal nutrition, especially in a brain naturally unstable. There is a discharge similar to, if not identical with, that of other centres in fits of rage or in hysteria; where the explosions assume another expression. From this very brief allusion to the conditions under which epileptic convulsions arise a light is thrown upon the lines of treatment to be adopted in each case of epilepsy.

It becomes obvious that one great matter is to relieve any state of tension, and to lessen mobility in the nervous system, and so to reduce the tendency to discharges from any exciting cause. Consequently it becomes desirable to administer agents which will lessen nervous activity while controlling the circulation, and especially the encephalic circulation. Such an agent we possess in bromide of potassium. It gives steadiness to the nervous system by lessening its activity, and still more its excitability, and so diminishes the tendency to give forth discharges from high tension as well as from exciting causes; and we can therefore comprehend its immense value in the treatment of epilepsy. That the employment of bromide of potassium has changed the aspect of epilepsy, or at least profoundly modified it, can scarcely be denied. In many cases the fits can be kept away for almost any length of time by its free use; though they not rarely return soon after its withdrawal, to disappear again with the readministration of the remedy. No neurotic agent we are yet acquainted with has received such universal acceptance in the treatment of epilepsy, and held its ground so firmly, as bromide of potassium. It is quite certain that numbers of other agents have been vaunted as useful and effectual, and after a temporary favour receded into comparative obscurity; but the bromide increases steadily in favour even with the most sceptical. It is not only that it lessens nervous action in the centres, but it diminishes nerve conductivity, and so is useful in two ways. It diminishes the tendency to explosions, and it lessens centripetal impressions coming in from a distance.

The treatment of epilepsy is not, however, to be confined to the administration of bromide of potassium, no matter how freely. There are other matters to be considered. There is the

reduction of tension in the nerve centres by modifications of nutrition. In many epileptics the discharge is preceded by a ravenous appetite and the consumption of large quantities of food. It is impossible to shut one's eyes to the effect such supplies of food will have in adding to the vascularity and nutrition of unstable nerve-centres. There is, too, something in nitrogen which increases nerve activity, and renders nerve-tissue more explosive; and free quantities of nitrogenized food add to nerve susceptibility. Consequently a non-stimulating diet is distinctly indicated in many cases. A certain amount of normal discharge of nerve force is not unimportant as well. Brown Séquard's guinea-pigs, which had frequent fits in confinement when abundantly fed, lost much of their convulsive tendency in liberty with a different regimen. From such considerations we can see a probable relation at least betwixt nervous discharges and excessive nutrition in unstable brains, especially where there is much nervous inactivity. Exercise in the fresh air with a regulated diet will do much to reduce the liability to such discharges in many brains.

On the other hand, we know that convulsions are apt to occur, if they are not always present, in sudden hæmorrhage. Consequently we can see how, under other circumstances, tonics, chalybeates, and liberal supplies of good food may be beneficial in restoring some brains to their normal equilibrium. Many cases are permanently benefited by good nutrition just as much as a lowering of the diet is required for others. Of the tonics most resorted to iron is one of the first, often beneficially given with bromide of potassium; zinc, silver, or gold are also commonly used. Phosphorus is sometimes useful; while the vegetable tonics, as quinine and strychnine, are also serviceable. Other agents of neurotic character than the bromides are also useful in some cases, as belladonna and cannabis indica; but it is impossible yet to discriminate the cases to which they are suited, or to lay down any rules for the administration of these two agents in epilepsy.

Then again there comes the matter of the removal of irritant or other exciting causes. Extrinsic causes of such nervous explosions are to be guarded against and avoided, as sources of fright, of excitement, &c. All irritant matters within the

organism itself must be attended to and relieved. Thus intestinal or other irritation must be removed, and it is ever well to keep up the action of the intestines. A loaded state of the bowels is a great provoking cause of epilepsy in unstable brains. A tapeworm also has been known to cause epilepsy; and the recurrence of the fits was the indication of the presence of another worm in the same individual. The sexual organs are very commonly, indeed intimately associated with epilepsy. Thus we often see it in women at or about their menstrual periods. It is not only that in unstable brains peripheral irritation sets up centric discharges very readily; there seems something in the brains of epileptics which leaves them more at the mercy of their passions than other persons are. In such cases bromide of potassium or ammonium are useful in every way, especially along with measures which keep the pelvis free from load or congestion.

It is also a matter of importance to attend to the secretions and excretions. Especially is it necessary to attend to the elimination of waste nitrogenized matters. The relations of nitrogen to nerve-explosions, as well as nerve-explosiveness, are well seen in the convulsions of uræmia. A uræmic condition, especially when it occurs in anæmic subjects, is commonly accompanied by convulsions in normal brains; and consequently the disturbing effects of nitrogenized waste upon unstable brains becomes very intelligible. Free purgation with potash, laxatives, warm baths, and increased action of the skin, as well as kidneys, are indicated.

In many cases counter irritation is found of service, and Romberg gives some very striking cases. Brown Séquard and Van der Kolk also believe in the good effects of counter irritation. From what has been said of counter-irritation in Chapter XIII. this is not at all unintelligible.

The night terrors and the convulsions of children have to be treated on the same principles as epilepsy; and in them the condition of the intestinal canal is all important, as the reproductive organs exert comparatively little action at this period of life. Bromide of potassium is the most useful agent to directly control the nervous system in these cases.

§ 218. *Chorea* is as much a spinal affection as epilepsy is

a cerebral one. It occurs under various circumstances; and, like epilepsy, may be free from any organic change, or may occur under the most unalterable circumstances. As commonly seen in children chorea is often the evidence of arrested nerve-evolution. It is apt to be common in families of low nervous development, or in those where there is nervous instability. It is found in families where there is also epilepsy, neuralgia, and paralysis. Commonly there is defective motor power, impaired sensation in the affected limbs, and limited intelligence in choreic children. In such cases nervine and general tonics, arsenic, iron, &c., are indicated. Then it may arise from embolism, and there the establishment of collateral circulation alone gives relief. All measures, then, calculated to develop such collateral circulation should be resorted to. It may arise from irritation in the viscera, and has been found, like epilepsy, to come and go with a tapeworm. Here the removal of the irritation is the treatment of the chorea. Where the removal of the irritation is impracticable, as in the chorea of pregnancy, nerve sedatives, as the bromides, are most useful. There is all the difference in the world in the treatment of chorea according to its causal associations. But chorea generally is an indication of impairment of nerve-power, of the instability and irritability which shows itself in the nervous system when exhausted, or insufficiently nourished. "Chorea is a disease the essence of which is impairment of nervous power, and that this impairment may manifest itself in many different ways, according to the nerve-centres, especially affected. One reason at least why the malady is so frequent in young children is the greater mobility or excitability of the motor department of the nervous system in them than in older persons. What would be a neuralgia in the latter, or some other form of sensory disturbance, or perhaps emotional, takes that of muscular jactitation in them." (Handfield Jones.) Consequently the plan of giving tonics with liberal supplies of fat is a sound one in many cases. Zinc or iron are also useful; and I have seen the specific of Stissèro, sulphate of copper, do well in a most obstinate case. Strychnia is most useful where the cord seems lagging behind in the general evolution of puberty—a common condition for the exhibition of chorea. At other times belladonna is good, lessening apparently spinal excitability.

The combination of bromide of potassium with iron will often give very good effects in cases which have resisted both singly; and Da Costa advocates the use of the bromide of iron. Where there is simple irritability the bromide of potassium alone may be required. In almost all cases of chorea, as in other functional disturbances of the nervous system, liberal supplies of hydrocarbons, especially fat (in the form of cod-liver oil if necessary), and limited supplies of nitrogenized food, are indicated.

§ 219. *Hysteria* is a very troublesome and complex affection, and the brief summary, here alone possible, is to the effect that it is the outcome of a susceptible nervous system, often acted upon by the associations, mental and other, connected with the reproductive system; but by no means necessarily so. It is most common in spinsters from puberty to about six-and-thirty; but may be found in highly-strung nervous systems under totally different circumstances. In the case of spinsters it often ceases with marriage, and rarely persists after the advent of motherhood. In many cases the patient manifests a morbid self-consciousness, and is entirely absorbed in herself, her interests, and her sensations. In such cases the symptoms classed as spinal irritation are frequently found. This is the commonest form of hysteria, but it has myriads of manifestations. Joint disease, paralysis, hyperæsthesia, &c., are amongst its mimicries; but it will simulate peritonitis, or at other times explode in oft-repeated convulsions. In approaching hysteria from a therapeutic point of view, it is necessary first to discriminate its causal associations and its surroundings. If occurring in a person of high nervous development and mental culture, it is probably intimately related to some emotional disturbance not necessarily involving the passions. In such cases, camphor, hyoscyamus, or other calmative neurotics, are indicated, with rest and the avoidance of excitement. When associated with ungratified physiological aspirations in the spinster or the widow, hysteria is almost always accompanied with, if not caused by, ovarian fulness and congestion. The impressions arising therefrom either cause cerebral disturbance, or disturb motor or sensory processes, or influence the body temperature. In such cases it is necessary to unload the pelvic viscera by sulphate of magnesia with decoction of aloes, pushed

pretty freely, and to give bromides. On no account must the alleged incapacity to empty the bladder lead to manual measures of relief. Quiet surroundings, with judicious, but not ostentatious kindness, and a firm bearing in those around the patient, are absolutely necessary. If the patient's mother is an unwise woman all treatment will be found ultimately to be useless, or next to it. The ordinary measures of unpalatable remedies are of little real service. "The whole list of anti-hysteric remedies—such as musk, castor, valerian, assafœtida, and the like—appear to have this one property in common, that they do no good, and delay the real treatment of the case, which is not one of 'nauseous gums,' but of mental, moral, and social management." (Russell Reynolds.) In minor cases nature's remedy—a good cry—often is of much service and gives great relief. The *tout ensemble* of the hysteric female is unfortunate, and requires the utmost skill for its correct management or amelioration. Firm and well-defined measures alone are serviceable; and a hesitating vacillating adviser may soon render a case incurably bad which, under wiser measures, might have been largely amenable to treatment. In hysteric convulsions a deluge of cold water is useful for its moral as well its physical effects; but the most effectual plan, and least troublesome (that of C. J. Hare's), is to hold the mouth and nose forcibly, until a vigorous inspiration is at last attained, which usually terminates the fit. Inhalations of nitrite of amyl contain much promise.

§ 220. *Neuralgia* is a most common ailment, indeed one of the most universal plagues of humanity. It occurs in two pretty distinct forms, (1) that of anæmia and debility; and (2) that of degenerative change, especially in connection with lithiasis. In the first form Romberg's idiomatic utterance that "Pain is the prayer of a nerve for healthy blood"—that is healthy in quantity and quality both—is almost universally true. In order, however, to discriminate betwixt neuralgic and other similar pains the four rules of Anstie must be borne in mind. First, the one-sidedness, except in severe cases, where the pain becomes sometimes bilateral. Secondly, its gusty character, not a steady, continuous pain, but coming in ebbs and flows. Thirdly, the association of the pain with physical depression, imperfect nutrition, or exhaustion. Fourthly, the

effects of tonic treatment. In addition to these the pain is often sudden or fitful in appearance, with intervals of complete freedom from pain; except in advanced cases, where the intermissions become more or less lost. It also follows the track of sensory nerves. It is often associated with a family history of neuroses of various kinds. Often, too, there are present sensitive points along the affected nerve, the tender spots of Valleix. One of the very commonest forms of neuralgia is the intercostal, the pain in the side, or under the heart, so frequently complained of by women. This form is most commonly associated with leucorrhœa, next with suckling, and then with excessive tea-drinking or dyspepsia; in some cases all these are found together. Perhaps intercostal neuralgia points more strongly than any other form to the absolute necessity for the removal of all debilitating or co-existing conditions producing exhaustion or irritation; as well as the administration of food, tonics, and chalybeates.[1] The cure of the leucorrhœa, and its frequent accompaniment, menorrhagia, is the essential step in one case; the abandonment of suckling is necessary in another; and the avoidance of tea is as requisite in a third. What is true of this form of neuralgia holds good in all others, facial or lumbar. It is useless to attempt to feed up the patient if drains upon the system are left unchecked, or sources of nervous exhaustion are permitted to remain. Every form of debilitating action, mental and bodily, should be removed. Then iron, with or without ammonia or arsenic, quinine, and strychnine, are the chief agents to be relied upon. These drugs may be given in combinations of two or more with advantage. Then comes the absolutely necessary fat. The influence of fat over neuralgiæ is unquestionable. When we remember that nervous tissue consists so largely of fat and phosphorus, it can be no matter for surprise that fat, in all its forms, and phosphorus should be so valuable in the treatment of conditions of nerve debility. Phosphorus may be given in any of its forms; but as phosphoric acid, either free, or in combination as a phosphate, it is least useful; and as free phosphorus is most serviceable. Fresh air, exercise, and

[1] It occurs at that intercostal nerve which comes off from the cord where the great splanchnic runs in, and which is, therefore, most affected by any visceral disturbance causing irritation.

invigorating surroundings are ever of service, and the avoidance of surroundings of opposite character is equally desirable. Such are the means of cure. There are also palliative measures. Opium is of use to procure sleep; while it may be used locally. The hypodermic injection of morphia, so as to secure local and general effects, is a great boon alike to patients and practitioners. Chloral is of little use, and is not desirable. It is too depressant, and lowers the nervous system too much. For local relief aconite is most useful, in the form of a strong tincture, or the liniment of the British Pharmacopœia, with or without belladonna liniment. Often this may be painted on merely, and yet give effectual relief. At other times it is better to use a more powerful measure, especially in sciatica. For such end then aconite liniment, ʒii., and an equal quantity of belladonna liniment, may be mixed with ℥ss. of glycerine, or better still, treacle. This does not readily dry. The mixture must be spread liberally on a strip of lint of two or four folds in thickness, and the prepared lint applied along the course of the affected nerve; covering the lint with oil silk, sufficiently large to overlap the lint half an inch all round. This can be secured by a roller bandage, or the leg of a stocking, and left on for hours. When desirable a new application can be put on; but it is even better to spread some more of the mixture on the original lint, until it becomes completely saturated, and then reapply it. This is a powerful local measure, often of incalculable service, and can be used along with general measures, no matter what the form of neuralgia (p. 249).

Neuralgia may be rheumatic, or gouty, or degenerative. As such, it is most commonly found in advanced life and in those of a nervous diathesis. It is not incompatible with great vigour in such persons, but is more commonly found associated with overwork. Such forms of neuralgia are generally best treated by remembering the associations, and giving potash and colchicum along with tonics and chalybeates. In such cases, the desirability of a diet containing much fat and little nitrogenized food becomes of greater urgency than in other neuralgiæ even. Alkaline purgatives are useful, and in atonic cases arsenic may be added with advantage. After the *materies morbi* has been got

rid of by such measures, then a cautious administration of potash and iron with quinine may be commenced; and for some time the evacuant and tonic measures may be combined and blended ere tonics alone are given. In these forms of neuralgia local measures are more satisfactory than in pure neuralgia—which is essentially a disorder of adynamic character.

Local palsies and local spasms must be therapeutically considered in relation to their exciting cause and special associations.

Electricity can have no lengthened notice here, as its use obtains chiefly among those who do not require the perusal of a work like the present. It is useful diagnostically as well as therapeutically. As a remedial agent it is often most useful: mostly in localized nerve affections, least so in maladies of cerebral origin. If the two poles can be placed on each side of a nerve lesion, then the current may rouse the nerve fibrils, and do good. If used too soon much harm may follow its employment. In all cases it may be used to maintain the activity and nutrition of muscles, so that they are kept in such a condition as to resume action as soon as nerve currents once more reach them. It may also be used in cases of arrested development, as in incapacity to walk, or backwardness in walking, in infants. And it is equally serviceable in cases of loss of power from muscular atrophy; but here good nutrition is absolutely essential to improvement.

With this chapter on the nervous system the second part of this work concludes. The second part is the practical application of the general principles laid down in the first section. The whole scheme is completed by the two following chapters on Hygiene and Diet. The perusal of this work will show that there is a certain refinement, or fineness to be attained in therapeutic measures: such as the addition of strychnia to digitalis in certain cases of cardiac debility; of digitalis to depressant alkalies in gout with a feeble heart; of colchicum to the medicines when a gouty factor is found present in the morbid condition; or of hydrobromic acid to quinine in cases where that drug causes headache. The power to recognize these subtle distinctions is an individual property quite independent

of the acquired knowledge; just as music or painting require certain natural qualities. Like these, therapeusis is an art; and for its highest expression there is a something required which no study can give. This may be greatly developed by careful study; but it is after all an individual possession, and the therapeutic instinct stands in the same category as the musical faculty.

CHAPTER XXII.

PUBLIC AND PRIVATE HYGIENE.

§ 221. *Public Hygiene.*—As well as the cure of disease, there is the matter of its prevention;—a very important matter, and one now much better recognized than in times past. The conviction that prevention of disease is a better method than cure, even if cure were invariably attainable—which it is not—is now generally prevalent. This is partly the result of better general education and the spread of information; but also not a little due to the fact that the wear and tear of life, the direct consequence of the pace at which we live, is such that few systems are fit to bear fairly well the test of acute disease. This last applies rather to the dwellers in towns than the denizens of hamlets and villages; is more true in the hives of industry than in the scattered population who follow agricultural pursuits. The pace at which we now live is much faster than that of our immediate predecessors, nor is there any prospect of immediate retardation; though it may well be questioned whether man will continue indefinitely his present feverish pursuit of wealth. It is not merely to make ends meet that man, and especially the Anglo-Saxon, struggles so strenuously and persistently; the early exertions are continued and, if possible, increased in order to make a fortune—for nowadays it would seem that the prevalent opinion is that without wealth life is scarcely endurable. A truer and juster idea of happiness and comfort will ultimately obtain, and man will find himself more agreeably as well as more profitably engaged in other questions than the gain of mere material wealth. It is only of late years that wealth has

been readily attainable to any considerable number of people; and its dazzling fascination blinds mankind at present to the evils and the drawbacks which underlie the alluring surface. Experience, however, is being rapidly furnished to demonstrate that wealth is not the royal road to happiness, that money-making may warp the intelligence and dwarf higher qualities; that in material wealth we are not to find unalloyed good. At present, however, we live in an age which is pretty universally finding out the powers of endurance of every individual by the searching test of over-exceeding them. It is not in commerce only that this high pressure existence obtains: in every walk of life now there is a general pushing forward; a great deal is required now to enable the individual to hold his own: how much more then is required in order that each may pass his fellows in the race of life? It is the sustained rate of life-speed which requires that the individual shall lose none of his headway by intercurrent sickness, that gives a stimulus to public hygiene. Man in his swift pursuit of wealth does not wish to lose ground by sickness. He takes care of his health in order that he may grow wealthy; but he does not grow wise in proportion, and his care of himself in many ways is more than counter-balanced by his gross neglect of himself in others. We are all inclined to look very sharply after any sources of ailment, except the now common one of physiological bankruptcy, by too frequent and persistent drafts upon the body force. The large increase of heart-disease, and still more brain-disease, amidst the well-to-do classes, of late, is the direct outcome of our impetuous excitement and anxiety, of "wear and worrit."

Such, however, being the case, it is desirable that the young medical man should recognize the fact, and be prepared accordingly to advise his patients.

§ 222. Firstly, then, about the house in which we live. Much ill-health is the direct consequence of ill-built; or ill-planned houses, of low rooms, of insufficient sunshine, and, still more, of bad ventilation and worse sewerage. The primitive arrangements of nomadic tribes are utterly unsuited to the existing circumstances of the day. The magnificent sanitary arrangements of past civilizations were lost during the dark ages. Cloacal arrangements were entirely lost sight of, the streets

were sewers, while water was drawn from wells immediately underneath and amidst this filth; the floors of houses were strewn with rushes, amidst which refuse and waste accumulated, a fresh layer of rushes merely hiding the nastiness it concealed, but did not remove; in the churches lay the decomposing dead, poisoning the living; crusaders ignorant of, as well as fanatically disregardful of all sanitary laws, spread pestilences in their marches; plagues and pestilences decimating, nay, depopulating whole territories, as anyone who has read Haeckel's *Epidemics of the Middle Ages* well knows, were constant and persistent; while the ordinary heavy death-rate at times ascended to a terrible fatality. From such a state of matters we are now awakening; not, however, without repeated reminders in the forms of severe outbreaks of preventible disease; and are setting to work seriously to improve matters, and to entertain the question of hygiene, and to recognize the value of sanitary arrangements. Consequently houses are now built with careful regard to their position, so far as is possible, to the foundations, to the regular supply of water and of air, and the proper removal of all waste and fæcal matter. The importance of sunshine to the health of humanity is now recognized. We know from barracks how lack of sunshine and ill-health go together. Then we also have learnt that spacious rooms, giving a large cubic space to each individual, are of little avail unless that air be changed repeatedly, and for this end ventilation is imperatively necessary: by too carefully closing every aperture all the evils of bad ventilation are artificially secured. Not only do many of the wealthy classes inhabit day rooms too carefully heated, the air of which is laden with the products of combustion; but the advantages of large bedrooms at night are lost and neutralized by burning gas for hours in these rooms in the evenings, closing every crevice against a draught, and then often, too, lighting a large fire. By this means the oxygen of the room is largely consumed until the fire dies out; leaving the human being in a sleep which is partial carbonic acid poisoning: there are no means for the renewal of air; the draught caused by the fire is no longer existing; and under such circumstances man seeks to fit himself for days of toil and exhaustion. The storing up of oxygen at night, as Voigt has shown, for the needs of the

waking hours, so necessary and desirable, is as far as possible prevented by the very individuals who need it most. How far such nocturnal storing up of oxygen by the humbler classes, whose houses do not admit of proper ventilation, is simply impossible, it is not easy to say: their neglect of sanitary arrangements is not merely an outcome of indifference, but is largely the inevitable result of poverty. Plentiful supplies of fresh air are desirable for every living thing; and if, under certain circumstances, they are unattainable, in a great many instances their absence is the result of ignorance or indifference. In a great many affections of the lungs the disease arises from mechanical irritants suspended in the air; and in all cases of disease, and especially chronic disease of the lungs, the mischief is aggravated by the respiration of such mechanical irritants.

The importance of sufficient ventilation in our public buildings is not yet sufficiently recognized. Churches, theatres, places of public entertainment, picture-galleries, &c., are all liable to produce distinct and tangible effects, as faintness, headache, malaise, upon some individuals, who are very susceptible to bad ventilation and foul air; while similar more persistent conditions are produced in less susceptible individuals when chronically exposed to such conditions. In railway-carriages, in tramway cars, and in omnibuses, this disregard to the necessities of the system in the way of a sufficient supply of oxygen is painful to see, as well as to bear, for those who do understand the subject. An abject fear of colds from free supplies of air absorbs all the attention of many individuals, and renders them forgetful of other evils which do not lie so immediately at the surface.

§ 223. The importance of a good supply of pure air is not nearly so well appreciated generally, as is the necessity for free supplies of pure water. Mankind has ever sought to get a clear and sparkling water, and objects to it if its smell be unsavoury; but of the finer and subtler contaminations he has remained, until recently, profoundly ignorant. The curious relations of cholera to water-supply furnish a case in point. In one outbreak in London 37 per 10,000 of those who drank the water brought from the Thames near Ditton died; but 130 per 10,000 of those who drank water brought from the Thames at

Chelsea died. Here is an unquestionable piece of evidence that a constantly impure water-supply leaves the system less equal to resist an epidemic form of disease. It is not that water is often the direct source of disease, as diarrhœa and typhoid fever ; but it is commonly a cause of a gradual, steady deterioration of the health, which is revealed by the inability of the system to withstand the strain of some acute intercurrent disease. If temperance, or rather teetotalism, be a good thing, its advocates ought at least to secure their adherents from the dangers to which they are thus exposed ; for outbreaks of typhoid fever have been found to seize the water-drinkers of a house, while the beer-drinkers have been free from attack. In our relations to the public as medical men we must be impartial, and sentiment must not warp our intelligence; we must be as ready to acknowledge the dangers of water-drinking, as we are to admit the destructive consequences of excessive indulgence in alcohol. It is not in towns only that the evil effects of a contaminated water-supply is felt; indeed they have been too rudely awakened by irrefutable facts to be any longer oblivious to the consequences ; but also in the country, where wells lie close to sinks and middensteads; where the village stream furnishes to those at one end of the hamlet, as a beverage the sewage of the houses placed further up. In few villages is the water to be trusted, unless it be the product of some well-cared-for spring, or some exceptional well. The repeated outbreaks of typhoid fever have accumulated evidence on this matter which is sufficient to convince the most sceptical.

§ 224. Closely connected with our water-supply is that of our sewage. The fact that in large communities the water-carriage system is the only practicable one; and the other fact, that if the sewage were entirely removed from our waste water-supply, the sewers would no longer receive the benefits of being flushed by the waste water in rainy seasons and in thunderstorms, cause the question to be more complicated than it would be, if the axiom "the rainfall to the river and the sewage to the soil," were capable of practical application. As it is, the two matters are bound up together in such a manner that they cannot be separated. We know, however, that many outbreaks of disease are occasioned by our water-carriage of sewage. Not only is

sewer gas apt to diffuse itself from the water-closet trap, and so to poison the inhabitants of the house; but leakage from sewer-pipes is apt to penetrate the water-supply, and so cause disease. Especially is this the case where the nitrites of the fæcal matters have eaten through the iron pipes, as they are apt to do, and the water-supply is intermittent. When the water-supply is cut off sewer-gas so finds its way into the empty tubes, which exercise a suction action, as the water runs out of them; and then follows disease. If there be any typhoid fever in the town the poison will get universal diffusion when the water is again on, and an outbreak will result. The possibilities of water contamination by our sewage are so numerous that it would be simply impossible here to indicate a tithe of them. The publication of sanitary journals, as the *Sanitary Record* in England and the *Sanitarian* in New York, is doing much to familiarize not the profession only, but lay readers with the manifold dangers which ensue from neglect of sewage and sewerage. The removal of fæcal matter by the use of the earth closet is feasible in large establishments, as sanitoriums, &c., where the system of water-carriage is likely to lead to the pollution of neighbouring streams, or where public institutions are liable to actions at law in consequence of their sewage, or in private houses, for indoor arrangements in the country; but as a means for use in comparatively small towns even, it must be pronounced unsuited and impracticable. That towns, however, can go on polluting adjacent rivers and poisoning the water for their neighbours, as of yore, is quite out of the question, especially in our manufacturing districts. There are immense difficulties in the way, and vested interests to be attended to; but, nevertheless, towns where wealth is made must set apart a portion of that wealth for the removal of their sewage; and of all plans the system of sewage irrigation over meadows seems the most feasible, and to possess the maximum of advantages with the minimum of drawbacks. By the different systems of filtration and sewage of meadows combined, there seems a prospect of getting rid of sewage in such a manner that the fluid shall fertilize the land, and leaving there its fæcal matters, return through the purifying soil to the river a fairly pure water. In all large plains, studded with hamlets and towns, the contamination of water with sewage,

in spite of everything yet known, is such that filters in private houses are very desirable.

The sewage difficulties are such in every health-resort as to, as soon as ever any place becomes popular, cause the greatest difficulties. Look, for instance, to the health-giving valley of the Wharfe, where Ben Rhydding towers over one of the healthiest of districts, near pure air of the most bracing character, with limpid water from far-stretching moorlands; and yet Ilkley is now a town with all the difficulties of aggregations of individuals. Whether in such districts as Harrogate, Ilkley, &c., the system of only permitting so many acres, when being sold, to each house and no fewer; so that for the wealthy there is a villa and grounds; and for the less wealthy sanatoriums under professional and skilled superintendence, with every possible sanitary arrangement,—would be successful in getting rid of many of the present drawbacks, or not, it is impossible to say. It is hard that the poorer members of the community should be cut off from the advantages of health-resorts; and yet the conversion of rural districts of that character into towns of second-rate lodging-houses, with their sanitary defects, is a questionable means of bringing such health-resorts within their reach.

§ 225. The causes of diseases associated with decomposition have been held to be germs, whose origin and growth putrefaction encourages; or else to be tiny particles, in atomic activity, from one organism wafted to or otherwise brought in contact with other organisms, in which they set up changes similar to those being undergone by themselves. As to which of these hypotheses is correct, or whether the true explanation has yet to be discovered, I am not in a position to say, nor, indeed, apparently is anyone else as yet; but this we do know, that a large series of agents, known as disinfectants and antiseptics, have the property of arresting the activity of the infecting media. That carbolic acid added to the offensive peasoup stools of a typhoid-fever patient takes away the offensive odour, and not only that, but renders them innocuous, we have every reason to believe. It must not, however, be supposed that the offensive odour is the poison; but, at the same time, an odour of a disagreeable character is usually found present where septic poison is being

generated. By his sense of smell man is warned to take precautions; but the stench is not itself poisonous, as is seen in the offensive odours of tanneries, for the popular belief is that the neighbourhood of a tannery actually confers healthiness. Wherever there is decomposing matter, especially nitrogenous, there is a disagreeable odour evolved; and with such decomposing matter certain fevers, and especially typhoid, are associated causally. Murchison, indeed, calls typhoid fever "pythogenic fever," or "fever bred of putrefaction," and some French writers regard it as procurable at will. In consequence of the vast accumulation of evidence that septic poisons are causally connected with decomposition—an amount which no ordinary mind can resist—a great stimulus has been given to the subjects of disinfectants or antiseptics. These agents, whether derived from vegetable or mineral sources, possess the property of uniting with bodies in a state of atomic activity, and forming with them stable compounds; which, as such, are inert, and so free from dangerous qualities. The decaying or decomposing matter forms a species of base or basyle, in union with the arresting acid, as seen in the use of carbolic acid, for instance. In Condy's fluid, however, a diametrically opposite action takes place. Here the active oxygen, liberated from the fluid, quickly procures entire and complete oxidation of the particles in atomic change; and so does away with their dangerous properties.

It is a matter of no small importance for the young practitioner to have distinct ideas on the subject of disinfection, as at the present time the subject is invested with somewhat of novelty, as well as possessing merits of its own. There are various forms of disinfectants, some more suited to one requirement, others better fitted for different needs. To take the disinfection of drains and sewers first: here is required, as regards the fluid contents of the channel, a fluid form of disinfectant; and a suitable form is found in a solution of sulphate of iron, in carbolic acid in solution, or chloride of zinc, or of lime, &c. Such fluid should be poured pretty liberally into the offensive drain. At the traps, or other openings carbolic powder may be used with advantage. For the disinfection of privies, urinals, the arrest of offensive odour in water-closets, &c., the

carbolic powder is very useful. It should be used liberally and freely. It has the advantage of liberating the carbolic acid gradually; and consequently is useful to meet a persistent giving off of putrefactive matter, or offensive gases. Similar antiseptics are useful to deodorize and render harmless the dejecta from typhoid-fever patients. In the country these dejecta might, as speedily as possible, be buried at some distance from any water-supply, and the antiseptic action of earth soon renders them free from all danger. If in towns, they ought to be thoroughly disinfected ere being committed to the water-closets. A certain quantity of some soluble disinfectant might be added to the water in the pan of each closet, or some powder scattered in with advantage. A great source of danger in connection with the water-closets is the liability to so introduce sewer-gas into the house. When the water-supply, or waste-pipe of closets in the upper part of the house are in communication with those beneath, the rush of water to the lower outlets causes a rush of air to take the place of the vacuum so made, and sewer-gas often is so introduced into a house. At other times, especially in houses at the summit of each sewage-area, the pent-up sewer-gases rush up the waste-pipes, and from the water-closet infect the upper rooms of the houses. Especially is this the case if the sewerage opens into a tidal river. The rising water fills the outlet, and then compresses the pent-up air in the sewers; under such pressure the sewer-gases penetrate where under other circumstances they could not enter. The waste water-pipe should be broken in its course, so that sewer-gas may escape without rising into the house; or a shaft should be carried up and out beyond the roof, so that if pent-up sewer-gas should rise in the pipes it would find a ready outlet into a comparatively safe external air.

So much for general disinfection. We may now come to the question of more special disinfection. Supposing that there is already a case of fever in a house, the first thing to be done is to isolate the patient. No one should see him except those in immediate attendance upon him. All food should be brought into another contiguous chamber, and be removed from thence to the sick-room by the attendants; and all refuse, &c., should be conveyed by the nurses into this room and thoroughly

disinfected, and then it could be removed without fear of infection by the ordinary servants. Thus all direct communication betwixt the sick person and the household would be avoided. All soiled linen should be immersed in a disinfectant solution, all slops disinfected, and the clothes of the nurses should be disinfected on their leaving the room. In order to prevent the fever-poison passing out from the sick-room when the door is opened, a sheet saturated with some liquid disinfectant should be hung over the door-way; and be frequently moistened with the disinfecting solution. Within the room Condy's fluid might be scattered about freely, or some solution of carbolic acid, or chlorozone. All unnecessary articles ought to be removed from the room, as they might prove carriers of infection.

As to the patient, chlorate of potash in lemon-juice (very palatable), or sulphite of soda, may be administered internally; and if the case be small-pox or scarlatina, the patient may be washed with Wright's tar soap, or salicylic, or carbolic-acid soap. At the latter stages, when the dried crusts of small-pox, or the exfoliated epithelial scales of scarlatina constitute special sources of danger, a carbolized cerate, or oil, should be rubbed over the body, and the patient should be bathed every day or second day, and the exfoliated matter removed; then the disinfectant should be smeared over the whole surface again, and at the regular time the bath be resorted to. By such means the infective matter given off from the surface is rendered harmless. It is of as much importance to disinfect the cutaneous matters in these ailments, as it is to disinfect the stools in typhoid fever.

After the convalescent patient has left the sick-room it ought to be cleaned out; everything being removed, the empty-room should have its windows closed, and then, on a thick layer of sand, should be placed a red-hot iron plate, and upon it sulphur. The fumes of the burning sulphur then fill the room, which should be kept closed for twenty-four hours. After that it ought to be scoured out thoroughly, and then the sulphur-fuming ought to be gone through again. After this the windows should be opened for a couple of days, and then the room is safe enough. If necessary the woodwork could be

scraped and repainted, the ceiling whitewashed, and the wall-paper renewed, in addition.

The articles which are in the room might remain over the first fumigation, if they could not otherwise be well disinfected. If in the country, they should then be exposed freely to the air. All feather beds and mattresses ought to be teazed out and made over again. Things of no value should be burnt, as newspapers, journals, &c. Books should be carefully aired, or well shaken over some fuming disinfectant. In towns there are now large disinfectant chambers, where wearing apparel, bedding, &c., can be disinfected for a small charge. In villages, &c., the wearing apparel might be hung around a small spare room or outhouse, and then fumed with sulphur, or with iodine, whose fumes are an excellent disinfectant.

If the patient die, then the corpse should be washed with a strong solution of carbolic acid, placed as quickly as may be in a coffin, disinfectants being placed beneath and over it; and the coffin lid screwed down without delay. The burial should be proceeded with at once.

Such are the measures to be carried out when fever has once entered a house. It is not sufficient merely to see the patient through the fever, in scarlatina, small-pox, and typhus: the most infectious period is that of early convalescence. Such convalescents should be kept away from the healthy in convalescent rooms or wards; until the last scab has fallen off in small-pox, and until the last particle of skin has exfoliated and come away in scarlatina.

§ 226. The next point to be discussed is the question of the dissemination of disease by those who attend upon the sick, as the medical attendants, nurses, &c. Firstly, as to the medical attendant. When attending upon fever cases, the ordinary conventional rules ought to be put in abeyance; and the medical man should see his patient without removing his macintosh, and after leaving the room should have it sponged with a solution of Condy's fluid. This would pretty effectually disinfect him. He should also wash himself well either with Wright's tar soap, or a solution of Condy; hands, face, and beard all should be disinfected. After this he might go on his round without practical fear of being a poison-carrier. It is

well, when possible, to visit the fever patients last on the daily round. In rural practice, of course, this is not always practicable. Especially is it necessary and imperative upon the part of the medical man to take precautions when he has midwifery to attend. There is no evading the conclusion that the vagina readily takes up septic matter when brought in contact with it; and the scarlatinal poison readily sets up puerperal fever of a hopeless character when so conveyed to a parturient woman. The hands should be carefully washed, first in a solution of carbolic acid, and then in one of Condy—but not the two together, as they neutralize each other. The carbolic acid solution should be used first, then the hands may be rinsed with simple water, and, lastly, washed in a solution of Condy: by such means they will be free from dangerous properties, as well as odour.

As to the disinfecting of nurses, the question is a complicated one. In fever cases among the affluent there should always be two nurses, so that they could have regular and sufficient sleep in a large double-bedded room well ventilated. It is obvious that if the nurses' room is attended to by the ordinary domestics there must be some considerable danger of infection. The nurses then ought to do the chambermaid's work of their own room, carrying their slops, well disinfected, into the same room as the slops from the sick-room are carried; and which should always and unintermittingly be well disinfected. Their changes of linen should be brought about in the same way; all soiled linen being immersed in an antiseptic solution as soon as taken off. After it is done with, this nurses' room ought to be fumed and scoured in the same way as the actual sick-room—as given above.

In the dwellings of the humble, however, it is simply impossible to take efficient precautions against the carriage of infection by the nurses. Where neighbourly kindness has to supply the place of a hired skilled nurse, some risk must be run by the nurse; and when a neighbour sits up all night with the sick patient, it is not only the self-denial and exertion undergone that claims our respect, but there is actual possibility of infection and danger to their own loved ones at home that is risked. Under such circumstances the use of disinfectants and

the exposure to the air in passing from house to house are almost all that is feasible. While respecting neighbourly kindness in the humble, there is another form of neighbourliness which is to be sternly reprobated; and that is the reckless and thoughtless visits of the gossip to fever-stricken houses, "just to see how they are getting on." This is useless, and fraught with danger; and the medical attendant should set his face determinedly against all such practices.

§ 227. The only prospect of improving matters, as regards the management of fever among the poor, is the institution of fever hospitals in towns—in epidemics they may be of a temporary character—and the spread of the cottage-hospital system. The latter arrangement would meet famously the necessities of sporadic cases of infectious disease; and would often prevent the spread of such disease. This is especially true of typhoid fever, which is largely spread by persons going from one place to another while the fever is latent in them; on arriving at their new residence the fever develops, they are nursed by well-meaning but ignorant persons; the dejecta are not disinfected, and, finding their way into the water-supply, a local outbreak of fever results. If the cottage-hospital plan were in general use, the patient would be nursed under circumstances much less favourable to the spread of the disease; and the nurse, knowing something at least of nursing, would be less careless about the disposal of the dejecta, and so would limit the disease.

It is by no means absolutely necessary for the practical adoption of the cottage-hospital system to have a handsome building, &c.; a good well-aired cottage standing alone, with an intelligent widow in it, would form quite a sufficient hospital for a village, except in special outbreaks of fever. Such cottage and nurse could easily be secured by any board of guardians; while the union medical officer would willingly give some attention to the training of the nurse. Such an arrangement, with the nurse under the doctor's orders—a matter of no slight importance—would often check troublesome outbreaks of typhoid fever, and nip them in the bud.

The importance of having some similar institution for the reception and detention of travellers from places notoriously

affected with infectious disease, until their perfect healthiness is demonstrated, it is easy to see; but it would not be easy to carry such arrangements into practice with Anglo-Saxons. When, however, the liberty of the subject extends to carrying fever-poison to others, and so endangering their lives, or, at any rate, subjecting them to expense and suffering, that liberty seems certainly to call for some restrictions.

§ 228. *Private Hygiene.*—This important matter may most conveniently be divided into two sections, (1) that of the healthy individual; and (2) that of the invalid.

For a person in health the great question is how to preserve this condition of matters. In order to do this it is necessary to bear in mind the circumstances of each individual. If he be a wealthy man, there will probably exist a tendency towards an unnecessary consumption of food, that is, in excess of his absolute needs: but this varies much with different individuals; if the person be in humble circumstances, the amount of food may be insufficient. The southern labourer, described by the late Charles Kingsley in *Yeast*, gets but bread and cheese, and an occasional bit of bacon, or a dab of dripping, for his unvaried dietary, upon which he has to labour as best he may: with him a more liberal dietary would certainly be beneficial. The full-fed servants of rich men's houses have too much of what most poor needlewomen lack. Some intellectual excitement, some mental occupation is as necessary for the workman engaged in monotonous pursuits, as pin-head-making or needle-grinding, in order to preserve him from insanity or outbreaks of debauch, by which his health may be imperilled; as is exercise in the open air for the clerk, confined for hours to close and heated rooms, or the merchant, who is little better off, except in the question of length of hours; or the barrister or the literary man, who live sedentary lives, and breathe an atmosphere by no means too pure, or too highly charged with oxygen.

At other times the question of clothes becomes an important matter. Especially is this the case when autumn wanes, and hot noontides are combined with cool mornings and cold evenings. In spring we usually continue our winter clothing till advanced spring compels us to lay it aside; and colds from

the too ready adoption of summer costume, though far from uncommon, are less frequent than the various derangements of health in the autumn. In spring the form of ailment is usually an ordinary cold; in autumn a chill to the surface is apt to produce a catarrhal condition of the intestines which is set down to fruit. With some persons fruit seems to be regarded as the means of producing diarrhœa rather than as pleasant, wholesome, refreshing food; and is much too scrupulously avoided. It is wonderful, too, to see how carefully Eastern people, even in very hot countries, stick to their cummerband, by which the loins and abdomen are kept warm and protected from sudden chills. Many Europeans develop in time a similar attachment to this article of attire. It is always well for immigrants to conform to the customs of the places they migrate to; if they retain too conservatively their old habits, it is probable that illness will result, and after this experience they may become wiser; but then they may be killed or seriously injured in undergoing this species of instruction.

A great matter at present is the question of the bath. As regards the use of the bath, we have now reached a point not far removed from that of ancient Rome. Not so much time, however, is spent in the bath as yet; and the common form is that of the morning tub, now so universally in use. That cleanliness is a matter of the greatest importance we know well, and an efficient action of the skin is a great promoter of health. At the same time the free use of cold water tends to brace the vessels of the skin and educates them to contract readily on the impingement of cold, so that the risk of taking cold is diminished; nevertheless, there is something to be said on the other side. When the morning bath is resorted to in order to create a sense of energy and fitness for the day's work, which is wanting from imperfect hours of rest; it becomes no longer a useful agent, but contains an element of mischief. It then becomes a species of stimulant, which tends towards physiological bankruptcy; in that it enables the individual to reach his fund of reserve force, but does not itself furnish force, nor anything which can be converted into it. The general use of the bath cannot be too highly commended, but, like everything else, the bath is not an unalloyed good; it contains some potentialities

for doing harm under certain circumstances. With many persons the cold bath does harm in this way: It chills them too much, and the skin does not readily react and glow, even when industriously and perseveringly rubbed with flesh-brushes or Turkish towels. For such persons it is desirable that the water have the chill taken off, and that the time of the bath be brief. With these precautions many persons may take baths with benefit who now cannot do so, and with whom baths are more injurious than beneficial.

For women the use of the hip-bath is very desirable; and if that chills them too much, or is inconvenient, the bidet should never be neglected. Our English women are chaste doubtless; but in their chasteness they are apt to avoid all attention to their reproductive organs, and are infinitely less careful about their personal hygiene in this respect than are their continental sisters, especially the French woman. A great deal of feminine ill-health arises in or is fostered by neglect of ablutions round the hips and pelvis; and as the subject is rather a delicate one, it is not pressed by the bulk of medical advisers. A woman may be perfectly continent and chaste, and yet be scrupulously particular about her personal ablutions. Not only is the use of the bidet desirable every morning; but vaginal injections of cold water, alone, or with a little Condy's fluid added, every day are beneficial for those who have a tendency to a free flow of mucus from the vagina—and they are a large proportion of their sex—and in some cases these injections of cold water should be followed by the injection of a weak solution of sulphate of zinc, alum, or other astringent. Of course the ablutions must be sparing, and the water not cold during the catamenial flow; while the injections must be stopped during that period. By such means women would enjoy much comfort, and many of them better health.

Considering how women fasten their skirts from their hips and surround their pelvis with clothing, so as to keep it and its contents warm, indeed too warm; and the exposure to heat, as in cooks and laundresses; or the warmth of exertion in actresses, ballet-dancers, housemaids, and chambermaids; the action of the treadle in sewing-machines, especially the double-treadle form of machine; the close rooms in which girls and

women have to live in commercial houses; and the warm rooms wealthy ladies prefer; all which tend to produce a relaxed condition of the vaginal mucous membrane: no wonder few women escape at some time or other, a condition which renders the use of the bidet, and even the injection, indispensable to health and comfort.

Most of modern houses of any pretensions contain a bathroom, and this is a most salutary arrangement. After fatigue, mental or bodily, especially in warm weather, the bath is a great comfort, as well as an excellent hygienic arrangement. They are now so fitted usually as to admit of warm or cold baths, or the shower-bath—a famous means of producing wakefulness in those who are too fond of lying in bed in the mornings. Some also are so constructed as to give the needle-bath—a rather powerful agent, not to be used rashly, but very useful in asylums in the treatment of melancholia, or of simple dementia. The Turkish bath, now in much favour, is a luxury to most of those persons who frequent it; but it is also an excellent means of treating a cold, if caught at the commencement. After exposure to chill, immersion in a warm bath, and then a sojourn in a bed comfortably warm, will usually take away all unpleasant consequences. Indeed, an hour or two in bed after a bath is usually very refreshing.

So much for the ordinary use of the bath by healthy individuals. We may now proceed to the use of the bath, of baths, and bathing-places by invalids, or those who consider themselves to some extent such.

§ 229. The benefits to be derived from mineral waters, either warm or cold, poured out by certain springs, were recognized by old writers of medicine. How, and under what circumstances man first used such waters we can only speculate; probably for some persistent forms of skin disease. Empirically, and by long experience, was it found which baths did good in certain conditions. Now baths have developed from their primitive condition and become handsome and large towns; where a resident population thrives on the profits derived from visitors to these baths. As many of these visitors are there on the pretext of seeking the baths and drinking the waters, as are there for strictly necessary reasons. Consequently at most of these

places there is pleasant society, amusements to engage the attention and relieve *ennui*, together with rules and regulations ostensibly to secure all the possible benefits from the baths and waters, and so impress the minds of the visitors; but which are at the same time directly conducive to health. In sending patients to baths and watering-places there are other advantages than those furnished by some peculiar form of mineral water. To the merchant who sticks too closely to business and is engaged in crowded streets or thronged wharves the greater portion of the day, it is as health-giving to be out for hours in the open air; to meet pleasant company, to hear an outdoor concert, to rise early and to go to bed at ten o'clock, sleeping in a pure bracing air; as it is to take draughts of sulphurous water until the liver is thoroughly unloaded, and then to drink chalybeate waters as a tonic. All this time, too, there should be a liberal, but not too luxurious dietary; and the appetite should not be tempted too far by the nature of the viands. There are in such arrangements many things conducive to health beyond the mere mineral water. To ladies of fashion, after a long and exhausting season, which has turned day into night and produced the well-known depressing effects of exertion in heated rooms amidst an atmosphere fouled with myriads of gas-lights; the healthful quiet of a watering-place, its fresh air and sanatory breezes, together with long hours of rest at night, furnish an opportunity of regaining the lightsome sense of energy with which recently they have been but little acquainted; without there being any magical properties in the nauseous waters they so faithfully drink. The life led at wells and watering-places is itself so conducive to health, that we now find sanatoriums springing up in places where the waters are not vaunted as possessing any special properties; but where the claims of the institutions are founded on the other attractions the localities possess. Having admitted the advantages to be derived from the position and surroundings of most of our best-known watering-places and baths, it may be advantageous to review very briefly the different forms of waters, and the different disturbance of health to which each is best adapted.

§ 230. Firstly of water—as water. A large portion of our bodies is water; and a constant flow of water through us is

necessary to existence, to say nothing of health. By means of water in simple solution, a great many constituents of the body find their way out of the system. A constant bathing of the tissues with fluid is perpetually going on, and by such means the waste is removed. In many persons the amount of water, in any and every form, consumed *per diem* is much too little for the efficient washing of the tissues. The bulk of water then which is insisted upon at the various baths is itself an agent of no mean therapeutic power; and if it be also charged with various alkalies, the removal of waste will be facilitated. When there has been a rather too liberal dietary indulged in, and the patient suffers from suppressed gout in any of its protean forms, such free consumption of water is very useful, especially when alkaline. Such waters are to be found at Vichy, Vals, Heilbrunnen, Neuenahr, Bladon (Aa.), and Congress Springs, (Ca.); and are suited to dyspeptic affections, thickening of the joints, gout, chronic affections of the respiratory organs, &c. If it be desired also to act upon the bowels and there is a sluggish liver, so-called, or a loaded liver, with engorgement of the portal circulation; it is well to recommend the patient to visit some spa where the water is purgative as well as alkaline. Such water is furnished by the springs of Carlsbad, Marienbad, Tarasp, &c. Purgative waters charged with salt are to be found at Cheltenham, Leamington, St. Gervais; while fairly purely purgative waters are to be found at Püllna, Friedrichshall, the Hungarian Hunyadi János, Estill (Ky.), and Bedford (Pa.) Springs. Such waters are very useful in all cases where the digestive system has been systematically and regularly overworked.

In other cases, again, of broken health, as in the Indian cachexia, and the other debilitated conditions of the system produced by residence in tropical climates, and also in many cases where no foreign experience is in action, salt springs are very useful. In these springs chloride of sodium is combined with other constituents, may be carbonate of lime and carbonic acid, as in the waters of Homburg, Kissingen, Wiesbaden, Harrogate, Baden Baden, Cronthral, Congress, &c.; or with traces of iron, as is the case with several of the waters just mentioned In some of these springs the proportion of salt is much greater than in others, and for many persons the milder waters of

Baden Baden, Canstatt, Charleston (S.Ca.), are to be preferred to the highly-charged waters of Mannheim, Soden, Homburg, Saratoga (N.Y.), and Ballston (N.Y.). Then there are sulphur springs possessing their peculiar properties. They are said to act well upon lethargic skins, to be useful in rheumatism ; being commonly purgative, they are beneficial in plethora, biliary congestion, &c.

Aix la Chapelle is a mixed salt and sulphur spring, thought to be specially good in constitutional syphilis in the debilitated ; it is useful of course in many other maladies. Wielbach, Langenbrücken, Stachelberg, La Prese, Allevard, Enghien, the old sulphur-well at Harrogate, Gilsland, Moffat, and Strathpeffer are among the principal sulphur springs of Europe ; while in the United States there are West Baden (Ia.), Paroquet (Ky.), Sharon (N.Y.), the milder and pleasant waters of Minnequa (Pa.), Jordan's White Sulphur (Pa.), Greenbrier's (West Va.), and others ; and in Canada the powerful Sandwich Springs, near Ontario. These waters are all unpalatable, but are very serviceable in cases where the indulgence at the table has been rather too free. By means of Harrogate and Buxton, the wealthy, self-indulgent, high-living manufacturers of Yorkshire and Lancashire continue to keep themselves in moderately fair health, and even in many cases in redundant health.

Then there are chalybeate waters of great importance and freely scattered. These waters are either resorted to at once, or after a course of some of the waters previously mentioned. They are either themselves fairly pure, or mixed with other constituents, as salt, carbonate of soda, or sulphate of magnesia, or soda. If situated at some height above the sea, they are more efficacious. Thus Schwalbach is 900 feet above the sea, Spa 1000, Bagnères de Bigorres 1850, and St. Bernardine and St. Moritz over 5000 feet above the sea. Ferruginous waters are commonly found charged with other mineral constituents. Thus the waters of Giesshübel, Heilbrunnen, the Bailey Springs (Aa.), Estill (Ky.), &c., are also alkaline. Those of Marienbad, Franzenbad, Elster and Ocean Springs (Mi.), are alkaline-saline. Kissingen, Canstatt, Homburg, Harrogate, &c., are ferruginous and salt. Pyrmont, Bagnères de Bigorres, Tarasp, St. Moritz, Stribling Springs (Va.), &c., are also vastly saline ;

while Schwalbach, Spa, Tunbridge, Harrogate, and Marienbad are comparatively pure iron waters. Many of these waters are highly charged with carbonic acid, and so possess exhilarating qualities. One great matter, perhaps the greatest matter of all with mineral waters, is their dilution. The different substances are largely diluted with water, and thus are more readily assimilable than when given from the medicine bottle. Where patients are poor, and cannot be sent to drink mineral waters, nor yet even purchase imported mineral waters, much may be done by directing them to drink large draughts of water with or after each dose of medicine. This, as has been remarked before, often makes all the difference betwixt the medicine doing little or no good and its being beneficial, especially in combinations of alkalies with iron. The bicarbonate of potash with potassio-tartrate of iron in a bitter infusion, with or without a little sulphate of magnesia, will often produce as good effects as can be derived from some far distant spring, if largely diluted. Of course it is not the interest of those connected with such springs to admit this fact; and on the other hand, such home treatment does not include the new scenery, the fresh air, the pleasant life and gaiety of a fashionable spring; and in so much is actually inferior to a visit to a spa.

There are also waters impregnated with iodine, as in the water of Woodhall Spa, in Lincolnshire, where there is both iodide of potassium and bromide of sodium in solution. Similar waters are found at Kreutznach, Wildegg, Adelheids Quelle, &c. They may be taken in large quantities, indeed must be so taken, in order to furnish much of the medicinal constituents to the system. Lithium has been found in the Murg-quelle, and at Elster. For its solvent action upon uric acid and urates, much has been expected from it in the treatment of gout. Large quantities of water must be drunk in order to take in any perceptible or medicinal amounts of lithium; but the cases thus to be benefited often need large quantities of water as much as the mineral constituent.

Waters are now exported in large quantities, and vary from the potent Hunyadi János water to the delightful Apollinaris water, an exquisite beverage. Artificial waters, seltzer, soda, potash, lithia, &c., are now largely manufactured, and are in

almost universal use, to add to spirits, wine, beer, or even to be drunk alone. As lemonade, water simply charged with gas, and acidulated, has a most extensive sale. The chief drawbacks to these artificial waters are the carelessness with which many of them are made—a supply of pure water not being essential in the eyes of some manufacturers—and their price.

§ 231. So much for the various forms of waters furnished by our best known baths and wells, and the indications for drinking them. Now we may review the more special use of them as baths, and for bathing purposes.

Firstly, as the effects of temperature. In a bath below the temperature of the body there is a decided loss of heat, the surrounding water being a good conducting medium. Consequently even cold baths are rarely below 50° Fahr. If below this the immersion must be brief; and even then they can only be used by those who are fairly strong. The more the bather agitates the water the greater the loss of heat. After a cold bath the bather usually rubs the surface vigorously and produces a glow over the skin; this is caused by the dilatation of the cutaneous vessels and the rush of warm blood through them; the vigorous exercise of rubbing resulting in increased heat-production. The tepid bath is from 85° to 95°. Such baths are suited to delicate people, and such is the temperature of baths in which people reside for hours as in Baden (Vienna), or in the water under the Blocksburg at Ofen (Buda). At Leuk men and women sit for hours in water "with card-tables and drinks floated to them on trays." The warm bath is from 96° to 104°. Here the pulse and respiration are not much quickened, but the skin is induced to act readily. The hot bath runs from 104° to 110°, occasionally to 120°, which is very hot. Such baths form powerful stimulants, and excite the pulse and respiration considerably. They are obviously not adapted to weak persons. In hot baths the skin is thrown very freely into action; and this transpiration through the skin, taken together with the large draughts of water swallowed, produces a flow of water through the tissues of the body, which exercises the most beneficial effects.[1] Baths and drinking the waters then

[1] It is often well to go to bed after such baths, so that the perspiration goes on without fatigue, often with sleep; by this means baths are made more effective.

commonly go together; occasionally it happens that the patient either cannot or will not tolerate one of them, and consequently must go without the benefits to be derived from the combination. In many conditions such hydropathy is very useful and health-giving, and is much to be commended. Personally, I believe that hydropathy, rescued from quackery and under proper professional guidance and superintendence, will form one of the most universal remedies of the future; especially in cases where the system is laden with the deleterious products of waste.

Vapour baths, Turkish, Russian, or natural, are also excellent measures for exciting the action of the skin and inducing the depurative effects of perspiration. In addition to their general application, waters and vapours can be applied locally to many parts with advantage. The shower bath directed to the head is a familiar illustration.

Cold baths are often too depressing, and hot baths too stimulating to be indulged in safely by a large proportion of the visitors at baths and bathing-places.

There are other baths than those of pure water, of any temperature, and those of mineral waters. Such are the sand baths of Blankenberg and Norderney. A hole is dug in the sand, and then the patient is placed in it, and the sand shovelled in around him. They are said to produce free action of the skin. Such proximity of damp sand must cause much heat-loss; and these sand baths were the favourite treatment of yellow fever by the buccaneers of the Spanish Main. In other places mud baths are in vogue. Peat or turf baths are common in many German spas. Such baths are powerful cutaneous stimulants, and in some cases produce much cutaneous irritation. Partial peat baths, or peat poultices, are also used by some. Peat water forms the bath at other times. Baths of pine balsam are in vogue in some places. They also excite the skin when inactive. They are fragrant from the resinous substances in the pine balsam. The dregs of the wine-tub have also been utilized to form a species of bath. These baths have the properties common to all baths. Finally there are electrical baths, doubtless useful at times, but too much surrounded by quackery. In this account of baths and wells the writer is

much indebted to Macpherson's *Baths and Wells of Europe:* a work which may be consulted by the reader with advantage.

§ 232. There are also health-resorts which have nothing whatever to do with wells or springs, but which attract, in consequence of their climate, position, &c. Such are Brighton, Ramsgate, Torquay, Aberystwith, Westward Ho! and Scarborough, Whitby, Silloth, and others. These different places on various coasts, east, south, and west, are good and beneficial to different cases. In some cases the warm soft air of Devonshire is as healthful as it is depressing to others; while these last are benefited by the bracing air of eastern and northern localities. It is a matter of no slight moment to many persons where they reside. Some, however, are never well at the seaside; others, again, never so well as when there; while a third series find a sojourn by the seaside annually to exercise a most excellent influence over them for the rest of the year. In these different cases varied instructions must be given; and if one place distinctly disagrees with the patient, let him or her resort to some other locality. We cannot yet find an explanation of the why and the wherefore that some organisms feel well at Hastings, with which Brighton never agrees. It is useless to say that this is all imagination—though of course in some cases it is little else, because we cannot unravel and lay bare the subtle peculiarities of individuals which we denominate idiosyncrasies; we must bow before the facts until we can explain them. That such individuals should only be found in the affluent classes is intelligible enough; such organisms are incompatible with the hardships of labour for an existence, requiring residence, not according to sensations, but according to opportunities for making a livelihood. But since they do exist, it is the business of the physician to enable them to prolong their existence; and to make that existence as tolerable and agreeable to them as possible. It is chiefly with respect to the consumptive that health-resorts have been studied. Experience has taught us much in these matters. The first impression was to send the patient in winter to some warm climate, where the genial air and mild temperature would enable the patient to be out of doors for hours even in midwinter; breathing an air at once pure and fresh, and yet not so cold

as to induce attacks of inflammation in the diseased lungs. Madeira, from its position and its being on the route of Indiamen, was a favourite place for a long series of years, and was much resorted to; but now it has fallen from its high estate, apparently, however, from no demerits of its own. The shores of the Mediterranean are now the favourite winter resorts of the Anglo-Saxon, the Sclave, and other races, whose own winter temperatures are too severe. Egypt is also now a popular resort, as steam has made it more accessible to the world. Tangiers too has its advocates.

On the other hand, it has been found that in a large proportion of phthisical cases it is not some warm place in winter that is to be desired so much as a cool place in summer; where a bracing air maintains the general health in a desirable state. Consequently these cases seek the heights of Switzerland and the Tyrol, where the summer air is chilled by the proximity of snow-clad mountains. In these elevated regions the consumptive finds comparative health during the warm weather; and descending on the approach of cold weather to some healthful region nearer the sea-level, again finds a suitable resting-place compatible with existence. By such alternations life is preserved. It is even asserted by some that there are altitudes where consumption is never found, as in the Upper Engadine; and that the phthisical can be snatched from the fate before them by resorting to such places as lie without the tubercular zones. But this is largely fancy, and it will not be wise to trust too much to this avoidance of consumptive zones. So far have we advanced, or at least moved from the old therapeutic position, that while a low-lying warm locality in winter was once alone thought safe for the consumptive, we now advise the phthisical to winter in comparatively high altitudes; and that, too, with apparent advantage. In India also the hills are no longer forbidden to the consumptive, who can find there a comparatively comfortable existence, as well as other invalids do.

The remarks of the late Dr. Fuller are so much to the point that I shall quote them literally in connection with the question of the proper residence for the consumptive. We must ascertain "first, the sort of climate and the degree of temperature which formerly suited the patient's constitution, or, in other words, agreed best

with him when he was in health; and, secondly, the state of the patient's bronchial mucous membrane at the time when his removal to another climate comes under consideration. It is obvious that if the bronchial mucous membrane is irritable the invalid cannot bear the effects of a very dry and stimulating atmosphere, however warm the locality may be. His symptoms require a soft atmosphere, and its temperature and the precise degree of necessary humidity must be determined by reference to his constitutional peculiarities. Thus, if he formerly enjoyed better health in summer than in winter, and felt greatest vigour in very warm weather, and in an atmosphere devoid of markedly stimulating or relaxing qualities, the probability is that the climate of Syria, Persia, Rhodes, Egypt, and other parts of Northern Africa would exercise an influence on his system, the good effects of which can be hardly over-estimated.

"If, again, though usually better in summer than in winter, he was formerly oppressed by excessively dry heat, but enjoyed a warm, humid atmosphere, such as that of South Devon or Cornwall, the probability is that the climate of Torquay, Dawlish, Penzance, or Jersey, of Pau, Rome, the Azores, Teneriffe, Madeira, Santa Cruz, the Mauritius, or Ceylon, according to the degree of temperature required, would be found to suit his general health, and assist in subduing the irritability of the air-passages.

"And yet again, if he is constitutionally disposed to general languor, and has always felt as much depressed and enervated by heat as pinched and prostrated by cold, then, notwithstanding the irritability of his bronchial mucous membrane, a medium climate must be sought—a climate such as is to be found in Queenstown, and other parts of the coast of Ireland, in the western coast of Scotland, at Buxton, Cheltenham, St. Leonard's, Ventnor, and Bournemouth; or, if a somewhat higher range of temperature is necessary, in New Zealand, or the Cape of Good Hope.

"But a large class of consumptive patients exist in whom there is little or no irritability of the mucous membrane. In these a drier and more bracing air will generally prove of the greatest benefit; but nevertheless, as in the former cases, the selection of a locality in each particular instance must be regulated by the

constitutional peculiarities of the invalid. If his circulation is languid, and he has usually felt more vigorous in summer than in winter, the invalid must repair to a warm locality, and in such a case the climate of Mentone, Hyerès, Cannes, Malta, Nubia, Algeria, Upper Egypt, the northern districts of Syria and New South Wales are likely to prove extremely beneficial. In some such cases the air of the Himalayas, the more elevated parts of the Andes, and other hill districts, has been found remarkably serviceable.

"If, again, the patient has an active circulation, and has usually enjoyed better health in winter than in summer, feeling braced and invigorated by cold, he will probably derive benefit from a residence at Brighton, Margate, Aldborough, Cromer, Harrogate, or Malvern; or if a cooler and still keener air is required, from the climate of Montreal, or other places in Canada, or of certain dry localities in Russia, or other northern countries. Some of the most remarkable recoveries from consumption which have come within my own cognizance have occurred under the bracing influence of a northern clime." (*Diseases of the Chest*, Chapter IV.)

What is so well said by Dr. Fuller about the consumptive patient will apply to a large class of invalids, to whom a residence suited to their individual necessities is quite as important as it is to the phthisical. In all cases indeed the answer to the question of the propriety of going abroad must be answered carefully and conscientiously. It will not do in so grave a matter to give an off-hand answer, when the question involves residence amidst strangers in a foreign land, who speak an unfamiliar tongue; away from friends and relatives whose kindly sympathy is so dear to the invalid; with the prospect perhaps of a lingering death, where no kindly hand will cool the fevered brow, no well-known voice solace weary hours, no familiar presence cheer the chamber of the sick person. To send an invalid into exile without a good and valid reason is very improper. Even when several members of the family can accompany the invalid, it is a serious matter to order what may be productive of much inconvenience without good and valid reasons.

§ 233. *India.*—The question of change of air in India is one of such importance that it can scarcely be exaggerated, and in order

to do the subject justice, I have applied to my friend Sir Joseph Fayrer, K.C.S.I., to give me some information on the subject; which his long experience and extensive acquaintance with India so well enable him to do. With this request he kindly complied; and in the following remarks points out some matters not generally understood; but the gravity of which is self-apparent:—

"The subject of change of air and climate is a most important one in India. I really believe that it is more so there than at home; and if the Calcutta medical men had it not to fall back upon, they would find great difficulty in restoring a number of their patients to health. The most important means of obtaining change of air are the following, (1) the Hills, (2) the Sea, and (3) Europe. These are all extreme methods, and there are many slighter, but very effective changes—none so trivial as to be unimportant. For instance, change to another house, or even to another room in the same house; to another station, even if there be no very obvious difference in the climate; a few days or even hours in a boat on a river, if the patient be near one; and in Calcutta a run down the Hoogly in a small steamer to the Sandheads, where a day or two may be spent actually in real sea air; each and all of these are valuable remedies, and contribute largely towards enabling our countrymen and women to fulfil the period of their exile in the East, and to return to Europe, damaged it may be in constitution, and compromised in their capacity for sanguification; but still free from what is ordinarily termed structural disease. Of course the change of climate adapted to one is not always suitable to another; the visit to Simla, Missouri, Darjeeling, that would restore one man to vigour and health, might prove fatal to another; even the health-giving sea air, if resorted to only in the Indian seas, might prove a delusion in those cases where the more radical change to Europe is indicated, as I have often found to be the case. The difficulties of getting away, the probable loss of appointment or business, the want of funds, the anxieties and care of an establishment at home and in India; the temptation to complete the one or two more years which will conclude the term when a pension becomes due, and India may be abandoned for ever—these and other motives have led many

a one to trust to the lesser change of a voyage to Burmah or Singapore when the more radical one of a visit to Europe alone could have restored health, or, indeed, saved life.

"These are sometimes difficult problems for the medical man to solve, and at times it is necessary to be very firm in urging the necessity for a step that is so full of importance to the patient and his family. The question will naturally arise as to what are the cases where this change of air is desirable, and what variety of change is suited to particular cases? I believe that such change is needed for Europeans in India, after all attacks of disease which have amounted to more than mere passing derangements of the bowels or stomach; or perhaps slight attacks of fever the result of heat and exposure, or other corresponding trivial ailments, from which the young and otherwise healthy persons recover there as well as here: but in all cases where the disease or ailment has lasted longer than this, change is generally needed to restore the patient to his usual health and pristine vigour. I do not in the least mean to assert that he will necessarily remain an invalid in all cases without it; but that it is very desirable—that it is good economy in time and money—for the mercantile man, and also for the public servant, who is thus sooner fitted to resume his duties effectually, and to perform them with greater benefit to the State.

"The complete change to Europe is the most important, and it is often very necessary. Formerly under the old Honourable Company's *régime* a period of three years' furlough was accorded to officers who had served many years in India; and it was a wise rule. It has been contracted of late years, and the period reduced to two years, and even less; but I have frequently observed that it is the *third* year at home that completes the re-establishment of health in the cases of many who have been long exposed to the influence of the Indian climate. Eighteen, fifteen, and twelve months are the periods of leave now generally granted on medical certificate; but these are too often insufficient, and have to be extended. As a general rule, one might say that a visit to Europe for a year at least is desirable after six or seven years' residence in India, especially if that time has been spent in the plains;

and this even where there may have been no illness, only that deterioration which takes place more or less in Europeans after a protracted residence in hot and malarious climates. But after attacks, and still more if they have been severe, of the so-called tropical diseases, change to Europe is often the only means of restoring health; especially in those who have had more than one attack, and have also been long in India. Such cases as chronic dysentery; enlargement, malarious or otherwise, of the liver and spleen; abscess of the liver, and that dubious state in which no one can feel sure that an abscess has or has not formed; malarious cachexia, the result of frequent recurrence of fever, or of exposure to malarious influences, that have not caused fever, but anæmia, neuralgia, local disturbances of venous orarterial systems, with the numerous evils that result from that condition, according to the degree to which they exist; albuminuria, imperfect function or disease of the organs concerned in the due and proper elaboration of the blood, as evidenced by lithæmia and all its attendant troubles; the broken health which often remains after cholera and attacks of continued fever, insolatio, and above all that which is so commonly the consequence of overwork, mental rather than bodily, when the mind more than the body needs rest—such are the cases, but by no means all, that require the radical change to Europe.

"Next to this comes a sea-voyage. This may be to China, to Singapore, to Ceylon, to the Andaman Islands, seldom now, as used to be the case, to the Cape of Good Hope, or even the brief run to Madras, or some place on the coast; a few days on board a pilot brig or light vessel at the Sandheads, or a run down the river in a steam-tug just to meet the sea-air and return. Such trips are often of the greatest benefit, but unfortunately they are frequently far from sufficient, and are only the preludes to the change to Europe. Still every one in Calcutta knows how great is the benefit these trips confer, and how often, if taken in time, they serve to stave off or prevent the necessity of some more radical change. After attacks of fever, hepatic congestion, bowel complaints, nervous irritability, the result of heat, overwork, and imperfect action of the liver, an absence of this kind, say for a fortnight, in a steamer crossing

the Bay of Bengal, will often restore health; while in lesser cases a run down to the Sandheads, or a trip to Madras and back, will suffice. The fact is that by medical treatment, with all it implies, a patient may be got over the worst part of his trouble, and be restored to a certain condition of convalescence, —but can be got no further. Hitherto he has been getting on in a direct line, but ultimately he gets into a species of circle and makes no progress, and then it is that the sea-trip does so much good, and enables the invalid to return to his work. For instance, take the case of a young man who has been a few years in Calcutta, and who has already begun to feel the climate: he has an attack of fever with a certain amount of hepatic trouble, or perhaps even dysenteric complication. The early treatment is perfectly successful, and the symptoms rapidly disappear; but he does not get on, and remains weak and depressed, and unfit for work. Tonics, food, &c., all do no good. Send him for a week to sea, and he comes back strong and healthy, with colour in his cheeks and vigour in his frame.

"Now we come to the Hills. They are valuable too, and often do much good, but they cannot take the place of the change to Europe, or even the ordinary sea trip. For many cases, Darjeeling, Missouri, Simla, Murree, are all too cold and too elevated, and they do more harm than good. There is in such cases no power of resisting the influence of cold and the rarefaction of the air; and diarrhœa of a most intractable character results. These Hill stations are useful rather as places of refuge from the great heat, for the mental rather than the physical (though that too very often) effects of change; and for the bracing effects of cold air in those who are strong with unsapped constitutions. Those who have suffered from overwork, mental strain, malarious cachexia in the slighter forms, or have a nervous system rendered irritable by responsibility and anxiety, or exposure to heat, may and often do benefit by it: but the hill stations of the Himalayas are seldom of use to those who have suffered from hepatic disease, dysenteric affections, or general malarious cachexia. As a general rule these cases should not be sent there, but to sea, or home to Europe. It is not the same with the hill stations of the south, Ootamacund and Conoor,

much further south they have a different and less extreme climate, and are frequently of the greatest benefit; as I have often recognised in the case of patients of my own sent from Calcutta.

"As to minor changes, such rules as apply at home obtain in India, only I think they seem to tell more strikingly there. In short, change of air and climate constitute the most powerful curative agents, and often preventive measures, we have to fall back upon in India, and it is impossible to say too much in their behalf. This brief note is insufficient to do even the pretence of justice to the subject."

These remarks, though all too brief, are most valuable and suggestive: pointing out, as they do so forcibly, the limited amount of benefit to be derived in grave cases from a resort to the hill sanatoriums; which, however valuable they really are, appear to be overrated as to their potency by those who are not so familiar with the subject in its entirety.

§ 234. The subject of change of air and climate comes home to most of those who are either naturally delicate, or who begin to feel the tax of prolonged physical toil and exertion, or mental tension, in tropical or sub-tropical climates. In such cases the sea-voyage, when practicable, especially when it leads to new lands, new topics of thought, novel scenery and associations, is very desirable; as when the American takes a trip to Europe; when the resident of the Cape, or the Australian, takes a similar trip; or when the European visits their lands. In each and all cases such change is not uncommonly of inestimable benefit, and always almost of some decided good. When such voyage is not feasible, then a sojourn among the Blue Mountains of Virginia; or now to the Rocky Mountains, and the prairies that lay at their feet; or even to the Californian sierras, is beneficial to the denizen of the United States. The northern spurs of the Rocky Mountains in English territory, with the pleasant lands known as "the fertile belt," which lie around them, form a magnificent site for sanatoriums; as well as health-giving resorts for the naturalist, the artist, or the sportsman. In South America the slopes of the Andes are available for those who need coolness and quiet; and the lofty table-lands of Quito offer sites for sanatoriums; though perhaps liable to the objections which

Sir Joseph Fayrer makes to the Hill stations of India. Simla is 8,000 feet above the sea; Quito is 9,000 feet, while the table-land of Mexico is over 6,000 feet above the sea-level. Such altitudes, while doubtless securing coolness, must necessarily possess a rarefied air, and have other drawbacks.

It is not only the intervals of convalescence in the invalid which give importance to these matters; there is also the question of prevention, of the right and wholesome use of holidays. The tour through Switzerland, the Tyrol, or the Hartz Mountains, now so common with Europeans, are excellent health-giving measures, which can scarcely be too highly commended; but some caution is necessary that they are not made fatiguing, especially to the weaker and less enduring members of the party, under which circumstances they often do much more harm than good. For the residents in low-lying plains an annual sojourn to some elevated inland resort, or to the sea-side, is very desirable; while for those who live in elevated places a similar annual sojourn by the sea in some mild neighbourhood is equally beneficial. It is not, however, always the mere change of air that does all the good; there are other factors often, as the change of habits, of scenery, and of new surroundings generally which are of no slight value.

CHAPTER XXIII.

FOOD IN HEALTH AND IN ILL-HEALTH.

§ 235. SCARCELY, if at all, less important than medicinal agents is the matter of food. The subject is one which has attracted much attention at all times; and varied views have been expressed about it, from the whimsical distinctions as to the action and effect of different meats given in the Anatomy of Melancholy, to the clearer and more exact statements of Physiological Handbooks.

Liebig laid down a broad rule, which has been so widely spread, that reference to it is unavoidable. He divided foods into two classes: (1) nutritious or plastic food; and (2) respiratory food; not forming the mineral elements of food into a distinct class. This division had much to recommend it, but it is far too absolute. In the first place, plastic forms of food, to a certain extent, are respiratory food; and hydro-carbons are also requisite to the formation and building up of healthy normal tissues. Muscles, the very type of plastic food, contain a certain amount of glycogen in health, and in so far contain a hydro-carbonaceous, or respiratory food. In the oxidation of azotised matter on its road from peptones to urea, a certain amount of heat, or force is produced; independently of any hydro-carbon contained in the azotized food. On the other hand, tissues for their building and repair require a certain richness of hydro-carbonaceous matter; and if the food be too poor in this respect, wasting follows, with a strong tendency to the formation of tuberculous growths. Hence we strive to arrest the tubercular habit by giving the patient a plentiful supply of hydro-carbons

in the concentrated form of oil or fat; and in order to secure their better assimilation, give with them tonics and stomachics; even an artificially supplied pancreatic secretion is not without its value.

Retaining, then, this division in a modified form—namely, as (1) nitrogenized, and (2) non-nitrogenized foods, we can proceed to consider the matter more in detail.

Nitrogenized foods are those which in digestion are formed into peptones, and from which the tissues are built and repaired. The amount that a growing boy will eat of this material with impunity, indeed with advantage, is many times greater than what is required by an adult or aged person. In growth, tissues have to be built as well as repaired, and the digestive powers are fully equal to the task of assimilating the required material.

If a sufficiency of suitable food be attainable, and the assimilative powers are healthy, a fully-grown organism, structurally sound, is the result. But a much smaller quantity of nitrogenized food is alone absolutely required when the full growth is attained. In the face of this fact, the consumption of meat is widespread, and largely indulged in. There is a general impression abroad that a diet consisting largely of animal food endows the system with a sense of energy and capacity. The gillie who lives ordinarily on a diet almost exclusively vegetable, quickly increases in power of endurance, and in capacity to manifest energy, in the shooting season, when his dietary is more liberal, and contains a good proportion of animal food. On a consciousness of the capacity to increase a man's power of labour by liberal supplies of food, of which a large proportion is derived from the animal world, the farmer engages men to live in his house and eat at his table; while their wives and children eat at their own home. The farmer knows well enough that, if he arranges so that the bread-winner gets his meals at home, he will share what he can procure with his offspring, and in doing so will diminish his own capacity to labour. The farmer gives his horses an extra quantity of corn when the duties to be performed are heavy; he knows that if he does not do so his horses will fall off in condition, and have to be fed up again; so, instead of taking from their stored-up force, he meets the

increased wear and tear by a more liberal dietary. Not only does a liberal supply of animal food give an increment of energy, but it also endows the organism with an additional amount of vigour. The meat-fed man is livelier, and his nervous energy greater, than the vegetarian. A bear which was fed upon meat became unmanageable; but a dietary which furnished no excess of nitrogen kept him comparatively quiet and submissive. The energy of meat-eating races and of carnivora contrasts with the quiet and more subdued ways of vegetarians and herbivora. It is then this sense of vigour which a dietary of animal food gives, that makes mankind crave after it, and induces humanity to consume an amount of azotized material far beyond the absolute requirements of their tissues. A highly nitrogenized diet is conducive to mental vigour: about that there can be no question. "It is certain that three men, one of whom has had a full meal of meat and bread, the second cheese or salt fish, and the third potatoes, regard a difficulty which presents itself from entirely different points of view. The effect of the different articles of food on the brain and nervous system is different, according to certain constituents peculiar to each of the forms of food." (Liebig.) And it is equally certain that the power of thought in an individual is very different according as to whether he is well and liberally fed, or is in a state of partial starvation. This is a matter, however, which does not admit of demonstration; and yet there is a large amount of evidence pointing to it, and indicating that there are relations existing betwixt the different forms of food and manifestations of nervous energy.

We will now proceed to a part of this subject about which the proof is more certain and the matter more demonstrable. Azotized foods furnish the material for our tissues, for whose renewal they are required. But this is much less than is supposed; and tissue-repair requires but a comparatively small portion of our plastic food. The rest of the peptones, which are produced in each act of digestion, are split up, as has been insisted upon in Chapter II. (§ 15), in the liver, into glycogen and nitrogenized waste. All, or almost all, of this nitrogenized waste is superfluous; and the requisite amount of glycogen for the daily combustion within the system could be as well

furnished by farinaceous or saccharine material as by azotized food. The amount of urea passed daily does not so much represent the waste of tissue, as the manufacture of glycogen from albuminous matter in the liver. Even in fever much of the urea passed, frequently in large quantities, is derived from the albuminous and other nitrogenized material furnished to the system as food, in the shape of milk, beef-tea, eggs, &c. No doubt the tissue-waste, under a high temperature, is very considerable, but it must not be supposed that all the urea is furnished by tissue-waste. Much of the attention to the estimation of the urea excreted in pyretic conditions is thrown away really, and rendered comparatively valueless, because the estimates are not accompanied by accounts of the exact amount of the patient's daily ingesta. The origin of the urea is overlooked in the estimates, and the conclusions are radically invalidated by such omission. It may seem to some readers that this matter is unduly insisted upon throughout this work, but its importance is a sufficient vindication for the repeated references to it.

These products of nitrogenized ingesta are matters of much moment in the management of conditions of lithiasis. In renal inadequacy the first step, of course, is to diminish the amount of nitrogen consumed. The effects of quantities of azotized matter in the blood upon the nervous system have just been mentioned; and certain it is that the nitrogenized materials may be regarded as manifestors of force, *i.e.*, the man whose blood is highly charged with nitrogen can evolve nerve-energy more rapidly and freely than can the vegetarian—the brain-power of each being equal—and probably can maintain that evolution for a longer time; but, nevertheless, the actual force is furnished by the combustion of hydro-carbons.

§ 236. In the hydro-carbons we consume as food we find the chief supplies of our force-producing material. All manifestations of force, muscular, nervous, and glandular, are produced by oxidation within the system. Each muscle has its little store of glycogen as muscle-sugar; and when functionally active, it is that glycogen which is consumed and oxidized, not the structure of the muscle itself. It was supposed by Liebig, and by other more recent writers, that the muscle itself was worn out in

functional activity, but the experiments of Parkes and others have shown that sustained muscular activity is not so much accompanied by an increased amount of urea, as by an increased production of carbonic acid. The muscle, in this respect, is not unlike the wick of a candle, it burns the supply of hydrocarbon; and as long as this is furnished in good quantity, it is but slightly consumed itself; when, however, the supply of fuel fails, the wick itself is consumed, as in starvation. As long as the amount of urea excreted daily is regarded as the measure of tissue-waste only, so long shall we have erroneous conceptions as to the amount of nitrogenized matter required to meet, what are supposed to be normal daily wear and tear.

In hydrocarbons we find the great sources of our supply of force-producing material. There is a store of glycogen in each muscle, and a granary in the liver; while in our adipose tissues we carry, in a permanent condition, much fuel in a concentrated form. When the supplies of food are beyond the immediate requirements of the individual, there is an accumulation of stored-up material, giving an increase in body-weight. Not only is there an increase of fat, but each muscle is plumper and fuller, as is seen in the horse when in good condition, or made up for market. There is, in fact, a reserve of force-producing material stored up for the needs of the system, and a man in good full condition will outlive the spare man if exposed to complete, or partial starvation. Understand me distinctly, however: a fat man will not necessarily weather a fever better than a lean man, the clinical facts are rather the other way; nor yet will a stout man necessarily endure hunger better than a spare one; but the same organism possesses more endurance when in good condition than it does when previously reduced. The excess of nutrition is stored up, and evidence of this is given by increase of body-weight; when the demands upon the system are excessive, then the body-weight falls. The ordinary reserve store of man is equal to about eight or nine days' consumption, as found by the records of shipwrecks, &c. If the surrounding temperature be low, the store is soon exhausted, because the body temperature has to be maintained; if the exposure be in tropical regions, a longer period of abstinence is compatible with existence, because there little is required to maintain the body-

temperature, and so the reserve-store lasts longer. Of course, too, much depends upon the amount of muscular exertion to be performed; if it be great, the reserve stores will be all the sooner exhausted; if little, as in a boat, or, still more, a raft, and most when in bed, the stored-up force-producing material will be still longer ere it is consumed. When cold, we put our muscles in action; and in doing so produce more heat, and so become warmer. There is a greater combustion of muscle-sugar so induced, and thereby more heat is produced. So when muscular exertion is required from a famishing man, he is so much the sooner burnt up.

In sickness in bed the reserve stores are not much drawn upon; and if small quantities of nutriment are furnished, and the needs of the system are reduced to a minimum, a person will last several weeks on a very small quantity of food, and yet ultimately recover. Seegen[1] gives such a case. The observations began after the patient (who suffered from a gastric affection) had been taking very little food for several weeks; and for nearly fourteen days had been living on thirty-five grams of fresh milk daily. A gram being fifteen grains, this gives 515 grains of milk *per diem*. In addition to this, she only took so much water; which, of course, furnishes no force, as it is not oxidized. The thirty-five grams of milk contained, according to the determination of Becqueral and Vernois, 1·9 grams of albumen, corresponding to 0·29 gram of nitrogen taken daily, or 3·4 grams in twelve days. The urea excreted during the same period amounted to 106·9 grams, containing 49·8 grams of nitrogen; and the excess of nitrogen excreted over that consumed, and which necessarily must have come from the tissues of the body, was 46·4 grams. From the thirteenth day of observation onwards, to the twenty-fourth, a much larger quantity of food was taken; the milk during this time being 2,275 grams daily, besides an egg, and a little arrow-root. The nitrogen taken into the body during this period in the milk alone was 1·76 gram daily, while in the first twelve days it was only 0·2 gram. The excess of nitrogen taken in the food during the second period over that in the first was, therefore, not excreted, but stored up in the body. This case shows well how

[1] *Journal of the Chemical Society*, vol. xxv.

insufficient supplies of food are eked out by tissue consumption, of which the urea forms the cinders; and then, again, how tissue-nutrition takes up nitrogen from the food for the purposes of repair. It illustrates strikingly the requirements of convalescence; and shows how liberal supplies of food are required, the appetite and power of assimilation being remarkable at this time. The patient whose reserve-stores are small to commence with, is ill prepared for any long or severe demand upon the system; and succumbs to demands which could be met with safety from fuller and more abundant reserve-stores.

From the hydrocarbon elements of our food, then, we get the bulk of that material required for the maintenance of body-heat and the manifestations of force. Some glycogen is furnished by the splitting up of peptones; and fuel is also furnished in starvation by the combustion of the tissues, of which the amount of unoxidizable waste is the measure.

It is very desirable that definite and distinct impressions on this matter should exist, and that the importance of starch be recognized. Those popular books which measure the amount of nutriment contained in any substance by the proportion of nitrogen present would be very mirth-provoking, if they did not create erroneous impressions on an important subject.

For most persons a much larger proportion of farinaceous food in their dietary is desirable; and puddings of various forms may advantageously again make their appearance on other than nursery tables. The tendency of the present day is too much in favour of a lunch of cold meat, accompanied by a draught of wine, beer, or stout. No doubt in such a luncheon there are combined nitrogenized and hydro-carbonaceous elements, together with a stimulant; and where the alcohol in the beer does not induce somnolence, such a luncheon perhaps gives the necessary food in that form which best permits of an arduous afternoon's work being encountered. But it may be much wiser ultimately for younger men and growing boys to have a luncheon of a less stimulant character. "The best luncheon a growing young man can have is a dish of roast potatoes well buttered and peppered, and a draught of milk. Or the same vegetable, with a little bacon or fish, may be made into a Cornish pasty, which if wrapped up in flannel will keep hot for several hours." So says

one of our best authorities on diet (Chambers); the first form is within the reach of all who follow sedentary or town lives; while the latter is suitable for those who must go a-field to labour, or those who must take their noontide meal with them. Such an arrangement furnishes the species of food required for the production of force, in a readily assimilable and non-stimulant form; and in doing so constitutes a most suitable dietary for a midday meal. Of course such a lunch ought to be combined with a liberal breakfast and a substantial dinner in the evening. The matter of breakfast is very important. After a good substantial breakfast, long hours of labour can be undergone without a sense of fatigue or exhaustion; for hours can arduous work be maintained after a breakfast of bacon, or ham, with a good proportion of fat upon it; not only physical labour, but psychical toil can be well undergone, and a long day's writing, preceded by such a breakfast, is sustained without any of that feeling of the thoughts no longer framing themselves readily into concrete sentences, or that the words will no longer readily drop from the point of the pen. Those who have made observations on the matter, note how wide is the difference in endurance after such a breakfast as that described, and one of fish. Fish is rich in phosphorus, and "ohne Phosphor kein Gedanke" may have some elements of truth about it; but after a breakfast of fish, comparatively few hours of work produce the feeling of being exhausted; while a breakfast consisting largely of fat will give unwearied energy for twice as long. Phosphorus and nitrogen are very well in their way, and enable the brain to work up to a higher pressure; but the hydro-carbons are the fuel after all, both in the human organism and in the locomotive; and a certain proportion of each should exist in the dietary of all.

Perhaps a larger proportion of force-manifestors are desirable where the labour is chiefly cerebral, than where the toil of the nervous system is confined to keeping the muscles in action. "And whilst on the one hand it may be freely conceded to the advocates of 'vegetarianism' that a well-selected vegetable diet is capable of producing (in the greater number of individuals) the highest *physical* development of which they are capable, it may on the other hand be affirmed with equal certainty that

the substitution of a moderate proportion of animal flesh is in no way injurious, whilst, so far as our evidence at present extends, this seems rather to favour the highest *mental* development." (*Principles of Human Physiology*, § 62.) This expression of Carpenter's falls in with my own views; and perhaps a more stimulant dietary, both alcoholic and nitrogenized, is requisite for sustained mental work than for any other form of labour. Barristers, literary men, actors, and others similarly engaged may find that an indulgent dietary enables them better to get through their intellectual toil; but if this is the case it also throws some light upon the tendency in such persons to premature decay, or demise in the midst of apparently perfect and unimpaired health. It is the old story over again, "in order to live long it is necessary to live slowly;" or that moderation alone is conducive to the prolongation of enjoyment. A diet may be stimulant even without alcohol, though usually they go together; but such a dietary is hostile to length of days, while a non-stimulating dietary is conducive to prolonged existence. The individual must choose for himself in the matter; but where a large amount of intellectual toil has to be and must be undergone, then the power of choice is limited. In thus speaking of a stimulant dietary with alcohol, it must not be supposed that work can only be done under the influence of stimulants—far from it. The best and largest proportion of work is done on such a breakfast as has been just described; but then after the day's work is over, and the work done, a dinner of animal food, or largely so, with some alcohol, will secure the greatest fitness for the next day's toil. By such an arrangement it is found that the maximum of work can be done with the minimum of wear and tear. The alcohol under such circumstances should only be taken at meals, unless it be a small quantity at bedtime; and scarcely ever before dinner, if the labour has to be continued through the afternoon. Where, on the other hand, the labour to be undergone is chiefly muscular, a diet largely hydro-carbonaceous, and to a less extent of azotized material, is desirable, unless the labour be very severe; and then it has been found that a free supply of animal food is beneficial, as has been seen in the comparative capacities of English navvies on their wonted diet, in the construction of foreign railroads.

§ 237. Food, however, has other relations which are far from unimportant. In the excess, or diminution of certain constituents of our food do we find the explanation of many of our constitutional conditions. For instance, in an excess of nitrogenized food we find the causation of much of the lithiasis, or gout, whether regular, irregular, or suppressed, with which we are brought into contact. In an excess of hydrocarbonaceous food does obesity take its origin; and abstinence is an effectual treatment for such a condition. In a deficiency of oleaginous matters is found to lie the tendency to those ailments which are regarded as scrofulous, or as tubercular. Consequently in either tendency it is ever of the greatest importance to flood the system with oleaginous matter, so far as it is possible to procure its assimilation. If one form of fat or oil is unpalatable or indigestible, it becomes necessary to substitute another; until some one is found which can be digested. Neither is it desirable that one form be adhered to until satiety is induced; changes must be made, and fresh olive oil may sometimes be substituted for cod-liver oil; especially in those seasons when vegetables are procurable in plenteous supplies and in good condition, and with which large quantities of oil may readily be taken. At other times cream with fruits, cooked or uncooked, may be taken in large quantities; with stewed fruit or strawberries it is well borne, and as Devonshire cream is delicious with preserved ginger; while cream and maraschino form a nutritive drink for the affluent consumptive. It is not always the same thing, however, to consume food and to assimilate it; and in many cases a liberal supply of oleaginous food, however necessary for the system generally, produces biliary disturbance. In these cases—and they are numerous—it is well to maintain a gentle action on the bowels, and every three or four days to induce purgation, especially by alkaline saline purgatives; by such a plan, sweeping away the superfluous bile, in these persons the assimilation of oleaginous matter can be much furthered. At the same time, open air exercise in some bracing locality is very desirable. Not only must the *primæ viæ* be swept at intervals, but the removal of waste products, by liberal supplies of oxygen, is to be encouraged; such removal of waste being essential to perfect

tissue-repair. As soon as oleaginous matter is supplied to the tissues, those changes known as tubercular growths give way to the formation of healthy tissue.

In obesity, on the other hand, it is necessary to avoid those forms of food which readily develop adipose tissue. The favourite plan, in vogue at present, is that advocated by Mr. Banting. It consists of cutting off all hydro-carbonaceous food, and substituting for it a practically unlimited nitrogenized dietary. This is effectual in reducing the amount of fat; for the glycogen so furnished is insufficient for the needs of the system, and, consequently, the reserve stores of fat are drawn upon, and diminution in weight and bulk results. This plan is unphysiological, and is so far unwise that it takes no account of the amount of nitrogenized waste produced by it; and grave renal mischief often results therefrom. It is much more prudent to adopt a line of practice which secures the same results without the risks so run; and the best plan is to fill the stomach with material, which, while it satisfies the cravings of hunger, furnishes but little aliment. Consequently vegetables, especially such as have much parenchyma, as lettuces, cabbages, greens, spinach, &c., are very suitable. The next best material of diet is the use of cereals and fruits, taken in limited quantities. The cases of the Abbé Cornaro; of Wood, the miller of Billericay; of a patient of the late Dr. John Fothergill; of a Whitehaven man related by Wadd; of a baker of Pye-corner (Wadd), are quite as striking as that of Mr. Banting, or even more so. Cornaro took daily but twelve ounces of food, chiefly vegetable matter, and fourteen ounces of light wine, for fifty-eight years. Mr. Wood for eighteen years lived on sixteen ounces of flour daily, in the form of a pudding made of sea-biscuit; by which plan he reduced himself some ten or eleven stones, and was "metamorphosed from a monster to a person of moderate size; from the condition of an unhealthy decrepit old man to perfect health and the vigour and activity of youth." Dr. Fothergill's patient lived solely upon vegetables, with a little wine or light beer. The Whitehaven gentleman ate brown bread, and apples to fill his stomach; by which means he reduced himself eight stones. He purged himself thrice a week, but allowed himself a pint of port or sherry daily.

The baker took water gruel and brown bread, and lost fourteen stones. In the other case, related by Wadd, on a diet of four ounces of animal food, six ounces of bread, and two pounds of liquid, a gentleman reduced himself from thirty-two stones nine pounds, to twenty-three stones. These cases are each of them more remarkable than that of Mr. Banting, as regards the reduction of weight: and the means of attaining this reduction are much sounder than that gentleman's plan of unlimited meat; not even restricting the diet to fish. The Banting dietary is not to be compared to that of abstinence; the food taken being vegetables and hydrocarbons in the least concentrated form of farina. No doubt, too, alkaline purgatives are of great moment in aiding reduction. Except that it entails little that is disagreeable, Mr. Banting's plan is far inferior to those detailed above; and it is not creditable to the profession that for so long Mr. Banting could get no useful suggestions for the reduction of his bulk; and that when he did at last succeed, so dangerous a scheme should have been furnished to him. It is at once obvious that a frugal meal of matter largely carbonaceous is more effective than a liberal supply of azotized matter; which latter furnishes a considerable amount of glycogen, but with it a large quantity of nitrogenized waste; in the elimination of which the kidneys are kept functionally active, and in time become diseased.

§ 238. The consumption of azotized food in liberal quantities and over long periods of time, as on the Banting scheme, is a great factor in the production of chronic renal disease. Doubtless there is much difference in individuals and in families; in some the tendency to renal mischief is such that small provocation sets up abnormal changes; while others again practise the greatest indulgence in eating almost with impunity. Sooner or later, however, the sustained functional activity, with its necessary hyperæmia, develops a growth of connective tissue in the kidney; just as such interstitial growth is set up in other viscera by persistent hyperæmia. By this impairment of the kidney structure the work falls more heavily upon the parts remaining sound; and thus the disease is fostered. It is obvious, then, to any thinking person, that the first step to be taken under these circumstances, is to reduce the nitrogenized food to

a minimum; and that minimum is much less than is almost universally supposed. Very small amounts of nitrogenized matter are absolutely requisite for tissue repair. What has just been said of the dietary of the Abbé Cornaro, and of the miller of Billericay, proves this to a demonstration; for these men did not fall off in muscular weight, and the energy they possessed is full proof that their tissues, other than adipose, were well and sufficiently nourished. No doubt in both these cases, as well as the others mentioned above, there was a very perfect digestion, and all the food taken was assimilated—a condition by no means the rule; but, nevertheless, these cases show how small is the amount of plastic material necessarily required for perfect histogenesis. In laying down the dietary of the gouty, these facts must be borne in mind; and the remonstrances of the patient must be gently, but firmly met. To a large number of persons the pleasures of the table are the best part of their existence; and these are the very persons whose kidneys ultimately suffer for their sustained functional activity; and in whom it becomes so desirable to restrict their dietary. Consequently great firmness is necessary, and no little caution, in the management of them. Even while conscious, in many cases, of the benefit derived from a restricted dietary; these persons will take an early opportunity of consulting some one else in the hope of prevailing upon their new medical adviser to recommend a more liberal diet scale. As it is a marked trait in humanity to believe readily what it is agreeable to believe, the advice of the less skilled man is adopted; and it is only when the consequences follow, as in time they do, that a long deferred repentance sets in, usually too late to be of service. The question of such a dietary for gouty persons is far from being generally understood; and though a large proportion of the profession know the importance of restricting the dietary in such cases; still it is scarcely a living faith with them, and exercises little or no influence upon their practice. When the subject becomes better understood a stimulus will be given to the culinary preparation of fish, vegetables, farinaceous material, fats, and oils; and the cook's skill will render palatable what science selects.

This subject becomes of great importance when we bear in

mind the changes in the circulation which accompany chronic renal disease. The consequences of the blood being highly charged (ueberladen) with nitrogenized waste are, as we have seen, hypertrophy of the muscular walls of the arterioles and of the left ventricle; high arterial tension (ueberspannung) leading to those changes in the arterial coats known as atheroma; and, as a resultant sequel, a strong tendency to apoplexy from rupture of one of the intracranial vessels, and consequently again to paralysis; or to the formation of aneurism, the result of some accidental over-exertion or of the giving way of some portion of the arterial coat, previously weakened by atheromatous change. When the blood is more than usually charged with azotized waste, the usual high blood-pressure is increased, and the liability to rupture in the atheromatous arteries is doubled. On the other hand, Parkes (*Lancet*, May 23rd and 30th, 1874) has shown by the sphygmograph, that a non-nitrogenized diet is followed by a lowered blood-pressure, a diminished arterial tension. These two facts stand in a most suggestive relationship to each other, and point distinctly to the necessity for a non-nitrogenized diet for the gouty; especially where the vascular system is much implicated. That on such a non-nitrogenized dietary these persons should feel less energetic, and that they should complain of it as "too depressing," is only what we may fairly inductively expect; and we must be prepared to meet their murmurings, to be patient with them, and by reiteration to induce them to keep their real interests in view. By again altering their dietary such persons can at once both gratify their palate and increase the blood-pressure within the encephalic vessels, and so experience greater cerebral activity; but at the same time they must take the potential consequences. In the treatment of paralysis in those who live well, and in those in whom chronic renal mischief with its consequences exist, it is of equal importance to remember the action of food upon the vascular system; and so to avert the second attack which is looming in the distance. Much of our recent success in the treatment of paralysis, of cerebral origin, is due to our recognition of the importance of such regulation of the diet; as is seen in the excellent paper of Dr. Alfred Carpenter (of Croydon) in the *Practitioner* for May, 1875,

entitled "The Rational Treatment of some Forms of Hemiplegia." It is not only, however, in those cases where the vascular system gets the brunt of the effects of imperfect kidney action that such a dietary is of signal service; its adoption gives relief, more or less perfect, to all and every one of the myriad outcomes of the Protean malady—gout. Of course, in all cases the use of mineral waters, especially of those containing potash, as a daily habit; the regulation of the bowels, together with decided purgation at brief intervals; and a well-maintained action of the skin, by which means the imperfect action of the kidneys may be compensated; are all of service. Nevertheless, the regulation of the diet scale is the first and foremost matter.

§ 239. Under the heading of Diabetes, in Chapter XI., the diet suitable to that malady was given. It need not, then, be repeated; but something may be said here as to the dietary to be adopted by those who suffer from diabetes, while at the same time being the subjects of chronic Bright's disease—a very considerable class. With such patients the liberal amount of animal food usually permitted to diabetic patients would be a source of no small danger. The farinaceous foods in stinted quantities,[1] vegetables, salads with oils; or fish, few potatoes, and much butter, the fat of meat; and other aliment containing but limited amounts of nitrogen, are here clearly indicated. Not rarely too such persons are inclined to obesity; and then the problem to be solved is indeed a complex one. Here there is the tendency to put on fat to be taken into consideration; and, on the whole, the dietaries of Cornaro and his allies are the fittest to be adopted.

However distasteful, abstinence must be practised, both as to quantity and quality. Boiled rice with stewed fruit (though containing small quantities of sugar-producing material), spinach, salad, lettuces, fish, other articles of food which will give bulk to meet the cravings of the stomach, and yet not supply nutrition in too liberal quantities; are the forms of food to be chosen. How far in such cases alcohol is desirable will perhaps be a matter for the exercise of the right of private judgment; but it is a form of food which does not furnish much

[1] A watchful observer, the subject of glycosuria, has found that farinaceous food does not aggravate his diabetic symptoms; but sugar quickly affects him.

combustion-matter, and, from its stimulant properties, is desirable, as it relieves the depressing and lowering qualities of the Spartan fare indicated. A limited amount of alcohol in these cases is not objectionable.

Such are the leading indications for the medicinal use of food; both in the treatment as well as in the prevention of disease. The subject is one of high importance; and this importance is being rapidly recognized. It will be forced upon the attention of the profession ere long, as much by the highly educated laity outside as by the persistent admonitions of physiologists. It will, however, be a stubborn battle betwixt scientific knowledge, on the one hand; and the cravings of the palate, the pleasure of a sense of intellectual activity, and even the necessities of the individual, on the other—a man may have to kill himself to get a living. As life wears on the capacity to grapple successfully with large quantities of rich food declines, while synchronously the power to purchase it usually increases; the modified enjoyment of other pleasures leaves that of the table more vivid; and if it were not for the protection of indigestion, of which many so bitterly and ungratefully complain, the lives of a large number of individuals would not attain their furthest potential expansion. As Age lays his heavy hand upon the organism the taste for animal food commonly undergoes a natural and spontaneous reduction, and the diet of childhood is usually instinctively adopted. This is part of the natural conservatism of the system, which often shows itself with remarkable distinctness; and points out to the careful therapeutist, paths in which he may wisely follow. The tendency of the present age is towards the keeping up and sustaining line of practice; and we might in many cases adopt with advantage some of the lowering treatment and slop diet to which the last generation inclined.

§ 240. After this consideration of food in its relation to the body force and the requirements of various individuals, not only in conditions of health, but in certain abnormal conditions; the question of drinks may well be entertained. They present different aspects; and can be regarded from the different standpoints, as of food in a fluid form, as stimulants, beverages, pyretics, and apyretics, and again simply as water.

To take them in the order they thus stand; we come first to milk, which contains in itself all that is required for the wants of the organism. There is in it fat, nitrogenized matter, sugar, and salts. It is palatable when fresh, and usually easily taken by most persons. To some, however, it is a subject of repulsion; and for such persons some substitute for it must be found. To others, again, it is constipating; but this may usually be corrected by mixing it with seltzer-water; so treated, it forms a most agreeable beverage; and many persons who find milk alone too heavy for them can take it with a relish, and digest it well, when so treated. Ordinarily milk is best in its fresh state; but in diabetic conditions the best form is that of butter-milk, where the milk-sugar has been broken up into lactic acid: this is an agreeable beverage when properly prepared, and ought to form a large portion of the dietary of the diabetic in the country, or indeed anywhere where butter-milk can be procured. During pyretic conditions milk, alone or with some mineral water, should form the chief food; and recent observations in various fever-hospitals bear out this strongly. In convalescence, especially in its early stages, and in conditions of great debility, milk is the food *par excellence*. It supplies nutriment, both plastic and respiratory, in suitable proportions; and is infinitely superior to beef-tea, or alcohol as a food. When something more substantial, but yet in a fluid form, is indicated; milk may be thickened with corn-flour, and then have an egg beaten up with it and some sugar added. This forms a famous meal, and is excellent in certain forms of gastric catarrh. At times some preparation of alcohol may be added to milk, either plain or combined, as just described. Such is the famous rum and milk of world-wide repute. To prepare it properly, however, it is necessary to add some other ingredients. The best form is given at p. 184. Taken in the morning early, this draught enables the invalid either to have another nap, or to dress and then enjoy, and digest breakfast afterwards. In convalescence it is often very useful; while to many a phthisical patient it has simply been life. As custard, egg and milk form a pleasant food of a highly nutritive character.

The next form of nutritive fluid is beef-tea. I trust that the following remarks upon this valuable article may not seem to

some readers disrespectful—no disrespect is intended; but beef-tea, at present, holds a more exalted position than that to which it is lawfully entitled. Many persons, too, think it an article which cannot be abused; but this is a mistake. Its first abuse is, that it ranks far too high as a food; its second abuse arises from its stimulant properties.

As a food, beef-tea ranks low. It contains meat-salts a small quantity of albumen, and a little gelatine, together with some advanced nitrogenized matters, useless in histogenesis. But there is little in it to repair tissues, and less in it to sustain life; so far as our knowledge yet extends. There is little real force-bearing material in the protean compounds of beef-tea. Little actual force is evoked by the oxidation of nitrogenized compounds in the body. For the starving fever-patient, to give him beef-tea alone, is almost to give him a stone when he asks for bread. It makes him feel better for the time being, but that is due to its stimulant properties. We have seen above, how nitrogenized matter acts upon the nerve-centres and evokes energy. But then it is not wise to evoke manifestations of energy, without supplying force-producing material—this is a means of artificially inducing exhaustion. Alcohol is a force-producing hydrocarbon as well as a stimulant; and if a manifestor of force, at least brings something to the body fund; but beef-tea alone does not do this last, or if so, only to an infinitesimal amount. To give beef-tea, as is often done, in the earlier stages of fever or other ailment, is often to induce exhaustion earlier than it would otherwise have come on. Doubtless the sufferer feels refreshed by the beef-tea—personal experience leaves no doubt upon that head; but then this feeling is produced by the consumption of some of the body-store of force; and in so far is a loan, and not a gift. It is here that beef-tea falls so far short of milk, which furnishes force-producing material. By the exhibition of beef-tea in liberal quantities; under the amiable delusion that, because the patient feels better, brisker, and livelier after it, therefore he is better; many a patient is exhausted, and rendered physiologically bankrupt—his fund of body-force dissipated and squandered in aimless and useless manifestations of energy—ere the hour of need and the time of trial arrives. Instead of nursing carefully

and husbanding his force till the severe trial of the critical period arrives, it is wasted; and then exhaustion follows. It reminds one of the well-meant, but vicious action of ignorant neighbours in a first confinement. They smuggle spirits in a cup of tea, if they are afraid of the watchfulness of the medical attendant; or on some pretext get him out of the room, and then administer alcohol; and encourage the patient to make voluntary efforts in the first stage, when they are simply useless; and then, when the second stage comes, and these displays of voluntary effort would be useful and desirable, they are not forthcoming; the force that is then so desirable has been spent and wasted: and often it becomes necessary in such cases to apply the forceps to complete delivery; when, if a better knowledge had existed among the women in attendance, no such procedure would have been necessitated. Just in the same blundering way, some well-meaning, officious attendant squanders the body-capital in useless, profitless displays of energy in the early stages of acute maladies; and so ultimately wrecks the patient. These remarks are not unnecessarily strong; and are certainly called for by the ignorance of some persons, and the disinclination to think on the part of others. Beef-tea has become, in one sense, a trouble at present; not only is harm done by its agency, but its use prevents the more serviceable milk from being more largely used.

If, however, beef-tea be given with sago, or perhaps even better still with arrowroot, which goes thin on boiling and so drinks clean, it then possesses some force-producing material; and so something is furnished to the fund of body-force, in lieu of that force which is expended by the stimulant action of the nitrogenized matter. If biscuit powder, and a little buttter with pepper and salt be added, or fine bread-crumb, then beef-tea is a food. During a pyrexia, especially if there be difficulty in swallowing, arrowroot and beef-tea alternately with milk should form the chief sustenance; sometimes it may be desirable to suck the fluid through a glass tube, if deglutition be difficult. Another pleasant beverage possessing nutritive properties is rice-water, the well-known "cungee-pawnee" of Hindoostan. Where there is diarrhœa, rice as rice-water, or ground rice boiled and mixed with milk, beef-tea, mutton-broth,

&c., are very suitable. Whey, cream diluted with rice-water, or with soup, or beef-tea, are pleasant forms of food; and with these different fluid foods ice may be given, so as to convert the beverage into an apyretic. When given with some form of starch, with sugar, or with fat, beef-tea is a valuable addition to the dietary of the invalid; and loses the objections which are valid and well-founded against it in its simple form. When added to the farinaceæ and other foods, gelatine has been found by Voigt to be capable of digestion; but the conclusions of the French commission as to its uselessness in the form of jellies still hold good when it is given *alone*.

§ 241. As stimulants, fluids are commonly administered to the sick, the weak, and those who have just been exposed to some shock, or injury. In the giving of stimulants, as has been pointed out in Chapter X. (§§ 95–98), we unlock a certain amount of the body-fund of force. This is unquestionable; though alcohol furnishes some force in its oxidation within the system. In giving fluids as stimulants, this must be remembered; and tea, coffee, sal volatile, and chloric ether do not possess the force-producing hydrocarbon of alcohol. In combination with rich cream and sugar, tea and coffee may often be given with advantage, especially in convalescence. Vogel (*Diseases of Children*, p. 193) speaks highly of coffee so treated, as a useful stimulant in the affections of childhood. It is unnecessary here to go again into the action of stimulants at length; suffice it to say that the administration of stimulants, alcoholic or nitrogenized, should always be in proportion to the reserve fund of the system, and the pressure of the emergency. Sometimes, it may be neck or nothing; and an apparent recklessness may really be the most prudent and the wisest course—the patient must be tided over the perils of the hour, no matter at what cost. At other times, however, it is desirable to look forward a little, and not to subordinate the future too much to the present. It is of little use for a ship to round a point only to drift helplessly ashore in the bay beyond. Many patients sink, when the turning-point has been passed, from sheer exhaustion; for want of that force which has been expended already—may be in useless displays of energy, in manifestations of force which have served no useful purpose.

Such, it is to be feared, is too much the case with the modern treatment of disease, and the therapeutics of the present are far too saturated with the brandy and beef-tea theory. What is indicated is the greater use of force-producing food, and less of the mere manifestors of energy, in our treatment of acute disease. We want, in fact, better and more trustworthy physiological notions than at present obtain. The now fashionable Liebig's extract of beef is a stimulant, or a flavouring agent, rather than a food. It gives a pleasant character to farinaceous preparations, or forms an agreeable beverage when mixed with cold water; but it is scarcely a food. It is useful to render food palatable, and in so far is not to be despised. As a food it ranks below well-made beef-tea, though it is superior as a flavouring agent. Stimulants should be subordinate and ancillary to food in cases of debility in the young, whose evolution is retarded; in the dyspeptic; and in the general failure of senile decay. In such cases it is much wiser to reduce the demands upon the system to the capacities of the organism, in proportion to its diminished powers; than to erect an ideal standard to be aimed at, and then to whip up the bodily powers with alcohol and nitrogenized material until the patient feels as he would wish to feel, or an approach to it; and can do more or less what he wishes to do. By such means the system is exhausted before its time; and though, according to the ancient saw, "It is better to wear out than to rust out," still, the latter is usually much the slower process.

Finally, our treatment has at present a decided tendency to assume a character too distinctly stimulant, and not sufficiently nutritive and restorative. Stimulants should be auxiliary to food, in whose assimilation they often assist; in themselves they furnish little, and often no force-bearing material. They are, however, a means of reaching the physiological reserve fund of force, and consequently may be advantageous or pernicious, according to circumstances; and an ill-regulated or excessive process of stimulation may give results as disastrous, as a prudent and intelligent resort to stimulants may be beneficial and preservative.

§ 242. As beverages, fluids are in universal use both for the

healthy and the sick. They consist of water with or without other constituents. As rice-water, barley-water, &c., beverages are also foods. When consisting of vegetable juices as well as water, beverages are often useful as well as grateful. Thus in grape-countries, grape-juice, or must, is a favourite beverage; and from the amount of sugar contained in it, a small quantity of nitrogenized matter, and some salts, this must will often be found an agreeable beverage, possessing high nutritive properties; and can be iced without detriment to its qualities. The strawberry and raspberry syrups in such vogue in Dresden are also pleasant beverages. The potash in the strawberry renders its juice a desirable drink for the gouty and for strumous children. The juice of the apple and pear when fermented forms most agreeable beverages, possessing stimulant properties from a certain percentage of alcohol. The various preparations of the grape which we consume as wine are well-known and appreciated. In pyretic conditions acid wines are very desirable, and were largely used in the Franco-German war in fever cases, with excellent results. Taken with food, a glass or two of generous wine, as Burgundy, Marco Brunner, Sauterne, or sherry, are often very useful in aiding digestion; and champagne possesses, like all sparkling wines, stimulant properties not to be measured by the proportion of alcohol. Often too a glass of port after a meal is useful. As beverages we also use preparations of malt, the well-known ales and stouts, of every variety of alcoholic strength. They are also used with meals by many with advantage; but when prescribed for invalids care should be taken to see that they are in good condition, fresh, if from the cask; well up, and with a head, if bottled: stale malt liquors and flat bottled beverages are repulsive, and consequently objectionable to the invalid. Spirits are rather pure stimulants, and are not so much in vogue at meal-times. Nevertheless, with some persons a little brandy-and-water at meals is preferable to wine or any other beverage. Spirits are often used as beverages now with some form of mineral water, and as such may be taken in conditions of debility and exhaustion; though perhaps inferior to a draught of wine. In the evening ere going to bed they form a useful nightcap for those who have not only worked hard during the

day, but been subjected to worry; and often secure for such persons sound refreshing sleep.

Water too, simply as water, is an excellent beverage, in which most persons might indulge more freely with advantage. From the effects of perspiration in warm weather, from the calls of the bladder in society, numbers of persons take an undesirably small amount of fluids, not nearly sufficient for the real needs of the body and for the removal of waste. In adults the tissues are often much in need of being well washed by the permeation of water through their structure; and the advantages which we saw, in the last chapter, to attach to wells and watering-places lie no little in the increased consumption of water by those visiting them. The Missisquoi-water, once so famous in the U.S.A., when analysed by Dr. Squibb, was found to be simply an unusually pure water. After the experience of a fashionable season, of a festive time, or of a series of dinners, a course of water with abstinence is often most beneficial.

§ 243. Fluids too are often a ready and effective means of affecting temperature. In cold weather an increment of heat is furnished by hot fluids, as soups; and so waste of tissue for heat-production is economized. Especially after exposure to a low temperature, or when the body is chilled from any cause, draughts of hot fluids are very useful in restoring the body-temperature. In collapse they are often of great service; and they are equally serviceable in the production of perspiration in addition to the warm bath. We have for generations been in the habit of supplying hot fluids in a rational way; but it is only since the importance of variations of the body temperature has been enforced upon us by the use of the clinical thermometer; and the evil consequences of a rise above the normal body heat have been thereby demonstrated; that the use of chilled fluids has obtained. Of course for ages the practice of chilling waters, and the use of ice for cooling beverages, have been indulged in by the affluent; but the application of ice to the reduction of fever in the sick in humble life is of modern, indeed recent, origin. A pronounced impression can be made upon the body temperature by draughts of cold fluids, and this can be repeated in pyretic conditions.[1] In exposure to great heat, or after much

[1] Wunderlich on "Thermometry," *Syd. Soc. Trans.* p. 114.

exertion, iced fluids are very grateful. After much exertion in a high temperature so that exhaustion is approached, it is well to drink iced or chilled fluids, but slowly and in small quantities at once; as large draughts are sometimes followed by disastrous consequences. Large draughts of cold water at meals are also subject to abuse, especially in certain dyspeptics, where the cold checks the digestive processes.

On the other hand, in febrile conditions, in very hot weather, &c., iced fluids are grateful and free from objection. There is, however, on the part of imperfectly-instructed persons an unfounded dread of cold fluids; and a well-meaning mother will often torture her fevered child in a negative, yet effectual way, by withholding from it the cool fluid it craves for. Such conditions are often combined with anorexia, and under these circumstances milk, rice water, &c., chilled, are excellent means of feeding the child, by taking advantage of its thirst. As people advance in life they become less tolerant of iced fluids; and with the aged they should be used with caution, especially if the heart be weak.

This it is the more necessary to insist upon since the greater consumption of iced fluids has set in, as it has done of recent years. Such iced fluids, especially if the material of the fluid be some mineral water with an admixture of wine or spirit, are excellent in hot weather, especially where there is some accumulation of uric acid from imperfect oxidation. The daily consumption of a mineral water containing potash meets the continuous production of small quantities of uric acid, neutralizes it, and renders it soluble; and thus in solution it drains away in the fluids of the body. The excessive resort to alkaline waters by non-gouty persons is not uncommonly the cause of much discomfort and gastric debility.

§ 244. Not only is the food we consume of importance in the treatment of disease, as we have just seen, but it has further been essayed to treat diseases solely by a diet-cure. Such, for instance, are the grape-cure, the whey-cure, and the koumiss-cure.

Grape-juice contains a large quantity of sugar, some gum and albumen, with tartrates and phosphates of lime and potash. Consequently for a large class of cases, especially with a lithæmic

element about them, grapes form an excellent form of food. At first the grape-cure produces purgation, and this is often very useful, if not too pronounced ; and always has a tendency to keep the bowels open and to unload the portal circulation. Knowing as we do the association betwixt biliary congestion and a large amount of lithates in the water, such action of the grape-cure is most excellent. As the grape-juice also acts upon the kidneys, and other food is almost entirely forbidden, a perfect depuration of the system is induced ; especially valuable where the amount of food taken has been for long and persistently in excess of the needs of the system. Consequently in abdominal plethora, in catarrh of the digestive organs, &c., the grape-cure is often very beneficial. It is not adapted to debilitated conditions, especially in children and in delicate women ; it is a reducing agent chiefly adapted to men and women of full habit. Of course it can only be undergone during the season when the grapes are ripe. In Europe, America, the Cape, and Australia, where there are vineyards, especially in healthy places and amidst pleasant scenery, such grape-cures are to be commended. Strawberries are rich in potash, and contain iron ; therefore in similar cases of lithic acid tendencies the strawberry-cure of Interlachen is often to be advised, or prescribed with benefit. By the addition of milk and cream, where the strawberries alone are too reducing, or afford insufficient nourishment, a pleasant dietary is furnished, suitable to many invalids.

Milk-cures are as old as the days of Galen who sent strumous patients to the milk-cure at Stabiœ. In Switzerland the milk-cure is common, and there are several places where it is conducted on a large scale. When too constipating it can be combined with seltzer water. It is rather suited to cases of anæmia depending upon imperfect assimilation ; and in such cases often works marvels. In atonic gout it also is useful. In cases of threatened tuberculosis the milk-cure in some mountain-health resort, as in the Upper Engadine, is very good, and often wards off serious illness. In ulcer and catarrh of the stomach milk may advantageously be made the sole food.

Preparations of milk also are used. Whey has long been in favour. It contains the salts of milk and the sugar, freed from fat and caseine. It is especially adapted to the gouty and

plethoric. By combining it with milk it becomes more nutritive. Like most of these cures, it secures a small amount of nutrition with much fluid, and therefore suits two classes of people: the plethoric, who consume and digest too much; and those whose digestions are feeble, and who require their nutriment highly diluted, and in a diffused rather than a concentrated form. Care, however, must be taken about these latter cases in order that no mistake be made; for it is impossible always to be sure in cases of weak digestion that a dry diet instead of a highly-watered one is not rather indicated.

Butter-milk is also used for dietetic and even therapeutic purposes. In it the milk sugar is broken up into lactic acid; and therefore butter-milk is well suited to the diabetic, especially if it contain numerous flakes of butter in it. In some conditions of chronic Bright's disease it is also useful.

Milk prepared as koumiss is a pleasant fluid, containing fat, caseine, milk salts, lactic acid, some alcohol and carbonic acid gas. It agrees well with many cases of enfeebled digestion, and is well suited for the treatment of pyretic conditions, as well as conditions of more permanent debility. It is in vogue in Russia, at several places in Germany, and at Eaux Bonnes. Koumiss can also be bought in bottles in England and America, combined with glycerine; it forms an agreeable and most suitable beverage for most diabetics.

Such are the especial forms of cures accomplished by adaptations of certain forms of ordinary food. They are pleasant, and, from the reasons given above, well adapted to the successful treatment of many conditions. Not only are these cures good in themselves; but they also point out in a very distinct manner the great importance of a well-adjusted and suitable diet for many persons as a preventive of disease. In diabetes and gout we find that the question of diet is one of primary and cardinal importance; in the treatment of struma and tuberculosis it is of no less moment; and in many conditions of debility with impaired digestion it is no slight matter to select a suitable dietary, and to supply food in a form at once nutritive and digestible.

As there are many persons who cannot take milk in any shape, and yet for whom food in a fluid form is absolutely

necessary, it is often of advantage to know of some other fluid food to fall back upon. The following combination was almost the sole food of the late Duke of Gloucester for a long time. Of rice, well washed, of arrowroot, tapioca, and pearl barley, take each an ounce; add two quarts of water, and boil down to a quart; then flavour with candied eringo. This is palatable, and will often be found very serviceable.

A still better substitute may be made as follows:—Pour a pint of rice-water upon a tablespoonful of a mixture of fine almond flour (4 ozs.) and prepared sugar of milk (2 ozs.). The latter consists of sugar of milk, 13 ozs., powdered lump sugar, 2 ozs., and 1 oz. of a combination of salts, of which this is the formula—chloride of potassium, 6 ozs., phosphate of soda, 3 ozs., phosphate of magnesia, 2 ozs., and phosphate of iron 1 dr. I am indebted to Mr. Van Abbot, of Princes Street, for this formula. The rice water should be poured on boiling hot, and the mixture well stirred; after this it should cool and then be strained through a sieve. This forms a very milk-like fluid, both to sight and taste. It also contains a good quantity of fat in fine emulsion, and is almost identical with milk under the microscope. Personally I have found it very digestible.

CHAPTER XXIV.

CONCLUSION—THE MEDICAL MAN AT

§ 243. In this concluding chapter may be for some remarks intended chiefly for juni matter to be attended to in practice is Whatever may be the ordinary manner certain carriage in the sick-room, and a desirable. Such carriage is looked for b friends, and a sense of disappointment wanting. The medical man should avoi attracting the attention of those around h of to what he has to say. The conduct medical attendant will also exercise much the patient with confidence, and so encoura directions given; and thus to give the advic a fair trial. The young practitioner must the subject of a keen and critical survey, a be calm and self-possessed. Nothing will sustain the critical examination, and endow under the ordeal, as confidence in his o profession—in its social as well as its highe aspects.

Having been shown into the sick-room for the medical attendant to take up a p face and features shall be placed in the s shall fall fully upon the countenance of means various important ends are secured so comparatively veiled from observation, expression may not betray what is passi

for such expression might readily do much ill-service. At
same time the light upon the patient's features will often re
a wavering eye, a tremulous lip, a quivering nostril, or
frown of pain, especially when showing itself in brief inter
tent twitches; or it will bring out the configuration of the te
the contour of the face, a tortuous temporal artery, or a dend
atheromatous arterial twig; or perhaps a fatty cornea and
arcus senilis; all of which furnish valuable indications to
eye which has not only learned to note them, but also
interpret their significance correctly. All this may be obse
while examining the tongue. Carefully-cultivated phys
nomical diagnosis, as taught by Professor Laycock in E
burgh, will often give most important hints, directing
verbal inquiries, and pointing to the necessity for cer
physical investigations; and perhaps, more than all, c
furnishing valuable suggestions as to the line of treatment t
adopted.

As to the questions put, they should be brief, and inci
rather than discursive; especially if the case be a grave
They should, of course, always be to the point. If much tal
has to be done let it be done by the patient or his friends.
all about your patient; and do not divert the attention of t
around from the matter in hand to the observation of you
youthful reader, if you are either prudent or careful a
producing impressions and gaining confidences. A good k
ledge of practical psychology is invaluable: still it can sca
show to advantage if unaccompanied by a fair knowledg
your profession.

Spare no pains over your patient: and carry yourself so
you produce the right and correct impression that you
taking pains, and not merely being fussy. Shallow and ign
people are especially apt to misinterpret great pains. B
your guard, then, with such persons, or rather, perhaps, ag
them. With such persons it is never safe to be demonstra
It will often be necessary to be reserved in self-defence. It
good test of the natural good sense, as well as of the perfe
of training in the observing faculties of a young medical
to be able to distinguish betwixt the sensible and intelli

the opposite order of individuals in whose case silence is indeed golden.

§ 246. While this scrutiny is going on, inquiries may be made as to the family history, especially if there be any tendency to certain diseases or special peculiarities, as affections of the nervous system, chest diseases, &c. It is usually a matter of the greatest importance to form a sound and clear conception of the diathesis, as manifested by the class of ailments to which the family is liable. By such means only can be acquired that information which is called "a knowledge of the constitution"—a matter highly prized as well as of real value. Having gathered what can be gleaned on these topics, it is necessary to go carefully yet warily over the patient's past history. In doing so the discretion will often be severely tested. Really curious facts do occur in the histories of the lives of patients, which should not be overlooked, or always listened to in a spirit of incredulity. To act so would often be far from prudent: and I trust sincerely that every reader, no matter how little advanced in his studies, will be conscious how important a matter it is for a medical man to be prudent. At the same time, facts sometimes array themselves in such order that certain conclusions are forced upon one, and are irresistible; however the patient may wish to arrange them to tell something else. For instance, if a slim woman of good physique, and naturally good constitution, married, and who has had several miscarriages, complains of rheumatic pains in the collar-bones, upper arms, and lower part of the legs, it is well to listen with mute and unmoved countenance to her story of getting wet on going to church, and having to sit in her damp clothes through the service; or another will tell of having to work in a laundry: but all the time we are conscious that syphilis is at the root of it all, and see in mercury and iodide of potassium the best cure for such rheumatic pains. In fact it is necessary to apply one's experience without annoying the patient.

It is well also to mentally appraise the intellectual powers, &c., of the patient and those around, and estimate their intelligence carefully. Also try and test them as to how far they are likely to obey instructions to the letter, or to neglect

them. If the latter is to be apprehended, the directions should be brief, to the point, and given with decision. If the patient or his friends are familiar with sickness, the medical man may fairly venture to be more explicit. But it must be remembered this very experience makes them more capable of estimating him. Avoid familiarity under all circumstances. Be courteous, interested, and sympathising: but be on your guard against possible misinterpretation.

§ 247. Having gathered together a fair series of facts as to the past, concentrate the intelligence upon the immediate subject-matter in hand. Listen to the patient's account of the origin of the ailment, throwing in a well-directed question from time to time. Go carefully over every organ and system *seriatim*. Get into the habit and practice of making a systematic examination. If a woman, after asking about her bowels, inquire about her reproductive system. But, remember, ask about it in the same strictly business tone. If you hesitate, as if the inquiry were one of doubtful propriety, your patient will feel some hesitation in answering it; and the position will be disagreeable and unpleasant for both. This is a matter of much moment. If the patient is a spinster in the upper classes, it is the proper thing to make these inquiries of her mother, or of her maid, nurse, or other attendant. Never omit that. Having made a careful examination, including a close and painstaking physical examination, you will be then in a position to arrange the material into a diagnosis consistent with the facts; this will suggest the prognosis, and give a direction to the treatment. Be cautious, and do not commit yourself rashly to a prognosis. Often this is the subject of your being consulted; and your opinion is asked as to the nature of the ailment with much *empressement* by those who really do not care about it. They are eagerly noting the answer, as furnishing to them some guidance in the formation of their estimate of the value of your answer to their next question. If you do not succeed in impressing them that you quite understand the case; they naturally come to the logical conclusion that your answer to their next inquiry will not be very trustworthy. If your answers as to the nature of the case are satisfactory, then they feel confidence as to the value of your next answer. If neither

answer inspire confidence, the mutual relations will not be very agreeable.

It is always a good plan to make a note, so soon as it can be done unobserved, as to what you have said to the patient or the friends. It is rather unfortunate if at the second visit you contradict what was said on the first; or give conflicting directions without some explanatory statement. If this should be done, and the medical man is reminded that he said so and so on a prior occasion, a truthful answer will best serve him. Say at once, "If I said so then, there must have been some reason for it, else I should not have said it." Try to remember, and get your informant to aid you in your effort. But do not leave the matter uncleared up and in doubt; make it straight by all means.

The medical man is also often told that some professional brother has given an opinion different from or opposed to his. This is an unpleasant matter. If the people had been quite satisfied with this other opinion, they would not have sought a second. Know all the circumstances. If there be a change of residence, or death, or sickness on the other medical man's part to account for the change, then all may be fair and above board. If the matter looks at all "doubtful," be very cautious. It is not given to every family to be able to turn everything over exactly as they get it; indeed such power is very rare. They may not have heard correctly, nor understood the previous attendant thoroughly. They may even wish to extract from you some expression of opinion, which is contradictory to his, in order to make mischief. The natural opinion of every young practitioner is that the patients who call him in are of a high order of intelligence, and indeed generally superior to those who do not so act; and he is inclined to trust them accordingly.

This is very natural; but it is too often an amiable delusion. They may be impelled by sheer curiosity to draw you out and lead you into some expression of opinion. Or they may wish to extract from you what they wish to hear. It is a marked feature in patients, the youthful reader will find, that they always most readily accept and believe what they wish to believe. Culpable suppression of certain symptoms is not

unknown in order to induce an opinion favourable to their inclinations. For instance, do not be tempted to stake your reputation on the integrity of the kidneys because one hasty boiling has not furnished traces of albumen. Especially if some one else has said that they were affected. Passing periods of total absence of albumen are not at all rare.[1] Be prudent and careful that you are not converted into a means of annoyance to a brother practitioner. The people who would behave so to another, will not hesitate to turn round and serve you a similar ill-turn if necessary. Confine yourself as strictly as possible to the matter in hand; and be cautious about making any statements or admissions that may be troublesome or disagreeable on some future occasion.

Always remember that you have to sustain the reputation of your profession, as well as your own. The reputation of the profession is the aggregate of the individual reputations of its members.

Another thing, too, it is as well to bear in mind, and that is to avoid unnecessary fuss or superfluous measures, until you are in a position to do so with immunity—and only very fashionable physicians are in that position. There are wealthy *nouveaux riches* who adore fuss; and it may be well enough in their case. But the majority of human beings do not. So just adapt the measures to the necessities of the case. Often the simpler and less complex the measures, the greater and more distinct the impression produced. For instance, if a patient comes with a persisting diarrhœa, which has resisted the different measures tried, and it is obvious that it is due to irritant material in the bowels, a full dose of castor oil, or still better of rhubarb powder, will at once end the matter. Here the very simplicity of the remedial measures will gain the prescriber credit.

§ 248. Wherever you are, and under whatever circumstances you are placed, never forget two things:—1. Your own self-respect: and 2. The honour of your profession. The first is your

[1] The reader may consult a most striking case pointing this illustration, recorded by Basham in his work *On Dropsy*, 3rd edition, pp. 195–203. This was not a case of granular kidney, but of a much more grave type, rarely giving such intermissions.

duty to yourself; the second is your duty to your neighbour. First see that you conduct yourself so as to ensure the respect of those with whom you are thrown in contact. Secondly, never speak of or behave to a professional brother so as to bring him into discredit. This last is very important. The want of it has done much harm, and prevented us, as a body, from taking the position which would otherwise have long since been accorded to us. Each ecclesiastic asserts the dignity of his office, however unworthy he may think some others are to fill it. It would be wise if we followed their example—in this respect at least. Another lesson, too, we might learn from them, and that is the air of respectful gravity they assume at once when speaking of matters theological; and the readiness with which they check any levity of speech on such matters on the part of any one present. We all know how cautiously such subjects are spoken of in the presence of ecclesiastics. What a contrast the hushed, reverential tones of the laity discoursing of matters theological before a minister form to the readiness with which even well-bred people rush into flippant observations about homœopathy, hydropathy, and chloral hydrate, or electricity, to medical men; in season and out of it. In fact some people would seem never to allow a medical man any social distraction from incessant tales of bygone maladies. No doubt to some extent such conversation is unwittingly encouraged by a medical man's pride in his profession. It is rare to find medical men voting the subject of their daily thought, and their lives' energies "shop." They know better than that; and are apt to be drawn into medical talk in order to correct wrong impressions, or relieve a misapprehension. Consequently there is a large class on the watch for informal consultations. And there is a larger class who follow their example in talking medicine to medical men; not from any mean ulterior motive, but simply because they do not know any better. They mistake courteous attention for a professional interest in their conversation.

It is quite time that we followed the example of the other professions, theology and the law. The one in making professional subjects matter for respectful speech: the other in not being led into informal consultations.

At all times remember you ought to be a gentleman. Also be a self-respecting man. Never on any account be led into any connections with your patients which are dishonourable. Our position throws us in the way of many difficulties. We are compelled to tread warily; and the man who trips, discovered or undiscovered, lives with a mill-stone round his neck. Medical men occupy a position of honour. See that you are not led to sully it. Traps will be laid for you. You will be caught at times suddenly. See, then, that you are always on your guard.

Thorough self-respect and perfect self-restraint are expected from you. It is but your duty. There is no credit attached to the mere discharge of duty.

In approaching sick persons, it is well to blend cheeriness with sympathy. The visit of the medical man should be looked forward to by the patient with pleasure; and nothing tends more to produce this feeling than a cheerful demeanour. It is all very well to feel sympathy with the sufferer, but that is not sufficient; and the moral effect of the visit ought to be made to aid the action of the therapeutic measures. Much, however, depends upon the condition and the mental morphology of the patient. In some cases the sympathy may preponderate with advantage; while with others the cheeriness is more acceptable.

There is and can be no question but that the usefulness of every medical man, and especially of young men, is indefinitely increased by general prudence, thoughtfulness, and good sense. The days are past when medical men were regarded as being all the better professional men for a profound ignorance on other subjects. It was once thought that such ignorance argued a certain attention to their profession, and the absence of distraction from it to other topics; but such is not the present prevalent opinion. A medical man, especially if he holds a respectable degree, and is in so far a university man, is now expected to possess much knowledge on many topics; to be able to speak well upon them, and to indicate in his conversation on ordinary topics that his mind is trained and cultivated; if such is not the case, the laity will naturally be sceptical about the culture in matters professional. The manners and conversation of the man on subjects within the range of its cognizance can be

measured by the world at large; and upon these subjects it can form an opinion, when it feels incompetent to measure his capacities on matters purely professional. It gives a man weight with others to be generally well informed, and to show good sense in ordinary matters; and if he be lacking in these respects, a medical man will scarcely get credit for the knowledge he may really and actually possess.

Indeed this is no more than might fairly be expected. If a medical man indicate that he is but imperfectly informed on current questions, and still more be unconscious of his ignorance; observant persons will quickly take a note, and suspect his professional knowledge to be unsound. Of course a medical man may be of such a turn of mind as to take little interest in current topics, but he will be conscious that he is unacquainted with them; while in all probability he will give evidence of full acquaintance with the subjects in which he does take an interest. If, on the other hand, he talks confidently and yet loosely, with obviously imperfect knowledge, on ordinary topics, his professional utterances will not carry their proper weight with them.

§ 249. It is also, too, a great matter to familiarize the mind with what is now called the natural history of disease, *i.e.* the progress of maladies through their different stages. There is the initial stage, the middle, and then the more advanced stages. As in consumption, for instance, there is first the stage of consolidation, then that of softening, and then that of formation of cavity; in very fortunate cases there is further a falling in and cicatrization of the cavity. So, too, in Bright's disease, there is the early stage, of which there are few indications; and those only recognisable by the eye that has carefully educated itself to discern and note the early changes of what, in time, is distinct enough to a comparative tyro. There are the beginnings of morbid changes which can only be observed by those who have studied the marked and advanced changes, and so proceeded to a recognition of the earliest modifications. To the trained eye these indications are as pronounced, though hidden from others; as are the early manifestations of insanity visible to the skilled alienist physician, long ere they can be recognized by the ordinary observer. Then there are objective

and subjective phenomena which mark the establishment of the disease, and which are more generally known, such as a glistening ear-lobe, otolites, the deformed knuckle, &c., attacks of arthritis, of dyspepsia, of boils, of skin eruptions, or bronchitis, &c., with occasional fitful appearance of albumen in the urine. Ultimately there are atheroma, cardiac changes, with or without aortic valvulitis, failure of the circulation, the evidences of cardiac inability, as enlarged liver and spleen; congestion of the kidneys, with persistent albuminuria; general anasarca, &c., &c. It is as desirable that the medical attendant should think out these changes in their order and rotation, as that the farmer should recognize the growth and changes in his crops in their order, according as the three or seven-year system is adopted. By such study the medical man will learn to see these evils far ahead, and learn to meet them; and this is a matter of immeasurable importance. Changes foreseen afar off may be met, headed, and arrested even, by prudent, well-applied measures. If the changes looming in the distance are recognized, suitable precautions can be taken; just as a ship may weather a point only discernible by a trained eye on the outlook, and not visible to ordinary ken, if seen early enough; but if not recognized or noted in time, there may be no means of avoiding the shipwreck then inevitable. The eye can only see what it has learned to see; and the youthful gaze may see nothing, though the eye is young and the vision keen, where to the duller eye of advanced life the face may be a written page, whose characters are both familiar and distinct. The tortuous temporal artery, its thickness indicating the kind of atheromatous change going on in it; the species of arcus senilis; the absence or presence of degeneration in the skin; the formation of the teeth; the fulness under the lower eyelid; the tremulousness of the tongue, or the twitching of a muscle—are to the trained eye all indications pregnant with information: but which convey no information to the eye which has not learned to see and note these matters, and to the mind which has not found their interpretation. It is indeed just the difference betwixt Egyptian hieroglyphics to him who can read these characters and to him that cannot. To the one the subject-matter is unfolded, to the other there is merely a series of undecipherable characters;

which, however, might give the most valuable information if they could but be read. There is as yet no Rosetta stone by which young medical men can be taught to read readily the hieroglyphics of degenerative changes: and yet how strangely some men have learned to read for themselves these subtle indications, and taught themselves to interpret broadly their significance—even while unable to spell them out alphabetically. This forms a great portion of that individual experience so valuable and yet so untransferable. Careful observation and comparison of cases furnish in time a *repertoire* of experiences most valuable for the formation of prognosis, indeed

> "Till old experience doth attain
> To something of prophetic strain;"

and by the light of past experiences the old practitioner will often shadow out the future progress of a case with wonderful accuracy. In the strange forecasts of observant old men there is no "mystical lore," but rather a full-stored memory of past experience well-culled; which, however, speaks out in the puzzling form of unconscious cerebration rather than in the intelligible form of conscious induction. For the young man to whom such experience is impossible, its advantages can only be supposited by painstaking observation, extensive acquaintance with the experience of others, as found in their writings—for by such study youth may converse with the aged and with those who have passed away—and, further, by thinking and pondering over the matter; until the subject has become one consistent intelligible whole, which can be recognized in its entirety, and yet be studied in detail in each part. Without such study, and the scientific use of the imagination to bridge gaps which cannot otherwise be got over, no young man can meet and hold his own with an older man of riper experience as regards the formation of a prognosis in chronic maladies; and still more, in that practically more valuable matter, in the selection of remedies and the laying down of a line of conduct to be followed, which will keep at bay and stave off for long inevitable mischief.

§ 250. As an illustration of the manner in which careful observation of the general surroundings of a malady may be

made to supplement the information furnished by physical signs, and so enable a correct and proper diagnosis and prognosis to be made, the following quotation may be permissible. "Forms of disease closely allied are found to take in a totally different progress under diverse associated conditions. For instance, the pathological condition 'dilatation' with its objective phenomenon 'palpitation on effort' is a very different matter when found along with passing coexistent conditions than where it is a permanent state in a chronic invalid: and yet these do not differ so much from each other as they do from the dilatation of failing hypertrophy. Aortic stenosis and regurgitation differ so widely as regards their progress and the patient's prospects, that we might wonder at such diverse effects of a little connective tissue in the aortic valves, were it not for the importance of the situation of the new growth; and the well-recognized difference of an obstruction merely offered to the blood-flow from a muscular chamber and regurgitation into it—the influx of blood driven in by the aortic recoil, and not merely welling in, comparatively quietly, from the pulmonary vessels.

"In illustration of what is just indicated, we may now proceed to consider in detail the different progress of the pathological condition known as dilatation of the left ventricle, with its objective symptom, palpitation on effort; according as it occurs under different accompanying general conditions. The physical signs are diffused impulse, increased area of percussion dulness, a weak and irregular action of the ventricle, a want of volume in the first sound: while the subjective symptoms are, dyspnœa easily excited, and incapacity for exertion. In so far the signs and symptoms agree and are common to all; but when we come to consider the more special peculiarities of each condition the points of difference come out strongly, and illustrate vividly the importance of the general conditions under which this pathological change, dilatation, is found; enabling us to estimate its significance, and to foreshadow the probable progress of the case.

"Firstly, we meet with dilatation and its usual signs and symptoms in young men, with a distinct history of sustained over-exertion, of efforts made and maintained beyond the

patient's physical powers. Hence he has dilatation of his left ventricle. This form is very amenable to treatment. Rest, good nutrition, digitalis and iron, and in a few months the patient is well and returns to labour. Imperfect cure is the exception and not the rule. *Experto crede !*

"Secondly, we have dilatation in an elderly female, in whom it has existed for years. She is more or less of an invalid, and her capacity for exertion is very limited. It is unnecessary to go into any detail of a case so familiar to all. Here the condition is chronic, and that very chronicity carries with it a fair prognosis as to life, though the case is hopeless as to cure. It is like the chronicity of phthisis : the length of time the patient has actually lived with it holds out a prospect of life for a fair time longer—*i.e.* in the absence of any new symptoms indicating a change from the stationary condition. Here the treatment is palliative: rest is a *sine quâ non*, for exertion is simply impossible; but quiet, a good regimen, a carefully supervised medical treatment, following up each varying change, and moderating each intercurrent ailment, will usually enable the patient to live for years. Recovery is scarcely within hope; though Fuller tells us that a course of iron, adhered to for years, has often removed all evidence of dilatation. The progress of dilatation is very different here from its course in the first division.

"Thirdly, we meet with dilatation under totally different circumstances from either of the above divisions—namely, where pre-existing hypertrophy is being undermined by structural degeneration, and the muscular walls are yielding. It occurs chiefly in the latter stages of chronic Bright's disease, where simple hypertrophy unconnected with valvular disease is mostly found. To illustrate thoroughly the significance of dilatation under these circumstances will need a brief divergence from the subject-matter in hand—a rapid bird's-eye view of the preceding and causal changes.

"The course of events is usually in the following sequence:—

"1. Renal inadequacy, with accumulation of histolytic products in the blood.

"2. Spasm of the arterioles, from the effect of those products upon the vaso-motor centre. (Traube, Ludwig).

"3. Hypertrophy of the muscular walls of the arterioles from the persistent, oft-repeated spasm. (George Johnson, Traube.)

"4. Arteriole spasm and hypertrophy lead to obstructed blood-flow.

"5. Obstructed blood-flow induces hypertrophy in the left ventricle.

"6. The action of these two hypertrophied muscular ends of the arterial system produces over-distension (ueberspannung) of the elastic connecting arteries.

"7. This over-distension produces atheroma. (Szostakowski, Moxon, the writer, and others).

"8. Atheroma entails loss of arterial elasticity, and consequently impaired aortic systole.

"9. The aortic systole is the propelling power which drives the blood into the coronary vessels during the ventricular diastole; and impaired aortic systole leads to imperfect cardiac nutrition, structural degeneration, yielding of the decaying walls, and dilatation.

"In the induction of these last changes we must not overlook the assistance given by the degeneration of the coronary vessels. The dilatation here is a condition of the greatest gravity. It is neither a temporary nor yet a stationary chronic condition, as in the preceding forms: it is a degenerative change of the most serious nature, and its prognosis is of the most hopeless character. The atheromatous systemic arteries are not readily distensible, and the failing heart is every day less equal to the work entailed upon it. The hypertrophy which had maintained in it the requisite driving power is melting away, and nothing can restore it; indeed but little can be done even towards arresting the decaying process. Rest is imperative, and, along with palliative treatment, may for a brief period retard the downward progress; but it is only for a time. A process of degeneration is established whose march is simply irresistible.

"Thus we see that one pathological condition may be found under totally different circumstances, the progress in each case being of an utterly dissimilar character. In each case, however, the progress may usually be fairly predicted if the different factors are taken into account—the actual heart changes weighed

by the general co-existing condition. The grim significance of dilatation in the third division must never be underrated; and though at first the dilatation is distinctly blended with hypertrophy, it is not a chronic condition of combined hypertrophy and dilatation, the amount of hypertrophy lending an equivalent of hope; it is a decay of hypertrophy, whose arrest is impossible. Every recurring examination of the patient tells of the progress of the new changes, and of the inadequacy—indeed too often futility—of our attempts to arrest them.

"With relation to its possible constitutional origin should dilatation of the left ventricle be looked at on the one hand; with regard to its systemic consequences should it be viewed on the other: not only the exact form of the disease and its complications, but the reparative or resistent powers of the patient, the necessity for exertion or the practicability of rest, the exigencies of the individual—all must be included and appraised; if our estimate of the probable progress is to contain the elements of success and not of failure, and the advice given to the patient to be of value to him, and not a possible source of danger. It is only when our view embraces all these factors that even a correct diagnosis is of any real value; without them it is little, if anything, more than a mere feat of intellectual legerdemain." [1]

§ 251. It may seem to some that the pathological process just detailed briefly has figured a little too often in these pages, and the apology for its repeated appearance is, first its importance; and secondly, that many readers, and perhaps most of those for whom this work is more especially intended, will not always turn up Sections to which reference is made and given; and consequently some repetition on important matters is not only excusable, but even desirable. The whole subject of the changes which commence in imperfect blood depuration, the effect upon the circulation, the consequences and outcomes of that again, forms the most complete and illustrative morbid process with its different stages and order of evolution, that we are yet acquainted with; and so possesses an intense pathological interest: and something more than mere pathological interest

[1] *Lancet*, May and June, 1874, "The Progress of Heart Disease." Translated into *Echo de la Presse Médicale*, July to November, 1874.

to the far-seeing practitioner, who, recognizing the early changes, knows what will follow, and so takes his measures accordingly. In such cases to be fore-warned is to be fore-armed indeed; and as the knowledge of our profession in the abstract grows, so will each man in the concrete be more able to interpose and more or less effectually arrest morbid processes; instead of merely relieving imperfectly the disagreeable sensations and symptoms of an established and irreparable condition. It is this power to prevent, which a good knowledge of pathology, as distinct from mere morbid anatomy, gives, that makes it so valuable to the practitioner. If the pathological facts exist as mere facts, they are like beads unstrung; or the varied materials gathered together for the erection of a stately mansion, but which remain in more or less chaotic condition because the architect who possesses the plan is absent.

It is very desirable for many ends, prognostic as well as therapeutic, that a well-defined acquaintance with the progress of chronic maladies should exist. Such knowledge will often point to something looming in the future which may be met, and its shock lessened, if escape be impossible; on other occasions it will indicate that the time for certain measures to be useful has passed away. As it is impossible for a young practitioner to watch chronic cases for himself; and even if he chooses to do so his knowledge must but keep pace with the slow progress of his cases, and the advance of general knowledge will in the meantime have left him far astern; so it becomes imperative that he should erect for himself a chart of the progress of chronic maladies, of which but intermittent and transient views are permitted by circumstances: so that from an occasional isolated view of a case he may be able to construct a tolerable idea of the past history of the case before him, and still more of its probable future. No one can do this who has not laboured hard as well as willingly at the subject. The darkness which hangs over the past and shrouds the future from light must be illumined by acquaintance with the progress of similar cases, by knowledge of the subject in its entirety. In the same way that a geologist, when finding a certain fossil in a shale-bed, tells confidently from its presence there that the shale-bed points to no coal-seams beneath; because he knows well that this fossil is

found only in the earliest coal formations, and consequently knows that the shale-bed in which it is found points to the exhaustion of the coal-seams, and not to their commencement; so must the observant medical practitioner learn to recognize by certain signs that the case before him has passed certain points, and entered upon certain stages. The commencement of a mitral murmur in a case of old standing aortic disease; the inauguration of a tricuspid "whiff" in long-established mitral disease, furnish such landmarks—are indeed the milestones of morbid progress. By such indications in the course of many chronic maladies we are enabled to calculate the position of the disease as well as the prospects of the patient: to ascertain that the time has come when curative measures must give way, and palliative measures take their place; when there no longer exists a foothold for hope that the injury can be compensated, or that an approach to approximative cure can be entertained as potential; and when all our energies must be bent to the delay of the end; now distinctly and clearly inevitable. All therapeutics, whether curative or palliative, must rest, if they aspire to be rational and successful, upon a sound comprehension of the nature and exact position of the malady.

§ 252. There is much still to be done, much to be learnt, much to be investigated, before therapeutics shall have attained their ultimate evolution and their maximum of utility. But if such is the case there exist also ardent minds, enthusiastic and undaunted workers, who form an undying guild, which will, in time and with infinite patience, lay deep and firm the foundations of a rational therapeusis; and erect thereupon a structure which will comprise and hold in intelligent array and serried order the facts gathered by a long-existing and industrious empiricism; as well as the information given by enterprising and well-maintained physiological inquiry.

The prospect contains much to cheer us, much to encourage us to work and wait. If the work of the individual has no apparent fruition, and he passes away without the gratification of seeing the desired outcomes of his labours, there exists the consolation and the comfort that good honest work is never ultimately lost; and that what has been done by him will ultimately bear fruit in the hands of another; and that the

sum total for human knowledge is the better for him and his work; even though the fruition be delayed until he himself is forgotten in the silent tomb—unconscious of the busy life which is reaping what he has sown. We, living now, receive the benefits accruing from the work of past toilers; and so in return must we do something for those who will follow us, and do it too without a grudging or repining spirit, but simply with an honest consciousness of duty—done and to be done. There is a certain element and warp of selfishness in the web of the life of those who take what medicine has slowly accumulated, and use it merely for their own advantage and their individual interests; without a thought of making some return. Those who fell the oak when full-grown should strive at least to plant, even if they do not succeed in planting, an acorn. He that planted the acorn of the tree they profit by did not hope to see its mighty trunk on the waggon which conveys it to the timber merchant's yard—but perhaps he witnessed the fall of oaks some nameless and forgotten man had planted long before him. So, if we feel that others must enter into the fruition of our labours, we must not repine; we reap that which others before us have sown. The personal benefit is the consciousness of duty done, which is far more than hope of reward—the consciousness that we too have added our brick, and laid it fairly true and well, in the building of the temple of knowledge—that the whole is the aggregate of individual bricks, and that each one has its place and its value.

There are those, however, who would say in the matter of therapeutics:—"Generation after generation still sends forth new speculators—ardent, sanguine, and undiscouraged by the failure of their predecessors—to toil at the same Sisyphean task, to be met by the same impassable bounds, to catch the same vanishing and partial glimpses, to be conscious of the same incompetency, to confess to the same utter and disheartening defeat. One after another they retire from the voyage of discovery weary and baffled—some in the exasperation of mortified ambition—some having learned the rich lesson of humility; a few in faith and hope—many in bewilderment and despair—but none in knowledge—scarcely any (and those only the weakest) even in the delusion of fancied attainment." But in this scepticism, too often but the thin veil which

scarcely cloaks and utterly fails to conceal their ignorance, they are not justified by the facts of the case. Therapeutics have made steady advances since the study of physiology has opened up for us a knowledge, albeit yet very imperfect, of the normal processes of the body; and in doing so has given direction to pathological research and a form and order to the facts of morbid anatomy; as well as permitted of the investigation of the action of remedies by the more precise method of experimental research; so checking and correcting the vaguer conclusions furnished by clinical observation. Already they occupy a comparatively firm foundation of assured data; and round this nucleus an accretion of facts is forming: and if we have yet much to learn, we are at any rate conscious of our ignorance; and in possession of some lines of research which are trustworthy and to be relied upon. There is a great future before us in the struggle with disease; and we may reply to those who scoff in the following sentences, from the writer just quoted—having some reservations about the strict applicability of the first part of the commencing sentence:—"The true solution is perhaps no nearer to us than before, but false ones are disproved and discarded; positive science, which is always advancing, lends its aid not so much to disperse the darkness as to expose the *ignes fatui* which we mistook for light; and we are brought into a more hopeful state of progress and sent further on our way, in proportion as wider knowledge and exacter observation unroofs one after another of the errors in which we had sought a shelter, and fancied we could find repose. Perhaps, after all, our discomfitures hitherto are attributable less to the inadequacy of our speculative faculties than to the poverty of our positive knowledge; the problem may appear insoluble simply because we have not yet accumulated the materials necessary for approaching it; and the higher branches of physiology may yet point the path to the great secret."[1]

[1] Gregg, *Enigmas of Life.*

APPENDIX.

As this work was passing through the press attention was strongly attracted to several therapeutic agents. As, however, it seemed desirable to wait for further knowledge, their consideration was deferred to an appendix. The three agents are salicylic acid, jaborandi, and hydrobromic acid.

I. Salicylic Acid.

This agent is allowed to exercise a powerful antipyretic action over many febrile states, especially rheumatic fever. It is not yet clear how it exercises this action. Not having any opportunities for trying it, I have asked Dr. Broadbent, who has given salicylic acid an extensive trial in rheumatic fever, to furnish me with the results of his experience. He writes:—

"In doses of twenty grains repeated hourly for six hours on two consecutive days, as recommended by Stricker, it has notably cut short acute rheumatism, at whatever period of the attack, early or late, it may have been administered. In subacute cases, where the temperature was comparatively low and perspiration absent or slight, the effects have been less striking than in the well-marked acute forms of the disease, with high temperature and profuse sweating. On the evening of the first day the patient has generally slept comfortably. The temperature invariably fell; and after the second series of doses generally became normal. Sickness was occasionally produced, and in some cases considerable depression, so that brandy was required. The same doses of the drug given three

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