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THE

PRACTICE OF MEDICINE.

WORKS BY THE SAME AUTHOR.

A PRACTICAL TREATISE ON THE DISEASES OF INFANCY AND CHILDHOOD.

MEMORANDA ON POISONS.

32mo. Cloth.

THE SIGNS AND DISEASES OF PREGNANCY.

THE

PRACTICE OF MEDICINE.

BY

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PREFACE.

A FIFTH Edition of this Work having been demanded, all the time that could be spared from other onerous duties during the last two years has been devoted to rendering it more worthy of the great encouragement hitherto bestowed upon it. Although it can no longer be called a Manual, yet the original plan has been adhered to, of making its pages the medium of as much practical information as the space at my disposal would allow. Especially have I aimed at adopting a style which should be terse, without being obscure; while the endeavor has also been made to give particular prominence to those points which will aid the practitioner in the discharge of his responsible duties at the bedside.

Without attempting in any degree to deprecate criticism, it is still due to my readers to say how sincerely I trust it may not be thought that too dogmatic a tone has been adopted in the remarks upon the treatment of disease. But twenty years of daily observation have given me great confidence in the strength of the general principles which I have tried to inculcate in the following pages; and being thus zealously impressed, it is difficult (even were it advisable) to do otherwise than speak positively.

In conclusion, I cannot help expressing a hope that this work may still prove as useful as its many friends have assured me it has hitherto been. In preparing each new edition I have felt my responsibility greatly increase; but the labor and anxiety have been lessened by bearing in mind Dr. Arnold's remark,—"That so long as you humbly learn, so long you may hopefully teach."

HENRIETTA STREET, CAVENDISH SQUARE,
July, 1865.

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THE

PRACTICE OF MEDICINE.

PART I.

GENERAL DISEASES.

I. MORBID STATES OF THE BLOOD.

1. Introduction.—In vain shall we attempt to understand the nature of many of the diseases to which the human frame is liable, unless we possess an accurate knowledge of the constitution and properties of the blood; that fluid which we have been emphatically taught "is the life of all flesh," through the instrumentality of which the various changes which attend the phenomena of life are accomplished, and by means of which the different organs and tissues of the body are directly nourished. The study of this subject, though surrounded with difficulty, is as interesting as it is important; and if much has yet to be learned, especially with regard to the chemical and microscopical characters of the blood in disease, still very valuable observations are gradually accumulating.

The characteristics of the living organism are ceaseless change and ceaseless waste. Directly man begins to live, he begins to die. In the blood, as in the different tissues, the processes of decay and regeneration only terminate with the extinction of vitality. During action, the tissues waste; during repose, they are nourished, and the waste repaired. That "the lamp of life" may burn brightly, the material for chemical action must be supplied in fitting proportions. Hence to breathe, to eat, to drink, to sleep—in other words, to maintain a due supply of the liquid by which nutrient matter is distributed to the various tissues—are the indispensable conditions of life. In the course of one year an adult healthy man receives air, food, and water, amounting in the aggregate to more than 3000 lbs. (2240 lbs. = 1 ton); while in the same period of time he loses by urine and fæces, by transpired and expired matters, the same enormous amount of material. In infancy and youth the receipts are greater than the expenditure, and hence there is a gradual increase of weight. The bloodvessels, while they carry a certain amount of nutritive material to the tissues, only receive a smaller quantity of wasted material from them. But in old age this rule is reversed; and then, as with the spendthrift, the means of repair become at length exhausted. The same thing happens in disease,—the general condition of equilibrium is upset; the balance being still further destroyed, owing to the useless or poisonous agents generated within the system not being removed as speedily or completely as is necessary.

Life is only to be maintained by the circulation of arterial blood; and whether no blood circulates through the arteries, or only venous blood, the result is the same—death. When no blood circulates, death is said to take place from *syncope;* and this is of two kinds. Firstly, death by *anæmia*, in which there is a want of the due supply of blood to the heart, as is witnessed in fatal hemorrhage, &c.; secondly, death by *asthenia*, where there is a failure in the contractile power of the heart—and this is seen to occur from the action of certain poisons, from intense grief or terror, from lightning, concussion, blows on the epigastrium, as well as from certain forms of apoplexy. It must be remembered that in some instances death is due partly to anæmia and partly to asthenia; as may be particularly noticed in fatal cases of starvation, and in lingering disorders like phthisis, dysentery, &c.

When venous blood circulates through the arteries, death may happen in one of two ways. In the first place we have death by *asphyxia* (more correctly speaking, by *apnœa*—Ἀ, priv., and πνέω, to breathe), or *suffocation*, where the access of air to the lungs is prevented; as occurs in drowning, strangulation, choking, immobility of the respiratory muscles from tetanus, section of the phrenic and intercostal nerves, obstruction of the larynx by false membranes, many diseases of the lungs, and so on. Secondly, there is death by *coma*, in which the muscular movements required for respiration cease, owing to insensibility produced by some cerebral mischief; examples of which form are seen in many affections of the brain. Thus, in death by apnœa we have successively impeded respiration, the circulation of venous blood, and insensibility; while in coma the order of the phenomena is reversed, and we find insensibility, cessation of the thoracic movements, and a stoppage of the chemical functions of the lungs.

The blood may be described as an albuminous fluid, charged with salts, holding fibrin in solution, and containing corpuscles. It is of high specific gravity, being on the average 1055, reckoning that of water as 1000: the extremes, compatible with health, varying from 1050 to 1059. The specific gravity is diminished by bleeding, anæmia, albuminuria, scurvy, gout, &c.; while it is increased in cases of plethora, as well as in diseases attended with copious watery discharges—*e. g.* cholera, diabetes. The temperature is about 100° F.; and its reaction is constantly alkaline, the degree of alkalinity being greater during fasting than after food has been taken. The menstrual discharge, which consists of blood, offers no exception to this rule, in its pure state; the acidity it sometimes manifests being merely due to the admixture of an acid mucus as it flows through the vagina. In fact, throughout the animal kingdom, the circulating fluid is always alkaline; though it becomes spontaneously acid after death, owing—according to Bernard—to the sugar it contains being converted into lactic acid.

The statements made by physiologists as to the total quantity of blood present in the body vary greatly; some observers estimating it at from one-fifth to one-eighth of the entire weight. Thus, Valentin says that from experiments on cats, dogs, rabbits, and a sheep, he was led to the conclusion that the blood has to the weight of the body a proportion of 1 to 4.08 to 1 to 6.32. Herbivorous animals had, on an average, less blood than carnivorous. Taking one-fifth as the mean value, he believes that a man of 30 to 40 years, whose average weight

amounts to 140 lbs. would have 28 lbs. of blood. Wrisberg collected 26 lbs. 7½ oz. from a beheaded woman, and saw 28 lbs. 11 oz. lost by uterine hemorrhage! On the other hand, Weber and Lehmann, from experiments on the bodies of two criminals who suffered death by decapitation, obtained results which seemed to show that the proportion was as 1 to 8; so that the body of a man weighing 140 lbs. would contain 17½ lbs. of blood. But again, the more recent and trustworthy investigations of Welcker tend to make it probable that this proportion is too high; and that in man and the mammalia generally the average relative weight of the blood to that of the body is only as 1 to 14. Hence, the body of an adult healthy man will probably contain about ten pounds of blood.

There is an immense difference—a difference of life and death—between the blood which enters, and that which issues from, the lungs. The former—venous blood—comes to the lungs charged with carbonic acid. The latter—arterial blood—is the fluid which maintains life, and which circulates between the lungs and the systemic capillaries. The course of the circulation is as follows: The right auricle of the heart receives the blue venous blood of the whole body, by the ascending and descending venæ cavæ and the coronary sinus. From the auricular cavity it flows into the right ventricle, and so into the pulmonary artery to be distributed through the lungs. Returning thence, the crimson arterial blood is driven along the pulmonary veins into the left auricle, and then into the left ventricle. From the latter it is urged into the aorta; and by the ramifications of this vessel is distributed to all parts of the system, to be again returned by the capillaries, venous trunks, and venæ cavæ. The change of impure venous blood into pure arterial blood depends upon the exhalation of carbonic acid with the vapor of water, and the absorption of oxygen by the hæmatin of the blood-corpuscles; so that a transudation of gases takes place as the blood in its flow through the pulmonary capillaries becomes exposed to the influence of the atmosphere in the cavities of the air-cells. The alteration of arterial to venous blood occurs in the systemic capillaries, and is due to the hæmatin yielding up the oxygen associated with it, and becoming charged with carbonic acid. The theory, that in the act of respiration, a combination or perfect oxidation took place in the lungs, owing to the oxygen from the air uniting with the carbon from the blood and forming carbonic acid, has been abandoned. The oxygen and carbonic acid exist in the circulating fluid in solution or association, and not in a state of intimate chemical combination.

On minutely examining the blood as it exists while circulating in the vessels, we find it to consist of a transparent yellowish liquid called the liquor sanguinis or plasma; which is formed of serum holding fibrin in solution, and in which are contained very numerous red discs termed blood-corpuscles or blood-cells, together with a few larger colorless corpuscles.—A red blood-corpuscle, in the human subject, is a circular flattened cell without a nucleus, having an external elastic membrane and red contents. In the first months of intra-uterine life, with all the mammalia, nuclei are present; while the same is the case during the whole existence of frogs, fishes, and birds. The corpuscles, as has been mentioned already, obtain oxygen in the pulmonary circulation, and transfer it to the tissues they pervade,—being aptly termed car-

riers of oxygen; and then having given up this vivifying principle they are returned to the pulmonary air-cells for a fresh supply. The contents of the cells consist of a peculiar substance impregnated with red coloring matter, summarily called hæmatin. This latter contains a large amount of iron; and from it, under certain circumstances, three kinds of microscopic crystals can be obtained. The first variety of crystals has been named by Virchow *hæmatoidin*. They are formed spontaneously in the body, out of the hæmatin in coagula occurring in the Graafian vesicles, obliterated vessels, brain, &c. These crystals may be described as oblique rhombic columns of a yellowish-red or deep ruby tint, according to their thickness. Sometimes they resemble small crystals of uric acid or of the triple phosphates found in urine. And they are important, because an effused mass of blood, as in apoplexy, cannot be removed, except by a large portion of it undergoing this form of crystallization. Moreover, hæmatoidin presents properties which show that it is allied to the coloring matter of the bile—biliverdin. The second kind of crystals has been called *hæmin*. Their pathological interest is small, inasmuch as they have to be produced artificially, by chemical tests; but they are of great significance to the medical jurist, as offering a test of the presence of blood.* While the third class has received the name of *hæmato-crystallin;* crystals of this kind being very perishable, and only forming at a certain stage in the destruction of the blood-cells. This crystalline substance was also formerly named globulin, owing to its erroneously supposed identity with the protein-body obtained from the crystalline lens.

The colorless or lymph-corpuscles are small in number (the proportion to the red is in health as 1 to perhaps 370), are perfectly spherical in shape, destitute of all color, very delicate in structure, and have granular contents with one or more nuclei. When first discovered, they were mistaken for pus-corpuscles, the result of pyæmia. The importance of these corpuscles will be shown in the remarks subsequently to be made on leucocythemia; but at present it need only be added, that many physiologists allow that they are identical with those bodies occurring in lymph, chyle, mucus, and pus, to which the general term *cytoid corpuscles* has been applied. In addition to these red and white blood-cells, the higher powers of the microscope reveal the presence of numerous minute molecules or granules, similar to those found in the lymph and chyle.

When the blood is fresh drawn from the body, it forms, in about ten minutes, a gelatinous mass; this singular alteration being caused by the tendency of the particles of fibrin dissolved in the plasma to agglutinate together. In some fifteen minutes, when the process of solidification is complete, the glutinous mass will be found to be shrinking and resolving itself into two distinct portions, which are known respectively as the *crassamentum* or *clot*, and *serum*. This shrinking is due to the further coagulation or contraction of the fibrin; and it continues for some thirty or forty hours, after which time no more serum is expressed. The *clot* consists, then, of the fibrin holding the red corpuscles entangled within the meshes it has formed. These corpuscles may either be

* The mode of obtaining these crystals as tests for the detection of blood-stains is shown in Virchow's work on Cellular Pathology, translated by Dr. Chance, p. 145. London, 1860.

equally diffused through the clot; or they may, by sinking from its surface, leave the upper part colorless. When the latter happens, the colorless layer of fibrin, not being encumbered with corpuscles, contracts more than the lower part; and under these two circumstances the clot is said to be "buffed" and "cupped." The *serum* is the liquor sanguinis minus the fibrin; and consequently there is a most important distinction to be drawn between the plasma of living blood—so to speak, and the serum of blood removed from the vessels. This serum is a pale-colored, watery solution of albumen; having a density of about 1029, being of alkaline reaction, and holding in solution many important substances. The albumen is probably associated or combined with soda; and it is the plastic material from which the soft tissues are nourished, and by which the cells themselves grow. The fibrin probably arises from it, to be used up for the renovation and repair of the muscular tissues.

The attention of physiologists has long been directed to the discovery of the essential nature of this process of coagulation. But the question, What is the cause of the solidification of the fibrin in blood both in and out of the body? is still one that cannot be answered. There are objections to every theory that has been propounded: to that of John Hunter, that "coagulation is an operation of life;" to Hewson's, that the phenomenon is mainly due to the influence of atmospheric air; to Scudamore's, that it is greatly promoted by the escape of carbonic acid; to Draper's (a revived theory), that the fluidity of the blood during life is maintained by the muscular tissues picking out the fibrin, as it is solidified, for their nutrition; and to Richardson's, that the evolution of ammonia is the essential cause of the change. We only know for certain that coagulation is favored by rest, warmth, free access of air, and the multiplication of points of contact (Lister). Moreover, the withdrawal of the influence of living vessels is, in all probability, largely instrumental in causing this phenomenon.

It is difficult to give the exact chemical composition of the blood; since this fluid is altered not only in different diseases, but also by the quantity and variety of food taken. The following table, however, may be regarded as indicating the composition of healthy blood in 1000 parts:

Water,	784.
Oxygen, Carbonic acid, Nitrogen, — dissolved in the fluid.	
Cell membrane, Hæmatin, — constituting the red corpuscles,	131.
Fibrin,	2.2
Albumen,	70.
Salts:	
Phosphate of soda, lime, magnesia, and iron,	6.
Sulphate of potash,	
Chlorides of sodium and potassium, silica, &c.,	
Fats:	
Margarine, Oleine, Seroline, Cholesterine, Phosphuretted fats, &c.,	1.3
Extractive matters (unknown substances), with traces of urea, uric acid, creatine, &c.,	5.5

The blood receives matter from three sources: from the atmospheric air, through the lungs; from the primary digestion, which takes place in the alimentary canal; and from the secondary digestion, as that process is called by which the tissues which have served their purpose and become effete, are absorbed to be discharged from the economy. In return, it affords material for building up the tissues, for forming the secretions, and for producing the excretions. Hence, whatever interferes with the process of chylification, with respiration, with the excretory organs (as the bowels, liver, kidneys, and skin), and perhaps with the healthy condition of the nervous system, will affect the composition of the blood. Mr. Paget adopts the proposition found in the writings of Treviranus,* to the effect that "each single part of the body, in respect of its nutrition, stands to the whole body in the relation of an excreted substance;" and this certainly seems to be true. Thus, to take only one example, it can readily be understood that the phosphates deposited in the bones are as effectually excreted from the blood as those which are discharged with the urine. In health, then, when the sources of the blood are duly supplied, and when all the various organs and tissues abstract from this ever-circulating fluid the special materials they need, a general balance is maintained in the system; but allow the rough materials for forming blood to be too large or too small in quantity, or let one organ act imperfectly, and every part of the body becomes necessarily more or less unfavorably affected.

The changes which take place in the blood under different circumstances will be noticed in treating of the various disordered states of the system. It may, however, be useful to premise that as disease and death may ensue from injurious matters being retained or introduced in the blood, so they may also arise from certain elements which are indispensable to the healthy nutrition of organs being deficient or absent. To speak more particularly, it may be noticed that inflammatory disorders remarkably modify the composition of the blood; diminishing the albumen, doubling the amount of cholesterine, and increasing the quantity of fibrin to as much as even 10 parts in 1000. Venesection, or hemorrhage in any form, chiefly reduces the amount of the red particles, and to a slight degree lessens the quantity of the albumen and fatty matters; while it also diminishes the density of the serum. In Bright's disease and in cardiac dropsy the albumen is greatly diminished, owing to its escape in the urine; whereas this element is probably increased in scrofula and cancer. In starvation, scurvy, exhaustion from lingering disease, dipsomania, and in fevers, the amount of fibrin is diminished. A superalkaline condition of the blood may be produced by the use of alkalies, by abstinence from food, and by some forms of disease,—*e. g.*, typhoid and putrid fevers.

It will now be convenient to notice in succession those disorders which in the present day are specially known as *blood diseases*.

2. Hyperæmia.—Plethora, or fulness of blood (hyperæmia—Ὑπὲρ, in excess, and *αἷμα*, blood; polyæmia—*Πολὺς*, much); consists

* Die Erscheinungen und Gesetze des organischen Lebens, Band i, p. 402. Bremen, 1831. Mr. G. H. Lewes, in his work on the Physiology of Common Life, vol. i, p. 286, states that this conception is due to Caspar Friedrich Wolff, whose doctrine of epigenesis rests upon it. See Theorie von der Generation, 1764.

either of an excessive quantity of the vital fluid, the supply being greater than the demand; or, as is most commonly the case, of a superabundance of the red globules, the quantity of the blood remaining unchanged, while in quality it becomes over-rich. The proportion of fibrin is probably unaltered, or perhaps slightly increased (*hyperinosis*—Ὑπέρ, in excess, and ἶς, ἰνὸς, the fibre of flesh), in the second class of cases.

Hyperæmia produces lassitude and indolence, a desire for sleep, snoring and dreaming, attacks of vertigo, and sometimes hemorrhage. It is a condition often plainly indicated by distension of the capillaries, as may be observed on the cheeks, lips, and mucous membranes; by a full, strong, resistent pulse; and by a turgid appearance of the veins. Obesity, also, is sometimes an accompaniment, though by no means an infallible sign of plethora. Indeed, as will be mentioned in a future page, many fat persons suffer from a deficiency, rather than from an excess of blood; and consequently they bear lowering measures during the progress of disease very badly.

When the blood merely exists in too great abundance in one or more particular organs or tissues, we say that there is partial plethora, or a local congestion or determination of blood. Partial plethora not uncommonly occurs in cases where the blood, taken as a whole, has been much diminished in quantity or quality by disease. If we irritate an organ mechanically, we cause an increased flow of blood to it through the arteries, which gives rise to *active* congestion; a condition which, after a time, either decreases insensibly, or ends in hemorrhage, or passes into inflammation. When the return of blood to the heart through the veins is impeded, as by the compression of one or more venous trunks, we have what is called *mechanical* congestion. Or again, the circulation of the blood through the capillaries of a part may be sluggish, as is often seen in persons debilitated by age or disease, and we then have *passive* congestion.

The blood being directly fed by the chyle, it is evident that too free living must be one of the most common *causes* of hyperæmia. The normal waste of tissue, and consequent expenditure of blood, is also impeded by a sedentary mode of life. Sometimes this condition is hereditary; and occasionally I have found it occur in women after "the change of life." So again, plethora may result from the loss of an important part of the body. Thus, a spare man, some months after amputation at the hip-joint, became strong, robust, and red-faced; for since he took as much food as he was accustomed to before the disease set in which rendered removal of his limb necessary, so of course he made as much blood as appeared needed for the nourishment of his body prior to nearly one-fourth part of it being removed.

The *treatment* of general plethora must consist in the adoption of a restricted diet, or the employment of non-nutritious substances; in the avoidance of beer and all other alcoholic drinks; in lessening the hours devoted to sleep; and in the use of active exercise in pure air. Saline purgatives often do good—(F. 165, 167, 169). The bromide of ammonium (F. 37) might be useful. So, also, rather large doses of liquor potassæ (F. 73) have been recommended, especially where there is a rapidly-increasing tendency to grow fat, though their efficacy is very

doubtful. In extreme cases the abstraction of a small quantity of blood may be necessary.

3. Anæmia.—Deficiency or poverty of blood (anæmia—from *Ἀ*, privative, and *αἷμα*, blood; spanæmia—*Σπανὸς*, thin or poor; hydræmia —*Ὕδωρ*, water; or oligæmia—*Ὀλίγος*, thin); arises generally in cases where there has been deprivation of the proper materials necessary for the formation of healthy blood, where the digestive functions are imperfectly performed, and in the course of severe chronic maladies. It occurs also in those diseases which are attended with a gradual draining of the circulating fluid,—as happens in persons suffering from bleeding piles, women with menorrhagia or cancer uteri, &c. It may of course be produced artificially by excessive venesection, the administration of mercury or antimony or purgatives, and such like means. The anæmic state is not peculiar to any particular period of life; and males and females are equally affected by it. If the blood be analyzed, it will be found that the red globules are deficient; so that, instead of existing in the proportion of about 130 per 1000 parts, as in health, they are reduced to 80, or 60, or even (in severe cases) to 30. The proportion of fibrin either remains unchanged, or it is perhaps diminished (*hypinosis*—*Ὑπὸ*, under, and *ἶς*, *ἰνὸς*, the fibre of flesh). The liquor sanguinis is also poor in albumen; while the salts may be increased in quantity.

Those varieties of anæmia which are caused by tuberculosis, amyloid degeneration, fatty degeneration, albuminuria, carcinoma, scurvy, &c., will be treated of at length in succeeding pages.

Symptoms.—This disease proclaims both itself and its nature—impoverishment of the blood. The chief symptoms are—a pale, waxy, blanched appearance of the countenance and integuments generally, as well as of the lips, tongue, and inside of the mouth; a pulse feeble and rapid; loss of appetite, with indigestion and flatulence and irregular action of the bowels; a free secretion of pale limpid urine; low spirits, and severe headache; and great general debility with languor. There is often an enlargement of the thyroid gland; and with or without this an unnatural prominence of the eyeball (*exophthalmos*, *proptosis oculi*), producing a staring appearance as if the orbits were too small for their contents. The nervous sensibility is morbidly increased; and muscæ volitantes, with scintillations, are complained of. The temperature of the surface and extremities is below the normal standard. There may be œdema of the ankles, with or without albuminuria. While in women the catamenial fluid is pale and watery, and usually scanty.

Then any exertion is attended by a sense of sinking, with fainting or syncope; and there is palpitation with hurried breathing. This panting dyspnœa is easily explained on the supposition that the blood-cells are the carriers of oxygen; for when these corpuscles are diminished, increased respiratory efforts must be established if the due oxygenation of the blood is to be maintained.

On practising auscultation over the base of the heart, a soft systolic bruit or bellows-sound will frequently be detected; which may be traced distinctly up the aorta, and in the subclavian and carotid arteries. In some cases an intermittent murmur, synchronous with the beat of the pulse, may be heard in all the large arteries. By placing the stethoscope over the jugular vein, especially over the right, a continuous hum-

ming, or cooing, or even whistling sound—the *bruit de diable*—will be heard; a sound which is partly caused, as Dr. Ogier Ward first pointed out, by the descent of attenuated blood through the great cervical veins. Too much importance, however, must not be attached to this venous murmur; since it may be detected, though probably in a less degree than in anæmia, in the great majority of healthy individuals, and almost always in children and young women.

In cases of long continuance general atrophy sets in; together with dropsical effusions, great dyspnœa, diarrhœa, profuse sweating, and spasms or convulsions. Moreover, the low degree of vitality which exists, renders the system unable to resist the influence of any morbid poison to which it may be exposed. When death occurs it may take place gradually from exhaustion; or more suddenly from syncope, convulsions, or coma. The tissues will afterwards be found pallid and flabby; and the heart and vessels comparatively bloodless. But no traces of structural disease will be detected, in cases of simple anæmia, with the exception that the thyroid gland may be much enlarged.

Treatment.—Occasionally we meet with such serious cases that we can for a time only trust to the most careful nursing, to the guarded exhibition of some preparation of cinchona, to the very frequent administration of wine or brandy, to the use of milk or raw eggs or broth (F. 2, 3, 17, &c.), and to the strict maintenance of the recumbent posture —possibly on a water-bed.—But generally speaking the patient is seen before matters have arrived at this stage; when we have the satisfaction of knowing that removal of the cause, the use of tonics and stimulants, the avoidance of all excesses, the due observance of mental and bodily repose, together with a suitable diet, will effect a cure. The remedies we particularly trust to are the various preparations of iron (F. 392, 393, 404). In the Ferrum Redactum (the fer réduit of the French), we have a very valuable agent, consisting of metallic iron reduced to a state of minute division by means of hydrogen; which preparation may be administered by itself or with quinine (F. 380). Aloetic purgatives, combined or not with steel (F. 148, 393, 404), are often valuable. When there is much restlessness, soothing doses of henbane or hop are needed; and when much palpitation, small doses of aconite do good (F. 305, 310, 322). Then plain nourishing food must be allowed as freely as it can be assimilated; beginning with milk and eggs and beef tea, until we can advance to fish or poultry or mutton, cod-liver oil, and unadulterated bitter ale. When the gastric juice is deficient in quantity, pepsine will work wonders (F. 394, 420). The only other curative agents to be remembered are out-door exercise, short of fatigue; the respiration of pure air; and cold bathing, particularly in sea-water. Under the judicious use of such restoratives, the bloodlessness and all its resulting formidable symptoms entirely disappear; though it must be remembered that as it takes a longer time to replace the red globules than the other constituents of the blood, so the remedies must be persevered with for many weeks.

In anæmia dependent on too severe mental occupation, the phosphate of iron or zinc, or the phosphoric acid in some tonic infusion (F. 376, 405, 414), together with cod-liver oil, do much good. In such cases the blood gets poor and watery to a marked degree; and hence requires to be enriched by rest from intellectual pursuits, good diet, fatty arti-

cles of food, and chalybeates. Overwork of the brain produces deterioration of the vital force as certainly as too prolonged or too intense muscular action, or an insufficient supply of nourishment.

Invalids from tropical climates very often suffer from anæmia. This may be the result of long residence in malarious districts; or it may be the sequel of hepatitis, fever, dysentery, and cholera. In the treatment of remittent and intermittent fevers, &c., in India, bleeding, mercury, purgatives, and low diet, often constitute the remedies. Leeches appear to be employed by dozens at a time; and of course they often produce severe and protracted anæmia. Sir James Ranald Martin mentions several cases where hundreds of these blood-suckers had been used during an illness. One gentleman, who was so unlucky in 1855 as to fall from his horse, had twenty-two dozen applied at once; while another was invalided for life, after the employment of at least three thousand in six years.* Necessarily in patients thus treated, the blood remains impoverished, and the whole system enfeebled for a very long time after the European has returned home; in fact, the disease, whatever its nature, could hardly be more injurious than the remedy. Amongst the symptoms by which anæmia is especially characterized in tropical invalids, are hemorrhages, passive congestions of the thoracic or abdominal viscera, and abdominal neuralgic pains. If the nature of these signals of debility be mistaken, and depletion in any form resorted to, grave mischief will result. The only remedies of any avail are good food, ferruginous tonics, a complete holiday, and a residence in the country air. Sir Ranald Martin particularly recommends a visit to the Highlands of Scotland, a suggestion not to be forgotten.

A peculiar form of anæmia, termed CHLOROSIS (*Χλωρὸς*, green), frequently affects young women about the age of puberty. According to some authorities this disease has its origin in the nervous system; the disturbance of the digestive, circulatory, and uterine functions being the effect of this morbid action. Without entirely denying this theory, I am sure that many cases which have come under my notice have been dependent on, or at least very intimately connected with, disordered menstruation, and probably certain sexual causes. The nervous system has suffered equally with the circulating and the muscular, just as all the tissues become affected when the blood is too poor to nourish them properly. But this suffering has appeared to me to stand in the relation of effect instead of cause. In chlorosis, the red corpuscles are pale and small, being also diminished in number, even to one-third of the normal standard; while the proportion of albumen in the liquor sanguinis is natural. The fibrin, in some instances, has been found to be increased, though no trace of any inflammatory action was to be discovered in the system. In chlorotic women the wax-like hue of the countenance is remarkable. Indeed, so peculiar is this pallor of the skin, that the disease is popularly known as the *green sickness*. The subjects of it present certain prominent symptoms. Thus, they have a deficient or depraved appetite, the bowels are costive, the urine is pale

* The Influence of Tropical Climates in producing the Acute Endemic Diseases of Europeans. Second Edition, p. 652. London, 1861.

and of low specific gravity, the mucous membranes have an exsanguine appearance, the tongue is flaccid and indented at the edges by the teeth, the pulse is weak and quick, and the menstrual discharge is pale and scanty. There is an indisposition for exertion; with vertigo, headache, palpitations, pain in the left side over the false ribs, backache, and various hysterical affections. The same cardiac and vascular murmurs are to be detected as in anæmia; and not unfrequently also the same enlargement of the thyroid gland, with the peculiar protrusion of the eyeballs.

These phenomena are developed gradually, and often after there have been symptoms of disordered menstruation for some little time. Dysmenorrhœa and leucorrhœa are very common precursors of chlorosis.

The cure of this affection is not usually difficult. Perfect health may generally be restored by attention to the diet and mode of living, and by a course of chalybeates. I say "generally," because in some rare instances severe symptoms set in suddenly, and death takes place as if from cerebral effusion. When we administer iron in cases of chlorosis and anæmia it not only acts as a general tonic, but in all probability becomes assimilated and enters directly into the formation of the blood-globule. The soluble preparations of steel are much more active than the insoluble; while the less astringent the former can be procured, the more energetic will be their influence.

4. Leucocythemia.—This remarkable affection may be best defined as a morbid state of the blood, in which the white corpuscles are greatly increased in number, while the red cells are much diminished. It is always connected with hypertrophy of one or more of the lymphatic glands, or of the spleen.

Leucocythemia has been particularly investigated by Virchow and Hughes Bennett. The former named it *Leukæmia*, or white blood; an objectionable term, inasmuch as the blood is not white, but of its usual color. Dr. Bennett has therefore substituted the word *Leucocythemia*, from λευκὸς white, κυτος a cell, and αἷμα blood; literally white-cell blood. The first example of it was described by Dr. Bennett in October, 1845, who regarded it as an instance of "suppuration of the blood without inflammation." It occurred in a case of hypertrophy of the liver, spleen, and lymphatic glands. Six weeks subsequently Virchow published the notes of a similar case; and gave what cannot but be deemed a more correct explanation of its nature. For he showed that the bodies which Dr. Bennett regarded as pus globules resulting from suppuration, were really the colorless corpuscles of the blood.

Symptoms.—Very little is known of this disease or its causes at present. In cases where it has been found to exist, the majority of the patients have suffered from an unusual pallor, like that of anæmia; from great emaciation and debility; from more or less swelling of the abdomen, owing to enlargement of the spleen, or liver, or both; from disordered respiration; and from increasing prostration and emaciation, gradually ending in death. In many cases, moreover, there has been diarrhœa; hemorrhage in some form or other, but especially epistaxis; urine loaded with uric acid; nausea, jaundice, fever, and loss of appe-

tite; together with œdema of the legs, anasarca, or ascites, dependent on the abdominal enlargement.

Diagnosis.—If we examine the blood of a patient affected with the symptoms just described, no mistake can be made with regard to the nature of the disease. On placing an ounce or two of leucocythemic blood, which has been freed from fibrin, in a narrow glass, the red corpuscles sink to the bottom, while the upper part of the mass looks like milk. This appearance is due to the colorless corpuscles; and it may be distinguished from that caused by fat, by the circumstance that it is not removed by ether. In extreme cases portions of the blood resemble pus.

On examining the blood microscopically, under a magnifying power of 250 diameters, the yellow and colorless corpuscles are at first seen rolling together; the excess in the number of the latter being at once recognizable, and becoming more evident as the colored bodies get aggregated together in rolls, leaving clear spaces between them filled with the colorless ones. A drop of blood taken from a prick in the finger is sufficient for examination. The results of chemical analysis on nine occasions recorded by Dr. Bennett, show an excess of fibrin and a diminution of blood-corpuscles.

Prognosis.—This is always unfavorable. The marasmus (*Μαραίνω*, to grow lean), generally increases steadily. All that we can do is to try and put off the fatal termination, in which attempt we may sometimes be successful for one or two years.

Pathology.—In health the ratio of colorless to red corpuscles is about 1 : 373 (Donders and Moleschott); whereas in the disease under consideration they often stand to the red corpuscles in the high proportion of 1 : 3. According to many physiologists the red corpuscles are formed from the colorless ones by the direct transformation of the latter into the former. From numerous observations, however, Dr. Bennett believes with Wharton Jones that the colored disc is merely the liberated nucleus of the colorless cell. The opinion, first promulgated by Hewson, that the blood-corpuscles were derived from the lymphatic glands, has been generally rejected. But after a careful consideration of the subject Dr. Hughes Bennett confirms this view. His conclusions are: "1. That the blood-corpuscles of vertebrate animals are originally formed in the lymphatic glandular system, and that the great majority of them, on joining the circulation, become colored in a manner that is as yet unexplained. Hence the blood-corpuscles may be considered as a secretion from the lymphatic glands, although in the higher animals that secretion only becomes fully formed after it has received color by exposure to oxygen in the lungs. 2. That, in mammalia, the lymphatic glandular system is composed of the spleen, thymus, thyroid, supra-renal, pituitary, pineal, and lymphatic glands. 3. That, in fishes, reptiles, and birds, the colored blood-corpuscles are nucleated cells, originating in these glands; but that, in mammals, they are free nuclei, sometimes derived as such from the glands; at others, developed within colorless cells. 4. That, in certain hypertrophies of the lymphatic glands in man, their cell elements are multiplied to an unusual extent, and under such circumstances find their way into the blood, and constitute an increase in the number of its colorless cells. A corresponding

diminution in the formation of free nuclei, and consequently of colored corpuscles, must also occur. This is leucocythemia."*

From the foregoing it follows that one or more of the blood-glands will be found enlarged in the disease under consideration. Most commonly this change is discovered in the spleen, liver, and lymphatics; less frequently the thyroid body and the supra-renal capsules are affected. Sometimes the spleen has weighed as much as nine pounds; but this organ may be greatly enlarged without the blood being leucocythemic. The liver may be hypertrophied, or cirrhosed, or cancerous; though in some instances it has been perfectly healthy. The condition in which the increased proportion of colorless corpuscles appears to be dependent upon an affection of the lymphatic glands has been designated *Leucocytosis* by Virchow, in contradistinction to that due to splenic hypertrophy. But the foregoing remarks will show that this is a very unnecessary distinction; and one which, as it seems to me, can only lead to confusion.

Treatment.—The remedies which would appear to promise the most success, for a time, are certain tonics; especially, perhaps, bark, iron in various forms, and quinine. Iodide of potassium and the chloride of potassium have been fruitlessly tried. Good nourishing food will be indispensable, and cod-liver oil may often no doubt be beneficial. The practitioner must, however, in a great measure be guided by the prominent symptoms in each case; always taking care to check any attacks of hemorrhage or diarrhœa as soon as they arise.

5. Piarhæmia.—Healthy blood contains, on an average, somewhat less than two parts of fat in a thousand; and it probably exists in combination with potash or soda, as a kind of soap. Hence, on a minute examination of normal blood no oil-globules are to be seen. Milkiness of the serum or fatty blood (piarhæmia—*Πῖαρ*, fat, and *αἷμα*, blood; pioxæmia—*Πίων*, fat; or lipæmia—*Λίπα*, fat) is met with under certain circumstances in disease, and hence demands attention. Its physical causes are two—viz., free fat, and molecular albumen.

In the first place, piarhæmia is a *physiological* result of digestion, pregnancy, lactation, and hibernation. During the process of digestion, the lactescence of the serum is said by Becquerel and Rodier to begin about two hours after the ingestion of aliment, and to continue for two or three hours. The serum is found to be turbid, opalescent, and semi-opaque; a condition which is only transitory, and is due to the absorption of the fatty matters of the food, formed into an emulsion by the pancreatic juice, and absorbed as such in the duodenum. Examined microscopically, this condition of the serum is seen to be due to the presence of a large number of fat globules and of molecular granules of albumen. According to Christison and Lecanu, the passage of the chyle into the blood renders the serum turbid; this turbidity lasting until the insoluble fatty matters—oleine, stearine, and margarine—enter into combination with the free soda of the blood, and become converted into the oleic, stearic, and margaric acids.

Secondly, lactescent serum is the *pathological* result of disease. The

* Clinical Lectures on the Principles and Practice of Medicine. Third Edition, p. 884. Edinburgh, 1859.

cases in which its occurrence has been noted are diabetes, chronic alcoholism, dropsy, jaundice, nephritis, hepatitis, pneumonia, and especially Bright's disease. In an interesting case of piarhæmia accompanying acute diabetes, recorded by Dr. Charles Coote, which ran its course very rapidly, and was attended with great prostration, the blood after death was found fluid, homogeneous, and of a dull-red color like raspberry cream; while in a few seconds it separated into two distinct portions, the supernatant layer being of the color and appearance of thick cream, and the subjacent portion presenting the appearance of fluid venous blood. The creamy layer was certainly free fat, for it was wholly taken up by ether.

Various explanations have been given of the occurrence of fatty blood in disease. Formerly pathologists attributed it to the passage of unaltered chyle into the circulation; an explanation which, though in some measure true, was shown by Hewson to be insufficient, since he observed this condition in many instances where the patients had taken little or no food for many days. Raspail maintained that the fat was set free in the blood for want of a free alkali to hold it in the form of a soap. Dr. Babington appears to regard piarhæmia as a fatty degeneration of the albumen of the blood. Rokitansky thinks it is often due to fatty degeneration of the colorless corpuscles, which are previously formed in excess, so that it is to be regarded as a modification of leucocythemia; but he also admits the direct introduction of fat into the blood, and the liberation of combined fat contained in it, to be possible causes. Virchow regards it as dependent upon the non-combustion of fat, and its consequent accumulation in the blood; while he considers the presence of molecular albumen to be only a secondary phenomenon, the slow saponification of the excess of fat abstracting from the albumen of the blood the alkali required to keep the latter in solution. And lastly, Dr. C. Coote, from a comparison of all the facts which have been published upon this topic, concludes*—1. That piarhæmia consists in an excess of saponifiable fat in the blood, and not in the mere liberation of fat from its combinations. 2. The excess of fat may be the result of two causes —viz. (*a*) the excessive ingestion of fat, as in piarhæmia during digestion; (*b*) the diminished elimination of the same, as in hibernation and pulmonary diseases. 3. Fat, if directly ingested, may enter the blood with the chyle through the thoracic duct; though from the consideration of the case recorded by Dr. Coote, it seems that it may also be elaborated in and absorbed directly from the liver. 4. Piarhæmia is not a result of diabetes mellitus, for either may exist without the other. 5. The pathology of blood milky from molecular albumen must be considered as still almost wholly negative. Though probably never an independent affection, yet it is not a mere accidental occurrence of piarhæmia. Its apparent relation to albuminuria seems to point to some organic change in the constitution of the plasma of the blood itself.

6. Glucohæmia.—The excretion of sugar by the kidney, constituting a disease known as diabetes mellitus, or saccharine diabetes (diabetes—*Διά*, through, and *βαίνω*, to move; melituria—*Μέλι*, honey, and *οὖρον*, the urine; glucosuria—*Γλυκὺς*, sweet; glucohæmia—*Γλυκὺς*, and

* Lancet. London, Sept. 8th and 15th, 1860.

αἷμα, blood); has attracted considerable attention since the time (about the year 1660) when Thomas Willis first observed the saccharine condition of the urine in this affection. More than a century later (1778) Cowley succeeded in isolating the saccharine principle. Without, however, tracing the history of our knowledge of diabetes, it may at once be said that the first hypothesis of any moment which we find promulgated was to this effect, viz., that the sugar formed in the stomach and alimentary canal, from the starchy and saccharine elements of the food, instead of being converted into other compounds, was absorbed and excreted by the kidneys. Dr. Macgregor positively detected sugar in the serum of the blood, and published the result of his investigations in 1837. It necessarily followed that the treatment of diabetes consisted in allowing a diet free from substances which could be converted into saccharine matter; and it is certain that thus the general symptoms were frequently alleviated, while the amount of sugar which could be detected in the urine was usually considerably diminished.

Then came (in 1848) the elaborate researches of M. Claude Bernard, on what he called the glycogenic function of the liver. This eminent physiologist, while allowing that sugar may be formed during digestion, and that a certain portion may become absorbed, has yet further taught that this substance is a normal secretion of the liver. Thus, if a dog be fed for some time on a purely animal diet, and then killed, the blood of the portal vein, or that going to the liver, will be found free from sugar; whereas the blood of the hepatic veins, or that coming from the gland, will be highly charged with it. He also proved that sugar may be formed in abnormal quantities by irritating the eighth pair of nerves at their origin in the fourth ventricle; while section of both these nerves suspends the sugar-forming function of the liver. In health the sugar formed by the liver passes into the hepatic veins, the inferior vena cava, the right cavities of the heart, and thence by the pulmonary artery to the lungs, where it is consumed. When abnormally increased the lungs cannot excrete all of it, and hence part passes off by the kidneys, producing diabetes. But although the division of the pneumogastric nerves has the effect just mentioned, yet the sugar-forming power of the liver is restored by irritating their upper cut ends; and diabetes may be produced just as if the origins of these nerves were excited. On the other hand, the application of an irritant to the lower ends of the divided nerves gives no result. Bernard therefore concludes that the nervous power which excites the liver to secrete the saccharine matter, does not originate in the brain, to be carried by the pneumogastrics to the hepatic organ; but rather that the stimulus proceeds along these nerves to the brain, and thence by reflex action is transmitted to the liver. Further consideration led to the opinion that in health the reflex action which excites the hepatic sugar-forming function originates in the stimulus given by the air we breathe to the pulmonary branches of the pneumogastrics. He believes, in short, that at each inspiration these branches receive a stimulus which is transported through the main trunks of the nerves to the brain, and is thence reflected by the spinal cord and the thoracic portion of the sympathetic to the liver. Experiments in proof of the foregoing showed that when the function of respiration is stimulated—as by the exhibition of ether or chloroform—sugar temporarily appears in the urine. Again, it is supposed that just as

the lungs act by reflex influence on the liver, so increased action of the liver acts upon the kidney; and hence that sugar produced in excess in one organ is excreted by the other.

Pursuing his investigations still further, Bernard was led to the conclusion that the liver secretes a substance which is changed into sugar by some ferment, instead of forming the sugar directly. This glycogenic or sugar-forming substance, on being separated from the liver, presents the characters of hydrated starch; and when it comes into contact with the supposed ferment in the blood the transformation is effected. The sugar in the blood, when the latter reaches the lungs, is decomposed by the oxygen and disappears; so that the liver produces the glycogen which forms the sugar, whilst the lungs are the organs in which the latter is consumed. Of course, in health only the blood which circulates between the liver and the lungs contains saccharine matter; and therefore when this material is found in the circulation generally it may be the consequence either of excess of hepatic power, or of diminished pulmonary action.

In July, 1857, Dr. Harley published* his views on the pathology of diabetes, and showed that while agreeing in the main with Bernard, he yet doubted the conclusion of this physiologist that in the normal state respiration is the excitor of the glycogenic function of the liver. His experiments seem to indicate that if the pneumogastric carries the stimulus to the brain, to be thence transmitted by the spinal cord and splanchnic nerves to the liver, the point of departure of the stimulus is probably in the liver itself; and that the cause of the reflex action may originate in the stimulating effect of the portal blood upon the hepatic branches of the pneumogastric. Thus, if the stimulating effect of the blood of the portal vein be imitated by injecting into that vessel ether, chloroform, alcohol, or ammonia, the liver is excited to secrete an excess of sugar, and the animal operated upon is rendered for a time diabetic. Dr. Harley also confirms the opinion of M. Chauveau that the sugar is not destroyed in any appreciable quantity during its passage through the lungs. On the contrary, he believes that this agent, formed by the liver, goes to the support of the general system; and hence that, in health, it disappears from the general circulation during its transit through the minute capillaries of the different tissues.

These plausible theories may possibly be modified by and by, owing to recent analyses of the blood by Dr. Pavy. This gentleman—in papers communicated to the Royal Society in 1858 and 1860—states, that although the blood collected from the right side of the heart after death contains abundance of sugar, yet when it is removed from the same part by catheterism during life it presents but a trace. Inferences, therefore, that have been drawn of the *ante-mortem* state from *post-mortem* examinations must be abandoned. Very slight causes—*e.g.*, such as interfere with the breathing—determine the presence of a large quantity of sugar in the circulation during life. As the mode of examining the blood hitherto adopted has led to false inferences, so the plan pursued with regard to the liver has had the same effect. The liver forms a material which has been called the glycogenic substance: but as Dr. Pavy does not regard this material as a sugar-forming sub-

* British and Foreign Medico-Chirurgical Review, vol. xx, p. 191. London, 1857.

stance under physiological conditions, he names it hepatine, as belonging to the liver. More recently, to avoid an unnecessary multiplication of names, he has adopted the term "amyloid substance;" a proper step, since in its chemical properties this material is nearly allied to starch, or more closely to dextrine.* This amyloid substance, or animal-liver starch, is chiefly derived from saccharine matter consumed as food, and from the metamorphosis of starch into sugar in the alimentary canal. The sugar is carried by the portal system to the liver, detained there, and converted into amyloid substance; the latter then being found in the hepatic cells. But what purposes it serves in the animal economy are at present unknown; though Dr. Pavy is inclined to believe that it is destined to enter the intestinal canal through the biliary ducts, and that it will be found entering both into the formation of bile and the production of fat. The important point to remember, however, is this: that although under natural circumstances during life the amyloid substance resists transformation into sugar, yet after death such a change is rapidly effected. An infinitesimal proportion of sugar is normally present in the blood during life as well as in the urine. But an amount which is easily recognized by simple tests results only from disease, or naturally after death. So that diabetes is, in fact, nothing more than the exaggeration of the scanty glycogenesis of health; the sugar from the alimentary canal, instead of being transformed into amyloid substance in the liver, passing through this gland into the general circulation, whence it is sure to appear in the urine. And thus we can understand that the diabetic condition is sometimes only temporary, and that it may be caused by certain articles of saccharine or starchy food when taken in great excess. Abnormal states of the circulation, and probably of the blood, also lead to a similar production. Certain altered conditions of the nervous system likewise occasion an extensive collection and discharge of sugar in the body. Injury to particular parts of the sympathetic rapidly produces a strongly diabetic state, and so does the inhalation of chloroform or ether. And lastly, the introduction of carbonate of soda largely into the circulation altogether prevents this effect.

Although my skill in physiological chemistry is not sufficient to enable me to give any satisfactory solution to the difficulties thus raised, yet I believe that Dr. Pavy's opinions are becoming much more generally adopted than they were ten years ago. Nevertheless, Dr. Harley still appears to challenge their accuracy; and in many important points this gentleman supports Bernard's views on the glycogenic functions of the liver.† So, also, Dr. Thudichum has objected to Dr. Pavy's method of analysis; and has expressed a strong opinion in favor of the views which were current prior to the publication of this gentleman's opinions.‡ It follows, therefore, from the remarkable history of this affection, that the student ought to postpone coming to any positive decision on the subject, until he is in possession of further evidence. It seems necessary to conclude, however disappointing may be the confession, that the pathology of diabetes still remains a problem to be solved.

For the sake of convenience, and in accordance with custom, the

* Researches on the Nature and Treatment of Diabetes, p. 26. London, 1862.
† Proceedings of the Royal Society of London, vol. x, p. 289. London, 1860.
‡ British Medical Journal, p. 206. London, March 17, 1860.

symptoms, diagnosis, and treatment of this affection will be considered in the section on renal disorders; though it is hardly necessary to say that the occurrence of saccharine urine is only a prominent symptom of one or more unknown diseases.

7. Uræmia.—The urine is one of the chief depurating secretions by which the normal condition of the blood is maintained. When, from any cause, the function of the kidneys becomes impaired or suppressed, urea (furnished, in great part at least, from the metamorphosis of the worn-out tissues, uric acid perhaps standing in the relation of an intermediate substance) is no longer eliminated by these organs; and it therefore accumulates in the blood, producing that morbid condition known as uræmia (*urea;* and αἷμα, blood).

The important amount of work performed by the cells of the uriniferous tubes is very clearly shown in the following table by the Rev. Professor Haughton, of Trinity College, Dublin.* It exhibits the *natural daily constants of the urine of the average man;* and from its examination we cannot but infer that suppression of this excretion is one of the most dangerous events which can happen:

Excretion. Weight of Body 145 lbs.	Per day.	Per day, per lb. of body-weight.
Urine.	52·62 oz., or 23021·25 grs.	2·84 drs., or 155.348 grs.
1. Urea,	493.19 grs.	3.331 grs.
2. Uric acid,	3.15 "	0.021 "
3. Phosphoric acid,	32.36 "	0.218 "
4. Sulphuric acid,	31.55 "	0.214 "
5. Chlorine,	106.56 "	0.673 "
6. Extractives,	175.27 "	1.183 "
7. Balance (viz., inorganic bases),	115.73 "	0.827 "
Total solids,	957.81 grs.	6.467 grs.

The term *uræmic intoxication* is employed to denote that peculiar kind of poisoning which results from the accumulation of urea in the blood. As we shall presently see, considerable discussion has taken place as to whether the simple accumulation of urea is sufficient to account for the symptoms; Frerichs asserting that the real poisonous agent is carbonate of ammonia resulting from the decomposition of the retained urea by some ferment in the blood. Whatever conclusion, however, may be come to on this point, the significant clinical fact remains, that uræmic toxæmia is induced by whatever interferes with the excreting functions of the kidneys.

The direct effects of this poisoning are seen in a disturbed action of the two great nervous centres,—the brain and spinal cord. These centres may be affected either separately or together. Consequently we have three forms of uræmic poisoning: 1. That in which a state

* Dublin Quarterly Journal of Medical Science, vol. xxxiv, p. 288. Dublin, 1862.

of stupor supervenes rather abruptly, and from which the patient is aroused with difficulty. It is soon followed by complete coma, with stertorous breathing, as in ordinary poisoning from opium. 2. The variety in which convulsions of an epileptic character suddenly set in, often affecting the entire muscular system. Consciousness remains unimpaired. And 3. That kind in which coma and convulsions are combined.

Albuminuria with uræmia may arise from other conditions than structural disease of the kidney. The convulsions which occur during pregnancy and parturition are supposed by some to be caused by the pressure of the uterus, giving rise to active renal congestion; while others regard them as due to a degradation of the maternal blood. Suppression of urine (*ischuria renalis*, or *anuria*) is a frequent and often fatal result of cholera, and of other morbid poisons in the blood. It may form a very dangerous symptom during the progress of fever, and of the exanthemata —particularly scarlatina.

The *phenomena of uræmic poisoning* have usually been ascribed to the direct action of the urea retained in the blood. In 1851, however, Frerichs* advanced the opinion that the toxæmia is not due directly to this retention; but to the conversion of the urea into carbonate of ammonia, through the influence of some particular ferment supposed to be present in the circulating fluid. At first this view was almost universally accepted; the experiments upon which it was based being regarded as convincing. Moreover, by its light an explanation was apparently given of those cases where individuals in the last stage of renal disease have their blood highly charged with urea, without any uræmic phenomena taking place; simply, it was argued, because the unknown ferment, by means of which the urea is converted into carbonate of ammonia, is absent. But in a short time, when the nature of the ferment had been fruitlessly sought for, doubts began to be thrown on this hypothesis; and more recently it would appear to have been completely overthrown by the labors of Zimmerman,† Hammond,‡ Bernard,§ Richardson,‖ and others. Briefly it may be said that there are two highly important objections to the views of Frerichs: 1. That ammonia is not an abnormal constituent of the blood. 2. That there is no proof that urea, while retained in the system, is converted into carbonate of ammonia. It is true that Frerichs detected ammonia in the breath of persons laboring under Bright's disease; but Richardson, in conducting many examinations of persons in perfect health, failed to find it in only one.¶ The experiments which most strongly

* Die Bright'sche Nierenkrankheit und deren Behandlung, p. 111. Braunschweig, 1851.

† British and Foreign Medico-Chirurgical Review, vol. xi, p. 289. London, 1853.

‡ Physiological Memoirs, p. 303. Philadelphia, 1863. Dr. Hammond's essay was first published in the North American Medico-Chirurgical Review, April, 1858.

§ Leçons sur les Propriétés Physiologiques et les Altérations Pathologiques des Liquides de l'Organisme, tome ii, p. 36. Paris, 1859.

‖ Clinical Essays, vol. i, p. 133. London, 1862.

¶ The presence of ammonia in the expired air is roughly proved by holding a glass rod moistened with hydrochloric acid before the mouth, and obtaining the thick white fumes indicative of its presence. Or, more correctly, we may test for it by Richardson's process; which consists in moistening a slip of glass with hydrochloric acid, and exposing it to the suspected vapor. If ammonia be present, minute crystals of chloride of ammonium will be formed; and these are readily detected by a microscopic examination, with an object-glass of moderate power.

tend to support the views of Frerichs, are those performed by Dr. Alexander Petroff, of Dorpat. They were chiefly undertaken to disprove the validity of Dr. Oppler's explanations; who, finding that the quantity of urea and extractives in the blood of dogs whose kidneys had been removed was much increased, and that the muscles contained more leucine and creatine than under ordinary circumstances, concluded that uræmic poisoning was caused by the accumulation of products of decomposition of nitrogenous matter within the centres of the nervous system. Very careful experiments appear to have been made by Dr. Petroff on the comparative effects of injections of ammonia into the blood, and the artificial production of uræmia. The following are the general conclusions at which he arrives: 1. When the kidney function is interrupted, carbonate of ammonia is formed in the blood. 2. Injection of carbonate of ammonia into the blood produces symptoms strictly comparable to those of uræmia. 3. The degree in which these symptoms appear, and their character, depends on the proportion of ammonia in the blood, and the circumstances under which it exists there.

Nevertheless, as before mentioned, this attempted confirmation of Frerichs' theory has attracted but little attention. And it is certain that authorities in this country, at least, now regard those views which were previously accepted as most probably correct. They have been especially upheld by Dr. Hammond; who, after much observation and numerous experiments, ascribed uræmic intoxication to the direct action of the elements of the urine retained in the blood upon the brain and nervous system, in a manner we do not yet understand. Of these elements it is almost certain that urea is the most poisonous. The fact, that this substance in large quantity has been found in the blood of persons affected with renal disease, but in whom no symptoms of blood poisoning were present, certainly appears to militate against this view: but Hammond suggests, that—as with most other poisons—all persons are not alike sensitive to its action. Moreover, in kidney degeneration the urea generally accumulates very slowly; so that the system may thus tolerate a much larger quantity than when a large amount is suddenly thrown into the blood.

If now, we leave the pathology of this disease, and examine a typical case of uræmic poisoning, we shall find, on investigating the history, that there have been certain *premonitory symptoms*. Those particularly to be mentioned are œdema of the face and extremities, drowsiness, snoring during sleep, transitory attacks of mental confusion, partial paralysis of sensation, debility, biliousness, chilliness, nausea and vomiting, occasional attacks of diarrhœa, and a peculiar fetid condition of the breath owing to its being charged with ammonia. Then, the *acute symptoms* have been preceded by a chill, and particularly by complete suppression of urine. Coma or convulsions, or both together, set in suddenly; the coma perhaps being so profound that the patient cannot be roused. The skin is cold, the complexion of a dusky tinge, the pupils insensible to light and dilated, the pulse slow and intermittent, and the respiration obstructed. The breath, however, is no longer ammoniacal.

Now it is necessary to remember that all cases do not present the symptoms just described. Thus, the difficulty of diagnosis may be increased by finding that there is merely coma without any convulsion;

while the former may be so slight that there is no difficulty in rousing the patient. The pupil may be natural; and neither dropsy, diarrhœa, nor vomiting may have occurred. But in all cases there is either suppression of the functions of the kidneys, or if any urine can be obtained from the bladder it will be found highly albuminous.

The explanation of the ammoniacal state of the expired air is simple according to the views of Dr. Richardson. It has been already mentioned that in all persons there is an exhalation of ammonia by the breath. In uræmia, prior to coma or convulsions, the amount is increased, for the lungs are supplementing the kidneys. But when the acute symptoms are developed the alkali may be absent from the respired air, owing to the unfortunate circumstance that the compensating eliminating function of the lungs has become suppressed.

Under treatment the acute symptoms sometimes pass off, and recovery to a greater or less extent ensues. Even in those very unpromising cases where there is structural disease of the kidney, the patients may rally for some little time.

The *diagnosis* of uræmic toxæmia is not unattended with difficulty. Without care it is not unlikely to be confounded with those other diseases of which coma and convulsions are the prominent symptoms. It simulates epileptic coma, apoplexy, hysteria, anæmia, acholia, cholæmia, and alcoholic or narcotic poisoning. But the diagnosis may generally be correctly made by inquiring into the functions of the kidneys. For, in all cases of renal coma or convulsions, we find either complete suppression of urine; or this excretion is scanty, of low specific gravity, and highly albuminous. To distinguish suppression of urine from retention, it will generally be necessary to use the catheter.

Moreover the urea in the blood is always present in considerable quantity; as may be proved by the following method of analysis: Take the serum obtained after venesection or that which may be obtained from a good-sized blister, and add a few drops of acetic acid to it. Then evaporate to dryness, over a water-bath, and extract the residue with boiling alcohol, which is a ready solvent of urea. This alcoholic extract is to be evaporated to dryness, treated with a few drops of distilled water, plunged into a freezing mixture, and then to have added to it a few drops of pure nitric acid. If urea be present, the characteristic crystals of nitrate of urea soon appear in the solution, and are positively recognized by the microscope.

It sometimes happens that a patient is not seen until he is comatose, and when, from the absence of friends, no account or previous history can be obtained. In a fatal case of epileptic coma which I saw some years ago under these circumstances, the symptoms so strongly resembled those due to uræmia, that no diagnosis could be made until the urine was drawn off and analyzed. The attendants upon the patient concluded that some narcotic poison had been taken, and as there were certain incidental matters of a suspicious nature, it was deemed necessary to hold a coroner's inquest. Not that there was any failing in the medical evidence, but unpleasant rumors began to be circulated, and publicity seemed necessary to remove them.*

* Medical Gazette. New Series, vol. xiii, p. 578. London, 1851.

The *treatment* of a case of uræmia must be considered under two heads:

1. When we fear the occurrence of coma or convulsions, the attempt should be made to purify the blood by means of those extensive excretory channels—the skin and intestinal canal. Sweating may be induced by the hot-air bath, with the copious administration of diluents, such as tea, iced lemonade, water, &c., or by wrapping the patient in the wet sheet, or by sponging the body with tepid vinegar—a proceeding which often produces copious diaphoresis. The best purgatives, perhaps, are saline aperients with colchicum; or assafœtida and castor-oil enemata; or elaterium, jalap, or podophyllin (F. 157, 160, 182, 189). Where there is debility, small doses of steel may be given (particularly F. 403). And I feel sure that I have done much good in these cases by the prolonged exhibition of arsenic (F. 52, 399), though I am not prepared to state its mode of action. The practitioner must carefully avoid the use of calomel, for even one or two moderate doses may develop mercurial ptyalism in cases of renal disease. So, also, opium is generally objectionable; although I have not hesitated to resort to it where there has been great irritability or sleeplessness. Blisters, and even sinapisms, can be of no service, while they have caused gangrene of the skin. Stimulants, such as brandy and whiskey, have appeared to be frequently needed, and when given with caution I have never seen them do harm. The diet should be plain, and, while nourishing, ought not to contain much animal food.

2. As regards the management of those cases where the eclamptic fits have set in, we can hardly do better than administer an active purge (F. 151, 168) as soon as the case is seen. Sweating may be induced at the same time by one of the means just mentioned. The inhalation of chloroform has been found useful, and though it requires some courage to administer it, yet I have reason to believe it has been the means of saving life in puerperal convulsions. And, lastly, venesection has been advocated, on the principle that in proportion as the cerebral and renal congestion is relieved, consciousness will gradually be restored. Without denying that opening a vein may sometimes be useful, yet it has happened to me to witness examples of puerperal convulsions attended with flooding; and in some of these it was certain that the more freely the blood came away the greater became the severity of the symptoms. Nevertheless, none of the cases on which this observation is founded ended fatally.

It is certain that the excretion of urea is much increased by a purely animal diet, and that it is greater under a rich or mixed than under a spare or vegetable diet. Hence, when the kidneys act imperfectly, it may not be unadvisable to attempt to limit the production of urea as far as possible.

8. Acholia.—The liver is the largest gland in the body, its weight, in the adult, varying from 2 to 4 lbs. During digestion it always becomes much congested; and consequently, while this process is going on, it is both larger and heavier than at other times. There are many reasons for believing that four different operations are conducted in this organ. 1. The production of amyloid substance. 2. The manufacture of bile. 3. The final destruction of old blood-corpuscles, probably after

their partial disintegration in the spleen; and, 4. It aids in the perfecting of the young corpuscles or blood-cells.

Human bile is a complex fluid, being viscid, of a dark golden-brown tint, having a specific gravity of 1018, and being neutral when perfectly fresh. The secretion of it is constantly going on, though most actively during digestion. The daily quantity of bile secreted in man is not positively determined; but if it bear any proportion to that in the carnivora we may estimate it, from the experiments of Bidder and Schmidt, at about 2½ lbs for an adult weighing 140 lbs. The following are the constituents of the bile: 1. Glycocholic and Taurocholic acid; 2. Cholesterine, a crystalline fatty matter, not peculiar to bile; 3. Biliverdin, or coloring matter; 4. A resinous or waxy material; 5. Sugar; and 6. Inorganic matter, chiefly soda, potash, and iron.

Until very recently the physiologists of the present day have generally allowed (and the opinion is still maintained by many authorities) that none of the matters which constitute bile exist preformed in the blood; so that the constituents of this fluid have been supposed to arise not by a process of simple excretion, but by one of actual formation in the liver. The hepatic cells, it has been said, not only attract certain matters from the blood flowing through the capillary vessels, but they effect within their cavities a transmutation of these matters. Hence disorganization of these cells—or, in other words, arrest of the functions of the liver—from any cause, must lead to acholia.

In order that the practitioner may become acquainted with the most recent opinions upon the formation of bile, attention will be fitly directed to some important researches on this matter. And, to begin, it must be confessed that our knowledge of the uses and pathological importance of *cholesterine* is not very precise. Dr. Austin Flint, junior, of New York, however, has made some observations, which, if confirmed, would go far to clear up many of the unsettled points relating to this substance. He has particularly examined cholesterine in its relations with seroline, the latter being a substance hitherto detected only in the serum of the blood (whence its name), but which Dr. Flint has found to exist normally in the fæces, and which, therefore, he has named stercorine. It is held that these two substances—cholesterine and seroline or stercorine—have a direct relation to each other; and that the knowledge of this relation, and of the function of cholesterine, may explain those symptoms which attend the morbid condition termed acholia. For this latter term Dr. Flint substitutes cholesteræmia. He believes that cholesterine is a product of the destructive assimilation of the nervous tissue, being absorbed from the substance of the brain and nerves by the blood, and eliminated by the liver. Hence in the bile there are two important elements, having two separate functions: "1. It contains the glycocholate and taurocholate of soda, which are not found in the blood, are manufactured in the liver, are discharged mainly at a certain stage of the digestive process, are destined to assist in some of the nutritive processes, are not discharged from the body, and, in fine, are products of secretion. 2. It contains cholesterine; which is found in the blood, is merely separated from it by the liver, and not manufactured in this organ; is not destined to assist in any of the nutritive processes, but merely separated to be discharged from the body, and is a product

of excretion."* As cholesterine is not found as such in the fæces (notwithstanding the contrary statement by many authors on physiological chemistry), Dr. Flint has made many experiments to determine what changes it undergoes; and the result of his investigations is, that it is converted into stercorine (or seroline). The retention, then, of cholesterine in the blood produces toxæmia, just in the same way as we have uræmic poisoning from the accumulation of urea. The difference in the gravity of the symptoms in the two varieties of jaundice (that from retention and that from suppression) is due to this circumstance, viz., that in simple jaundice, dependent on the retention of the bile in the excretory passages, and the absorption of its coloring matter, the amount of cholesterine in the blood is not necessarily increased; while in jaundice connected with structural change cholesterine is retained, and acts as a poison.

Dr. Harley has recently published† some valuable observations which tend to confirm the opinion that jaundice has a twofold origin,—from *re-absorption*, owing to some obstruction to the escape of bile, and from *suppression* with retention in the blood of the matters which should be formed into bile by the liver. But he also believes that the liver is an excretive as well as a formative organ of the bile. The liver manufactures glycocholic and taurocholic acids. But it only separates from the blood the biliverdin‡ or coloring matter of the bile, and the cholesterine: which substances are not peculiar to the liver, but are always found in the blood independently of the presence or absence of the liver. In jaundice from suppression the substances which the liver generates will be entirely wanting; while those which it merely excretes from the blood will collect in this fluid. Consequently the biliverdin accumulates till the serum is saturated with this pigment, from which it exudes and stains the tissues, producing the color we term jaundice. The elimination of this matter by the kidneys gives the urine a saffron color. Hence Dr. Harley regards these symptoms as due to the imperfect excretion of biliverdin, quite independent of the presence or absence of the other constituents of the bile. The bile acids, not the bile-pigment, induce the symptoms of poisoning. And from this it is argued, that when the coloring matter alone is found in the urine the jaundice is due to suppression; but when the biliary acids are present, it is clear that they must have been formed by the liver, and owing to some obstruction have been re-absorbed into the blood.

According to Dr. Beale, the view that in certain cases of jaundice there is suppressed action of the liver, that bile is not produced, and

* American Journal of the Medical Sciences. New Series, volume xliv, p. 337. Philadelphia, 1862.

† Jaundice: its Pathology and Treatment. London, 1863.

‡ There seems to be a repugnance on the part of chemists, in the present day, to work upon any subject without coining one or more new names. This extravagance only leads to confusion; for unfortunately, though two authorities write upon the same matter, at the same time, they will not adopt the same nomenclature. They only agree in discarding the terms which have been previously received. It is difficult to say by how many different denominations the bile-pigment is known. Dr. Thudichum (A Treatise on Gall-stones, p. 90. London, 1863) employs the word *cholochrome* to designate coloring matter of bile and all its varieties. For the brown coloring matter he retains the name *cholophæine*, for the green variety *cholochloine*. The older names of cholepyrrhine, biliphæine, and bilifulvine may be regarded as synonymous with cholophæine. Biliverdin and cholechlorine are the synonyms of cholochloine.

that no biliary acids are formed, is opposed to many facts. Entertaining the opinion that the coloring matters as well as the resinous acids are actually formed in the liver, he also thinks that in all cases of jaundice the bile has been formed by the hepatic cells; this fluid having been re-absorbed after its formation, and perhaps much of it again excreted in an altered form by the intestines. "It is easy to conceive," says Dr. Beale, "that the relative proportion of the biliary acids and coloring matters produced, may be very different in different cases—that the quantity of the acids formed may vary greatly—that their composition may be affected—taurocholic acid being produced instead of glycocholic acid (Kühne)—that the quantity of blood-corpuscles disintegrated by the presence of bile compounds in the blood—and that other chemical derangements may be caused without the action of the liver *cells* being suspended."*

There are certain diseases of the liver—such as acute atrophy, impermeability of the bile ducts, cirrhosis, fatty degeneration, &c.—which lead to complete disorganization of this gland, and therefore to an arrest of its functions. Under these circumstances symptoms of blood-poisoning may arise, which very generally terminate fatally in a short time. Of course this toxæmia does not ensue in all cases, because sufficient healthy hepatic tissue may be left to do the necessary work.

Abnormal conditions of the nervous system are the essential *symptoms* in cases of acholia. Usually there is first a stage of excitement, characterized by noisy delirium and convulsions; which is followed, secondly, by depression marked by somnolence and progressively increasing coma. Sometimes the first stage is absent, and the patients rapidly fall into a state of typhoid prostration, which passes into coma. Along with these symptoms we have hemorrhage from the mucous membrane of the stomach and intestines, petechiæ and ecchymoses of the skin, and in a few cases jaundice.

The *treatment* must consist in the administration of active purgatives, particularly croton oil or podophyllin (F. 160, 168). Benzoic acid (F. 49), or the hydrochlorate of ammonia (F. 60), or the nitro-muriatic acid (F. 378), may be tried, if there should be time for them to act. By these agents life may perhaps be prolonged for a brief period. Beyond this the cases are hopeless.

The term acholia (from Ἀ, privative, and χολή, bile), signifying deficiency or absence of bile, has been here employed in the sense intended by Frerichs. Without therefore saying that this author's views are correct, we may, with our present imperfect knowledge, assume them to be so. Hence acholia must not be confounded with jaundice or cholæmia (from Χολή, and αἷμα, blood), a morbid state in which bile exists in the blood owing to its re-absorption after having been formed by the liver. In the one case we have retained in the blood those substances by the metamorphosis of which bile is produced; in the other the blood contains the bile itself. The subject of jaundice has to be still further considered in the section on hepatic diseases.

9. Ichorhæmia.—A very important morbid condition of the blood (ichorhæmia—Ἰχώρ, pus, and αἷμα, blood; septicæmia—Σήπω, to putrefy; pyæmia or pyohæmia—Πύον, pus); is caused by the introduction of ichor-

* Urine, Urinary Deposits, and Calculi. Second Edition, p. 215. London, 1863.

ous or putrid matters into the system. This disorder is never a primary affection, but occurs subsequently to some injury or wound. It may follow a boil, a diffused abscess, or an attack of erysipelas. Suppurative inflammations of the joints, or of the veins, especially seem to induce it. And ichorhæmia generally displays its effects by producing severe constitutional disturbance, with great depression; as well as by inducing suppuration in certain important organs.

In considering the *pathology* of ichorhæmia the first question which requires an answer is this: Do the symptoms depend upon the presence of pus cells in the blood? The attempt to solve this difficulty has given rise to a vast amount of controversy. Until recently the question was always answered in the affirmative; and three hypotheses were current to explain whence the pus so found was derived. Thus it has been said —1. The pus globules are absorbed (*purulent absorption*) from a suppurating cavity. 2. The pus is the result of phlebitis occurring in the veins which are in contact with the suppurating tissues. 3. The pus is furnished by the blood itself.—How little dependence is to be placed on either of these theories will now be shown.

For the detection of pus in the blood the microscope has been almost exclusively depended on. But since the publication of Dr. Hughes Bennett's researches on Leucocythemia, in 1852, it has been generally allowed that the so-called pus corpuscles which have been detected in the blood are identical with the colorless cells of that fluid, constituting, when in excess, the white cell-blood. Moreover, most pathologists agree that there is nothing peculiar in good and laudable pus which necessarily leads it to poison the blood. The absorption of pus in its entirety is not possible; but there can be no doubt that the fluid portion of pus may be entirely absorbed, leaving behind merely the shrivelled cells deprived of their vitality. This inspissation of pus occurs without producing any symptoms of the so-called purulent infection. Again, there is a second way in which the whole contents of an abscess may disappear —viz., by the pus cells undergoing fatty degeneration, becoming disintegrated, and reduced to a fluid condition, in which absorption is rendered easy. There is, of course, the possibility of an abscess bursting into a vein; but, in all probability, before this took place the canal of the vessel would be obliterated. And so, again, the peripheral lymphatic vessels may in the same way be filled with pus; but before they reach a bloodvessel their course is interrupted by lymphatic glands, in which they break up into small branches, and through these no pus corpuscle can pass. Virchow well illustrates this occurrence by showing that in the process of tattooing some of the cinnabar, gunpowder, or the like, finds its way into the lymphatic vessels, but is always separated by filtration in the nearest lymphatic glands. Hence, while leucocythemia proves that corpuscles, identical in form, size, structure, and chemical composition with those of pus, may float in the blood and circulate innocuously, the fact of the absorption of abscesses, either wholly or in part, demonstrates that healthy pus is not poisonous. The truth seems to be that what has been called pyæmia is not dependent upon pus cells mingling with the blood, but on a matter derived from some unhealthy kinds of pus. This poisons the blood—producing a state of fermentation, according to some writers, and it occasions the secondary phenomena.

Ichorhæmia is particularly dreaded by obstetricians and surgeons,

since it not unfrequently is the cause of very dangerous symptoms after parturition (*puerperal fever*) and surgical operations. It may display itself in more ways than one. Thus, in some cases, the patient seems to be so immediately and deeply affected by the morbid matter that death occurs before any local phenomena can be developed. In a second class, the intensity of the poison seems to be exerted upon the liver or the mucous membrane of the intestinal canal; in the one case Nature appearing to make efforts at elimination by the discharge of a large quantity of dark bile, in the other by a severe attack of diarrhœa or dysentery. Then there is a third set of cases where the serous membranes bear the brunt of the poison, and we have pleurisy, or pericarditis, or peritonitis; or the cutaneous surface is the part affected, and we find erysipelas, or a more or less copious eruption of boils. And again, there is a fourth class in which profuse suppuration ensues, giving rise to *secondary* or *metastatic* abscesses in the lungs, liver, joints, eyes, &c.

Amongst the various forms of suppuration is one to which the term *Cellulitis venenata* is applied; meaning thereby a diffused form of inflammation of the areolar tissue which arises from punctures received in dissecting the dead body. Some animal fluids are more dangerous than others, as the serum found in the abdomen after peritonitis, and that left after gangrenous inflammation. The bites of certain venomous reptiles, as the cobra di capello, will also produce the same effects; and even the sting of the bee has proved fatal. The poison, whatever its nature, thus absorbed gives rise chiefly to inflammation of the areolar tissue and absorbents, generally of the wounded limb, but sometimes of remote parts. The lymphatic glands are very often affected. The skin over the affected part is pale but tense and shining, while the swelling which occurs communicates a peculiar boggy feel to the touch. These inflammations are attended with rigors, restlessness, extreme pain, and great depression; and they either cause death in a few days or even hours, or they end in suppuration or gangrene. In fatal cases, death is preceded by delirium, offensive perspirations, a yellowness of the skin, dyspnœa, drowsiness, and deep stupor. When patients recover, it is often only to find the constitution permanently injured.

The effluvia given off from the dead body may be the cause of extensive toxæmia or blood-poisoning. These effluvia may, without injuring the party exposed to them, be carried by him to a third person, and give rise to the most distressing results—a fact which demands the particular attention of obstetricians. Mr. Teale gives the following evidence of the pernicious influence of these poisons: "One evening, at the dissection of the body of a patient upon whom I had operated for strangulated hernia, several surgeons were present. Of these, two attended one case of midwifery each during the following night, and a third three cases. The two patients attended by the first two surgeons died of puerperal fever. Two of those attended by the third surgeon also died; and his third patient escaped death from this formidable malady with the greatest difficulty, after having been in extreme danger several days. It is an important fact, that no other cases occurred in the practice of these gentlemen."* Unfortunately the foregoing

* A Practical Treatise on Abdominal Hernia, p. 92. London, 1846.

is no isolated example of the truth of my remark. In the Lying-in hospitals of Vienna and Prague, a very large mortality was distinctly traced to a want of caution in admitting students from the dissecting-rooms to the wards. The danger which arises from handling morbid preparations, unhealthy purulent secretions, &c., is equally great; and consequently the obstetric practitioner cannot exercise too much caution. If obliged to be present at a post-mortem examination, he should not visit any parturient woman until he has changed all his clothes, and washed his hands thoroughly with some chlorine solution or other active disinfectant.

The *symptoms* of ichorhæmia very much resemble those produced by erysipelas. Hence it is only necessary to mention a few of the most prominent. The disorder generally sets in with a severe rigor; followed by great heat of body, sweating, and increased frequency of pulse. These rigors are often repeated, perhaps periodically; or in their place various convulsive affections are substituted. In a lady who was long under my care with pelvic abscess, the reformation of matter was sometimes preceded by a rigor and sometimes by an epileptiform seizure, but there was always one or the other to warn me of the mischief that had commenced. Then, if there is an open wound, it generally takes on an unhealthy appearance,—it sloughs, or its granulating surface looks indolent and the discharge from it ceases. Another symptom is a peculiar sweetish or fermentative odor of the breath and of the body generally. At the same time there is great prostration, with extreme restlessness and anxiety, sickness and diarrhœa, dyspnœa and cough, pains about the region of the heart, and perhaps low muttering delirium. The body wastes, the feebleness becomes extreme, the lips and tongue get brown and dry and covered with sordes, the skin may be jaundiced, and the suffering from diffuse suppuration in the tissues or joints may be most severe. Profuse sweats, with perhaps effusion into the pleura or pericardium, or a low form of pneumonia, increase the exhaustion; so that the patient dies worn out. When the case terminates favorably, the fortunate escape has to be paid for by a wearying and tedious convalescence.

It follows from the foregoing that the *prognosis* in all forms of ichorhæmia is unfavorable; but it is especially so when the patient has been previously lowered by exhausting disease, by hemorrhage, by a severe operation, or by insufficient food with residence in an unhealthy house.

The rate at which the symptoms may run on to a fatal termination varies, death frequently occurring within the fortnight; though with alternate remissions and relapses, it may be deferred for some six or seven weeks. In other very acute cases the progress is much more rapid. This is well shown in the following instance recorded by Dr. William Addison:* On the 28th December, at 8 o'clock A.M., a physician pricked his finger while assisting to make the post-mortem examination of a lady who had died from puerperal peritonitis. In the evening he felt some pain and uneasiness at the part, and had it touched with nitrate of silver. During the night shiverings came on, and there was extreme restlessness. On the morning of the 29th the finger was much

* Cell Therapeutics, p. 36. London, 1856.

swollen, and red lines extended up the arm; leeches, fomentations, and poultices were applied. In the afternoon there was great prostration. On the 30th, the hand and arm were greatly swollen, the finger had put on a livid appearance, the glands in the axilla were affected, and the pain was very great. On the 31st, the pulse was from 90 to 100, the breathing was irregular, and there was torpor with drowsiness. In the evening, the symptoms were found more alarming; and there was an erysipelatous blush over the side of the chest, and in the axilla. During the night, the breathing became more difficult, the drowsiness gradually passed into deep stupor, and death took place at 6 o'clock on the morning of the 1st January.

In the *treatment* of ichorhæmia it must be remembered that this exhausting affection is most common during unhealthy seasons, when disorders of a low type are prevalent. Moreover, the sufferers from it are usually those whose constitutional powers are not of the first order. Hence, while endeavoring to carry out the object of primary importance—the purification of the blood—we must not fail to support the vital powers and to relieve pain.

Taking the latter indications first, it will suffice to say that stimulants are needed from the commencement; wine or beer appearing preferable in some instances, while in others brandy has to be given in large and often-repeated doses. The restorative soup (F. 2) will often be invaluable; and so will the essence of beef (F. 3), or a mixture of brandy and eggs (F. 17). Bark, with ether or ammonia (F. 371), is a good remedy; and in some instances life would seem to have been preserved by the administration of three or four grains of quinine every four or six hours. Pain is to be relieved by opium, in doses sufficient to soothe and comfort the patient. Locally, no remedies give more relief than linseed-meal poultices, either with or without the application of belladonna or extract of poppies. If abscesses form, or even if the integuments and deeper tissues get inflamed and tense without suppuration, free incisions will be called for. To check the thirst, iced drinks, or Wenham Lake ice to suck, must be allowed. And then, in all cases, care must be taken that the patient's bed is placed in the centre of the apartment, that the hangings are removed, that a sufficient fire be maintained, and that the windows be opened. He must be kept in a pure cool atmosphere, night and day, even at the slight risk of catching cold. In truth, however, this risk is merely a myth. Miss Florence Nightingale tells us that in the wooden huts before Sebastopol, with their pervious walls and open ridge ventilators, in which the patients sometimes said "they would get less snow if they were outside," such a thing as *catching cold* was never heard of. The patients being well covered with blankets, were all the better for the cold air.* To prevent the occurrence of ichorhæmia and erysipelas in our hospitals the latter should be built in healthy localities; plenty of light must be admitted into the wards; while 2500 cubic feet of space per bed ought to be allowed, with an interval of about 6 feet between each couch. A good nurse—one who will quietly but thoroughly carry out the physician's directions—is invaluable; and she will of course attend to the cleanliness of the sufferer and his room.

* Notes on Hospitals. Third Edition, p. 15. London, 1863.

To eliminate the poison from the system practitioners have very commonly trusted to active purgatives, particularly to full doses of calomel. Even if there were no other remedies deserving of trial, I should still discountenance the routine use of these agents; for I believe their mischievous effects to be second only to those produced by bleeding. At the same time, if at the commencement of the case there are indications that the intestines are loaded, an aperient should be given, but not a drastic purge. And fortunately there is the less necessity for inducing free action of the bowels, because we can do more good by making the skin act freely. For this purpose we may employ the vapor-bath, or the wet-sheet packing (F. 136), or even the acid sponging (F. 138).

After an elaborate series of experiments, Dr. Polli, of Milan, has come to the conclusion that sulphurous acid, and various sulphites and hyposulphites, have the power of arresting all known forms of fermentation, and of retarding putrefaction.* Many diseases (typhus, pyæmia, puerperal fever, hospital gangrene, dissecting-wounds, glanders, cholera, &c.), he asserts, arise from a fermentation of some of the principles contained in the blood; and one grand object of his memoir is to prove the fallacy of Bernard's view,—that the use of chemical agents capable of arresting the fermentation would destroy the vital properties of the blood. Dr. Polli's experiments were of this nature: A certain number of dogs had putrid blood injected into their veins, and all died but one. An equal number had large and repeated doses of the sulphites administered; and subsequently the same quantity of putrid blood was injected, as in the first cases. All recovered. It was also found, that if the putrid blood were mixed with a certain proportion of sulphite of soda before injecting it, the dogs did not die as when putrid blood alone was employed. And, again, an equal quantity of the discharge of glanders was injected into the femoral veins of two large dogs. One died, with the symptoms of glanders, in six days; the other, previously sulphited, quickly recovered. As to the mode of administration of the sulphites in man, Dr. Polli tells us that they may be fearlessly given in large doses. From one to three drachms of the sulphite or hyposulphite of soda or magnesia may be given daily, in divided doses, for several days together. As the sulphite of magnesia (F. 48) is the richest in sulphurous acid, it is preferable to every other preparation.

In wounds from dissecting, or from the bites of reptiles, attempts should be made by sucking or by the application of a cupping-glass to remove the poison from the puncture or bite. To prevent absorption a ligature is at the same time to be tied between the wounded part and the trunk. It will also be advisable to apply lunar caustic freely to the wound. In other respects the treatment must be that just mentioned.

10. Thrombosis and Embolism.—There can now be no doubt—for the fact has long since been proved by many independent observers—that when the blood contains, either absolutely or relatively, a great

* Sulle Malattie da Fermento Morbifico, e sul loro Trattamento. Milan, 1860. See also, British Medical Journal, p. 339, March 29, 1862; Half-Yearly Abstract of Medical Sciences, vol. xxxvii, p. 245. London, 1863; and Mr. Henry Lee's Introductory Lecture at St. George's Hospital, On General Principles in Medicine, p. 20. London, 1863.

excess of fibrin (hyperinosis), or when there exists any obstacle to the normal circulation, fibrinous formations may take place during life in the heart, or in the arteries, or in the veins, or in the cerebral sinuses, or in the portal system. The symptoms which these solid substances—formerly known as polypi—give rise to are such, that their existence may with care be diagnosed. When a portion of fibrin coagulates in one of the arteries and is carried along by the current, it will of course be arrested in the capillaries, if not before; when in the veins, it may not be stopped till it reaches the lungs; when in the portal system, the liver capillaries will offer an obstacle to its further progress. And although it should be noticed that emboli may form in the lymphatics, yet the passage of these vessels through glands must prevent the transit of any body for any great distance along them.

Pathology.—Before entering upon this part of the subject, it is necessary to give an explanation of the terms employed. By *thrombosis* (*θρόμβος*, a clot of blood), is generally understood the partial or complete closure of a vessel, by a morbid product developed at the site of the obstruction. The coagulum, which is usually fibrinous, is known as an *autochthonous clot* or *thrombus*. The term *embolism* (*Ἔμβολος*, a plug), is used to designate an obstruction caused by any body detached and transported from the interior of the heart or of some vessel. The migratory substance is an *embolus*.

Thrombi or emboli may vary in size—from a mass sufficient to obstruct the aorta, to a particle which will enter a capillary vessel. They may consist not only of fibrin, but of a fragment of gangrenous tissue, or of the constituents of tubercle or cancer which may have got into a vessel. The formation of a thrombus in a bloodvessel may act primarily by causing complete or partial obstruction. The secondary disturbances may be twofold: First, larger or smaller fragments may become detached from the end of the thrombus, and be carried along by the current of blood to remote vessels (embolism); or, secondly, the coagulum may soften and become converted into a matter like pus—constituting according to Virchow the process called "suppurative phlebitis."

These concretions are most frequently met with in diseases attended with great exhaustion or debility; and they have been especially found in cases of croup, diphtheria, scarlet fever, endocarditis, pneumonia, bronchitis, phthisis, typhus, purpura, erysipelas, hemorrhage, and prostration from natural decay as well as from dissipation. With regard to croup, for example, my own experience would lead me to believe that death is much more frequently due to thrombi than to simple asphyxia. Their formation also seems to be particularly favored by the condition of the blood during pregnancy and the puerperal state. Thus in August, 1863, I saw a lady whose general health was never good, who had advanced to the sixth month of her second pregnancy, and in whom the following series of events had occurred: A sudden fright, succeeded by an attack of fainting, great rapidity of heart's action, agitation with nervous depression, and very severe pain in the left leg and ankle. When I visited her on the day following the occurrence of these symptoms there was much debility; while the foot and leg were very œdematous, cold, and no pulsations could be detected beyond the femoral artery. The symptoms, in short, were just those which would arise from the application of a ligature to the chief artery of the limb; and

there was clearly the same necessity for establishing a collateral circulation to avoid gangrene. Of another variety of these cases I met with an example in 1860: A delicate lady, twenty-five years of age, under my care, had such symptoms after the delivery of her first child, that I believe a small clot formed in the right side of the heart, though her labor had neither been difficult nor attended with more than ordinary hemorrhage. For six weeks after her accouchement, the muscular prostration was so extreme, that she literally could not turn over from one side to the other; and when the least attempt was made to raise her in bed, so as to change her linen, &c., the most severe attacks of dyspnœa set in.

The fibrinous masses may form suddenly, and at once cause death by obstructing the circulation; or else they may arise gradually and produce symptoms which creep on insidiously and last a long time. In the latter case the masses (thrombi) may become organized and attached to the walls of the heart, or they may soften; while from these attachments portions (emboli) may be carried away by the blood so as to block up the circulation at some extreme point. Perhaps the right auricle is their most common seat; but it can be easily understood that the edges of the valves, as well as the muscular and tendinous cords of the ventricles, are parts to which they readily become attached. Possibly, also, the small bead-like and warty exudations thrown out in endocarditis may sometimes form a foundation on which a concretion may become deposited. The particles of solid fibrin carried away by the blood from the left side of the heart are usually arrested in the vessels of the brain, spleen, or kidney; while those from the right cavities pass by the pulmonary artery and its branches into the lungs.

Symptoms.—The symptoms caused by a fibrinous deposit in the *heart* are always well-marked, and are of the same general character, whatever may be the disease from which the patient is suffering at the time of its formation. Their nature varies according as the concretion is deposited on the right or on the left side of the heart. When the obstruction is on the *right* side, as is most commonly the case, the return of blood from the systemic veins is prevented; and as the flow of blood to the lungs for aeration is impeded, so arterial blood is not duly supplied to the brain and different organs. Hence if death results, it happens from syncope rather than from asphyxia.

The course of the symptoms may perhaps be best shown by referring to the case to which allusion has already been made. This patient had a favorable labor of some eight hours' duration, and when left by me at midnight, about an hour a half after the birth of the child, was in a favorable condition. The pains of parturition had been very severe; but although the use of chloroform was suggested, the inhalation of it had been declined. Prior to my departure, and afterwards, brandy with arrow-root was given; and at about two A.M. the lady expressed herself as feeling comfortable, and quietly fell asleep. She passed a good night; but on the following morning, at eight A.M., I was hastily summoned, as a most severe and distressing attack of dyspnœa had just set in. On my speedy arrival, I found the breathing hurried and gasping, the surface of the body pale and cold, the pulse feeble and intermittent, and the patient exceedingly faint and frightened. Indeed, the state of collapse was very alarming; but the administration of some

brandy with ether and ammonia, and the application of a large linseed-meal poultice with mustard in it, gave sensible relief in about three-quarters of an hour. I could only venture to place the stethoscope over the apex of each lung, but I thus learned that the respiratory murmur was natural; and hence this fact combined with the symptoms, seemed to point out the heart as the seat of obstruction. The most perfect quiet was enjoined; small quantities of essence of beef, ammonia, and brandy were given at short intervals; and at the end of the day, the extract of belladonna was freely applied over the breasts, to prevent or check the secretion of milk.

Now the foregoing symptoms were quite sufficient to teach me, even if I had not been aware of the fact from the writings of others, that cases of this description must generally end in sudden death; and in this instance it was clear that very little more was required for the obstructed heart to become quite paralyzed. We know that patients prostrated by acute diseases, and also parturient women, have died suddenly after an attempt to sit up in bed or to pass a stool, and the fatal event has been referred simply to fainting; but it seems very probable that the real cause may have often been the sudden blocking-up of one of the cardiac orifices or of the pulmonary artery by a mass of fibrin.

When the clot obstructs the circulation by its situation in the *left* cavities of the heart, or in the aorta, death, if it occur, takes place either suddenly or at the end of a few hours, from coma, and not from syncope. The symptoms then are violent action of the heart, great congestion of the lungs with dyspnœa of a suffocative character, expectoration of a bloody and frothy mucus, a leaden hue of the surface, with coldness of the extremities. Supposing the patient to recover from the first urgent stage, the symptoms will degenerate into those of valvular obstruction of the left side. Such a condition might be diagnosed by the sudden appearance of a murmur where the heart had previously been healthy, and where there had existed no signs of endocarditis. It must be remembered that concretions have more than once been found to exist on both sides of the heart at the same time, and the symptoms have then chiefly resembled those which arise from deposition in the right cavities.

When fibrinous concretions are discovered in any of the *arteries* or *veins*, they may have formed at the parts where they are found. For example, Dr. Humphry records, amongst other cases, that of a pale, anæmic, very weak girl, who was being dressed by her friends in order that she might be taken out of the hospital. Suddenly she fell fainting, and quickly died. During her stay in the ward the right arm had been swollen, and had been kept hanging out of bed; as the patient found this position, with the head inclined towards the right shoulder, the most comfortable. On examining the body there was slight emphysema of the lung, but otherwise the organs were healthy. The right innominate, subclavian, and internal jugular veins were each obstructed by a large clot. That in the innominate vein was firm, of a buff color, scarcely tinged with red, and adherent to the vessel's coats; while in the jugular vein the clot was soft, and looked like a mixture of blood and pus.

But it must also be remembered, as before stated, that the concretions which form in the heart may be carried by the blood, wholly or in part,

into some artery which they block up; and thus the supply of blood to an important organ may be suddenly cut off, producing alarming and even fatal results. When the particles are minute they may be carried into the capillaries, and merely give rise to local congestion and stagnation; while it is now allowed that the masses sometimes soften and break up, the disintegrated portions mingling with the blood and contaminating it. In this manner many cases of ichorhæmia and phlebitis are induced. The effects which have been found to ensue from a fibrinous deposit being carried from the *left* side of the heart, are as follows: in several instances, softening of the brain, ending in hemiplegia, owing to the plugging of the middle cerebral artery; paralysis and loss of sensation in the arm, from the obstruction of the brachial and ulnar arteries; temporary loss of power in one of the lower extremities, which has become relieved on the solution of the clot, or on the establishment of the collateral circulation; disease of the kidney from obstruction of the renal artery; and disease of the spleen. The consequences which follow from the propulsion of masses of fibrin from the *right* side of the heart are shown in the lungs, by the presence of coagula in the pulmonary arteries and different kinds of deposit in the pulmonary tissue. In this way may be explained the occurrence of some forms of pneumonia, gangrene of the lung, &c. Obstruction in the pulmonary capillaries is indicated by œdema or infiltration of the lung tissue, and by pulmonary apoplexy. In the same way Mr. Paget has shown that particles of cancerous matter may be brought from remote organs to the right side of the heart and thence transmitted to the lungs, where they become arrested in the pulmonary capillaries, and so induce stagnation and subsequent changes in the blood.

Prognosis.—This must always be very guarded. For the patient may die outright, simply from the formation of the clot and consequent obstruction. Or, when arising in a serious disease,—such as croup,—it may just turn the balance and prevent recovery; though there may be only retarded, not annihilated circulation. Or, it may hasten death in an incurable disease, such as cancer; when without this complication the sufferer might survive for many months. Or, the subsequent softening of the fibrinous substance may produce severe or fatal ichorhæmia. Or, lastly, by cutting off the main supply of blood to a limb it may induce gangrene, which will certainly be recovered from with difficulty, if at all.

Thus the sources of danger exist not only in the interruption of the blood-current, but also in the morbid condition of the system produced by the disturbed nutrition of a limb or organ, as well as in the mingling of elements rendered purulent or gangrenous with the blood.

Post-mortem Appearances.—When a fibrinous deposit is found in the heart, it may become a question whether it was formed during life or after death. Supposing the fibrin to have separated after death—the blood being stagnant—it forms only a light-colored layer on the upper part of a red clot. On the contrary, when the deposition has taken place during life—the blood being in motion—we find a mass which is modelled to the cavity containing it, which is adherent to the walls, and which is grooved by the blood that has passed over it. In some instances also, the fibrin has been seen lining one of the cavities of the

heart like a false endocardium; or else, forming an additional coat to the aorta or other large vessel, without obstructing it.

Sometimes the fibrinous masses, or thrombi, soften in their centres; and they are then discovered containing a fluid of a dirty reddish-brown color, or of a lighter hue resembling pus. Examined microscopically no pus-corpuscles can be found in this fluid, and hence it is a puriform—not a purulent substance. If the process of softening goes on to a great extent, we may find only an outer shell or cyst remaining. Occasionally the walls of this cyst get ruptured; and the contents becoming mingled with the blood, poison this fluid as effectually, and give rise to the same typhoid symptoms, as if disorganized matter had been injected directly into a vein.

The limited size of this volume unfortunately precludes my entering into many arguments which need discussion on this interesting matter; but I would refer those who wish to investigate it further, to the writings of Virchow, Cohn, Richardson, Gulliver, Humphry, Paget, Kirkes, and John W. Ogle. There are also two excellent articles on this subject in the "British and Foreign Medico-Chirurgical Review," for July, 1861, and January, 1863.

Treatment.—Sufficient has been already said to prove, that the indications which lead to a rational treatment are very different in different cases. Thus, in some urgent instances, all our efforts must be directed to keeping the patient alive at the time, without caring for the after-consequences. In other cases, the relief of pain, the compensatory establishment of collateral circulation, and the prevention of the transference of fresh emboli, are the objects to be held in view. Or, again, we may endeavor to produce solution of the clot, or its partial organization. While, in a fourth class, the poisoning of the system by the purulent and ichorous destruction of the clot will have to be combated.

The remedies upon which we have learned to rely are few, and it must be confessed that their action is uncertain. When there is great prostration, stimulants will of course be needed, brandy usually proving very valuable. Then, in almost all instances, the strictest quiet must be imposed: no bleeding, blistering, or purging is to be thought of: the sick-room should be freely supplied with pure air: and such nourishment as essence of beef, raw eggs, and milk ought to be freely administered.

The admirable series of experiments by Dr. Richardson has taught us that all the alkalies are resolvent—*i. e.*, they lead to solution of nitrogenous tissue. This gentleman proves that after death from the alkalies, from antimony, or from many of the alkaloids (as strychnia, morphia, belladonna, and arnica), there is the same fluidity or partial fluidity of the blood, the same dissolution of the blood-corpuscles, the same softening of the soft parts, the same absence of cadaveric rigidity, and the same extensive but simple vascularity of mucous surfaces and vascular organs. In the carbonate of ammonia we have an admirable agent; since it is not only possessed of the same power as the other alkalies, but it has also the valuable property of exciting the heart and circulation, as well as the muscular system. This agent, freely diluted, may then always be administered, unless there is evidence that it is present in excess in the blood and breath; while very often it may advantageously be combined with bark (F. 391). It must not be con-

cluded from these remarks that ammonia is the agent which keeps the blood, in the living body, in a fluid state. It has already been stated (p. 21) that Dr. Richardson's theory is deemed wholly untenable by several authorities; but those who most differ from him still allow he has proved that ammonia is contained in the blood in larger quantities than was supposed, and that added to coagulated blood (out of the body) it is capable of again rendering it fluid.

Another remedy of great value in these cases is opium; for it not only quiets the circulation, but it relieves pain, and calms the depressing fears and nervous restlessness. The dose must be sufficient to accomplish these objects.—And lastly, to remove that low state of health which both favors thrombosis and the corruption of the clot when formed, we must trust to a good nourishing diet, the effects of pure air, and the administration of quinine (F. 379) or of sulphurous acid (F. 48).

When the result is successful, the practitioner may be prepared to find that the necessarily tedious convalescence will excite the displeasure of the patient's friends, who are generally unreasonable in proportion to their ignorance; but his annoyance at this circumstance will be lessened, when he remembers the great danger from which he has rescued the sufferer.

11. Hæmatozoa.—In the writings of old authors, from the time of Pliny, cases are to be found recording the presence of animalculæ in the blood (hæmatozoa—from *Αἷμα*, blood, and *ζῶον*, an animal). The physicians of the present day have also published examples of this occurrence; but while the statements of some of these gentlemen have been confirmed by independent observers, those of others have been refuted.—Bushnan has reported the case of a boy affected with influenza, in whose blood worms half an inch long were detected an hour after bleeding. According to Rhind, however, these were merely the larvæ of the *Tipula oleracea*, a fly which is so abundantly found in summer in ditch and river water; or, according to Von Siebold, they consisted of the red larvæ of the *Chironomus plumosus*, frequent in water-barrels. Of course they were accidentally introduced into the blood after its withdrawal from the body.—Goodfellow met with an instance, in which animalculæ, varying in length from $\frac{1}{5000}$th to $\frac{1}{3000}$th of an inch, were present in the blood of a fever patient.

The *Distoma hæmatobium* (Bilharzia hæmatobia) was first discovered by Bilharz, in Egypt, in 1851. This entozoon has a flat elongated body, with a cylindrical tail; and it inhabits the vena portæ, and the mesenteric, hepatic, bladder, and intestinal veins. The two sexes are very dissimilar. According to Bilharz and Küchenmeister, the male is much the largest, being about one-fifth of an inch in length; and he carries the female in a kind of canal (canalis gynæcophorus) under his belly. Moquin-Tandon is therefore probably in error in believing that the female is the superior, and that she lodges the male. These remarkable parasites are very prevalent in those persons who drink the unfiltered waters of the Nile, and who consume fish from this river in a half putrid state. The symptoms are those of general constitutional disturbance, with chlorosis, pyelitis, bloody-urine, &c. This entozoon

is probably also the cause of a peculiar form of hæmaturia which is somewhat prevalent in Southern Africa and in the Mauritius. The principal remedies which have been used against them are calomel and turpentine.

A second species of Bilharzia (*Bilharzia magna*) has been discovered by Dr. T. S. Cobbold in the portal system of an African monkey—the Cercopithecus fuliginosus.

The *Hexathyridium Venarum* (Polystoma sanguicola) is about three lines in length, and has been detected in venous blood, as well as in the sputa of two young persons suffering from hæmoptysis.

MM. Gruby and Delafond have often detected a species of microscopic thread-worm in the blood of the dog. These filariæ are found in great numbers, they have a diameter less than that of the blood-discs, and they circulate in the most minute capillaries. In about four or five per cent. of dogs, the blood is verminous. It has been proposed to give this hæmatozoon the name of *Filaria papillosa hæmatica canis domestici.*

Andral discovered true *hydatids* in the pulmonary veins of a man aged fifty-five; but it is very doubtful if they were developed there, having been probably introduced through some perforation in the walls of the vessel. And, lastly, it is no doubt true that the *Fasciola hepatica* (the liver-fluke) has been found in the vena portæ. M. Duval, a physician at Rennes, while dissecting the body of a man forty-nine years of age, found a large distoma hepaticum in the trunk of the portal vein, in the midst of a little fluid blood. In tracing the hepatic divisions of the vein he discovered four or five other specimens of the same kind, all of which were about one inch in length, and half an inch in width. There were none in the mesenteric branches which form the portal vein, and no disease was detected in the liver—or, indeed, in the body—excepting the flukes. The distoma hepaticum and the distoma lanceolatum are often found together in great numbers in the gall-ducts and bladder of the sheep and other graminivorous animals, producing a disease known as the *distemper* or *rot.*

II. SCURVY.

Scorbutus, or scurvy, is a complex morbid state caused by long-continued privation of fresh succulent vegetables. Insufficient or improper food, foul drinking-water, exposure to impure air, and previous attacks of ague or dysentery, may all have a predisposing influence; but they will not by themselves produce this disease.

Of late years scurvy has been seen with comparative rarity in this country; although examples of it are occasionally met with amongst the aged inmates of asylums, workhouses, &c. In our navy it has been gradually becoming extinct since the year 1795, when an Admiralty order was first issued for furnishing the fleet with a regular supply of lemon-juice. But bad cases still not unfrequently occur in the mer-

cantile service, and recent Arctic navigators have also suffered from it.* The mortality from this disease was formerly frightful; more seamen dying from it than from all other causes put together, not omitting the accidents of war. Thus, Admiral Hosier sailed from England for the West Indies, in 1726, with seven ships of the line, and twice lost his whole crew by scurvy. Again, two years after Lord Anson's memorable expedition sailed from England in 1740, this disorder had proved fatal to four out of every five of the original crew; whilst in 1795 the safety of Lord Howe's Channel fleet was seriously endangered by its virulence. Now, by taking care to supply the men with fresh succulent vegetables or fruits, or their preserved juices, the circumnavigation of the globe may be accomplished without the loss of a hand from it. When, therefore, a sailor dies from scurvy, some one must be as responsible as if the fatal event were due to poisoning.

Our knowledge of the *pathology* of this disease is not very precise. There can, however, be little doubt that the blood is altered in composition; but if it be asked what ingredients are deficient, or in excess, or deteriorated in quality, we can only point to statements which are very contradictory. The red corpuscles are probably much diminished, while the water and fibrin are increased. Dr. Aldridge holds that the real cause is a deficiency in the food of certain minerals which are essential to the existence of nearly all the proximate-principles by which the animal structure is built up. These principles are phosphorus, sulphur, lime, potash, and soda. And he finds that both seeds and flesh are usually deficient in sulphur and the alkalies. Dr. Garrod in some measure confirms this view; for while attaching little importance to the absence of sulphur and soda, he still believes that the blood is deficient in potash, and that all antiscorbutics owe their virtues to the quantity of this salt they contain. He says, moreover, that scorbutic patients will recover when some of the salts of potash are added to their food, without the use of succulent vegetables or milk.—Land scurvy and sea scurvy are identical complaints in all respects.

The *symptoms* of scurvy show themselves gradually; commencing with lassitude, mental anxiety, offensive breath, the appearance of petechiæ on the legs, stiffness of the muscles, wearying pains in the bones, a pale exsanguine appearance of the gums, and dyspnœa on the least exertion. The appetite, however, continues good, and digestion is well performed; while, in the very aged, the callous and toothless gums remain healthy all through the disease.—Then, in the second stage, the countenance gets sallow and of a dusky hue; the gums swell, are spongy, of a livid color, and bleed on the slightest touch; the teeth loosen; and the breath becomes still more fetid. As the disease still further advances, the debility increases; the dyspnœa often becomes most urgent; the gums frequently slough; and hemorrhages occur from the gums, mouth, nose, stomach, and intestines. Ecchymoses, or effusions of blood beneath the skin, also appear, especially on the lower extremities

* Dr. Robert Barnes, in his Report on Scurvy in the Merchant Service (Sixth Report of the Medical Officer of the Privy Council, with Appendix, 1863), shows that during the twelve years, 1852–63, no less than 1058 cases of this disease have been admitted into the Hospital ship "Dreadnought;" the total number of in-patients for this period being 25,486. In the year 1863 alone, this institution received 86 cases of scurvy; 1 patient in every 23 of the whole number admitted being afflicted with this preventable disease.

and trunk; many parts of the body becoming so discolored with bruise-like marks that the patient appears as if he had been severely beaten. The legs swell, and attempts to move them give pain; tumors occasionally form in the extremities; there is stiffness and contraction of one or more joints; putrid fungoid ulcers arise, which have a tendency to bleed copiously; there is horrible despondency; the skin is dry and rough; the urine is scanty; in some instances there has been spontaneous salivation; and there is generally constipation. Unless relieved, the heart's action gets very feeble; and at the end of some weeks the patient either sinks from a sudden attack of diarrhœa or dysentery or dropsy, or he more slowly dies from exhaustion. In many instances, too, some slight exertion has been immediately followed by fatal syncope; probably from the formation of a thrombus or clot in the heart or in one of the large arteries.

In the *diagnosis* of scurvy no difficulty is likely to arise, since there is only one affection with which it can be confounded—purpura. From this it is to be distinguished by the gradual way in which the symptoms come on, and the cause; for purpura often appears suddenly, and is in no way due to abstinence from fresh vegetables. In purpura there is no sponginess or lividity of the gums, the skin is not of a dusky hue, nor is the disease prevented or cured by antiscorbutic remedies.

The *treatment* resolves itself into keeping the patient warm in a pure atmosphere, while we administer some one or more of the well-known antiscorbutics. The chief agents of this class are lemon or lime juice, oranges, cocoa-nuts, sauer-kraut, salads, water-cresses, potatoes, pickles, &c. Dr. Lind, in his work on scurvy, published in 1757, clearly proved the efficacy of oranges and lemons in preventing this disease; though his earnest suggestions to the Government were but little heeded for nearly forty years. To check the hemorrhage, gallic acid (F. 103) may be required; for the purging, a mixture of rhatany or catechu (F. 96, 97); and to strengthen the gums, either an astringent gargle (F. 250, 252) should be recommended, or the tannic acid lozenges (half a grain in each) of the British Pharmacopœia. In addition to these remedies, milk, nourishing soups, and wine or bottled ale must be allowed; spruce-beer (F. 7) has been found especially useful; while, as soon as the state of the gums and the digestive organs will permit of it, plenty of fresh meat and vegetables should be given.

If we believe in the soundness of the views of Drs. Aldridge and Garrod, and if we wish to administer physic, or if we have not the power to regulate the diet, we may employ the tartrate, chlorate, or phosphate of potash—F. 61, 356, 358, &c. Opium is sometimes needed to give sleep, and to relieve irritability. In all severe cases the recumbent posture should be strictly maintained; as fatal syncope may arise from any cause which in the least degree impedes the force of the heart's action. Moreover, the occurrence of bed-sores must be guarded against by putting the patient on a water mattress.

When Dr. Kane was in the Arctic Regions, and had several of his crew struck down with scurvy, he applied his medical knowledge to good purpose. He says,—"Among other remedies which I oppose to the distemper, I have commenced making sundry salts of iron; among them the citrate and a chlorohydrated tincture. We have but one bottle of brandy: my applying half a pint of it to the tincture shows the high

value I set upon this noble chalybeate. My nose bled to-day, and I was struck with the fluid brick-dusty poverty of the blood. I use iron much among my people: as a simple remedy it exceeds all others, except only the specific of raw meat: potash for its own action is well enough to meet some conditions of the disease, and we were in the habit of using freely an extemporaneous citrate prepared from our lime-juice; but as our cases became more reduced and complicated with hemorrhages, iron was our great remedy." And, again, mentioning the fortunate capture of a couple of rabbits, he adds, that by keeping them carefully covered up, they reached the ship sufficiently unfrozen to give about a pint of raw blood. It was "a grateful cordial to Brooks, Wilson, and Riley;" three of the worst cases.*

III. PURPURA.

This disease probably consists of some morbid state of the blood and capillary vessels; though the precise nature of the alteration, in its early stage, is unknown. The result, however, is that the red blood-corpuscles become disintegrated, while the contents of these cells are of course diffused. Hence purpura (so called from *Ηορφύρα*, a purple dye) may be said to be characterized by the occurrence of sanguineous effusions into the different tissues of the body; producing red or claret-colored patches, which are unaffected by pressure. When the hemorrhagic spots are very small, they are termed *petechiæ;* when large, *vibices* or *ecchymoses.*

This disease is often treated of as a cutaneous affection; and Willan —who erroneously considered it as nearly identical with scurvy—enumerates five varieties of it, viz., *purpura simplex*, *p. urticans*, *p. hæmorrhagica*, *p. senilis*, and *p. petechialis* or *contagiosa.* Such a subdivision seems, however, to be a very unnecessary refinement; for whether the spots be small as in the first form, or large as in the third, or whether they be elevated as in the second, matters but little with regard to the nature of the affection or its treatment.

The *causes* of purpura are obscure. Sometimes it seems due to the excessive use of salt provisions, or of pork preserved in nitrate of potash. The disease known as "black-leg," which occurs amongst the lumbermen on the Ottawa or Grand River of Canada, is merely a form of purpura; being produced by a diet of bread, tea, and pork saved from decomposition by packing in saltpetre. In many instances the origin of purpura may be traced to insufficient food, with the other ills of poverty; to chronic exhausting affections; to ichorhæmia; to degenerations of the liver or spleen; to Bright's disease; to intemperance; and to long-continued mental anxiety. It may also arise in cases of poisoning by arsenic, mercury, &c.

The *symptoms* are principally great languor and debility; sallow or dusky complexion; epistaxis; bad appetite, sometimes alternating with an inordinate craving for food; pains about the epigastrium; palpitation of the heart, with giddiness on making any exertion; constipation, &c.

* Arctic Explorations, pp. 286, 288. London, 1861.

The ecchymoses generally appear on the legs first, and then on the trunk. They are of variable size, from minute dots like flea-bites, to patches several inches in extent; while they are occasionally of a scarlet color, and sometimes of a dark livid hue, like the appearances presented by recent contusions. As they fade away, they assume a dirty-yellow tinge. The mere fact that the prominent feature of purpura is this exudation of blood from the cutaneous capillaries, would lead us to fear that simultaneously hemorrhage might take place into the substance of the mucous membranes, &c.; and not only is this the case, but it is this occurrence which renders purpura a dangerous affection. As a rule, in fatal cases, blood is found copiously effused into the mucous lining of the whole digestive tract from the mouth to the anus; beneath the serous membranes of the heart, lungs, and abdomen; between the arachnoid and pia mater, or even into the cerebral substance; into the urinary passages; as well as into the muscular and glandular tissues. Another characteristic change, moreover, is to be detected in the spleen; which is enlarged and softened, and studded with pale-yellow spots. By some authorities this condition of the spleen is regarded not as the effect of the disease, but as its cause.

The *treatment* should consist in the exhibition of full doses of aloes, senna, or castor oil, until the bowels are thoroughly cleared out; followed by the administration of quinine and iron, or of the mineral acids, or of arsenic with steel (F. 376, 378, 379, 381, 397, 399, &c.). A good nourishing diet, fresh fruit or vegetables, a fair allowance of stout or ale, and rest in a pure atmosphere, will be indispensable. The oil of turpentine, in small but frequently repeated doses (F. 50), has been strongly recommended where there is internal hemorrhage. As a rule, however, I feel more confidence in a mixture (F. 103) containing the gallic and sulphuric acids.

IV. HYDROPHOBIA.

Of the diseases which may arise from inoculation with poisons generated by unhealthy animals, hydrophobia (*Ὕδωρ*, water, and *φοβέω*, to dread), or rabies (*Rabio*, to rave), is the most distressing. It is, indeed, a fearful malady; not only on account of its almost universal fatality, but also because of the horrible suffering it gives rise to. Rabies is generally believed to occur spontaneously in the canine and perhaps in the feline races; but it is communicated by inoculation with the saliva to other animals and to man.

Symptoms.—The pathognomonic signs are,—cramps of the muscles of the pharynx and thorax; spasmodic action of the diaphragm; a great dread of fluids; a recurrence of paroxysms of phrensy on attempting to drink, or on exposure to a current of air; the flow of viscid saliva ("hydrophobic slaver"); restlessness and terrible anxiety; delirium, exhaustion, and generally death.

A person, we will suppose, is bitten by a rabid animal. After an uncertain interval, called the *stage of incubation*, or the *latent period*, complaint is made of mental uneasiness, chilliness, languor, and lassitude; there is restlessness also, loss of appetite, and more or less head-

ache. Sometimes a sensation of numbness, or even of great soreness, in the bitten part is experienced; but in any case the precursory symptoms are followed in two or three days by the *confirmed* stage of the disease. This commences generally with garrulity, peculiar sighings, nausea, and fever; to which succeed stiffness of the neck, difficulty of breathing and swallowing, a horror of liquids, an alarming sense of suffocation, and an excessive secretion of tenacious saliva, causing frequent hawking and spitting. There now set in violent spasmodic convulsions of the whole body; the paroxysms being occasioned especially by the sight of liquids, or the sound of running water, or any attempt at drinking. The spasmodic terror inspired by the sight of water has been well described by Dr. Marcet, who, in relating the history of a case of hydrophobia, says: "On our proposing to him to drink, he started up and recovered his breath by a deep, convulsive inspiration; yet he expressed much regret that he could not drink, as he conceived the water would give him great relief, his mouth being evidently parched and clammy. On being urged to try, however, he took up a cup of water in one hand, and a teaspoon in the other. The thought of drinking out of the cup seemed to him intolerable; but he seemed determined to drink with the spoon. With an expression of terror, yet with great resolution, he filled the spoon, and proceeded to carry it to his lips; but before it reached his mouth his courage forsook him, and he was obliged to desist. He repeatedly renewed the attempt, but with no better success. His arm became rigid and immovable whenever he tried to raise it towards his mouth, and he struggled in vain against this spasmodic resistance. At last shutting his eyes, and with a kind of convulsive effort, he suddenly threw into his mouth a few drops of the fluid, which he actually swallowed. But at the same instant he jumped up from his chair, and flew to the end of the room, panting for his breath, and in a state of indescribable terror."*

About the *second day* the symptoms become more severe. The thirst gets distressing; there is pain at the epigastrium, and flatulence; the countenance is anxious, and indicative of horror or despair; the forehead is perhaps covered with a cold clammy sweat; and there is generally much mental distress, with excessive irritability, though the intellect remains perfect. As the fatal issue quickly approaches, the sense of suffocation grows more urgent; the surface of the body is so sensitive that a draught of cold air, or the lightest touch, brings on convulsive paroxysms; the senses of hearing and vision get morbidly acute; the saliva is more difficult to expel, though the attempts at spitting are incessant; there is frequent micturition; until at length the terror becomes succeeded by wild delirium, which ends in exhaustion and death. Sometimes there is a great mitigation of suffering a few hours before death. The patient becomes tranquil, perhaps falls into a quiet sleep, and then dies without a struggle.

The *stage of incubation* in hydrophobia may be said to vary from thirty days to eighteen or twenty months; the duration perhaps depending upon the virulence and quantity of the poison, as well as upon the constitution and age of the party inoculated. The period appears to be shorter in very young persons than in those more advanced in years.

* Medico-Chirurgical Transactions, vol. i, p. 138. London, 1809.

Cases are recorded where the symptoms have set in as early as the eighth day; but others are known in which their appearance has been delayed for four, five, and seven years. In one instance related by Dr. Bardsley it is said that twelve years intervened between the bite and the first hydrophobic symptoms.*

Prognosis.—Very few cases of recovery are known. The general duration of the disease is from two to four or even six days, counting from the commencement of the confirmed stage. There seems reason to believe that only a small number of those bitten by rabid animals suffer from hydrophobia. John Hunter mentions an instance in which of twenty-one persons bitten by a dog, only one suffered. The bite of a rabid wolf appears to be more dangerous. M. Troilliet states that of seventeen persons bitten by a wolf, ten died; and on another occasion out of twenty-three, thirteen perished. Moreover, it is possible that an attack of hydrophobia may entirely go off after the premonitory symptoms have commenced. Dr. Elliotson relates—"Lancet," May, 1829—the following instance: Two little girls were bitten in the face by the same dog, while they were standing at their father's door. She who was bitten the second became hydrophobic and died. The other, at exactly the same time, experienced precisely the same premonitory symptoms as her sister—heaviness and general indisposition—but they all went off.

Mr. Youatt has proved that hydrophobia has occasionally a favorable termination in the dog. In this animal the two prominent symptoms are an alteration in the bark, with a continued biting and swallowing of straws, hairs, pieces of paper, &c. Usually there is no fear of water, and indeed drink is greedily sought. Of 131 dogs bitten by a rabid animal or inoculated by M. Renault, 63 presented no symptoms of disease during the four subsequent months. In the remaining 68, rabies was developed at periods varying from the 5th to the 120th day; 12 being attacked between the 30th and 40th, and 15 between the 40th and 50th days.

Morbid Anatomy.—The rigor mortis is of short duration. The depending parts of the body are usually very livid. The fauces and pharynx are vascular, and sometimes covered with lymph. The lungs may be congested, and the bronchi loaded with tenacious frothy mucus. In some cases the stomach and intestines have presented evidence of partial inflammatory action. But the most constant morbid appearances are detected in the brain and spinal cord; the meninges being congested, fibrinous coagula being present in the sinuses, the ventricles containing a slight excess of fluid, and blood or serum being effused around the cervical portion of the cord. Occasionally there has been a complete absence of any discoverable lesion in the body.

Pathology.—The symptoms together with the absence of any constant structural change seem to show that this disease depends upon some peculiar alteration in the blood; this alteration affecting the nervous system, and especially the medulla oblongata and three divisions of the eighth pair. The poison, when absorbed, seems to slowly effect some change in the blood, while at the same time it increases in quantity and virulence. The process by which this occurs has been compared to that

* Medical Reports of Cases and Experiments, &c., p. 237. London, 1807.

which happens in fermentation. According to some authors a double zymosis or fermentation takes place; first in the part wounded, and secondly in the system at large. The question is often asked—Is the disease due to the slow operation of the poison on the system, or to the mental anxiety which the patient undergoes from the consciousness of his danger? Although our knowledge of the nature of this affection is very imperfect, still I know of no reason for believing that mental anxiety will give rise to hydrophobia any more than it will produce variola or syphilis. Whether in a rabid animal other secretions than the saliva are poisonous is uncertain; but it is very probable that they are so.

Treatment.—This must be prophylactic, for the cure of the disease seems in the present state of medical knowledge almost hopeless. The wounded part is to be excised as soon as possible after the bite; care being taken to remove every portion touched by the animal's teeth, and to obtain a clean raw surface. Even if some days have elapsed from the infliction of the wound, excision had better be resorted to. The operation can do no harm, while by the aid of chloroform it is rendered painless. The wound is then to be thoroughly washed by a stream of water long poured over it; while lunar caustic ought afterwards to be applied. Mr. Youatt prefers the nitrate of silver freely used, to every other caustic; and he also recommends that after its application the wound be quickly healed, though many authorities advise that it should be kept open by irritating ointments.

In treating the disease itself, I would resort to subcutaneous injections of atropine, to quiet the nervous system; as well as to the administration, either by the mouth or rectum, of solutions of the sulphite or hyposulphite of soda or magnesia. The reputed power of these agents in neutralizing blood-poisons is worth testing. No benefit resulting, large doses of iodide of potassium might be deserving of trial. Ice should be given to suck; and perhaps its application to the upper part of the spine might afford relief.

Enormous doses of opium have failed to do good; and the same must be said of belladonna, prussic acid, Indian hemp, curara, and tobacco. Dr. Todd kept a patient under the influence of chloroform for about eight hours; but it did not seem to retard the fatal termination. So severe are the sufferings, however, that it is a great point to give even temporary relief. Dr. Marcet's patient said imploringly—"Oh, do something for me. I would suffer myself to be cut to pieces! I cannot raise the phlegm; it sticks to me like bird-lime." And after trying to collect himself, he again exclaimed—"Gentlemen, don't ask me questions, I cannot say more, my feelings cannot be described!" When the case is seen early, it might perhaps prove beneficial to induce free perspiration by the vapor-bath. If the theory of a double zymosis be true, it may do good to lay open the cicatrix and induce suppuration in it. Tracheotomy has been proposed, but it would be a useless piece of cruelty to resort to it.

The practitioner should remember that inoculation through the saliva of a patient with hydrophobia seems by no means impossible. He should, consequently, carefully guard against this secretion coming in contact, directly or by towels, with any scratch or abraded surface.

V. GLANDERS.

The disease known as glanders (*equinia*, *farcinoma*, or *farcy*), in the human subject, is a malignant febrile affection, which is both contagious and infectious, and is due to a specific poison received from glandered horses. Glanders and farcy are essentially identical, both having their origin in the same poison. But when the effects of the morbid agent are manifested in the nasal cavities, the disease is known as *glanders;* while when the lymphatic system suffers, it is called *farcy*.

In the *horse*, glanders is a disease which has long been recognized; for, according to Mr. Youatt, few veterinary writers have published a more accurate account of it than was given by Hippocrates 2300 years ago. It is a loathsome and incurable malady; beginning in this animal with a contagious, constantly-flowing, aqueous discharge from the nostril—commonly the left. In the second stage of the disease, the discharge becomes viscid and glutinous; then it gets purulent, and the neighboring glands, especially the submaxillary, begin to enlarge; spots of ulceration soon appear on the membrane covering the cartilage of the nose; and the poor beast loses flesh and strength. His hair also comes off, his appetite fails, and he has a more or less urgent cough. As the disease steadily advances, the ulcers increase in size; the discharge is rendered bloody and offensive; the membrane lining the frontal sinuses inflames and ulcerates; the forehead grows tender; more of the absorbents are involved; the conjunctivæ swell and suppurate; little tumors appear about the face and soon ulcerate; and farcy is now supperadded, or the glanders degenerates into farcy. The progress is henceforth rapid: the deep-seated absorbents are soon affected; one or both of the hind legs swell to a great size; the discharge increases in quantity and fetidity; and the animal seems to present a mass of putrefaction, until at length he dies completely exhausted.

Farcy in the horse is an inflammation of the lymphatic glands and vessels, giving rise to small tumors called "buttons," or "farcy-buds," that gradually suppurate. The ulcers which form have the same character as the glanderous ones in the nose; while the virus they secrete is just as infectious. By slow degrees this virus poisons the whole system; all the capillary absorbents become inflamed; the legs and head swell enormously; and generally the disease surely runs on to a fatal termination.

In *man* the symptoms which result from the absorption of the poison may show themselves as acute or chronic glanders, or as acute or chronic farcy.—The *acute glanders* is attended by suffering somewhat similar to that which occurs in the horse; the prominent signs being fever; great debility; pains of a rheumatic character in the limbs; profuse offensive discharge from the nostrils; and the formation of a number of pustules and tumors in different parts of the body, which have a great tendency to suppurate and become gangrenous. The pustular eruption does not occur until about the twelfth day: it is accompanied by profuse fetid sweats, and sometimes by the formation of black bullæ. Abscesses appear in the neighborhood of the joints; the nose, eyelids, and face swell and perhaps ulcerate; the urine is often albuminous and loaded with renal casts; and the constitutional disturb-

ance is shown, by great weakness and delirium. The disease generally proves fatal before the twentieth day. It occurs for the most part in grooms, stable-men, &c. Of fifteen cases collected by Rayer, fourteen died. The period of incubation is probably from two to eight days.*

Chronic glanders runs its course more slowly to a disastrous termination; the symptoms consisting especially of a discharge from the nostril, of offensive perspirations, and the formation of abscesses in the neighborhood of the large joints. Out of three reported cases only one recovered.

In *acute farcy*, the inflammation begins in the lymphatics leading from the part wounded, and is followed by swelling of the glands and extensive suppuration in the subcutaneous areolar tissue. Great exhaustion soon sets in, from which, however, the patient may recover; but if a pustular or gangrenous eruption appear, together with the glanderous discharge from the nostril, the case may be looked upon as hopeless. In fifteen examples of acute farcy death resulted in ten.

Chronic farcy produces the following effects. Suppose a groom has a slight abrasion on one of his fingers, and that it comes in contact with a little of the discharge from a glandered horse. A few days subsequently a painful sore appears, which is poulticed. In a day or two an eschar forms; on removing which a deep, unhealthy ulcer is seen. Similar ulcers form about the head, upon the arm, in the course of the absorbents, and in the axilla. The health begins to suffer; while unless the patient can take plenty of nourishment and perhaps remove to the sea-side, symptoms of acute glanders will soon set in and destroy him. This unfavorable result may, however, be often averted; for out of seven cases only one died.

For the *treatment* of acute glanders all kinds of remedies have been ineffectually employed. Under these circumstances it is incumbent upon the physician to give a trial to any plan of treatment which affords a hope, however slight, of cure. The experiments of Dr. Polli, of Milan, have already been referred to (p. 46), but the following is especially worthy of recollection: Two dogs were inoculated with the discharge of glanders through the skin. To one ninety grains of sulphite of soda were administered daily; to the other no remedy was applied. The wound in the former healed up in a few days; in the latter animal it

* Dr. Manquet of Tours has related a frightful case of glanders and farcy attacking a pregnant woman. The patient was a rag-picker, living in a filthy atmosphere. The disease was caught from a miserable pony, which had been allowed to feed frequently off of the same dishes with the family. The following is Dr. Manquet's summary of the train of events in the woman's illness: "Acute pleuro-pneumonia, masked at the outset by accessions of intermittent fever of a double tertian type. On the eighth day, resolution of the pulmonary inflammation, which is replaced by an extremely painful articular rheumatism. Pustular eruptions on the legs: fluctuating subcutaneous tumors in the long axis of the limb, and in the course of the lymphatic vessels (farcy). On the eleventh day a malignant pustule on the nose, which tumefies, reddens, violaceous œdema, phlyctænoid erysipelas. In four days a confluent eruption occupies all the face, and reaches as far as the right shoulder (glanders). Numerous abscesses (farcinous poisoning). Discharge from both nostrils: glandular engorgement. Fever very active towards the end: state of typhoid prostration: petechial spots over the whole body. Spontaneous accouchement on the thirteenth day: infant living (though premature). Death (of the mother), in a condition of putrefaction of the head, on the fifteenth day of the illness, the eighth of the glanderous affection." The infant lived twenty-four hours, and seems to have succumbed to mere feebleness.

opened and yielded a sanious discharge, and general infection followed. From this the conclusion seems inevitable that the sulphite of soda or magnesia (F. 48) should be tried in man.

In chronic farcy a cure has been effected by large doses (grs. 10 to 15, thrice daily) of iodide of potassium and bark. Quinine might prove useful. Stimulants, good nourishing food, and pure air, will be necessary in all cases. It will also be advisable to open the abscesses, and to syringe the nostrils or wash the ulcers with plenty of water, containing a little chloride of zinc or some other disinfectant solution. The internal administration of creasote, together with the application of lotions containing this medicine, to the ulcers, has been thought sometimes to do good. With a few cases we might perhaps assist nature in eliminating the poison through the skin, by using the vapor-bath.

As regards *prophylactic treatment*, it is only necessary to recommend free cauterization of the inoculated tissue, together with the administration of the sulphite of soda or magnesia.

VI. FURUNCULAR INFLAMMATIONS.

1. Boils.—A boil or furunculus (from *Ferveo*, to burn) is a circumscribed hard tumor, small but very painful, caused by inflammation of the true skin and subjacent areolar tissue. Suppuration takes place slowly and imperfectly, the skin ulcerates, and then in two or three days a slough of areolar tissue (the core) is discharged from the centre. Boils most frequently form on the back of the hand, the neck, the armpit, the nates, or the thighs. In many cases three or four are met with in different situations, at the same time, successive crops appearing, to the great annoyance of the patient.

Causes.—A boil may always be regarded as a sign of malnutrition. Hence the most common causes are a residence in an impure atmosphere, insufficient or improper food, sexual excesses, overwork or mental anxiety, and, in short, anything which leads to deterioration of the blood. The young and old seem to suffer equally.

Treatment.—Locally, warm water-dressing or poultices should be applied. The most ancient poultice that we read of was made from figs; being used for a boil when Hezekiah was "sick unto death."* Unless the pain be very great, I am convinced that it is better to let the boil break, rather than to open it with the knife. The former plan is never attended with inconvenience, whereas improper interference has led to a severe attack of erysipelas.

Then, in addition to removing the cause, the bowels should be cleared out by an active aperient (F. 150, 172). After its operation a good nourishing diet must be allowed, with a moderate quantity of wine or pure beer. As a tonic nothing suits better than quinine (F. 379), or one of the mineral acids with bark (F. 376). When there are successive crops of boils, with or without any obvious cause, no remedy is so efficacious as a trip to the country.

* "And Isaiah said, Take a lump of figs: and they took and laid *it* on the boil, and he recovered."—2 KINGS 20: 7.

2. Styes.—A stye or hordeolum (from Hordeum, barley) is merely a small boil, of the size and firmness of a barleycorn, situated at the edge of the eyelid. It often forms in strumous and other weakly children. Fomentations and poultices will bring it to a head; while bark or steel, with good diet and cod-liver oil, suffice to remove the constitutional cause. If the excretions are offensive and insufficient in amount, aperients will be needed.

3. Carbuncles.—A carbuncle or anthrax (from Ἄνθραξ, a coal) consists of severe inflammation of a circumscribed portion of the skin and subjacent tissue, with infiltration of unhealthy lymph. The swelling is hard, flattened and more or less circular in shape, of a dull-red color, and very painful; while it varies in diameter from half an inch to six or seven inches. The surrounding skin is tender, of a purplish tint, and burning hot; and there is a severe throbbing or dull aching pain in the whole of the affected part. As the mischief progresses the centre of the tumefaction suppurates; at first a doughy feel being communicated to the touch, with subsequently an indistinct sense of fluctuation. Then, the skin ulcerates in several small spots, from which a bloody purulent fluid, with shreds of sloughy areolar tissue may be squeezed. The openings gradually coalesce, the discharge increases and gets thinner, while all the grayish sloughs separate from the living tissue and come away. If the case progress favorably healthy granulations spring up, and the wound gradually closes.

Carbuncles are most frequently situated in the nape of the neck, or on the back; the next most frequent sites being the shoulders, sides of trunk, abdominal wall, buttocks, back of the arm and forearm, and upper or lower lip. They are rare in childhood and youth; generally occurring in individuals who have passed the middle period of life. Men suffer at least twice as often as women.

Causes.—As boils are due to a vitiated state of the blood, so carbuncles have their origin in a similar but exaggerated condition. Sometimes they occur as sequelæ to one of the continued or eruptive fevers; or they may arise in individuals weakened by renal disease. And not unfrequently they appear due to an unhealthy condition of the atmosphere and season. Lastly, irritating liniments, plasters, and blisters, will give rise to them in cases where the predisposing influence of debility is present.

Constitutional Symptoms.—For a day or two prior to the appearance of the carbuncle the patient notices that he is not well: there is a sense of malaise, with languor and chilliness. As the inflammatory action manifests itself the constitutional disturbance becomes marked in proportion to the extent of the morbid process; and there is headache, constipation, confusion of intellect, irritability from the pain, a sallow complexion, a feeble rapid pulse, and a thickly-furred tongue. The urine sometimes contains sugar. Occasionally we find violent fever and delirium, extreme prostration setting in early. A fatal result may ensue from exhaustion, from ichorhæmia, or from an extension of the disease to important tissues. If the Registrar-General's Report for ten years (1851 to 1862) be examined, it will be found that the annual average mortality in England and Wales from this disease is 247. Carbuncles, unlike boils, are generally solitary.

Treatment.—Linseed-meal poultices or anodyne fomentations should be early employed; since they afford more relief than any other applications, and hasten suppuration. A crucial incision down to the base of the swelling, by removing the tension, often gives ease; and it may be resorted to even before suppuration has become established. This is not to be regarded as a rule, to be carried out in all cases, but as a plan to be resorted to with judgment and discretion. In the old and very nervous, where there is an unconquerable dread of chloroform, I have not seen reason to regret trusting to fomentations, without recommending the knife. Subsequently, when the sloughs have all come away, a stimulating lotion (F. 264) will promote granulation and cicatrization.

Mr. French has recommended subcutaneous incisions, both for boils and carbuncles. The extent of the induration being ascertained, a tenotomy knife is passed horizontally underneath it; the blade of which is then turned upwards, and the hardened structure cut through to the utmost extremity of the induration, avoiding the skin. The disease is thus arrested in one direction; and to prevent its spreading in the other, a second puncture at right angles with the first is to be made, thus forming a subcutaneous crucial incision. When any bleeding has ceased, the whole surface of the tumor is to be covered with collodion. Immediate relief is felt, and the patient is at once able to pursue his ordinary avocations.

Mr. Prichard, of Bristol, who has helped to revive the caustic plan of treatment, not only thinks very highly of it, but is a strenuous opponent of the crucial incision. In whatever stage the carbuncle may be, he takes a stick of potassa fusa, and rubs it freely into the centre until an eschar is fully formed. The diameter of the skin destroyed is about one-fourth or a third of the indurated mass. A strong solution of iodine in collodion (F. 205) is then applied to the circumference of the swelling, so as to destroy the erysipelatous element of the disease. Poultices are avoided, and a dressing of turpentine ointment (Brit. Phar.) applied. Great care is afterwards taken to let the slough come away without dragging or cutting it, and attention is paid to insure cleanliness. To prevent the pain of this proceeding, a freezing mixture of pounded ice and salt may be applied to the surface for five minutes before its adoption.

As regards the general remedies our treatment resolves itself into insuring free excretion by the kidneys, liver, and intestinal glands, while supporting the strength. Podophyllin (F. 160), jalap and senna (F. 151), castor oil, colocynth and blue pill (F. 172), or saline aperients with colchicum (F. 152), are very useful in the first stage; but care must be taken not to induce diarrhœa. Then, chlorate of potash and tincture of perchloride of iron (F. 402), or the mineral acids and bark (F. 376), or ammonia and bark (F. 371), or quinine (F. 379), or steel and arsenic (F. 381), will prove very beneficial; and with easily-digested food (cream, milk, raw eggs, essence of beef, mutton-chops, &c.), and stimulants in accordance with the necessity for them, will probably lead the case to a successful issue. It is often necessary to relieve the pain with opium, a full dose (F. 316, 340, 343) once in the twenty-four hours being better than oft-repeated small quantities.

4. Malignant Vesicle.—This contagious and fatal disease (*Malig-*

nant Pustule, Charbon) has long been familiarly known to practitioners abroad; but in this country it has attracted less attention. Examples of it, however, have occasionally been described in the medical journals; and in September, 1852, Mr. Harvey Ludlow gave an account in the "Medical Times and Gazette," of six cases which had been under treatment in St. Bartholomew's Hospital. More recently Dr. William Budd has written some excellent papers on the subject.*

Symptoms.—In most cases there is the following train of events: First, the formation of a small pimple or vesicle on some exposed part, —often the upper lip, or other portion of the face. In scratching to relieve the unbearable itching or stinging sensation, the vesicle gets broken; and then, at the end of twenty-four or thirty-six hours, there is found considerable swelling and some discoloration. The carbuncular inflammation now rapidly increases in severity; and the tissues in the neighborhood of the original pimple swell enormously, become of a brawny hardness, get cold and lose their vitality, and assume a black color. There is a constant drivelling of saliva, the breath is peculiarly fetid, the pulse becomes feeble and rapid, the respiration gets embarrassed, profuse clammy sweats cover the body, and delirium with great prostration sets in; death often resulting, with all the symptoms of general blood-poisoning, within eight days from the commencement of the attack.

Pathology.—This disease has long been the cause of great mortality amongst sheep, oxen, horses, and other animals; being known under the names of "joint-murrain," "black quarter," "quarter evil," "charbon," "sang," "spleen gangrene," &c. It is conveyed to man either by direct inoculation, or by eating the flesh of cattle which have suffered from it; while, in some instances, flies or other insects have carried the poison from the diseased beast and inoculated man. Many facts also prove that the virus is retained in the hair, hides, hoofs, fat, and tallow of animals killed by it. Although the vesicle, in man, is usually situated on a surface habitually exposed, it is not necessarily so. Mr. Robert Harper has reported a case where it was on the penis; the patient, after dressing diseased sheep, having held this organ during micturition without previously washing the hands. For inoculation to take place, it is probably necessary that there should be some abrasion or slight wound; though it is by no means certain that it may not occur without this, in parts where the skin is thin. Women rarely suffer from malignant vesicle; most of the victims having been adult men, who had previously appeared healthy.

Treatment.—It is generally agreed that a cure may often be effected by decided treatment at an early period of the disease. One or more incisions should be made through the affected tissue, and a strong caustic applied,—such as potassa fusa, or the acid solution of nitrate of mercury, or the actual cautery. As regards the constitutional remedies, I would recommend the most reliance to be placed on the sulphite of soda or magnesia (F. 48), large doses of bark or quinine, alcoholic stimulants, milk or cream, raw eggs, and essence of beef (F. 2, 3), &c. The patient's bed must be placed where there is a free current of fresh air.

* "On the Occurrence of Malignant Pustule in England." Reprinted from the British Medical Journal. London, 1863.

VII. HEMORRHAGE.

1. Introduction.—The escape of blood from the vessels in which it is naturally contained constitutes hemorrhage (*hæmorrhagia*, from *Αἷμα*, blood, and *ῥήγνυμι*, to break out). For many years it has been maintained that blood may exude, as sweat does from the skin, from the unbroken surfaces of organs, without any rupture of arteries, capillaries, or veins; and in this way most of the cases of hemorrhage which come under the notice of the physician have been accounted for. Dr. Todd first taught me to doubt the occurrence of hemorrhage by *exhalation;* for he argued that if blood-corpuscles, which measure about $\frac{1}{3000}$ of an inch in diameter, could pass through pores in the capillaries, such openings must be large enough to be detected by the microscope. More recently Virchow has insisted upon the fact of the vascular system being everywhere closed by membranes, in which it is not possible to discern any porosity; and hence he asserts, that although we cannot, in every individual case, point out the exact site of the rupture, yet it is quite inconceivable that the blood with its corpuscles should be able to pass through the vessel's walls in any other way than through a hole in them.

Many *classifications* of hemorrhage have been attempted. The chief subdivisions made by authors in the present day are these: (1.) *traumatic* when a vessel has been directly divided, and *spontaneous* when the bleeding has resulted from some constitutional cause: (2.) *symptomatic* when clearly a result of some disease, as tubercle, cancer, &c., *idiopathic* or *essential*, when no such connection has been perceptible; or, (3.) *active* hemorrhage when congestion or inflammation has preceded the flow, and *passive* when there have previously existed signs of debility, with poverty of blood. Moreover, hemorrhages have been termed *constitutional* when they occur at intervals, and seem to be of service to the general health, as in the bleeding from piles in plethoric people; they are often called *vicarious* when supplemental of some other hemorrhage, as where a woman has a periodical bleeding from the nose in place of the usual catamenial discharge; and they are sometimes spoken of as *critical* when the flow of blood occurs during the progress of some disease, and produces marked good or bad effects.

The *causes* of hemorrhage are heat, violent mental emotions, muscular exertion, the use of stimulants, and exposure to various irritants. A predisposition to it appears sometimes as if it were hereditary, and then there is said to be the hemorrhagic diathesis. Mechanical obstacles to the circulation are powerful causes; a fact which is exemplified in the case of valvular disease of the heart, as well as in those affections of the liver which—by obstructing the flow of blood through the inferior vena cava and the vena portæ—produce congestion of the whole portal system, and as a consequence hemorrhage into the stomach or bowels. Morbid states of the blood—as, on the one hand plethora, on the other anæmia—are also favorable to hemorrhage. Degeneration of the tissues forming the coats of vessels is a frequent cause. And, lastly, diseases of certain organs—as of the liver and spleen—also tend to produce the hemorrhagic diathesis, by exercising some deleterious influence upon the composition of the blood.

The *seat* of the hemorrhage, speaking with some latitude, may be said to vary with the patient's age. Thus, bleeding from the nose is most common in youth; from the lungs and bronchial tubes, the stomach, the urinary passages, and the uterus in adults; and from the cerebral vessels and rectum in old age.

The *symptoms* necessarily depend upon the cause, seat, and extent of the loss, as well as upon the condition of the patient. Where signs of plethora have previously existed, with headache, heat of skin, and a full bounding pulse, a moderate bleeding may prove at the time beneficial; whereas, in cases of asthenia, every ounce of blood that comes away serves but to increase the vital depression. The effects which should raise the practitioner's fears are depression with rapidity of the pulse, pallor of the face, deep sighing, loss of vision, coldness of the extremities, syncope on attempting to sit up, great restlessness, and delirium. Sometimes there is no loss of consciousness, even though the powers of life are almost exhausted; and then amongst the many unmistakable symptoms of approaching death, I know of none more alarming than the patient's feeble expression of perfect ease and contentment, and his desire to be let alone.

Concerning the *hemorrhagic diathesis* (in which there is probably a watery condition of the blood, a deficiency of fibrin, and a delicate condition of the coats of the vessels, but particularly of the capillaries) it may be said, that it is equally manifested in male and female children, though during adult life men seem to suffer more frequently than women. This diathesis may be hereditary, or it may be induced by insufficient food and residence in a close, damp situation. It is indicated by the existence of a tendency to ecchymoses from slight pressure, dropsy, painful swellings around the joints, &c.; as well as by the occurrence of spontaneous hemorrhage from the umbilicus a few days after birth, from the nose or gums in youth, and from the urinary passages or rectum in after years. At all ages too, death may occur from bleeding after the infliction of the most trifling wound; as from a leech-bite, biting the tongue, the extraction of a tooth, a laceration from a fall, or even rupture of the hymen.

The *prognosis* is unfavorable when the hemorrhage takes place into a serous cavity, or into the substance of an organ, or when there is the hemorrhagic diathesis. In other instances it is generally favorable, death very rarely resulting. The obstetric physician especially must often be surprised at the large quantity of blood which is lost without the patient succumbing.

With regard to the general principles of *treatment*, it may be first noticed that as a rule it is desirable to suppress the hemorrhage. Some authorities affirm that there is danger in stopping a discharge which may almost be called habitual; but I have seen nothing that leads me to acquiesce in this opinion. On the contrary, many elderly people have come under my notice who have been injured, and greatly inconvenienced, by the frequent bleeding arising from piles. Of course, however, when such cases are interfered with, it is necessary to guard against congestions of internal organs; which may be best done by attention to the diet, and by taking care that the bowels act regularly. The few exceptional instances where attempts to arrest a bleeding would be hazardous, are found in plethoric people, who seem occasionally to

be relieved from a threatened fit of apoplexy by a timely attack of epistaxis. In vicarious hemorrhages we should try to procure the flow from the natural seat.

In endeavoring to control any form of hemorrhage we must keep the patient as quiet as possible. His apartment should be cool; he must rest on a mattress without much covering; his diet ought to be simple and usually unstimulating; while the position of his body is to be such that the afflux of blood to the bleeding organ may be impeded.

Our chief resources are then to be found in the use of astringents. One of the best of these agents is *cold*, and therefore ice is to be applied locally, while it may also be freely swallowed. A valuable and most efficient drug is *gallic acid*, given in doses of ten to twenty grains every four or six hours. The efficacy of this astringent is often increased by giving it with fifteen or twenty minims of the *aromatic sulphuric acid*. The *ammonio-sulphate of iron* (iron alum) is an excellent styptic, from which I have seen the best effects in hæmoptysis; while in all cases I think it better than the tincture of perchloride of iron. The *mineral acids* quicken coagulation, and hence either of them may often be used with advantage. *Ipecacuan* appears sometimes to exercise a favorable influence on internal hemorrhages, but it must generally be given in doses of one grain every thirty or sixty minutes, until a feeling of nausea is produced. In cases of hemorrhage from the lungs or stomach, the act of vomiting would probably do harm, but I have often seen it do marked good in flooding after labor. The *acetate of lead* was long recommended as an efficacious styptic, but I now never use it, since I have found it very inferior to gallic acid, &c. Though a decided opponent to the use of secret remedies, yet it must be allowed that *Ruspini's styptic* sometimes succeeds when other remedies fail. The *oil of turpentine* has also been esteemed a good astringent, especially in bleeding from the lungs, stomach, or kidneys. Ten or twenty minims may be given in mucilage every two or three hours; while sometimes it may be beneficially used in the form of inhalation, or as a stupe (a hot flannel sprinkled with the oil).

In obstinate cases *mercury* is a very valuable remedy. At one time I thought the beneficial effects were not induced until salivation was effected; but further experience has led me to believe this to be an error. The *liquor hydrargyri bichloridi* (Lond. Phar. 1851) may be given in doses of one to two drachms (gr. $\frac{1}{16}$ to gr. $\frac{1}{8}$) every three or four hours, until a good effect ensues. This metal is contra-indicated where there is any predisposition to pulmonary or renal disease.

When the hemorrhage has been excessive, and has produced exhaustion, *opium* is invaluable as a stimulant. It probably also has a tendency to induce contraction of the vessels. I generally prefer the extract, in doses varying from one to three grains, and it is better usually to combine it with cordials. *Ergot of rye* in ten-grain doses every hour, or the *liquid extract of ergot* (Brit. Phar.) in twenty-minim doses, will often succeed also.

Formerly *bleeding* was resorted to, in order that while the force of the heart's action was lessened, the current of blood might be diverted from the affected organ. When there is organic disease, venesection is most objectionable; while in no case does it possess such advantage over other remedies as to lead to its recommendation. If there be constipa-

tion, purgatives of *sulphate of soda*, or of *sulphate of magnesia and sulphuric acid* should be administered.

Lastly, it must be remembered that in very severe cases—particularly such as occur in obstetric practice—when other means fail, and there is loss of consciousness, with inability to swallow stimulants, we may resort to *transfusion*. This operation will be much simplified by resorting to Dr. Richardson's suggestion, that the blood to be injected should be kept in a liquid state by means of ammonia. About two minims of the strong liquor ammoniæ with twenty of water may be added to the ounce of blood, and even a little more if a tendency to coagulate be manifested. As the blood from a strong healthy individual falls into the vessel containing ammonia and water, it should be gently stirred. Then the syringe, being completely filled, so as to exclude even a bubble of air, and its nozzle introduced into one of the patient's veins at the bend of the arm, the operator must take care to proceed very slowly, for one of the great dangers of transfusion consists in forcing in the blood too rapidly. With regard to the quantity of blood to be transfused, it may be said that the operation should be stopped when the patient has rallied, which will generally occur when from three to twelve ounces have been injected.

2. Cerebral Hemorrhage.—When cerebral sanguineous effusion or apoplexy (*Ἀπὸ, πλήσσω*, I strike down) occurs in childhood, it most frequently assumes the form of hemorrhage into the cavity of the arachnoid. This form of *meningeal apoplexy* differs from *cerebral apoplexy*, inasmuch as it rarely gives rise to paralysis, owing perhaps to the pressure acting uniformly upon the contents of the cranium. When only a small quantity of blood is effused, absorption may take place and recovery ensue.

Disease of the brain may give rise to hemorrhage into the ventricles, a form of apoplexy which is more rapidly fatal than any other kind.

Hemorrhage into the substance of the brain is the most frequent variety of apoplexy which occurs in advanced life. The amount of blood poured out varies from a drop or two to many ounces; and although all parts of the encephalon may be the seat of the effusion, yet the latter is most frequently found in the vicinity of the corpora striata. The fatality of apoplexy seems to be in proportion to the amount of injury done to the cerebral tissue, as well as to the nearness of the effusion to the medulla oblongata. Hemorrhage into the cerebellum may take place alone, or combined with effusion into the cerebrum: it is not very common, but when it occurs it very quickly causes death.

In searching for the immediate *cause* of apoplexy, attention must be paid to the composition of the blood, the state of the vessels, and the condition of the surrounding tissues. With regard to the first, our knowledge is imperfect; but, according to Andral and Gavarret, there is an essential connection between cerebral hemorrhages and a diminution of the fibrin of the blood with an increase of the red globules. Apoplexy not unfrequently occurs as a sequel of renal or cardiac disease; when it is probably due in part to an altered condition of the blood, though we know that in Bright's disease the coats of the arteries are also often the seat of some degeneration. Thin or poor blood may be the only cause; in confirmation of which view it may be remarked that a fatal

fit occurred in a patient under my care, who for many months had suffered from almost uncontrollable uterine hemorrhage, due to a fibrous tumor. Mr. Travers met with a case where the attack happened while the patient was being bled for pneumonia. But it is probable that, in the majority of cases, disease of the coats of the vessels is the cause of the effusion; the morbid action having occasionally gone so far as to produce aneurism of the cerebral arteries. Chronic arteritis by producing pulpy softening, or calcareous or atheromatous deposits (calcification and fatty degeneration), may render the vessels unable to bear the force of the blood-current. When the nutrition of the nerve tissue becomes diminished, softening ensues; and the same result sometimes follows from acute inflammation. The way in which the cerebral arteries get occasionally plugged by a portion of fibrin has been already described.

For the further consideration of this subject the reader is referred to the article on *Apoplexy*, in the section on Diseases of the Nervous System.

3. Otorrhagia.—Hemorrhage from the ears, or otorrhagia (from *οὖς*, the ear, and *ῥήγνυμι*, to burst out), arises from many different causes. The chief are the following: 1. *Fracture of the base of the skull*, by which a communication is established between the sinuses of the dura mater and the middle ear. The membrana tympani being ruptured, the blood escapes externally. If both petrous bones be injured, there will be hemorrhage from both ears. The occurrence of bleeding, on one or both sides, is generally regarded as a symptom of very unfavorable import. 2. *Wounds and ulcerations of the auditory canal;* whether produced by earpicks or other instruments, insects, foreign bodies voluntarily introduced, or old hardened ceruminous concretions. 3. *Granulations, polypi, and abscesses of the auditory canal.* 4. *Caries and necrosis of the petrous portion of the temporal bone, with destruction of the membrana tympani.* If the walls of the carotid canal be involved, a spiculum of bone may wound the internal carotid artery, and cause fatal loss of blood. 5. *Rupture of the membrana tympani;* which may occur during the ascent of high mountains, or in the descent of low valleys, or in going to any great depth in a diving-bell, &c.; during violent sneezing or vomiting; or during a paroxysm of hooping-cough or asthma. In these cases the air is violently forced through the Eustachian tube into the tympanum, the delicate membrane of which gives way where it is least capable of offering resistance—near the insertion of the handle of the malleus. And 6. *It may be a vicarious hemorrhage,—i. e.*, it may replace the catamenia, or a long-continued bleeding from piles or old ulcers.

4. Epistaxis.—Probably every one remembers the frequency with which, in his school-days, he suffered from a "bloody nose," and the famous plans by which old ladies were wont to cure it. Unless this bleeding comes on during the progress of some disease—as hooping-cough, &c.—it is seldom troublesome in youth.

But epistaxis (*Ἐπιστάζω*, to drop upon) often gives rise to much anxiety when it occurs in advanced life. If there be a tendency to apoplexy, or if the patient be afflicted with heart-disease, the bleeding may prove beneficial. This is by no means the case, however, when it sets in during

the progress of disorders which injure the quality of the blood; as in renal and hepatic diseases, in fever, scurvy, purpura, &c. Exhausting epistaxis may be the immediate cause of death in cases of leucocythemia, when this affection is approaching a fatal termination.

The bleeding seldom takes place from both nostrils; and it may be continuous, or it may cease and return after an uncertain interval, or it may happen periodically. The blood may flow in drops, or in a complete stream; while it may not only come from the nostrils in front, but may pass posteriorly into the mouth and fauces. In adults, males suffer from it more often than females. It may be caused by direct violence, by whatever obstructs or greatly quickens the circulation, by morbid states of the blood, by congestion of neighboring parts, by the suppression of some habitual discharge, as well as by polypus and disease of the pituitary membrane.

In the *treatment*, care must be taken to discriminate between those cases where interference is requisite, and the contrary. Supposing the aid of our art is needed, it will be better to have the patient sitting upright in a cool apartment, and with the neck unconfined by collars, &c. Dr. Négrier says he has always found the bleeding arrested by making the patient raise one or both of the arms above his head, and letting him hold them in that position for some time. This simple plan failing (as I have mostly found it do), cold applied to the neck and back may, by reflex action, check the discharge; or cold water, or ice, may be applied directly over the nose and forehead. In urgent cases I have successfully swabbed the nostril with a saturated solution of perchloride of iron; and have likewise seen injections of infusion of matico, or of alum and water, or of the tincture of perchloride of iron and water, or of the iron alum in solution, do good. Plugging the nostril with charpie, or with cotton wool soaked in some astringent lotion, often succeeds; and so does the passage of a styptic rod made with equal parts of tannin and cocoa butter (F. 424). But these expedients proving useless, the posterior orifice of the nostril must be plugged; a proceeding, however, which is very annoying to the patient. It is easily accomplished by introducing a gum elastic catheter, with a piece of waxed twine passed through its canal so as to project at the eyelet-hole, along the nostril into the pharynx; the end of the ligature being then brought through the mouth with a pair of forceps, and made tight to a piece of sponge. By removing the catheter and pulling the nasal end of the twine, the sponge plug will be firmly drawn into the posterior nares; from which position it should not be removed for forty-eight hours.

With regard to internal remedies, the condition of the patient must be our guide in selecting either mercury, or gallic acid, or the ammonio-sulphate of iron, or the tincture of perchloride of iron, or turpentine (F. 27, 50, 101, 102, 103. 116, &c.). Sometimes mild laxatives (F. 142, 143) may be used; or if there be any liver derangement, nitric acid and taraxacum (F. 147) will do good. The diet is to be nourishing, with a fair amount of potatoes, water-cresses, and ripe succulent fruit.

5. Stomatorrhagia.—Discharges of blood from the mouth and throat (stomatorrhagia—from *Στόμα*, a mouth, and *ῥήγνυμι*, to break out), seldom give rise to any trouble, except when they occur during the last stages of scurvy or purpura, or after the excessive use of mercury. In

some few instances the small veins about the inside of the cheek and pharynx become varicose; and should their walls rupture, severe or fatal bleeding may result. Ulcers about the tongue and fauces rarely bleed much; but once or twice glossitis terminating in gangrene has produced hemorrhage which has only ceased with death.

Dr. Condie, of Philadelphia, has recorded a case where the blood flowed from the mouth in a stream, and on the gums being wiped with a sponge, it "was seen to start up at every pore from the whole surface." Now, this would by many be regarded as an example of *hemorrhage by exhalation;* just as the occurrence of cutaneous bleeding, where the blood appears like a dew upon the skin, has been explained. But in all these cases there is simply an exudation of serum colored by the red matters of the dissolved or ruptured blood-corpuscles.

It is worthy of note that prisoners, malingerers, hysterical females, and others, often feign hæmoptysis by pricking their gums, sucking out the blood, and mingling it with saliva and phlegm. This imposition will be readily detected on examining the mouth, as well as by noting the absence of all signs of thoracic or abdominal disease.

The *treatment* of stomatorrhagia must be conducted on the general principles already laid down. Medicines need not be administered unless the use of a cold astringent wash fails to stop the bleeding.

6. Hæmoptysis.—The term hæmoptysis (*Αἷμα*, blood, and *πτύω*, to spit), may be applied to those cases where the blood escapes through the mouth from the larynx, trachea, bronchial tubes, or air-cells of the lungs. Sometimes the blood is poured into the lung tissue without any external discharge, and then the disease is generally spoken of as *pulmonary apoplexy.*

In by far the greater number of cases hæmoptysis is merely symptomatic of tubercular phthisis; though it may also, and not unfrequently, be due to disease of the heart—especially of the left cavities—impeding the return of blood from the lungs. Very rarely it may arise from some ulceration of the air-passages; from inflammation, abscess, gangrene, or cancer of the lung; from the detachment of fibrinous casts of one or more of the small bronchial tubes; from aneurism of the great vessels; while, lastly, in females, it may be connected with some irregularity or suppression of the catamenia, though I have seen no cases of this kind where there was not reason to suspect tuberculosis. When there exists a predisposition to this form of hemorrhage, it may be immediately brought about by anything which hurries the circulation, by congestions of various important organs, by violent coughing, playing on wind instruments, ascending high mountains, tight lacing, &c.

The discharge, when proceeding from the lungs, is often preceded by pain or oppression in the chest, a sense of heat and soreness beneath the sternum or between the shoulders, lassitude and mental depression, flushings of the face, a salt taste in the mouth, dry cough, dyspnœa, and palpitations; while sometimes I have noticed that there has been a complete absence of premonitory symptoms, with the exception of a slow pulse. The quantity of blood which may be expelled varies from a streak on a pellet of mucus, or a minute clot or two, to one or many pints; and the blood is generally frothy, of a bright florid hue, and is expectorated with more or less coughing. When, however, the bleeding

is excessive, it is often gulped up or vomited. Occasionally the diagnosis will be aided by shaking out the clots in water, when they may be found distinctly branched and forming casts of the bronchial tubes. Hæmoptysis occurs in about two-thirds of all the cases of phthisis, and it does so under two circumstances. Thus, it may happen from the active congestion of the first stage of tubercular deposit causing rupture of one or more small vessels, when it is to be regarded more as a warning of coming mischief, than as a proof of the lung being irremediably injured: or it may take place when the tubercles have begun to soften, and the coats of some vessel have been destroyed by the spreading of the ulceration. The hemorrhage very rarely destroys the patient at once; though in the cases which I have watched, it has certainly seemed to hasten the fatal termination of phthisis.

Many examples of aortic aneurism have been reported where there has been rust-colored expectoration; or where the sputa have been tinged with bright blood; or where there have been one or more gushes of blood, for weeks or even months before the disease has proved fatal by complete rupture, or by inducing laryngeal suffocation from pressure of the sac on one or both recurrent nerves. In the well-known case of Mr. Liston, hæmoptysis to the extent of many ounces occurred in July, 1847; after which there was a freedom from almost all symptoms until October, when cough set in with rusty sputa. Death took place in December, 1847. At the autopsy there were found three or four perforations of the trachea; the openings having become blocked up with portions of the aneurismal clot.

In *pulmonary apoplexy*—an absurd name, for there is no sudden stroke, no loss of sensation or power of motion—the blood is effused into the air-cells and pulmonary tissue, where it coagulates. There are two forms of this affection: one where the effusion is *circumscribed*, and we find small, hard masses in the substance of the lungs, varying in size from a pea to a small orange; the other, in which the blood is *diffused* through the broken-down pulmonary tissues. Pulmonary apoplexy most frequently arises from diseases of the heart, particularly of the mitral orifice; but it may be due to some affection of the pulmonary tissue or vessels, or to such an impoverished state of the blood as occurs in scurvy, fever, &c. Sometimes the internal bleeding is attended with spitting of blood. If only a small quantity be extravasated, the patient recovers; but if the loss be excessive, symptoms of internal hemorrhage with great dyspnœa will manifest themselves, and most probably end fatally. Auscultation often tells us nothing in these cases. Nevertheless, if we can fortunately listen before the blood coagulates, we perhaps may find large crepitation from the air-bubbles passing through the fluid and bursting; while subsequently there will be dulness on percussion, with absence of all respiratory murmur in the affected portion.

But few special remarks are called for on the *treatment* of hæmoptysis. The hemorrhage should always be checked as quickly as possible; and for this purpose, after enjoining strict quiet and rest in bed with the head and shoulders elevated, and an unstimulating diet with cold drinks, I have found no remedy so efficacious as gallic acid. This agent should be given in the proportion of ten or fifteen grains every two, three, or four hours, according to the urgency of the symptoms; sometimes commencing with thirty grains for a dose in five or six ounces of water, with

half a drachm of the aromatic sulphuric acid. When there are indications of great anæmia, from five to ten grains of the ammonio-sulphate of iron (F. 116) may be preferable to the gallic acid. Sucking Wenham Lake ice does great good; and occasionally the application of cold over the chest is useful, though the effects of this practice must be watched. Some authorities state that a teaspoonful of common salt dissolved in a little water, or taken dry and swallowed as best the patient can, seldom fails to stop the bleeding for a time; others advise bleeding, leeching, antimony, or digitalis; some prefer the ergot of rye, or turpentine, or emetics of ipecacuanha; many, again, recommend dry cupping over the chest, or the application of turpentine stupes; and a few speak highly of the use of a ligature round the limbs, so as to impede the return of blood through the veins. To prevent the recurrence of the bleeding, we must relieve any cough which may be present by anodynes—especially by morphia; and then endeavor as much as possible to improve the general health.

7. Hæmatemesis.—This term, signifying strictly vomiting of blood (*Αἷμα*, blood, and *ἐμέω*, to vomit), is generally employed to denote hemorrhage from the stomach. The blood is usually vomited in large quantities, is not frothy, is sometimes mixed with food, and is often of a dark color from admixture with the hydrochloric acid of the gastric juice (all acids blacken the blood). Hence it presents marked differences from the blood in hæmoptysis; which is brought up by coughing in mouthfuls at a time, is of a florid red color, is frothy, and is mixed with sputa. Moreover, in hæmoptysis the hemorrhage is generally preceded by cough, dyspnœa, tickling in the throat, and a peculiar sensation in the thorax.

To make the distinction more clear these signs may be thus tabulated:

In *hæmoptysis:*	In *hæmatemesis:*
Dyspnœa; pain in chest.	Nausea; epigastric tension.
Blood coughed up in mouthfuls.	Blood vomited profusely.
Blood frothy.	Blood not frothy.
Blood of a florid red color.	Blood dark colored.
Blood mingled with sputa.	Blood mixed with food.
Absence of melæna.	Melæna very common.
Bronchial or pulmonary symptoms.	Gastric or duodenal symptoms.

Hæmatemesis may occur without any appreciable cause; or it may be vicarious of some other hemorrhage, especially of the catamenia; or it may result from changes in the blood itself, as in scurvy; or it may arise from aneurism of one of the abdominal vessels, the sac communicating with the bowels;* or it may be owing to congestion of the

* Dr. Gairdner has recorded (Clinical Medicine, p. 495. Edinburgh, 1862) an instructive example of aneurism of the superior mesenteric artery; which opened into the duodenum twenty-two months before death, causing repeated and very copious hæmatemesis. The symptoms and history closely resembled those of gastric ulcer. And there was this remarkable circumstance, that between the patient's admission (she was a servant girl, sixteen years old) into the Edinburgh Royal Infirmary on the 4th January, 1848 and her death on 28th November, 1849, complete convalescence took place. This was somewhat interrupted by an ulcer on the leg, amenorrhœa, and dyspepsia; but the hæmatemesis did not recur after the 7th February, 1848. On the day of her death she fell down suddenly in the street with an attack of syncope. At the autopsy it was found that the aneurism had burst into the peritoneum, in the cavity of which more than 3 lbs. of blood had been extravasated. The duodenal opening was closed.

stomach from some impediment to the free passage of the blood, such impediment being due to disease of the heart, liver, &c. But its most direct cause is either passive congestion of the walls of the stomach, or simple or malignant ulceration. In simple ulceration, the blood most frequently comes away slowly, in small quantities, and often after a meal; though sometimes a large vessel is laid open, and a gush of blood takes place which may prove fatal. So also in the ulceration of a cancerous mass the bleeding is usually slight. When from any causes the extravasation is moderate, the vomited matters are said to resemble "coffee grounds."

Hæmatemesis is more common in women than in men. It is generally preceded by a feeling of oppression and weight, by dull pain or tenderness in the epigastric and hypochondriac regions, as well as by a sense of anxiety and faintness. Often there is only nausea, dizziness, and depression of the pulse. The hemorrhage commonly produces great depression, owing partly to alarm, and partly to the quantity of blood lost.

In gastric hemorrhage, the blood frequently passes into the intestines, and is voided per anum; or part may be vomited and part expelled with the fæces. When the intestinal evacuations contain blood, whether this comes from the vessels of the stomach or only from those of the intestines, the patient is said to be suffering from *melæna* (*Μέλας*, black). As this name implies, the evacuations are often black, and sometimes resemble tar; but the dark appearance is by no means constant, and does not occur if the blood comes away too quickly to be acted upon by the intestinal juices. Cirrhosis of the liver, or any disease which produces obstruction of the portal system, necessarily gives rise to congestion of the gastric and intestinal veins; a condition which often terminates in the extravasation of large quantities of blood that are expelled with the stools. Amongst the other less common causes of melæna may be mentioned enteritis, dysentery, intussusception, simple and carcinomatous ulcerations, aneurismal and other tumors, &c. It must not be confounded with bleeding from the rectum, owing to the presence of a polypus or of hemorrhoids.

The *treatment* of acute hæmatemesis should consist in enjoining abstinence from food, perfect rest, with the horizontal posture; while cold acidulous drinks, ice and gallic acid may also be prescribed. The oil of turpentine is thought by some to be a specific. In one case, a single dose of a concentrated solution of the perchloride of iron (one teaspoonful in glycerine) effected a cure. Cold to the epigastrium is occasionally useful. If the patient be prostrated, enemata of beef-tea with port wine or brandy and a little opium will do much good.—Where the bleeding is chronic, or when it is continuous but slight in amount, the mineral acids with bark (F. 376) will often do more real service than any other remedies. Quinine and iron, however, prove very valuable in some instances (F. 380). Cream, raw eggs, essence of beef, and perhaps cod-liver oil, ought also to be allowed.—In cases of melæna, where there is no gastric disease, active purging will be necessary; and hence a full dose of calomel and jalap or of podophyllin (F. 140, 160) should be given, followed by the common black draught or castor-oil. Subsequently the mineral acids with bitters (F. 378) may be tried.

8. Hæmaturia.—Hæmaturia (*Αἷμα*, blood, and *οὖρον*, urine), or hemorrhage from the mucous membrane of the urinary passages, may proceed from the kidneys, bladder, or urethra. It is common in the early stages of those forms of renal disease which arise from a morbid state of the blood; hence, as we shall see by and by, it is a frequent result of acute desquamative nephritis. It may also arise from malignant disease of the kidney or bladder; from the presence of a calculus either in the kidney, ureter, bladder, or urethra; or from renal inflammation, as well as from cystitis. A blow over the loins has caused it; and irritating medicines, as oil of turpentine and cantharides, may also produce it. Occasionally it sets in during the course of rheumatic fever, pneumonia, continued fever, malignant small-pox, scurvy, &c., just as epistaxis does.—I have more than once seen urine contaminated with the menstrual discharge mistaken for hæmaturia; and therefore in a case of suspected renal disease the practitioner should not venture on giving an opinion while the woman has her courses on.

Urine containing blood in comparatively small quantity will be found of a peculiar smoky hue, or even of a black color (owing to the action of the acid of the urine on the hæmatine), and loaded with albumen. If the escape of blood be free, the color may vary from a port-wine hue to a bright arterial tint. The *distinction of renal from vesical hemorrhage* is important. Dr. Prout states that when the "blood is derived from the *kidney*, it is in general equally diffused throughout the whole urine; on the contrary, when derived from the *bladder*, the blood for the most part comes away in greater or less quantity at the termination of the discharge, the urine having previously flowed off nearly pure." Dr. Watson has also remarked that the expulsion of slender, cylindrical pieces of fibrin, which have evidently been moulded in the ureter, is characteristic of hemorrhage from the kidney or commencement of the ureter. Moreover, in hemorrhage from the kidney, the urine on being examined microscopically is sometimes found to contain casts of the renal tubes formed of coagulated blood (often spoken of as *blood-casts*); while there is also seen the delicate round renal epithelium, with casts composed of epithelial cells and blood-corpuscles.—When the bleeding is from the bladder, the blood-corpuscles are observed mixed with the flat scaly vesical epithelium; and the urine contains also more or less muco-purulent matter. Supposing malignant disease to be the cause, cancer-cells will not unfrequently be found in the urine, and so decide the diagnosis.—If there be one or more calculi the hemorrhage will be lessened or entirely checked by rest, and increased or reproduced by any jolting exercise.—While when the blood comes away in drops or in a stream, unmixed with urine, the urethra is in all probability its source.

A peculiar form of hæmaturia is sometimes met with in Egypt, Southern Africa, and the Mauritius, which is probably due to the Distoma hæmatobium. The eggs of this parasite are to be found in the urine, and sometimes the perfect entozoon may be discovered. The parasite is probably introduced into the system by drinking the waters of the district without filtering them.

The *treatment* will vary with the circumstances under which the hemorrhage occurs. Where there is malignant disease, or a calculus present, astringents may be resorted to; the best being the tincture of

the perchloride of iron, gallic acid, Ruspini's styptic, the diluted sulphuric acid, &c. The fear of causing strangury must prevent the use of turpentine. Where there is some morbid poison in the blood, or actual renal disease, we ought to rest the kidneys, and promote elimination by the skin and bowels; for which purpose hot-air baths, simple warm baths, and purgatives, will prove the most effectual. Hemorrhage from the urethra may often be checked by the application of ice, or by passing a large bougie, and leaving it in the passage for some hours. Lastly, in vesical hemorrhage, a solution of alum or of tannic acid may be injected into the bladder; while the iron alum can often be advantageously administered at the same time.

9. Menorrhagia.—Hemorrhage from the uterus is a symptom of so many different diseases, that, to consider it properly, one ought to write a treatise on the various functional and organic derangements of this organ. Strictly speaking, the term menorrhagia (*Μῆνες*, the menses, and *ῥήγνυμι*, to burst out), should only be applied to cases of increased menstrual flow; but very often it is employed to signify any sanguineous discharge from the uterus other than the normal monthly escape.

The *catamenia may be abnormally increased* from conditions which produce attenuated blood; as tuberculosis, granular degeneration of the kidneys, affections of the spleen, anæmia from prolonged lactation, &c. Another common cause is excessive congestion of the ovary and uterus during the maturation and escape of the ovule. The same result also ensues from any great excitement at the monthly period, or excessive sexual indulgence at other times; from metritis and ovaritis; from the hemorrhagic diathesis; as well as from such relaxation of the uterine tissue as is often associated with abrasion of the lips of the cervix.—The diseases which give rise to *uterine hemorrhage* are principally cancer, fibrous tumors or polypi, inflammatory diseases of the cervix, and the presence of moles in the cavity of the uterus; affections which may merely increase the catamenial flow, or which may produce frequent attacks of bleeding—sometimes so severe as to amount to flooding. The practitioner must also remember the frequency with which hemorrhage proves to be the precursor of abortion; as well as the constancy with which it indicates more or less separation of the placenta—perhaps owing to placenta prævia—in the latter months of pregnancy.

In making a few remarks on the *treatment* of these cases, it will be necessary to confine them to the steps to be adopted for controlling the hemorrhage; since the proceedings required for removing its cause will hereafter be treated of. At once, therefore, it may be said that astringents are the remedies chiefly to be trusted to; and the best of these are gallic acid and cinnamon, either alone or in combination, or with the aromatic sulphuric acid (F. 103, 104). Where any inflammatory action exists, mercury will be the best agent to employ; and, as before mentioned, I prefer the solution of corrosive sublimate (F. 27). The ergot of rye has no styptic property, but when the bleeding is due to a flabby state of the uterus, it may do good by inducing contraction. When there is anæmia, the ammonio-sulphate of iron is very efficacious (F. 116). Occasionally we meet with cases where the discharge of blood is excessive, though we can detect no cause for it, and where no kind of astringent or tonic has the least effect. In such I have

found most benefit from corrosive sublimate, or some other preparation of mercury; the infusion of digitalis, in half-ounce or ounce doses, as strongly recommended by Mr. Dickinson and Dr. Robert Lee, having given me nought but disappointment.

The local remedies to be resorted to are of considerable importance. They consist of either the application of cold over the pubes, and the passage of ice up the vagina; or the use of strong vaginal injections of tannic acid or infusion of matico; or the employment of astringent vaginal pessaries (F. 423); or the use of galvanism where there is a want of muscular contraction; or the introduction of sponge-tents into the os uteri (F. 426); or of plugging the vagina firmly with some soft material like cotton-wool, or a sponge soaked in vinegar. In many instances where there has been troublesome hemorrhage from the interior of the uterus, I have succeeded in stopping it with the styptic rod of tannin and cocoa butter (F. 424). The passage of this rod into the uterine cavity is easily accomplished; and in no case has its retention and dissolution in the uterus produced any unpleasant symptoms.

VIII. INFLAMMATION.

Every part of the body is liable to inflammation (*Inflammo*, to burn), and much of the premature extinction of human life is due to it. Hence a knowledge of the various phenomena of this morbid process—their causes, relations, and effects—may be said to be the master-key to the comprehension of the nature of disease.

Now although inflammation is here spoken of as "a morbid process," it is not to be inferred that its effects may not frequently be most salutary. By it morbid poisons are gradually expelled from the system, wounds which do not unite by the first intention are healed, fractured bones become firmly knitted together again, and so on. A portion of skin, as in the case of a boil, inflames and degenerates and dies; yet the inflammatory process, by its continuance, not only leads to the casting-off of the slough, but also to the reproduction of healthy tissue.

No useful or indeed correct definition of inflammation can be given at present. It may only be said that it is sometimes a destructive, sometimes a formative process; and that it consists essentially of local congestion and stagnation of blood, with an exudation of liquor sanguinis.

Causes.—Inflammation occasionally arises unexpectedly, and from causes unknown. In other instances it will be found to have been produced by some mechanical or chemical irritant, or by cold, or some morbid poison in the system, or contagion, or metastasis. It is now admitted by many as probable that inflammation is not an affection of the capillaries, nor an altered state of the nerves, nor a change in the blood; but that it is a form of abnormal nutrition—that where it has its seat, the series of changes by which the tissue is renovated is deranged. It is said to be *acute* when it runs its course rapidly, and is attended with severe constitutional and local disturbance; *chronic*, when its phenomena are less strongly marked. *Subacute* inflammation is marked by symptoms which are intermediate between acute and chronic,

and which do not attain any great severity. By some authors the term *latent* has been applied to those cases in which internal inflammation proceeds silently and treacherously, and without manifesting signs by which its existence might be suspected. And then there are certain *specific* inflammations, examples of which may be seen in scrofula, gout, rheumatism, the exanthemata, &c.

Pathology.—The study of the pathology of this complex morbid process shows that it consists in a derangement of the normal nutritive changes, leading to loss of function in the elements of the tissue involved.—"The conditions of the healthy maintenance of any part by nutrition, are," observes Mr. Paget,* "1st, a regular and not far-distant supply of blood; 2d, a right state and composition of that blood; 3d (at least in most cases), a certain influence of the nervous force; and 4th, a natural state of the part in which nutrition is to be effected. All these are usually altered in inflammation." The *supply* of blood is increased; the vessels are dilated and elongated, so that such as were previously invisible come into view, owing to their distension with red corpuscles; there is a tendency to stagnation—not coagulation—of the blood in many of the turgid vessels; and when lymph is effused, and begins to be organized, new vessels are formed in it. Every student, in the pursuit of microscopic investigations, has watched with delight the circulation in the healthy web of the frog's foot; and doubtless must have noticed that as the blood flows through the vessels the red corpuscles are most abundant in the middle of each stream, being surrounded by liquor sanguinis. On applying a drop of any irritant to the web, however, the stream gets more loaded with the blood-cells, the clear margin of liquor sanguinis gradually disappearing; while coeval with this, the rate of movement lessens. As the work of the irritant becomes more appreciable to the tissue, these two conditions (increase of cells and diminution of circulation) become more and more manifest, and the vessels enlarge; until at length there is *stagnation* or "*stasis.*" Around this area of capillary stasis there may be seen *congestion*,—a condition differing from stagnation only in degree; while outside this, again, there is *determination*,—fulness and rapid movement of blood. Then, as the result of this, we know that the liquor sanguinis exudes through the walls of the vessels; or sometimes even the coats rupture, and extravasation of blood-corpuscles ensues.—Again, in inflammation, the *purity* of the blood is more or less disturbed; the fibrin is probably increased, so is the water, so—sometimes—are the white corpuscles; while the red corpuscles are diminished, and when drawn from the vessels have a tendency to cluster into masses very rapidly.—The *nervous force* is not normal; but how it is changed we no more know than we can explain how it operates in ordinary nutrition.—And, lastly, the *healthy condition of the part itself* is altered in the inflammatory state; such change being due to more or less degeneration from hindered nutrition, as well as to the penetration of the inflammatory product into the elemental structures and the interstices between them.

Symptoms.—For some eighteen centuries, the distinctive external marks of the inflammatory process have been said to be the combina-

* Lectures on Surgical Pathology. Second Edition, p. 219. London, 1863.

tion of pain, swelling, heat, and redness: "Notæ inflammationis," says Celsus, "sunt quatuor, rubor et tumor, cum calore et dolore." The antiquity of this formula, however, must not lead to its too rigid adoption. In some of the cases which come under the physician's notice such a combination of phenomena is absent; while not only is this so, but occasionally we may be unable to discover any one of them. Pericarditis in an aged person, for example, may run its course without giving rise to pain or any appreciable increase of heat; while after death, though no one of the symptoms may perhaps have been detected, yet unmistakable evidence of inflammatory action is shown in the presence of an excessive exudation of liquor sanguinis.

Then we speak of the constitutional symptoms as consisting of a remarkable buffiness of the blood, and fever. As regards the *blood* it will be found when drawn from the body to exhibit, after standing and coagulating, the *buffy coat; i. e.*, the upper part of the clot will consist of fibrin unmixed with red corpuscles. It must be remembered, however, that this appearance is not characteristic of inflammation; for it generally arises when, from any circumstance, the fibrin coagulates more slowly, or the corpuscles subside more rapidly, than in healthy blood. It is also frequently found in the blood of plethoric persons, and in that of pregnant women. Sometimes the surface of the buffy coat is contracted and concave; the blood is then said to be buffed and cupped.—As soon as the inflammatory action reaches to a certain degree, the nervous and vascular systems become affected; the general derangement which ensues being spoken of as *inflammatory* or *symptomatic fever*, or as *constitutional disturbance.* This fever manifests itself by depression, chilliness followed by heat, frequency of pulse, headache, a furred tongue, thirst, and loss of appetite. Sometimes the chilliness amounts to shivering; and it is generally allowed that the onset of spontaneous inflammations is more frequently attended with rigors, than that of inflammation due to external injury. The intensity of the inflammatory fever will depend upon the nature of the tissue affected, the extent of the mischief, and the constitution of the patient. It is sometimes so slight as to escape notice; though always well marked when the nervous and circulating systems have not previously been enfeebled by disease or age.—The chemical examination of the *urine* shows a certain variation from the normal composition. Thus, the *chlorine* being chiefly derived from the chloride of sodium taken with the food, its amount will of course depend on the quantity of salt thus consumed. Hence in acute inflammatory diseases where there is always complete anorexia, we should expect to find the chlorine constantly diminishing, until the morbid action has reached its highest point; an increase occurring as restoration to health gradually takes place and the power of assimilating food returns. Accordingly this is what really happens in all acute diseases, except in the case of intermittent fevers. According to Neubauer and Vogel, the secretion of chlorine is usually increased during the paroxysms of these fevers, and sometimes for a short time after them: though the mean daily quantity is somewhat less than normal. (See the sections on *Intermittent Fever* and *Pneumonia.*) In chronic disorders, the quantity of chlorine will likewise depend on the amount and nature of food taken, the strength of the digestive organs, and the non-separation of it from the body by

watery stools, &c. Extra mental or bodily labor will also temporarily increase the secretion of chlorine.—The amount of *urea* secreted with the urine depends upon the extent of the tissue metamorphoses. Hence at the commencement of most acute febrile diseases the quantity is generally increased, although the patient has no animal food. After the disorder has reached its acmé, the amount becomes less than normal; but it increases as convalescence gets established.

When the inflammation goes on to suppuration, the commencement of this event is commonly marked by the occurrence of shivering, and the constitutional disturbance is then called *hectic fever;* the leading symptoms of which are frequency and weakness of pulse, alternations of chilliness with heat and flushing followed by sweating, an excessive wasting of the body, and daily increasing debility. Hectic fever also accompanies other diseases, as phthisis, dysentery, &c.

Termination or Effects.—The most favorable termination is *resolution*,—the complete restoration of the part to its normal state. The term *delitescence* is sometimes employed when the phenomena disappear suddenly and rapidly. If the inflammation only change its seat from one part to another, there is said to be *metastasis.*

Then the effects of this process may be *formative;* that is to say, new particles, granules, or cell-growths result, which are susceptible of further development. In this way we have serous effusions, varying in quantity from a few drachms to many pints; blood effusions, chiefly arising from the rupture of new vessels in freshly formed material; and the exudation of coagulable lymph or fibrin, which may become a nidus-substance for the growth of new elements. On the contrary, the effects may be *destructive;* as suppuration, when pus-cells are developed from the elements of the degenerating tissue; ulceration, a progressive softening and disintegration of successive layers of tissue; and sloughing, gangrene, sphacelus, or mortification.

When inflammation attacks the areolar tissue, all the results of inflammatory action may occur. So also when the larger glands and the solid viscera of the body suffer. In inflammation of the serous membranes we expect there will be exudation of serous fluid, and coagulable lymph or fibrin—in other words, that it will prove adhesive inflammation. The synovial membranes are less liable to this disease than the serous, and coagulable lymph is seldom poured out. The mucous membranes are rarely affected by the adhesive form of inflammation; but when attacked the inflamed membrane pours out serous fluid, or viscid mucus, or pus, or blood—as is well seen in pneumonia, when the extravasated red corpuscles give a rusty tinge to the sputa.

Treatment.—The general principles only admit of being laid down, so extensive is the subject; but their importance is such that they deserve attentive consideration. In the commencement the cause of the inflammation should, if possible, be removed. Attempts may then be made to obtain resolution; or, if this seems impossible, the next best termination, which, in cases of external inflammation, will generally be suppuration; in internal, sometimes suppuration, sometimes adhesion. The important point, then, for consideration is this: How are these desired results to be best attained? For very many years but one answer has been given to this question. The reply has been—by the adoption of the *antiphlogistic regimen;* which consists essentially in the use of

low diet, bloodletting, active purging, counter-irritation, mercury, and antimony. It is to be feared that such remedies still find favor with some practitioners; but I cannot help thinking that the more closely disease is studied, the smaller will become the number of the upholders of these devitalizing agents. My reasons for this opinion are—that when an inflammation is established it is not possible to cut it short; that general bleeding, unless carried to a very dangerous extent, will not sensibly diminish the amount of blood in an inflamed part; that bleeding will not render an impure blood pure; that depressing agents favor the extension of the morbid action, and deprive the system of the power of rallying from the effects of the disease; that in many instances of inflammation there is depressed nervous power, and impaired action of the heart; and that in all cases a lowering plan of treatment is found to be very badly borne in the present day, whatever may be said to have been the case in former times.

It is a favorite theory with some pathologists that inflammation, as we now see it, is of a different type to that which formerly existed; perhaps being more readily excited by mal-nutrition, being more prostrating, and possibly being more dangerous to life through its incapacitating the system for the same degree of reaction as that which formerly followed an attack. In other words, the febrile symptoms accompanying inflammation are said to have altered from an inflammatory to a typhoid character. This view has been ably suggested by Dr. Alison.* On the contrary, it is well disputed by Professor J. Hughes Bennett;† who believes that inflammation is the same now as it has ever been, that the analogy sought to be established between it and the varying types of fever is fallacious, and that bloodletting and antiphlogistic remedies have been all along opposed to a sound pathology. As these opinions cannot be discussed with sufficient fulness in these pages, I would especially recommend the perusal of Dr. Alison's and Professor Bennett's very admirable essays to my readers. At the same time it is right to say I agree with the conclusions of Dr. Bennett; being unable to see, that because the type of epidemic disorders varies, as it has always done, therefore that of organic diseases should do so.—Tubercular affections, the special result of deteriorated constitutional powers, are not more rife than they were. On the contrary, taking into consideration the increase of the population, the Reports of the Registrar-General for the last ten years show a decline in their mortality to some extent in England.—Count Cavour died at the age of fifty from over-work, though it is much to be feared bleeding had much to do with his premature death. "Like most Italians, he firmly believed in the efficacy of bleeding, and was accustomed to be bled in every case of illness."‡ Just one week before his death, after walking about his estate at Leri, he got chilled; and not feeling better the next morning, had himself bled. On the following day he was also bled, apparently without advice; and then on the next day but one, he again lost blood by the wish of his physician. The death of this statesman seems to have directed the general attention of his countrymen to the subject of bleeding. And this attention was not given too

* Edinburgh Medical Journal, May, 1857. † Idem, March, 1857.
‡ Cavour. A Memoir. By Edward Dicey. Second Edition, p. 234. London, 1861.

soon; for in 1861 the lancet appears to have been as freely used in Italy as it was formerly in England, when some of our hospital out-patient rooms were compared to slaughter-houses. Dr. Borelli, in particular, has attempted to show his confrères that the depletory treatment of disease is injurious; and, in some articles contributed during 1863 to the Sardinian "Gazetta Medica," he accounts for the necessity of substituting tonics and restoratives for antimony and purgatives and bleeding, by adopting this convenient change of type theory. Hence it becomes necessary for the supporters of this hypothesis to allow, that while disease in Great Britain has undergone this change some fifteen or twenty years since, it is only in the present day that it has done so on the Continent.*—And moreover if Dr. Alison be correct in all his assumptions, we must grant that not only the type but the cause of disease has changed: since, if we are to place implicit reliance upon the experience of Cullen, Gregory, Mason Good, and others, upon some points on which they are likely to have erred from the imperfection of the means of diagnosis, we surely must credit their statements where simple observation alone was necessary. Yet, only fifty years ago—to take one example from many—inflammation of the brain was supposed to be the constant cause of insanity; and the greatest men of the day believed that it invariably required lowering measures. At Bethlem Hospital the system of treatment consisted of bleeding, purg-

* The discussion very much resembles that which has often taken place as to the stature and strength of men at different epochs. Dr. Graves (Studies in Physiology and Medicine, p. 180, London, 1863) remarks upon this curious fact,—"That from the most remote ages there has existed a singular propensity among mankind, to disparage the size of their contemporaries, and to represent it as diminutive, when compared with that of preceding generations. We find traces of this opinion in the works of various writers from the time of Homer and Hesiod down to the present period; indeed this is carried so far in the ancient authors, that whenever an old man speaks of the stature and physical powers of men it is only for the purpose of descanting on the degeneracy of the human race, and of referring, with much complacency, to the feats of superior strength and activity which he witnessed among the tall and athletic companions of his youth. That this opinion is not borne out by facts, is proved by the measurement of human bones found in the most ancient burial-places, by considering the stature of the Egyptian mummies, by the examination of ancient armor, and lastly, by the inspection of the buildings designed for the abode and accommodation of mankind in former ages." And again the same author observes,—"With respect to the strength of men, the same opinions have prevailed as with regard to size and stature. It has been asserted, that the men of the present time have degenerated from the vigor of their ancestors; and it is also maintained, that civilized man is inferior in strength to the savage who roams the wilds of Africa or America. Neither of these opinions appears to be well founded; bodily strength is the result of health, exercise, and a proper supply of wholesome food."

The reader who feels any interest in this strange controversy may also refer to the writings of Geoffroy Saint-Hilaire. He tells us (Traité de Tératologie, tome i, p. 170, Paris, 1832) that, in 1718, Henrion, a zealous supporter of the view that the men of ancient times were of larger stature than their present descendants, formed a table or chronological scale of the variations of the human stature from the Creation to the Christian era. According to this Adam was 123 feet 9 inches high, and Eve 118 feet 9 inches and 9 lines; Noah was 20 feet lower than Adam; Abraham was between 27 and 28 feet in height; Moses 13 feet; while Hercules measured 10, Alexander 6, and Julius Cæsar 5 feet. The human race thus progressively diminishing, were it not for the interposition of Providence, would have dwindled to the size of microscopic beings by this time. These reveries of the learned Henrion were founded on the tradition of the Rabbins, according to which Adam was at first 900 cubits high; but after he had sinned, God caused a considerable diminution of his size.

ing, and vomiting in the spring months. "A certain day was appointed on which the patients were bled, another when they were purged, another when they were vomited. They were bled in May and again in June; *the precise time depended on the weather.* All this had been the practice for many years, and no better practice, it was stated, was then known."*

Again, for how many years were the sympathetic disorders of pregnancy attributed to plethora and bleeding resorted to, when in fact they were due to anæmia. Yet no one will argue that the blood of a woman with child is different now to what it was fifty years ago. The experiments of Andral and Gavarret showed that the mean normal proportion of blood globules is about 127; that the essential character of plethora is that this proportion is greatly increased; while in pregnancy it may be said to be always diminished. Practitioners then began to remember that they had found but little advantage from bleeding in the disorders arising from the progress of gestation; though many, perhaps, like Dr. Sangrado, attributed their want of success to not having practised depletion to a sufficient extent.

But something more may be said upon the practical bearings of the question—*i. e.*, upon the treatment of inflammation. On this point I think it may be remarked that those practitioners who have ventured to study the phenomena of acute inflammation for themselves, regardless of theories belonging to the past, and caring little whether or no disease has changed its type, are *now* mostly agreed that our treatment must be confined to simply attempting to guide the morbid process to a favorable termination; just in the same way as we at present try to conduct cases of typhus, small-pox, scarlatina, &c., through their natural progress, without making heroic and injurious efforts to cut short the disease. This object is to be obtained by supporting the vital powers instead of lowering them, and by assisting the excretion of effete products. If this be true, it necessarily follows that during the early stages of the attack all sources of irritation should be removed, so that the patient may enjoy perfect quiet of body and mind; the sick-room ought to be well ventilated, and kept at a temperature of about 60° Fahr.; the diet should be light, and ice or cold water freely allowed; opium is generally to be administered if there be pain or much irritability; while if the febrile excitement be great, salines in small doses (F. 348, 349, 351, 356, 358, &c.) may be ordered. Aperients will be needed if fæcal matters have accumulated in the intestines; but they are not to be employed as derivants,—*i.e.*, to draw blood from the inflamed tissue to the alimentary canal, since it is merely a delusion to suppose that they will have this effect. When the pulse becomes soft, good beef-tea and nutrients are to be administered; and directly there are indications of general weakness, we may be sure that wine or brandy is required, in quantity varying from four to twenty ounces in the twenty-four hours. As the period of crisis approaches, Dr. Hughes Bennett's example can be followed by giving a diuretic—half a drachm of spirit of nitrous ether, with or without ten minims of colchicum wine—thrice daily, to favor the excretion of urates; whilst,

* Further Report of the Commissioners in Lunacy to the Lord Chancellor, p. 78. London, 1847.

when a crisis occurs by sweating or diarrhœa, care is to be taken not rudely or unnecessarily to check it.—In all acute disorders the various organs are much weakened, so that their functions are either partially or entirely arrested. To give food when there is a perfect loathing of it is worse than useless. But we may advantageously administer alcoholic stimuli, either to retard the destructive metamorphosis of tissue, to afford to the system the elements for the generation of heat, to repair the circulating energies, and to supply a stimulus to the nervous system,—or simply because experience has proved to us the great value of such remedies, without teaching us how they act. Daily observation for a long time past has forced upon me the conviction that wine and brandy not only diminish the mortality of disease, but likewise lessen its intensity, and lead to complete restoration with the intervention of only a short convalescence.

The success of this kind of plan is apparent from the following: During the fifteen years ending in May, 1863, Dr. Bennett had thus treated all the cases of pneumonia which had been under his care in the clinical wards of the Royal Edinburgh Infirmary, amounting to one hundred and fifteen; of which number one hundred and twelve were dismissed cured, and three died. Rather more than half of these were cases of simple uncomplicated pneumonia, the average duration of which was some 13½ days. About one-sixth were double uncomplicated cases, their average duration being 20 days. If we examine seven of the complicated examples it will be found that one supervened on bronchitis and emphysema, two on typhus fever, one on bronchitis and pleurisy, one on pleurisy with effusion of eight weeks' standing, one on rheumatism with heart disease, and one on severe rheumatism with endocarditis and pericarditis: the average duration of the pneumonia in these seven being 21⅓ days. The three fatal cases were all complicated: the first, with uncontrollable diarrhœa and follicular disease of the mucous membrane of the small intestines; the second with persistent albuminuria and anasarca; and the third with delirium tremens and universal cerebral meningitis.

When such a result is contrasted with that obtained from an opposite course of treatment, it seems to me that all doubt on the subject must be removed. Thus, during ten years—from 1st July, 1839, to 1st July, 1849—648 cases of pneumonia were treated, by different physicians, according to the rules then enforced by all writers, in the Royal Infirmary of Edinburgh; of which number 388 were cured, 38 relieved, and 222 died. Of 107 cases, recorded by M. Louis in 1835, and treated by bleeding and tartar emetic, 32 died. So, of 648 cases treated by Rasori, in the hospital at Milan, by large doses of antimony, 143 died. Andral, in his "Clinique Médicale," tells us that pneumonia is one of those diseases the treatment of which is at once most simple and most efficacious. The principal remedy is copious bloodletting; neither children, adults, nor aged persons being spared. Yet of the 65 examples narrated to prove the soundness of his principles, no less than 36 ended fatally. Again, Laennec, who bled moderately at the commencement of the disease, regarded the mortality as one in six or eight. And lastly, Dr. Dietl treated 380 cases of primary pneumonia, in the Charity Hospital of Vienna, thus: 85 by venesection, one death in five resulting; 106 by large doses of tartar emetic, with one death in 5.22;

and 189 by diet only, with one death in 13½, all the fatal cases moreover being complicated.

At the same time that bleeding as an antiphlogistic remedy should be rarely if ever practised, it may be remembered that a small loss of blood may often be beneficial, particularly in relieving excessive pain, and in moderating attacks of dyspnœa due to some obstruction to the circulation in the heart or lungs. As Dr. Bennett remarks: "I have often been struck, especially in cases where large thoracic aneurisms cause these symptoms, with the small loss of blood which will occasion marked relief. The same result may be hoped for in other cases where the congestion is passive, even when that is associated with active repletion of blood, followed by exudation. But I need scarcely remark that this mere palliative object of bloodletting is not the ground on which the practice has hitherto been based, and that in this point of view it requires to be very differently explained." The same remarks apply to the use of tartar emetic; which is perhaps valuable in small doses, and combined with other neutral salts to favor excretion by the skin, kidneys, or intestines; but most injurious when employed in the heroic way often recommended.

With regard to the use of mercury, there appears to be every reason to believe that its utility in controlling inflammation or in promoting absorption of the effused products, has been very much overrated; and indeed it seems highly probable that inflammatory diseases will progress more favorably without the use of this medicine than with it. Some practitioners even now, however, would be afraid to treat pericarditis or iritis without mercury; yet more than eighteen years have elapsed since Dr. John Taylor's valuable contributions to clinical medicine were published,* in which it was clearly shown that the opinions then current on this subject required revision. For example, of the cases of pericardial inflammation on which this excellent physician founded his observations, four got well without any treatment; while in twelve, ptyalism was not succeeded by any abatement of the mischief. Moreover, in six others, ptyalism was followed by pericarditis; in three, by endocarditis; in two, by extensive pleurisy; in four, by pneumonia; and in one, by erysipelas and laryngitis. Again, in one instance, the pericarditis and pneumonia both increased in extent after ptyalism; while in only one was salivation followed speedily by relief, and in two or three by a gradual diminution. More recently, Dr. Henry W. Williams† has cured sixty-four cases of iritis, of every degree of severity, including its idiopathic, traumatic, rheumatic, and syphilitic varieties, without a dose of mercury; the treatment having chiefly consisted in sustaining the general system, in relieving pain by narcotics, and in keeping the pupil dilated by belladonna.

From all this the conclusion appears evident, that in the treatment of acute inflammatory diseases, practitioners must be content to trust more to Nature and less to heroic remedies than they have been in the habit of doing; for it is highly probable that though we may be able to guide inflammations to a successful termination, yet we cannot cut them short, and any attempts to do so will merely increase the

* Lancet, from 17th May, 1845, to 31st October, 1846.

† The Boston Medical and Surgical Journal, vol. lv, pp. 49, 69, 92. 1856.

patient's danger. The risk of all inflammations being in proportion to the weakness of the patient, the amount of blood-poisoning, and the complications which arise, it surely cannot be wise to go out of our way to produce debility, and thus favor the occurrence of toxæmia. But the fact is, and it ought never to be lost sight of, that "the body possesses a perfectly marvellous power whereby it protects itself against diseases, wards off some, cures in the best and speediest way many of those that have set in, and by a process of its own brings others more slowly to a favorable issue. This innate power is called the *vis Naturæ medicatrix*, being justly appreciated by physicians and philosophers, and highly praised by them. Of itself it is sufficient to cure numerous diseases; in almost all, its influence is beneficial; and, moreover, the remedies that are in their own nature the best, are only of use in so far as they stimulate, direct, and control this inherent virtue."*

IX. DROPSY.

Dropsy (formerly more correctly called hydropsy—from Ὕδωρ, water, and ὄψις, the appearance), may be defined as an accumulation of watery or serous liquid in some one or more of the natural serous cavities of the body, or in the interstices of the areolar tissue, or in both, occurring independently of inflammation.

It is a result of over-distension of the veins and their capillaries; and hence may arise from many different conditions. In general terms it may be said that there is some mechanical impediment to the circulation; with an altered condition of the blood,—either an excess of water, or an accumulation of excrementitious matters. Consequently, each case of dropsy will present two classes of dangerous symptoms,—those due to the original disease, and those produced by the effusion.

When the cerebral ventricles are distended with water, we say the patient has *hydrocephalus*. When serous fluid occupies the pleura or the pericardium, we express the diseased conditions by the terms *hydrothorax* and *hydropericardium*. If the cavity of the peritoneum be the seat of the collected water, the complaint is called *ascites*. Dropsy of the tunica vaginalis testis is termed *hydrocele*. Should the areolar tissue of one region only become infiltered with serous liquid, the part is said to be *œdematous;* while *anasarca* is the term applied to the more or less general accumulation of serum in the areolar tissue throughout the body. Lastly, the combination of anasarca with dropsy of one or more of the large serous cavities is known as *general dropsy*.

Now, to explain the mode in which dropsy may originate, it must be remembered that from all the surfaces of the healthy body a kind of excretion or oozing forth of fluid is constantly taking place, accompanied at the same time by absorption; so that when the two processes of exhalation and absorption are properly balanced, the surfaces will merely be kept moist. But suppose that the balance from some cause is disturbed; imagine exhalation to take place more rapidly from the surfaces of one of the shut sacs, or absorption more slowly, than in

* Conspectus Medicinæ Theoreticæ. Auctore Jacobo Gregory, M.D. Editio Quinta. Sect. 65, 66. Edinburgi, 1815.

health; under such circumstances it is clear that dropsy must result. It is probable that absorption takes place by the lymphatics, by the lacteals, and by the veins; the first removing the worn-out particles of the body, the second taking up the chyle from the alimentary canal, while the third imbibe the fluid exhaled from serous membranes. In dropsies, the veins and their capillaries are in fault; and it often happens that from congestion these vessels are not only unable to take up more fluid, but when much distended the watery portion of the blood transudes through their coats. The process by which this latter occurrence takes place is explicable on the principles of endosmose and exosmose.

When dropsies arise from defective absorption, they are called *chronic* or *passive* dropsies; when from excessive exhalation of serous fluid, *active* or *acute*. Those due to cardiac or renal disease, producing some alteration in the blood, with obstruction to the circulation, are usually of the first kind; those caused by cold, by sudden checking of the urine or perspiration, by the poison of scarlatina, &c., of the second.

The *symptoms* of dropsy may come on rapidly or slowly, according to the cause. Briefly it may be said that there may be excited or depressed vascular action; palpitation and dyspnœa on exertion; the urine is generally scanty, and in renal cases is albuminous; there is thirst, deficient perspiration, and constipation; while in dropsy from watery blood the marked anæmia is pathognomonic. It is instructive to remember that in cases of spontaneous cure the removal of the fluid is accompanied by profuse sweating, diuresis, or diarrhœa. Effusion of fluid within the cranium causes convulsions, coma, paralysis, and apoplexy; the pressure of liquid in the thorax impedes the action of the heart and lungs; while œdema of the extremities may produce inflammation and gangrene. In many cases of general dropsy, both the heart and kidneys are affected. Death may ensue from the dropsy; or from some inflammatory intercurrent disorder,—as pleurisy or enteritis; or from the primary organic disease.

The *causes* producing those conditions on which dropsy depends, are firstly, any circumstances which can induce irritation or congestion of secreting tissues—as cold, the retrocession of skin eruptions, and the poison of gout, rheumatism, &c.; secondly, whatever weakens the tissues or impoverishes the blood—as insufficient food, loss of blood, exhausting diseases, malaria, and scurvy; thirdly, anything which obstructs the circulation and produces venous congestion—as obliteration of the veins, abdominal tumors, and organic diseases of the heart, lungs, liver, spleen, kidneys, and lymphatics.

The *prognosis* will depend upon the cause. When there is no organic disease of important viscera, a cure can be frequently effected. When the heart, liver, or kidneys are permanently affected, the dropsy may often be, at least temporarily, removed.

The *treatment* of dropsy will be discussed in speaking of the different varieties; but it may here be remarked that in all cases two indications necessarily require to be followed—viz., the cure of the effusion which is only the symptom of other disease, and the relief of the disease itself. For the former we trust chiefly to diuretics, purgatives, diaphoretics, emetics, and the mechanical removal of the fluid by tapping and acupuncture.

One of the most celebrated of the ancient Greek physicians, Aretæus, was of opinion that success in the treatment of dropsy was due more to accident and the favor of the gods than to remedial measures. And if by "success" a permanent cure of organic disease be meant, no doubt the observation will still apply. But it must be remembered that in dropsy due to a fatal disease, the patient may succumb to the former, long before the latter would in its uncomplicated course destroy him; and hence if this distressing symptom can be relieved or removed, life may be very materially prolonged.

Many authors on tropical diseases describe certain complicated cases of general dropsy under the name of BERIBERI, OR THE BAD SICKNESS OF CEYLON.* This obscure disease is almost unknown to pathologists in this country; though it is a frequent cause of death among European and native troops at Ceylon, and convicts in Indian jails. It would appear that a residence of some eight or twelve months in a district where it is endemic is necessary for its development. From the writings of Drs. Morehead, Aitkin, and Waring, &c., I gather that the *symptoms* of this affection are chiefly increasing weakness, marked anæmia, anxiety, numbness of the surface generally, with stiffness and œdema of the lower extremities. The trunk and face then become swollen, there is difficulty of breathing, the limbs get almost paralytic, and there is vomiting—sometimes of blood. The urine is almost suppressed, the thirst is great, the pulse is intermittent and fluttering; and then palpitations are experienced with a sense of suffocation, probably in consequence of effusion of serum into the pleuræ and pericardium. Great exhaustion naturally follows; and in two or three weeks from the commencement, there is in most instances death. Occasionally the fatal event occurs suddenly and unexpectedly,—probably from embolism. The *morbid appearances* afterwards found are anasarca, œdema of the lungs, hydrothorax, hydropericardium, ascites, and cranial effusion. Cold or wet is the exciting *cause*, and hence it occurs not unfrequently towards the close of the rainy season; while a watery condition of the blood is the predisposing condition. Sometimes the effusion is encouraged by coexisting heart, liver, or renal disease; and often the persons affected are favorably circumstanced for the development of scurvy—that is to say, they have a scorbutic diathesis. In the *treatment*, attention to the means which prevent scurvy will be advisable, with warm clothing, &c. Then, if the vascular action be not depressed, purgatives may be used, as elaterium; or diuretics can be trusted to. The vapor or hot-air bath often proves very useful. Stimulants will generally be required, together with milk, animal food, &c.

There are two remedies, much esteemed in parts of India, which it may be well to remember. These are *Treeak Farook*, the ingredients of which are unknown, but which acts as an aperient and diuretic when combined with rhubarb; and *Oleum Nigrum*, prepared from the seeds of Celastrus Nutans, Benzoin, Cloves, and Nutmegs. The dose of the former is from 5 to 15 grains; while of the latter 10 minims is needed to produce a stimulant and diaphoretic effect.

* The name *Beriberi* is that given by the Malabars to this disease. *Beri* is the Singalese for weakness, and by iteration implies great weakness.

X. CARCINOMA, OR CANCER.

1. General Pathology.—There is scarcely an organ or tissue in the body which may not be attacked by cancer or carcinoma (*Καρκίνος*, a crab). It occurs most frequently in women, on account of the liability of the breast and uterus to be affected by it; otherwise it would seem to be more common in men, since the skin, bones, and digestive organs are more prone to it in the male than in the female sex.* It is very uncommon in children; but when it occurs in them it is generally located in the bones, or in the eye, or—very rarely—in the testicle, or ovary.

A cancer may be described as a local manifestation of a specific disease of the blood, having incorporated in it peculiar morbid materials, which accumulate in the blood, and which its growth may tend to increase.† As it is of constitutional origin, so the removal of the local manifestation does not effect a cure; but the cancer returns either in the seat of the original disease, or in some other parts. Moreover, when the primary affection has existed for a variable period, secondary deposits are very apt to be formed in the lymphatic glands, lungs, liver, spleen, &c. This definition of cancer does not meet with universal acceptance, since some authorities now assert that the disease is at first local, though at an early period it becomes general.‡ Any way, the practical point is that the surgeon does not seem to be consulted while the affection is only local; for otherwise the assertion made in France that cancer is completely incurable could not have been successfully maintained, as it has been.

Although the tendency of cancer, however, is to increase constantly and rapidly until life is destroyed, yet in a very few instances it becomes latent; that is to say, after it has reached a certain line of development, it remains in a state of quiescence, neither advancing nor receding. Sir B. Brodie refers to a case where the cancer was quiescent for twenty-five years; Dr. Babington knew an instance in which scirrhus of the mamma was stationary for twenty-four years; and Sir Astley Cooper attended two women in whom the period of latency was respectively seventeen and twenty-two years. Equally rare is the spontaneous cure of cancer by inflammation, ulceration, and sloughing, or by fatty or calcareous degeneration; yet it is certain that nature has by these means effected at least temporary, if not permanent cures. And if we consider the matter fairly, the wonder is that a cancerous growth does not undergo spontaneous cure more frequently, rather than so very seldom. All cancer-cells have a period of development, growth,

* In England, in 1862, the deaths of *males* from cancer were 2256; the greatest number (646) dying between 55 and 65 years of age. Of *females* 5140 died; the period of greatest mortality being between the 45th and 55th years, in which decade 1337 perished.

† Mr. Paget. Lectures on Surgical Pathology. Vol. ii, p. 287. London, 1853.

‡ Several other theories have also been proposed to explain the nature of cancer. Thus, some have believed that the disease is of hydatid growth,—that independent organized parasites of the entozoa class are produced. Broussais, with his followers, regarded the malignant growth as the result of inflammatory mischief. A third theory assumes that the diseased part has the functions of a gland, secreting from the blood, and thus removing from the system the cancer poison.

and decay; but unfortunately, though they perish, they leave behind germs which perpetuate the structure. In a monograph "On the Healing Process of Cancer in the Liver," published by Bochdalek, of Prague, in 1845, is described a mode of cure as it sometimes occurs in this organ, the disease breaking down into a purulent-looking matter; so that the fluid portion being absorbed, the whole shrinks together, leaving a small inert fibrous or fatty mass.

If any cancerous growth be minutely examined, it will be found to consist of peculiar nucleated cells, called "cancer-cells," and of their free nuclei, with a milky fluid or semi-fluid mixture, termed "cancer-juice." The more dry and juiceless the growth, the less is its malignancy. The cancer-cells and juice are either infiltrated into previously healthy tissues, or they are contained in a stroma or bed of new fibrous tissue. The cancer-cells are of various shapes, being round, oval, fusiform, triangular, or elongated into one or more sharp processes; they vary in size from the $\frac{1}{700}$ to the $\frac{1}{2000}$ of an inch, the medium being $\frac{1}{1000}$; and they chiefly resemble in structure and aspect the secreting gland-cells. On magnifying a specimen of scirrhus about two hundred diameters, the cells will be seen containing a comparatively large, regular, oval or round, and well-defined nucleus; sometimes two nuclei exist in the same cell, and each nucleus has one or two nucleoli. Moreover, mingled with these cells we find free nuclei, and numerous degenerated cancer-cells; some of these cells appearing withered, and full of oil globules, others being transformed into granular matter, in the *débris* of which the nuclei lie loose.

Lebert thinks that the cancer-cell is pathognomonic—that it may be distinguished from every other kind of cell growth, and that it positively indicates the nature of the formation. Dr. Hughes Bennett and Müller consider, on the other hand, that no single element is diagnostic. Hence their opinion seems to confirm that generally entertained, viz., that the microscope is merely an aid to diagnosis; and that, conjoined with a consideration of the symptoms, progress, form, and general appearance of the morbid growth, it may frequently enable us to arrive at a correct conclusion as to the nature of any particular case.

Dr. Wilks, writing in 1858, states his conviction that cancer has no peculiarities which can always distinguish it from other morbid growths, or even from many healthy structures. He suggests that if we make a list of different abnormal structures, arranging them according to their rapidity of growth, disposition to spread, propagation, &c., those at the top of the scale may be styled cancerous; but no boundary line can be drawn between the last which is styled cancer and the next on the list, which has acquired some other name. Or again, if the term malignant be applied to the highest on the list, semi-malignant to those below, and innocent to the lowest, that still no clearly-defined lines can be made between these divisions.

It is yet a question whether simple or benign tumors ever undergo degeneration into cancerous growths. Many surgeons believe this to be impossible, but more evidence is needed before this conclusion can be finally accepted. At all events, there appears no reason why cancer-cells should not be infiltrated into the tissues of non-malignant growths as readily as into the textures of a healthy gland; unless, indeed, it be that the former are generally firmer and less vascular than the latter.

2. Varieties of Cancer.—There are three principal varieties, and five subvarieties of malignant disease,* the latter being probably mere modifications of the former. They consist of—

Scirrhus, or Hard Cancer.
Medullary, or Soft Cancer.
Epithelial Cancer.
    Colloid, Gelatiniform, Alveolar, Cystic, or Gum Cancer.
    Melanoid, or Black Cancer.
    Osteoid Cancer.
    Hæmatoid Cancer, or Fungus Hæmatodes.
    Villous Cancer.

A scirrhus cancer never becomes medullary or epithelial, nor does the converse happen. But a medullary or an epithelial cancer may become melanoid or hæmatoid; a scirrhus or a firm medullary may become osteoid; or either of the three chief forms may assume the colloid character.

In all forms of cancer there is one general sign which is looked upon as pathognomonic. This is the cancerous cachexia. It is recognized by the peculiar dirty-yellowness of the skin, the contracted features, the general loss of flesh, the prostration of strength, the absence of all energy, and the mental irritability which constitute it. According to some authorities, this symptom precedes the local manifestation; but my own experience leads me to agree with those who regard it as a secondary effect, and as being a measure of the general systemic mischief.

a. Scirrhus, or Hard Cancer.—This is the most frequent form of cancer. It is seen occasionally in the stomach, in the upper part of the rectum, and elsewhere; but most frequently, by far, in the female breast.

In the breast, scirrhus (Σκιῤῥός, indurated) is found as an infiltration, affecting part or the whole of the mammary gland. The diseased mass is extremely hard, correspondingly heavy, and inelastic; while the increase in size is not great, for the part of the gland affected is not much larger than it was in health. After a variable period, the tumor with the proper tissues of the breast in contact with its surface, and the skin which is often adherent to it, ulcerates; a foul, excavated, spreading ulcer, with everted edges, being formed, from which there is a constant sanious discharge, and very often sharp attacks of hemorrhage. The ulceration sometimes extends from the skin inwards; sometimes from the substance of the cancer outwards. The amount of suffering varies; occasionally the pain being comparatively slight, though generally it is severe, lancinating, and most exhausting.

As the local disease advances, the health fails, and the cancerous cachexia becomes fully established. The state of the sufferer at this period has been well described by Sir Charles Bell: "The general condition of the patient is pitiable. Suffering much bodily, and every-

* To avoid any error, it should be mentioned that the terms "cancer" and "malignant," employed in the text, are regarded as synonymous. The expression "malignant" is so generally used that—provided a definite meaning be attached to the word—I cannot see how any good would arise from abandoning it. Moreover, it is convenient, since it allows us to speak of the *degree* of malignancy of any particular variety of cancer.

thing most frightful present to the imagination, a continual hectic preys upon her, which is shown in increasing emaciation. The countenance is pale and anxious, with a slight leaden hue; the features have become pinched, the lips and nostrils slightly livid; the pulse is frequent; the pains are severe. In the hard tumors the pain is stinging or sharp; in the exposed surface it is burning and sore. Pains, like those of rheumatism, extend over the body, especially to the back and lower part of the spine; the hips and shoulders are subject to those pains. Successively the glands of the axilla, and those above the clavicle, become diseased. Severe pains shoot down the arm of the affected side. It swells to an alarming degree, and lies immovable. At length there is nausea and weakness of digestion. A tickling cough distresses her. Severe stitches strike through the side; the pulse becomes rapid and faltering; the surface cadaverous; the breathing anxious; and so she sinks."*

Scirrhus of the breast is very rare in men; it occurs in women most frequently between the ages of forty-five and fifty.

Records, made by Mr. Paget,† of 139 cases of scirrhus of the breast, watched to their conclusions, or to their survivals beyond the average duration, give the following results: In 75 not submitted to operation, the average duration of life, after the patient's first observation of the disease, has been 48 months. In 64 submitted to operation, and surviving its immediate consequences, the corresponding average has been a little more than 52 months. The longest duration of life, in the former class, has been 216 months; in the latter class, 146: the shortest in the former was 7 months; in the latter 7½.

β. Medullary or Soft Cancer.—Medullary (*Medulla*, pith or marrow), or encephaloid (*Ἐγκέφαλος*, the brain), or cerebriform (*Cerebrum*, the brain, and *forma*, a model) cancers are of two kinds—soft and firm; the former being the most frequent. In either condition they are found in about equal proportion as separable tumors, or as infiltrations. As *separable* tumors, when occurring in the testicle, the breast, the eye, the intermuscular and other spaces in the limbs; as *infiltrations*, when occupying the substance of the uterus, the alimentary canal, the serous membranes, and the bones. In either form their course towards a fatal career is rapid; the average duration of life, from the patient's first observation of the disease, being little more than two years. Moreover, they occur at an earlier age than other kinds of cancer, being sometimes met with before puberty. The *soft medullary tumors* are commonly round or oval; and present to the touch a sense as of the fluctuation of some thick fluid, so that the most experienced are often deceived. They are very vascular; the material composing them resembles brain substance, partially decomposed and broken up; they yield abundance of cancer-juice on being pressed or scraped; and they frequently contain extravasated blood. The *firm medullary cancers* are elastic and tense, but not hard, like scirrhus; in their shape and size they resemble the soft; while they may possess distinct investing capsules, or may extend into the substance of organs.

Medullary cancer of the breast is so rare in this country that, even in our museums, specimens are but seldom seen; on the Continent,

* Medico-Chirurgical Transactions, vol. xii, p. 223. London, 1822.
† Lancet, 19th January, 1856.

however, this form appears to be more common. The lymphatic glands are much more frequently primarily affected with medullary cancer than with scirrhus.

γ. *Epithelial Cancer.*—Some difference of opinion exists as to whether this disease is really a form of cancer; or whether it is not an affection *sui generis*, consisting of an infiltration of cells of scaly epithelium,* with a serous liquid different from cancer-juice. Hence some authors speak of it as "epithelioma," or as a "cancroid" affection. In its clinical history, however, it resembles cancer; inasmuch as it returns after being removed by operation, it is prone to incurable ulceration, it affects the lymphatics seated near it, and it destroys the patient. On the other hand, it is peculiar in two respects—it is very little liable to multiplication in internal organs, and it appears often to be produced by local causes only. As pathologists seem divided upon this question, it will be better to treat of it in this place, as if it were undoubtedly a true form of cancer; a plan which has the recommendation of being probably correct, while it is certainly convenient.

The disease is generally located in or beneath some portion of skin or mucous membrane; its most common seats being the lower lip, the scrotum—in chimney-sweeps, the tongue, the larynx, the nymphæ, the labia majora, and the cervix and lips of the uterus. It may commence as a warty growth, or as a slight induration which speedily ulcerates. In the former case, its growth is comparatively slow; in the latter, it makes rapid progress, the ulceration extending in all directions, and destroying every tissue—even bone—which it meets. The lymphatics become involved, and then gradually the chief symptoms of the cancerous cachexia manifest themselves. Its origin appears sometimes traceable to the irritation of soot, a short clay pipe, &c. Moreover, cases have been recorded which seem to show that a simple epithelial tumor, when long irritated, may undergo development into epithelial cancer.

True "cauliflower-excrescence of the uterus" is, in all probability, always a variety of epithelial cancer; commencing on the surface of the labia uteri in the form of small papillary or villous eminences, which by their growth, expansion, and branching, take on the peculiar cauliflower appearance. It is a rare disease; so much so, that during the six years I was physician to the Hospital for Women, there came under my care—according to the observations which I have recorded—59 cases of carcinoma of the uterus amongst the out-patients, only one of which was an example of cauliflower excrescence; the remaining 58 being instances of scirrhus, or of medullary cancer, or more frequently of epithelial cancer not assuming the appearance of an excrescence.

Care must be taken to distinguish epithelial cancer from rodent ulcer and from lupus. *Rodent ulcer* has generally a somewhat circular shape, with indurated margins; and it gradually spreads in all directions. It most frequently attacks the eyelids, next to these parts the nose or cheeks, and very rarely the auricle of the ear; in some cases it has occurred on the vulva, and in other regions. Then it does not affect the lymphatic glands; it does not destroy life, or only does so very slowly; and the general health is not injured unless there be pain or

* From Ἐπί, upon, and θηλή, the nipple. Properly, therefore, the epidermis of the nipple; but now used generally for the layers of cells forming the cuticle.

hemorrhage. It occurs about the middle period of life, equally in both sexes; and it is only to be cured by complete removal with the knife, or by thorough destruction with caustics—especially by the chloride of zinc. If a portion of the edge of the ulcer be minutely examined, it will be found to consist of fibrous tissue, and not of cell-structures.—*Lupus* or *Noli me tangere* commences frequently by the formation of a dull-red tubercle, which has its seat most often on the ala or tip of the nose; the resulting ulceration is slow, it is superficial, only involving the skin, and its edges are not indurated; it seldom commences after the middle period of life; and it has a great tendency to heal spontaneously.—*Epithelial cancer* occurs much oftener in the male than in the female sex, and it is most common after the age of 50. When once established it gradually progresses to the destruction of life, but more slowly than medullary cancer; rather less than four years being the average duration of life from the commencement. Its malignancy seems greater when it is seated on the tongue or on the penis, than when on the scrotum or the lower extremities; and the removal of the disease by operation probably gives a better chance of recovery than the excision of any other variety of carcinoma. The essential character of this disease is, that it is composed of cells of epithelium and their nuclei; the cells varying in size and shape, and being infiltrated, together with a juice or serous fluid, into the interstices of the affected tissues.

δ. Colloid Cancer.—This variety of cancer—to which the names of colloid (*Κόλλα*, glue), alveolar (*Alveolus*, a little trench), cystic (*Κύστις*, a bladder), and gelatiniform (*Gelatina* and *forma*) cancer have been applied—consists of a clear viscid substance somewhat resembling soft gelatine or gum. Its most frequent primary seats are the stomach, intestinal canal, omentum, breast, and peritoneum; secondarily, it affects the lymphatic glands, lungs, &c. A section of a colloid cancer presents to the naked eye a clear, soft, gelatinous mass, intersected and surrounded by tough fibrous-looking tissue; the intersections, when numerous, forming small cysts or cavities filled with colloid matter. Such a cancer often attains considerable size:—in the Museum of King's College is a preparation showing a tumor of this nature, connected with the omentum, as large as a cocoa-nut. It probably always occurs as an infiltration, superseding the natural tissues of the affected part as it grows. It occurs equally in both sexes; it is very rare in children; and in its progress and symptoms it corresponds with other cancers.

Colloid matter may form independently of cancer, as happens sometimes in the thyroid gland in bronchocele, and in some multilocular ovarian tumors. The latter often attain an immense size, but they may be removed by operation without any fear of the return of the disease.

ε. Melanoid Cancer.—Melanotic (*Μελανόω*, to grow black), melanic, or black cancer, is generally medullary cancer modified by the superaddition of a black pigment. Scirrhus sometimes becomes associated with melanosis, and still more rarely epithelioma does so.

ζ. Osteoid Cancer.—The nature of osteoid (*Ὀστέον*, a bone) cancers may be best expressed, according to Mr. Paget, by calling them ossified fibrous or medullary cancers; and by regarding them as illustrating a calcareous or osseous degeneration. Their growth is usually from some

bone, and especially from the lower part of the femur. Their general history corresponds to that of the scirrhus and medullary varieties; they are as malignant and as quickly fatal as the medullary; and they give rise to secondary deposits in the areolar tissue, lymphatics, lungs, &c.

η. *Hæmatoid Cancer.*—Hæmatoid (*Αἷμα*, blood, and *εἶδος*, form) cancer—fungus hæmatodes—is probably a soft medullary or other cancer, the substance of which has become more or less infiltrated with blood. When it protrudes through the skin it forms a large vascular mass, somewhat resembling a clot of blood.

There are certain *sanguineous cancerous tumors*, which on account of their rarity have hardly received the attention they merit. These growths are rich in bloodvessels, and in splenoid tissue analogous to the placenta. Most of them are situated in or near the bones, they are very vascular and often pulsatile, and they look like a piece of spleen or of raw soddened meat. They recur after extirpation, while generally their growth is rapid. I have seen only one instance of this form of malignant disease; and in this case the tumor grew into the cavity of the mouth from the side of the lower jaw. It was removed by Mr. Fergusson, but soon returned. Again it was excised, but how far this last operation proved successful I do not know.

θ. *Villous Cancer.*—Villous (*Villus*, shaggy hair) cancer is a variety of medullary and perhaps of epithelial cancer, occurring most frequently on the mucous membrane of the urinary bladder. The histories of cases of this disease coincide with those of medullary cancers.

3. Causes of Cancer.—With regard to the causes of this disease but little is known. All classes of society are equally subject to it; the rich and poor, the idle and industrious, the gay and the melancholy, all suffering from it in equal proportions. The only known predisposing causes are thus summed up by Dr. Druitt: "1. *Descent* from a cancerous parent, which seems to have some slight influence, and was found by Lebert to exist in about one-seventh of a certain number of cases. 2. *Sex*, for cancer is at least from one-third to one-half more prevalent in the female. 3. *Age*, because nearly half of the entire number of cases occur between forty and sixty. Lastly, although cancer is not contagious in the ordinary sense of the term, there seems reason for believing that, if fresh cancer-cells are introduced into the blood, they may be deposited and propagate themselves. The experiment has been tried on dogs by Langenbeck and by Lebert; and cancerous tumors were found in various parts, when the animals were killed some time afterwards; yet it must be remembered that some of the tumors found in these cases may have existed before the inoculation."* The experiment of Langenbeck, however, was carefully repeated by Vogel, but without producing the same result; while Gluge also failed in his attempts at inoculation. From all this it is evident that our knowledge of the causes of this disease is very slender. In the great majority of cases the patient is unable in any way to account for its origin; very frequently—in scirrhus of the breast especially—the tumor is only discovered by accident; and it is almost certain that mental anxiety, peculiar

* The Surgeon's Vade Mecum. Seventh Edition, p. 112. London, 1856

temperaments, particular occupations, injuries, &c., have nothing to do with producing the cancerous diathesis. Tubercle is deposited in the most active organs; cancer, on the contrary, attacks an injured or weak part. Hence it sometimes seems to follow a blow. In listening to the histories of patients afflicted with cancer of the uterus, I have been struck with the frequency with which they have told me of the loss of one or more of their relatives from phthisis. The same circumstance has been noticed by Mr. Zachariah Laurence, who seems rather inclined to entertain the opinion that there may be some connection between the two diseases. At all events he says that of 40 patients, the subjects of scirrhus or encephaloid, 15 knew of one or more blood-relations having died from phthisis.*

4. Treatment of Cancer.—The treatment of cancer is at present, as far as I positively know, in just the same unsatisfactory condition as was that of phthisis only a few years ago. But inasmuch as we have sure ground for believing that well-marked cases of pulmonary consumption, which would have been regarded as utterly incurable a few years since, are now sometimes restored to health by the aid of medicine; so we have every reason to trust that at no distant day cancer may be made to yield to some remedy, or combination of remedies, yet to be discovered. In the meantime much may be done to relieve the patient's sufferings, and to prolong life.

a. Palliative Treatment.—The great point is to keep up the constitutional powers to as near the standard of health as the disease will allow; which may best be done by tonics, nourishing food, pure air, warm clothing, great cleanliness, removal of offensive discharges, mental occupation, and by preventing or relieving pain. In carrying out this important indication the physician will not only be deservedly earning the gratitude of his patient, but he may likewise, by kindness and judicious advice, be preventing him from consulting those callous charlatans who will make the most solemn assertions of their ability to cure him, until he either sinks into the grave, or has expended every guinea that he possesses. Moreover, it is the positive duty of the practitioner to make every effort to give even temporary relief; for, as Bacon has well said,—"I esteem it the office of a physician not only to restore health, but to mitigate pain and dolors, and not only when such mitigation may conduce to recovery, but when it may serve to make a fair and easy passage."

The best means to adopt in addition to all known hygienic measures for the maintenance of the general strength are to do all that is possible to relieve pain; to improve the blood by tonics and nutritious food; and to check the growth of the cancer and the contamination of the system by suitable remedies.

First, as to the Relief of Pain.—This is a most important object; inasmuch as the great bane of cancer, next to its tendency to destroy life, is the acute physical suffering to which it gives rise. And not only is this so, but it is certain that the more intense the pain, the more rapidly will the patient succumb. Many practitioners appear insufficiently impressed with these facts; and they hesitate to effect a certain

* The Diagnosis of Surgical Cancer. Second Edition, p. 62. London, 1858.

good by the proper administration of sedatives, lest they should check the secretions, destroy the appetite, or produce other doubtful evils. So much benefit, however, has resulted from the free use of anodynes in my hands, that a reconsideration of this subject cannot be too strongly urged; for it is surely no small good to be able to prolong life, by rendering that life bearable. Moreover, the more carefully the phenomena of this disease have been studied at the bed-side, the more probable it seems to me that if a cure for cancer be ultimately discovered, it will be found amongst agents possessing narcotic properties. On one point I feel certain, that the irritation of malignant ulcerations by caustics and astringents is most injurious in every way, while the application of soothing remedies is just as beneficial. In making this remark it is necessary to explain that I am not referring so much to the total destruction of cancerous growths by potential escharotics, as to their irritation by the superficial application of these agents. And, if we think of the matter, it cannot but seem probable that nothing is so likely to increase cell-growth as stimulation and heat. If we take cancer of the uterus, for example, in whatever stage the disease may be, the free local use of belladonna is found invaluable. This agent can be readily applied by the patient herself, in the form of a pessary (F. 423).

The mode in which the narcotic is administered is a matter of no little moment. As a general rule, I believe the least efficient plan is to give it by the mouth; but if *opium* be prescribed in this way, I would recommend the extract to be used in the form of pills, in preference to any other preparation (F. 343). Frequently it will be better, in order to avoid producing constipation, to give this drug in combination with belladonna (F. 344). The dose at first should be small; but week by week it must be increased, as the system gets gradually accustomed to it. In this way, large quantities at length become needed; but I have never seen anything but good from even such an amount as twenty or thirty grains in the day.—*Morphia* may also be given by the mouth; either in the form of pills, or in combination with chloroform, Indian hemp, ether, hydrocyanic acid, &c. (F. 315, 317, 329).—But of all the methods for exhibiting the agents under consideration no one is so valuable as the *subcutaneous injection of morphia*. By this method the most complete relief is afforded, with small doses, and without deranging the stomach. Considerable caution, however, is necessary with the first injections, even when the patient has been taking morphia by the mouth for some time; and certainly the practitioner should feel his way by commencing with only a quarter of a grain. It is difficult to give a satisfactory explanation of this circumstance, but nevertheless it must not be forgotten. In some instances one injection in the twenty-four hours will suffice to insure a good night's rest, with a comfortable calm day; but in others it has to be repeated every twelve hours (F. 314). *Aconite* and *atropine* may perhaps be employed in the same way, but at present I have had no experience with these very powerful agents.—Next in value to hypodermic injections are *enemata* or *suppositories;* for making which the extract or the liquid extract of opium had best be employed (F. 339, 340). There may be cases where *conium* or *henbane* may be advantageously administered, but usually these anodynes have seemed to me very inefficient.

Secondly, the improvement of the blood by tonics and nutritious food has to be considered. With reference to tonics none are generally so beneficial as the various preparations of *bark*. The compound tincture of cinchona, or the tincture of yellow cinchona, in full doses, may be recommended; either of these restoratives being combined with ammonia or ether (F. 371), or, where there is any tendency to hemorrhage, with the mineral acids (F. 376). *Ferruginous tonics* seem seldom to agree so well as the bark, but there is often no objection to employing both. Thus, a draught with phosphoric acid and bark may be given night and morning; while the reduced iron, or the ammonio-citrate of iron, or steel wine, or some similar preparation, may be administered at dinner in the middle of the day (F. 380, 394, &c.). *Cod-liver oil* is frequently very useful (F. 389); and where it is indicated, but the stomach rejects it, attempts must be made to procure its digestion by the simultaneous administration of *Pepsine* (F. 420).

As regards *diet*, only the most nutritious food should be allowed. Wine, beer, milk, cream, raw eggs, and animal food, are all necessary (F. 2, 3, 5, 17, &c.). And where there is so poor an appetite that but small quantities of these matters can be taken, it will often be advantageous to use them as enemata (F. 21, 22, 23). Under these circumstances the opium already recommended may be mixed with the nourishment, so as to avoid teasing the patient with more injections than are absolutely needed.

Thirdly, we have to try and check the growth of the cancer and the contamination of the system. And here it must be confessed that our ignorance is great, for we know of no mineral or vegetable product which possesses the required power. Iodide of Potassium, Iodine, Mercury, Iodide of Lead, Bromide of Potassium, Bromine, Iodide of Iron, Iodide of Arsenic, Arsenic, Puccoon, and a host of similar remedies have been tried only with the result of proving their worthlessness. It seems indeed like the labor of Sisyphus to continue the employment of such agents. They do no real good, and the best plan is now to condemn them. Unfortunately nothing much more promising can be suggested; but the drug which has appeared to me more nearly to fulfil our purpose than any other is *belladonna*. A more extended experience is required before it can be right to speak of this agent with greater confidence. I commenced its use unwillingly, because it was long since recommended, and was not thought to exert much influence for good. But in moderate doses, continued for several months, it has certainly been very useful in my hands. And I would especially recommend that when a cancerous growth has been removed by excision or caustic, the patient should perseveringly take the belladonna for a long time afterwards. Combined with zinc or quinine (F. 383, 410), we have an excellent tonic, while it *appears* to have the power of moderating abnormal cell-growth.

By many, the preceding remarks will appear somewhat disheartening. But in the present state of medical science the practitioner must be content to give relief to bodily suffering, and to afford mental tranquillity, without expecting to effect a cure of this fearful disease. It is in no slight degree gratifying to be able to accomplish only as much as this: and therefore while striving to increase our knowledge, let us remember that if the foregoing remedies be carefully and perseveringly

used, mental and bodily ease may be given and life prolonged even for a few years.*

β. Curative Treatment.—In attempts to effect a cure, one of three plans has usually been followed, viz., either excision; removal by caustics; or the promotion of absorption by methodical compression, sometimes combined with the application of intense cold.

First, as to Excision.—A general opinion can only be formed with great difficulty, since the views of surgeons on this head are still much divided. But I think no one will deny that, as a general rule, extirpation by the knife is quite insufficient to effect a cure: it may relieve the local distress, it may prolong life for a few months, and as chloroform renders the operation painless, it may, perhaps, occasionally be worth while resorting to it to gain these objects. Nevertheless, on the other hand, it must not be forgotten that the operation may itself prove fatal; while in some cases it certainly appears to increase the malignity of the disease. Thus, Dr. Walshe points out that "excision of a cancerous tumor seems to awaken a dormant force. Cancers spring up in all directions, and enlarge with a power of vegetation almost incredible." Again, of the cases of cancer of the tongue which are described by authors, the most frightful are those which have been operated upon. Mr. Weedon Cooke says that "the disease reappears with intense malignity, not only in the tongue itself, but in all the neighboring glands. The tongue sloughs more rapidly and bleeds profusely, the glands enlarge to an enormous size, interfering with the powers of deglutition; they then ulcerate, and discharge serum, or pus, or blood, rapidly destroying the patient by a hideous death. This is the rule in patients operated on: it is the exception in cases treated only constitutionally." With regard to the *time* at which, if an operation be determined upon, it should be performed, authorities differ. Some surgeons recommend excision when the disease is first discovered; others, as I think erroneously, advise delay. Mr. Spencer Wells, in laying down some precepts as to the use of the knife, observes—"It is not to use it in the early stages of cancer, not to use it unless the cancer is actually ulcerated, or growing so fast that the skin is about to give way. In such cases, especially where an open cancer gives great pain, and is wearing away the patient by bleeding or profuse fetid discharge, the knife is used in the hope of relieving suffering, and prolonging, not saving life. In some other cases, where a cancer causes great mental anxiety to a patient, you may remove it at her earnest entreaty, after explaining fairly the danger of relapse."†

* As illustrative of these observations, the following case may be related: Mary Stanning, thirty-two years of age, married, but never pregnant, came under my care at the Farringdon Dispensary, on 20th March, 1851, suffering from scirrhus of the rectum. Finding that I could not cure her, she applied and was admitted into one of our metropolitan hospitals, which she left in an apparently dying state in April, 1852. On the 28th of the same month I was sent for; and found her very low, and as if she could not live many hours. The eminent surgeon under whose treatment she had been in the hospital wrote to say that he had heard M. S. was under my care, that she was dying, and that he would like to be present at the post-mortem examination. By attendance to the hygienic rules laid down in the text; by the occasional exhibition of bark, of steel, and other tonics; by the employment of wine and nourishing food; and by the daily use of large quantities of opium, this patient slowly improved. She was able to get about, to keep her rooms clean, &c.; and although her sufferings at times were acute, yet she generally was tolerably free from pain until the last few weeks of her life. She died on the 18th of June, 1856.

† On Cancer Cures and Cancer Curers. Medical Times and Gazette, 11th July, 1857.

Now knowing with what difficulties this subject is surrounded, it is necessary to speak with some diffidence of the views of others. But it does not strike me that these rules are those generally followed by the profession, and I am not even sure Mr. Wells now adopts them. However this may be, my own opinion is that excision can only be resorted to with a prospect of success if the tumor be small and comparatively circumscribed, if the lymphatics be unaffected, if the skin and muscles be non-adherent, and if the cancerous cachexia be not developed. And even in these cases it is necessary that a free dissection be made, removing if possible a little of the adjacent sound texture; while it may be doubted whether it is advantageous to procure union of the wound by the first intention. Moreover, the patient ought not to be lost sight of for many months afterwards. And whether removal be effected by the knife or by caustics, it will be advisable, as before recommended, to administer the belladonna.

While speaking of the knife it ought to be mentioned that attempts have been made to destroy malignant tumors by lowering their nutrition; with which object practitioners have tied the chief nutrient artery of the affected part. No real success has attended these efforts. Nor could it well be expected, remembering how readily the collateral circulation would be established after the operation.

Secondly, Removal by Caustics.—This method has found many advocates in the present day; and it possesses at least this advantage, that it may be useful in deeply ulcerated, and some other cancers, where the knife is objectionable. The chief agents which have been used are arsenical pastes, chloride of zinc, chloride of bromium, sulphate of zinc, manganese cum potassa, the strong mineral acids, and the concentrated alkalies. The *arsenical pastes* cannot be employed without great caution, inasmuch as their action is not merely local but pervades the whole system. M. Manec, of the Salpétrière Hospital, Paris, has largely used them; for he believes that arsenic has a peculiar destructive affinity for cancerous growths, and that its action does not extend to healthy tissues. His formula—perhaps the best one which can be tried—is one part of arsenious acid to seven or eight of cinnabar, with four of burnt sponge, made into a paste with a few drops of water. He does not employ it to a surface of greater extent than the size of an English florin at each application; and he states that the quantity of arsenic absorbed from such a surface never produces unpleasant symptoms. Should severe pain arise, it may be mitigated by applying bladders containing ice and salt. (See also F. 199.)

The *chloride of zinc* is a valuable agent, especially as there is little to fear from its absorption. The epidermis must first be destroyed by a blister or by strong nitric acid; and the caustic is then to be applied, mixed according to F. 197, in quantity varying with the amount of destruction required. Dr. Fell's plan of treatment consists in the use of the chloride of zinc combined with a perennial plant known among the North American Indians by the name of puccoon, but described by botanists—owing to the blood-like juice which exudes from it when cut—as the Sanguinaria Canadensis (F. 197). The chloride of zinc is the essential agent, however, and this creates a superficial slough; which slough is daily scored to a certain depth by several incisions with the knife, strips of linen covered with the caustic being afterwards laid in

the furrows. At each dressing the tumor is destroyed deeper and deeper; until at length it becomes converted into a large eschar, which separates by a line of demarcation according to the general principles of surgery. Together with this local application, the general health is attended to; a nourishing and sustaining diet is allowed; and the puccoon is administered thrice daily in half-grain doses. Frequently also Dr. Fell combines with this drug the sixteenth of a grain of the iodide of arsenic, and one grain of the extract of conium. The *chloride of bromium* has been highly praised by Landolfi, who uses it made into a paste with flour, or combined with other caustics (F. 196). The proper method of applying the paste is on a piece of linen cut to the size of the part to be destroyed. At the end of twenty-four hours the rag is removed; the slough separates after a few days; and the sore is then dressed with charpie soaked in a solution of chloride of bromium—grs. 10 to 20 in water fl. oz. xij. The patient takes a pill morning and evening, containing one-tenth of a grain of the chloride. I have tried this plan in one instance of cancer uteri; but while the local disease seemed to be much diminished by it, the patient died with all the constitutional symptoms unrelieved. *Sulphate of zinc* has been strongly recommended by Professor Simpson; who says, that when it is applied to an open and diseased surface it acts as a safe, most powerful, and manageable caustic. It may be employed in the form of a dry fine powder; or as a paste made with an ounce of the salt to fl. dr. j of glycerine; or as an ointment—one ounce to 120 grs. of lard. When used in either way to an open or ulcerated surface, the part to which it is applied is rapidly destroyed to a depth corresponding to the thickness of the superimposed layer; the slough usually separates on the fifth or sixth day; and there is left behind, if the whole morbid tissue be removed, a red, granulating, healthy wound, which rapidly cicatrizes. Until all the disease is destroyed, the applications must be repeated. The sulphate of zinc will only act as a caustic to a broken or open surface; hence, when the epithelium is entire, this must be removed by a small blister, or by a strong acid, or by the supersulphate of zinc (F. 198). Its application gives rise to local pain and burning in most instances, but never to any constitutional disturbance. The *manganese cum potassa* is much used by Mr. Weedon Cooke in ulcerated cancer. It is said to be efficacious, causes but little pain, removes all unpleasant odor from the sore, and does not injure the general health. This agent may be employed as a powder, or made into a paste with water; while it must be applied in a layer as thick as the tissue to be destroyed. By means of carrot poultices the eschar is made to drop off in three or four days; when, if necessary, the manganese is reapplied until the diseased mass is all destroyed, and the subjacent healthy tissues granulate and cicatrize by the aid of a slightly stimulating lotion of chlorate of potash. With regard to the *strong mineral acids* and the *concentrated alkalies* but little need be said. If the former be used, sulphuric acid, made into a paste with saffron, will prove the most efficacious; if the latter, the Vienna paste (F. 204).

Thirdly.—There remains for consideration the plan which chiefly has for its object *the promotion of absorption by methodical compression, with or without the application of intense cold.* Pressure is supposed to act beneficially in cancer by diminishing the supply of blood, and

hence of nourishment to the tumor; by depriving the cells of the space necessary for their growth; by injuring them from direct violence; and by promoting their absorption. Since compression was first proposed by Mr. Samuel Young, in 1809, numerous cases have been treated by it by different surgeons; and certainly the results seem to have been more favorable than those produced by any other mode. The pressure, however, must be methodically and perseveringly applied; the most unobjectionable method being by Dr. Neil Arnott's apparatus, which consists of a spring, an air-cushion supported by a flat resisting frame or shield, a pad, and two belts. "The effects produced by pressure are," says Dr. Walshe, "removal of existing adhesions, total cessation of pain, disappearance of swelling in the communicating lymphatic glands, gradual reduction of bulky masses to small, hard, flat patches, or rounded nodules (which appear to be, both locally and generally, perfectly innocuous), and in the most favorable cases total removal of the morbid production. The relief of pain afforded by the instrument is, without exaggeration, almost marvellous; this effect being insured by the peculiar softness and other properties of the air-cushion, the medium through which the pressure of the spring is transmitted to the surface."*

The efficacy of intense cold depends on its arresting the circulation, producing some change in the microscopic cells, and in altering the vitality of the part. Congelation not only gives relief from pain, but is said to arrest the progress of the disease; though its influence in the latter respect is generally allowed to be very slight. In cancer of the uterus, the frigorific mixture—equal parts of ice and salt—may be applied by means of a gutta percha speculum, daily, for fifteen or thirty minutes, or even oftener. I have used it in a few instances only; for although I found that it allayed pain, yet it did not seem to possess the least efficacy as a means of cure.

XI. TUBERCULOSIS.

The term tuberculosis (from *Tuberculum*, dim. of *Tuber*, a knob or excrescence), is employed to designate an idiopathic blood disease, which manifests itself by producing conditions commonly known as scrofula, pulmonary consumption or phthisis, tubercular hydrocephalus, tubercular peritonitis, and tabes mesenterica. The precise nature of the change in the blood is unknown; but it would seem that the aqueous part is increased in proportion to the solids, while the red corpuscles are especially diminished. The importance of paying particular attention to this affection can hardly be over-estimated. The deaths in England for the year 1862, with an estimated population of 20,336,467, were 436,566; of which number considerably more than one-seventh were from tuberculosis in some form or other. Thus there died of—

Scrofula, ...	3,416	66,612
Tabes mesenterica, . . .	5,203	
Phthisis, ...	50,962	
Hydrocephalus, ...	7,031	

* The Nature and Treatment of Cancer, p. 211. London, 1846.

This number, it must be noticed, is quite independent of 67,565 deaths from other affections of the lungs, pleuræ, bronchi, or larynx; some of which are not unlikely to have been more or less closely connected with the tuberculous cachexia.

Tubercle, or tuberculous matter, is the specific product of this disease. It is deposited in a fluid state from the capillaries just as lymph is; the deposit coagulating, and forming a foreign body. Hence it exists in isolable masses, or is infiltrated into the tissues of many different organs; being most frequently found in the lungs, constituting pulmonary tuberculosis, or tubercular disease of the lungs, or phthisis, or consumption—these terms being generally regarded as synonymous. In 1317 cases of tuberculosis examined by Willigk, the following was the order in which various organs were found affected: Lungs, intestines, mesenteric glands, larynx, lymphatic glands, peritoneum, spleen, kidneys, pleura, liver, air-passages, bones, genital organs, brain, cerebral membranes, urinary passages, pericardium, stomach, bowels, skin, muscles, tongue, pharynx, œsophagus, pancreas, and heart.

Pulmonary tubercles are present in two forms, as gray and yellow tubercle. The *gray* tubercles are soft, compressible, and semi-transparent; and by the microscope are seen to be composed of minute irregular-shaped bodies with connecting substance. Their resemblance to millet-seeds leads to their being spoken of as miliary tubercles. The *yellow* tubercle is found in larger masses, presenting an opaque cheesy appearance. It is now generally believed that these two varieties merely represent different stages of the same substance, the gray being sooner or later converted into the yellow deposit. The change is supposed to be due to fatty degeneration; the oil or fat communicating the yellow color. In more favorable cases the gray instead of retrograding into yellow tubercle, becomes dry and dense, shrivelling into a contracted fibrous-like mass. Occasionally this latter change is associated with calcareous degeneration.

Of course there has been a vast amount of speculation as to the mode of formation and nature of tubercle. One class of pathologists maintains that tubercle is only a retrograde metamorphosis of pre-existing structures, tissue elements, or morbid products. Another explanation, and that to which many authorities—as Rokitansky, Lebert, Ancell, and Hughes Bennett—subscribe, is that it consists of an exudation of the liquor sanguinis, presenting marked differences from the simple or inflammatory exudation on the one hand, and the cancerous exudation on the other. As the blood is of course dependent for its constitution on the results of the primary digestion in the alimentary canal, on the secondary digestion in the tissues, and on the healthy performance of the function of respiration, so we must agree with Dr. Bennett that the causes of the tubercular exudation are to be sought in the circumstances which operate on, or influence, those results. "The successive changes which occur for the purposes of assimilation in the healthy economy may be shortly enumerated as follows: 1st. Introduction into the stomach and alimentary canal of organic matter. 2d. Its transformation by the process of digestion into albuminous and oily compounds: this process is chemical. 3d. The imbibition of these through the mucous membrane in a fluid state, and their union in the termini of the villi and lacteals to form elementary molecules: this process is

physical. 4th. The transformation of these, first, into chyle corpuscles, and, secondly, into those of the blood, through the agency of the lymphatic glandular system: which is a vital process. It is from this fluid, still further elaborated in numerous ways, that the nutritive materials of the tissues are derived, so that it must be evident if the first steps of the process are imperfectly performed, the subsequent ones must also be interfered with. Hence we can readily comprehend how an improper quantity or quality of food, by diminishing the number of the elementary nutritive molecules, must impede nutrition."*

From the chemical analysis of tubercle, it would appear to consist of animal matter and earthy salts; the former being principally albumen and cholesterine, while the latter consist chiefly of insoluble phosphate and carbonate of lime, with the soluble salts of soda. Tubercle has a low and feeble vitality; each mass as it forms obliterating the capillary vessels within its sphere of infiltration, so that it is essentially bloodless. When deposited it has a tendency to perish or soften, and to cause its expulsion by inducing disorganization and ulceration of the surrounding tissues. The destructive or ulcerative tendency may, however, be sometimes checked; as is proved by the occasional detection in the deadhouse, of lungs marked with cicatrices. The testimony of Laennec, Carswell, Bennett, and Sir James Clark also goes to confirm the truth of this observation; and although I have heard physicians of repute state that *they* have never cured a case of consumption, yet I am sure myself and others have seen cases recover after well-directed treatment. There are three ways in which it is probable that a cure may result,—either by the conversion of the tubercular matter into a cretaceous or calcareous substance; or by the expectoration of the exudation, the collapse of the ulcerated walls, and the cicatrization of the cavity; or by the ulcerated walls becoming covered with a false membrane, and forming a chronic cavity. In any case it is of course inferred that the blood is rendered healthy, and consequently that the deposition of tubercle is stopped.

A necropsy of a tubercular patient is seldom made without finding fatty degeneration of the liver, kidneys, or arteries; but whether these degenerations stand in the relation of secondary dependence upon the tubercle-forming diathesis, is uncertain.

The *causes* which have been most frequently assigned for tuberculosis are hereditary influence, syphilis, bad air, improper food, and a cold damp atmosphere. As regards hereditary influence, it may be noticed that if by this is meant that there is a certain poison or strumous virus transmitted from parents to children, the position is hardly tenable; but, on the other hand, if it be only understood that the children of tuberculous parents are more liable to have the disease developed in them on the application of the exciting causes than the children of healthy parents, as was the opinion of John Hunter, the position is most probably true. That it is not contagious is certain. Many authors have imagined that a syphilitic taint in either parent will induce tuberculosis in their offspring; while some have even maintained that this disease is only a degenerated species of syphilis. There

* On the Pathology and Treatment of Pulmonary Consumption. By John Hughes Bennett, M.D., &c. Second Edition, p. 33. Edinburgh, 1859.

seems, however, to be but little truth in either of these suppositions; tubercular affections and syphilis being very different diseases, quite independent the one of the other. Neither does the development of tubercle appear to be influenced by climate or temperature. But it is to diseased nutrition, however brought about, that we may refer the production of tuberculosis; and it is to insufficient, innutritious, or improper food, that the vast majority of cases of diseased nutrition are due, though it may also arise from almost constantly breathing a vitiated atmosphere, or from want of cleanliness and healthy exercise.*

The *symptoms* which precede the occurrence of tuberculosis are generally indicative of disorder of the digestive organs. Dr. Wilson Philip first noticed that there were some forms of indigestion which ended in phthisis; and it has more recently been proved by Mr. Jonathan Hutchinson and others, that the peculiar feature of this dyspepsia consists in the difficult assimilation of fatty matters. Sugar, fat, and even alcohol "turn acid," giving rise to sour eructations, heartburn, and flatulence. Besides these important warnings it is stated by many authorities—though the truthfulness of the statement may be questioned—that persons possessing the tuberculous or strumous diathesis manifest certain peculiarities, such as a coldness of the body; a dull white, but very delicate skin; and a rounded graceful outline of the face, with a delicacy of feature, and rosy hue of the cheeks, strongly contrasting with the surrounding pallor, and often giving to the countenance, especially in women, a characteristic beauty. The hair is also said to be usually blonde or auburn; while the eyes are large, blue, projecting, and humid, with the pupils habitually dilated. Moreover, it is said that such persons are remarkable for the development of the head, of the alæ nasi, and of the upper lip, as also for the large size of the lower jaw, and the milk-white teeth which early become carious; while it is also asserted that the breath is habitually sour and fetid, the neck long and rounded, the chest narrow and flat, the shoulders high, the abdomen large and prominent, the limbs thin, and the flesh soft and flabby. It is commonly believed that in youth all scrofulous persons manifest great cerebral activity; that they are impatient and passionate; that their intellectual system is largely developed; and that although many have more imagination than judgment, yet some occasionally are capable of sustained mental exertion. There are very few cases, however, where the actual appearances will correspond with this description. The most constant peculiarities are the paleness and coldness of the body, and the tumidity of the abdomen.

Tubercular disease may set in at any period of life, though it is peculiarly a disease of childhood and youth. Perhaps the liability to it is greatest from three to fifteen, and from eighteen to thirty-five or forty.

* "In all parts of Europe," says Dr. Baly, late physician to the Millbank Penitentiary, "the proportion of deaths has been much greater among criminals in prisons, than amongst persons of a corresponding class out of prison; and the increased mortality is due to various forms of scrofula, and especially tubercular phthisis. The causes which contribute to this result are cold, poorness of diet, deficient ventilation, want of sufficient bodily exercise, and dejection of mind. In a great number of cases of phthisis in this prison, apparently hopeless, the disease was immediately checked on the release of the prisoners, many of whom entirely recovered." Quoted from Dr. William Addison,—On Healthy and Diseased Structure, p. 48. London, 1849.

Its development is favored by all conditions which tend to render the blood unhealthy; such as malformations of the chest, defective structure of the lungs, a small heart, diseased nutrition, sexual excesses, &c. When these causes act upon a frame hereditarily predisposed, the disease is almost sure to be developed; but it is not certain, though it is very probable, that they can give rise to it where there is no such predisposition.

Tubercular diseases are not only preceded but are frequently accompanied by a disordered state of the primæ viæ,—such as "biliousness," acid eructations, flatulence, a distaste for fatty food, and a generally bad appetite; conditions which are so constant, that some authors speak of them as *strumous dyspepsia*. Then we find paleness and puffiness of the face, swelling of the lips and nostrils, purulent discharges from the ears, vesicular eruptions about the head, enlargement of the glands of the neck and of the tonsils, disagreeable exhalations from the skin, especially of the feet and axillæ, feebleness with rapidity of the pulse, weakness and progressive loss of weight. Moreover, together with a diminished power of maintaining the animal heat, there is general uneasiness or irritability with a susceptibility to attacks of simple fever. As the disorder progresses, so all those symptoms which arise from depraved or impoverished blood, and from enfeebled vital energies, become manifested.

It is a matter of common observation that many tuberculous patients, while daily losing flesh and strength, are yet very sanguine in expecting recovery; though unfortunately they generally imagine a cure is to be effected without any great exertion on their own parts. It seems to me that in no disease is it more important to impress upon the sufferer the absolute necessity for steady perseverance in the use of remedies; and the hopelessness of giving way to that want of energy and determination, which many excuse by the expression of their devout desire to "trust in Providence."

Remembering what has been said upon the hereditary nature of tuberculosis, it may be noticed that there are three points to be particularly attended to, in order to prevent its transmission. These are,—1. To obtain well-assorted marriages—the marriages of parties in sound health and vigor, and not related by blood to each other. 2. Where this disease exists in the parents, or in either of them, great care must be taken to maintain the health of the mother during the period of utero-gestation. She should wear warm clothing, take regular exercise in the open air, avoid heated rooms and late hours, sleep in a large room, and have a plain nourishing diet. 3. On the birth of the child, every means ought to be taken to strengthen its general health, and to counteract the hereditary influence, by attention to the food, air, clothing, &c. If the mother be free from the strumous habit she may suckle her offspring, but otherwise a young and healthy nurse should do so. At the age of nine or ten months the infant ought to be weaned and fed on cow's milk, a small quantity of light nutritious vegetables, and a little good broth. Dr. Paris strongly recommends milk impregnated with the fat of mutton suet, which he orders to be prepared by inclosing the suet in a muslin bag, and then simmering it with the milk. The child must be clothed in flannel; should live in apartments which are airy and well-lighted; ought to have plenty of exercise in the open air; and once daily should have a cold sea-water bath, or a cold bath

with bay-salt dissolved in it. Ill-ventilated, badly drained, damp houses must be avoided; as well as localities generally regarded as unhealthy.

M. Guérin, from numerous experiments on animals, has proved the possibility of inducing artificial "rickets" at will, by merely separating the young too early from their mothers, and supplying them with food suitable only for the adult. There is no question that in these cases of improper feeding partial starvation is induced, both by the imperfect assimilation of the food, and by the diminution of digestive power which is brought about. That the same result can be produced in the human subject by the same means no one who attends the hospital out-patient room can doubt. The infant mortality in Lancashire has long been excessively high, the occupations of the poorer women causing them to neglect their children. During the cotton famine (1862–63) this mortality has greatly diminished; for the mothers being unemployed have had time to attend to the feeding of their offspring, while as the resources of the parents have been diminished the children have not been stuffed with unsuitable artificial food. And it must be remembered that excessive mortality is only a portion of the evil which care will remove. The effects of partial starvation are not simply most fatal to large numbers during infancy, but highly injurious by laying the foundation for future suffering in those who escape immediate death. With an ill-developed body we commonly find a weak nervous system, and consequently a low form of intelligence; so that individuals thus constituted are unable to make any stand against the first inroads of physical and moral disease.

For remarks on the *treatment* of tuberculosis, the reader must refer to the sections on Phthisis, Hydrocephalus, Tabes Mesenterica, &c. But it may be briefly stated that the object always to be held in view is to improve the faulty nutrition, so as to promote the formation of healthy blood, and thus prevent the fresh exudation of tubercle; while we also try to favor the absorption of that which has been deposited. Everything which can serve in any degree to deteriorate the constitution will increase the severity of this disorder; and therefore in each instance special attention must be paid to the subjects of diet, dress, exercise, repose, sexual intercourse, and air to be breathed,—not forgetting also to see that the functions of the digestive organs and the skin are properly performed.

XII. MELANOSIS.

This is a very rare disease, concerning which our knowledge is not very extensive. It is characterized by the deposition in various tissues of the body, of a black or dark-brown substance; whence its name, from *μέλας*, black, and *νόσος*, disease.

Melanotic formations may take place in various parts of the body, may present much variety of form, and may owe their production to different agents. They are divided by Dr. Carswell into two great groups:* 1. True Melanosis, of which there is only one class; and 2.

* Pathological Anatomy. Section on Melanoma. London, 1838.

Spurious Melanosis, of which there are three kinds—*a*, that arising from the introduction of carbonaceous matter; *b*, from the action of chemical agents on the blood; and *c*, from the stagnation of the blood.

1. True Melanosis.—This disease has its seat most commonly in the connective and adipose tissues; but it is also found, though rarely, in the mucous and serous membranes, in tendons and cartilages, as well as in the osseous system—particularly the bones of the cranium, the ribs, and the sternum. The organs it most commonly affects are the liver, lungs, spleen, pancreas, lymphatic glands, brain, eye, kidneys, testes, uterus, ovaries, rectum, and mammæ. Moreover, melanotic matter has been detected in the blood—particularly in that taken from the minute veins of the liver. It is sometimes found associated with various forms of cancer; and Andral states that he has met with it in the false membranes formed on serous surfaces. Melanotic disease has a great tendency to extend to different parts of the body through the lymphatic system.

Varieties.—Dr. Carswell describes four minor forms of true melanosis: 1. The *punctiform*, in which the black coloring matter appears in minute points or dots, grouped together in a small space, or irregularly scattered over a large surface; this variety being most frequently seen in the liver, which then looks as if it had been freely dusted with charcoal. 2. *Tuberiform melanosis* (the most common and conspicuous of all the forms) may occur in most of the organs, and sometimes on serous surfaces, such as the pleura and peritoneum. The tumors vary in size from a pin's head to an orange; they may be single or aggregated together, in the latter case producing irregularly-shaped masses of great bulk; they may be inclosed in a membranous covering, or they may be nonencysted; and coexistent with them the punctiform variety is found in the liver, lungs, and kidneys. 3. *Stratiform melanosis* occurs only on serous membranes. The black matter may be so small in quantity that the tissue on which it is deposited may merely appear as if stained with it; or it may be more abundant, so as to form a distinct layer of the consistence of firm jelly. This form is much more frequently met with in the horse than in man. 4. *Liquiform melanosis* is chiefly formed in natural or morbid cavities. Dr. Carswell says that he never saw it in man as a product of secretion, but that he met with it in consequence of the destruction of melanotic tumors, and the effusion of their contents into serous cavities. The accidental cavities in which it has been found have been chiefly ovarian cysts.

It is probable that the melanotic matter is deposited in a fluid state, and that it acquires consistence by the absorption of its more liquid parts. It is never found solid in serous cavities, where its diffusion is not impeded by unyielding tissues; but in the liver and lungs the tumors may have about the same consistence as a lymphatic gland. The black matter is almost tasteless and odorless; and chemical analysis shows that it is essentially composed of the constituent elements of the blood. According to M. Foy, it is the coloring matter of the blood highly carbonized.

Symptoms.—In subcutaneous melanosis the appearance of the tumors or nodules removes all difficulty as to diagnosis. But the symptoms accompanying melanotic deposits in internal organs are rarely well-

marked; so that their presence is often only ascertained after death. Dr. Copland states,* that as far as the symptoms have been recorded, and as far as he could observe them in a single case, melanosis is characterized by a gradual sinking of the vital energies, a cachectic habit of body, and a dusky ash-colored countenance. There is also a marked change in the nutritive functions, slowly giving rise to emaciation, dropsy, weakness of the pulse, and night-sweats towards the termination of the disease; while occasionally, when the lungs have been affected, there has been a blackened mucous expectoration.†

Pathology.—It is still a matter of uncertainty whether true melanosis is not simply medullary cancer modified by the formation of black pig-

* A Dictionary of Practical Medicine, vol. ii, p. 830. London, 1858.

† A very interesting example of extensive subcutaneous melanosis has been recently under the care of Mr. Lawrence, at St. Bartholomew's Hospital. From the account which has been published (Medical Times and Gazette, p. 225, 27th February, 1864), and from a letter with which Mr. Eccles has favored me, it appears that J. F., aged thirty-three, was in an emaciated low condition, when admitted on 28th January, 1864. He had been a railway porter for eleven years, was married and the father of two healthy children, and his parents were living. Eighteen months previously he first noticed a lump in each groin the size of a hazel-nut. Six months subsequently another growth, resembling a wart, appeared just below the umbilicus; which increased rapidly in size, was removed by ligature, and left only a black mark. Until two months ago he was strong and well, no fresh nodules having appeared; but at this time the hundreds which were now scattered all over him made their appearance, and his health gradually deteriorated. When admitted, the original lumps in the groin were about the size of small eggs, hard, nodular, very movable, and apparently consisting of enlarged glands. Scattered over the trunk and the lower and left upper extremities, were innumerable nodules; which varied in size from a millet-seed to a full-sized pea, and seemed to be situated in the subcutaneous tissue. They were thickest over the abdomen and back; but, in the thighs, laid chiefly in the course of the vein. Similar nodules were felt in the situation of the lymphatic glands in the neck. He complained of some pain in the right lumbar region, but otherwise did not suffer much, save from a continued sensation of sinking. No blood was detected in the urine, although he said that of late he had passed blood in his water. There was no evidence of the disease being of a cancerous nature. A microscopic examination of the melanotic matter showed only the small pigment granules and the larger pigment cells.—On the 9th February, the day after death from exhaustion, Mr. Eccles made an examination of the body. On reflecting the abdominal integument, the nodules were proved to be, with few exceptions, entirely subcutaneous. They were easily separable from their connections, were of the consistence of soft putty, and were quite black. One rib, just at its junction with the costal cartilage, was infiltrated, and the bone softened, so as to be easily cut through with a scalpel. Somewhat larger nodules were scattered over the interior of the thorax, beneath the pleura; and a like condition existed in the pericardium, the cavity of which was filled with a dark serous fluid. Similar deposits were found beneath the visceral layer of the pleura, especially between the lobes, and some of smaller size in the substance of the lower lobes of each lung. The bronchial glands were apparently wholly infiltrated. The heart was studded on its exterior with numerous nodules (very like ordinary dry black currants), which here and there seemed to involve the muscular tissue of the heart. Similar deposits were situated beneath the endocardium, but the valves were unaffected. The liver was only slightly affected, the disease seemingly extending from the surface into the substance of the viscus. The fibrous capsules of the kidneys were greatly affected, especially the right, only a very little of the structure of these organs being apparently implicated. The supra-renal capsules were not examined. The spleen was very firm and small; but no deposit could be detected. Attached to the omentum were several masses of disease, of which the largest were two lying in the cavity of the pelvis, each somewhat larger than a man's fist. On cutting through these, they were apparently uniform in structure throughout. The intestines were seemingly natural, save that the rectum contained some pinkish-colored fæces. The brain, orbits, &c., could not be examined; an unfortunate circumstance, as the man gradually became blind a few days before his death. The mesenteric glands were affected in the same way as the bronchial, and there were numerous nodules beneath the peritonæum in the sub-peritonæal tissue.

ment in its elemental structures. Mr. Paget says: "On this long-disputed point there can, I think, be no reasonable doubt. I have referred to a case of melanotic epithelial cancer: but, with this exception, I have not seen or read of any example of melanosis or melanotic tumor in the human subject which might not be regarded as a medullary cancer with black pigment. In the horse and dog, I believe, black tumors occur which have no cancerous character; but none such are recorded in human pathology."* On the other hand, Dr. Walshe entertains a directly opposite opinion, and for the following reasons: "1. That the melanic pigment should in itself constitute cancer is an absurdity: it never even forms a stroma, as the cells continue permanently free. 2. The stroma of many melanic tumors is perfectly distinct in its physical, chemical, and microscopical characters from all cancerous stromata. 3. Many melanic tumors do not contain cancerous juice. 4. The microscopical characters of the pigment-cells and granules are the same in all kinds of growth in which they occur. 5. Melanic tumors, when no ordinary cancerous elements exist in them, cause no local or general symptoms, except those dependent on the size and seat of the growth. 6. When melanic tumors produce the local or general symptoms of cancer, they are found either to be composed of encephaloid or schirrus, wholly or in part, impregnated with black pigment. 7. Neither the local nor general symptoms produced by carcinoma are modified in cases in which melanic matter is found to pervade it. 8. The circumstance that melanosis is rarely solitary, is strongly insisted upon by Cruveilhier, as a ground for ranking it with cancer. But tubercle multiplies similarly, yet assuredly tubercle is not cancer."† Unfortunately, I can myself say but little upon this matter; though it seems to me, from a careful study of many of the recorded cases, that there is reason to doubt whether melanosis is so closely allied to cancer as many pathologists assert. It is not a very uncommon disease in horses, especially in those of a gray color; and it is said that in these animals life is scarcely shortened by its presence, though it exhibits the same tendency as in man to multiply itself in different parts of the system.

Melanosis is most often met with in the middle-aged, or even in those advanced in life. Mr. Wardrop, however, has seen it in a little girl only two years old, in whom "the humors of the eye were converted into a black gelatinous substance." When the disease attacks the skin, it will often be found to have commenced in or near a congenital mole or a wart.

Treatment.—On this head there is little to be said that is satisfactory. Indeed all that can be done is to combat the distressing symptoms as they present themselves. The two classes of medicines which will be found most useful are tonics, and cholagogue purgatives. The necessity for good diet, sea air, and a moderate amount of exercise, should also be borne in mind.

2. Spurious Melanosis.—There are three kinds of this counterfeit disease:

a. From the Introduction of Carbonaceous Matter.—In this variety

* Lectures on Surgical Pathology. Edited by William Turner, M.D. Second Edition, p. 731. London, 1863.

† The Nature and Treatment of Cancer, p. 184. London, 1846.

of false melanosis or black phthisis, the lungs—it occurs only in these organs—present a black carbonaceous color; the bronchial glands are also blackened; and the pulmonary tissue is indurated and friable, infiltrated with black serum, and often broken down into irregular cavities. The discoloration has its origin in the inhalation of the carbonaceous product of ordinary combustion; and it is chiefly found in the lungs of those who have worked in coal-mines.

b. From the Action of Chemical Agents on the Blood.—In digestion of the coats of the stomach by the gastric juice after death, and in poisoning by acids, the blood contained in the gastric capillaries, as well as that which is extravasated, will generally present a blackish tint. The inhalation of sulphuretted hydrogen gas will also darken the blood in the intestinal capillaries.

c. From the Stagnation of Blood.—Retarded or impeded circulation may produce black discoloration of the blood. When this fluid ceases to circulate in the capillaries of an organ it coagulates, the serum and salts become absorbed, and a black substance remains. The latter probably consists of fibrin and hæmatin. The organs in which the foregoing change occurs are the digestive and the respiratory.

XIII. FATTY DEGENERATION.

The designation of *fatty degeneration*, or *fatty metamorphosis*, is given to a certain class of cases which during life are marked by anæmia with great prostration; and which, after death, are found to be distinguished by the more or less perfect transformation into fat of various important textures, but especially of the muscular fibres of the heart.

There is the adipose tissue, in which fat is naturally stored up for the welfare of the individual: and there are other textures—as the villi of the mucous coat of the duodenum and jejunum—where this element transitorily abounds after the digestion of particular kinds of food. But in the cases about to be treated of, fatty matter is present in abnormal situations, the tissues being converted into this substance; in consequence of which there may result the most disastrous lesions. There is, therefore, no connection between the tendency to form fat around organs, or to the production of obesity, and the change of textures into fat. In the former case we have a condition which may prove preservative if confined within due limits. In the latter, we recognize only a process of decay and death; the result of some defect in the nutritive functions. A tissue once completely converted into fat—and there is no tissue in the body which may not undergo such conversion—cannot be reconstructed by human aid. But the extension of this degeneration may be hindered, while the work of the affected organ may be lightened by well-timed assistance.

A fatty degeneration of one or more of the viscera—most frequently perhaps of portions of the muscular fibres of the *heart*—is very commonly found after death from chronic disease, or even from old age. Inactivity, impaired nervous power, the persistent yielding to some master-passion, over-study, and cessation of function, lead to this change; as does phthisis, excessive or continuous loss of blood, continued fever,

and indeed all wasting diseases. Intemperance is a fruitful source of it, so is long-continued privation of good food and pure air, and so also appears to be a residence in tropical climates.

The fact that the tissues of even more than one organ are in a state of degeneration must simply be taken as an indication that life is somewhat in peril. Not that death is necessarily imminent, but the individual, if he would live, must exercise great and constant caution. The bloodvessels of the brain may long have their coats affected, and yet offer no impediment to the flow of blood or to cerebral nutrition; but let any sudden strain be put upon them, and apoplexy at once results from their rupture.

All varieties of cell-formation may undergo fatty degeneration, the process commencing at first with the production of a few fatty molecules, and continuing until the amount is so great that the cell-wall ruptures. The *liver* is particularly liable to be thus affected, the hepatic cells becoming enlarged and loaded with oil granules. In certain forms of *Bright's disease* the epithelium of the convoluted uriniferous tubules is found in a state of fatty degeneration; the degenerated epithelium so filling the tubules that they present a yellowish opaque appearance. In fatty degeneration of the *muscular fibres of the heart* the metamorphosis may go on until all normal structure disappears in the portions affected. In the walls of *arteries* the change takes place in the internal coat, being often visible to the naked eye in the shape of round or angular white spots; such parts, on being minutely examined, presenting the usual characteristic appearances. The atheromatous change which occurs in the arterial walls of old people—particularly in the aorta—is a form of fatty degeneration, beginning with inflammation of the arterial coat, and often ending in softening and ulceration. If an atheromatous patch be submitted to microscopic examination, it will be seen to consist of fat globules, plates of cholesterine, granule cells, and amorphous fragments of tissue. In certain diseases—as paralysis, deformities of the limbs, spinal curvature, &c.,—the *muscular structures of the affected part* may undergo transformation into fat; so that they are observed on dissection to be pale, thin, and yellowish, or marked longitudinally with alternate red and yellow streaks. This latter appearance is due to the deposit of fat between the primitive muscular fasciculi, combined with real fatty degeneration. It is a condition which can be well examined in any of the voluntary muscles of overfed prize cattle. And lastly, about the age of fifty, when old age begins to steal on by slow degrees, the corneæ may be the first to tell the unwelcome truth. The *arcus senilis*, commencing at the upper and outer margin of the clear cornea, and occurring symmetrically in both eyes, is the result of the retrograde metamorphosis under consideration. And this change is of special importance, inasmuch as it is sometimes indicative of a like alteration going on in organs beyond our ken. I say "sometimes," because it is certain that it may exist alone, the tissues of the heart or liver or kidneys being healthy; or the latter may be undergoing fatty degeneration without the arcus being present.*

* The reader who wishes to study this part of the subject more closely should refer to Mr. Edwin Canton's excellent treatise "On the Arcus Senilis, or Fatty Degeneration of the Cornea." London, 1863.

The designation of *idiopathic fatty degeneration* has been given by Dr. Wilks to a class of cases in which excessive anæmia and debility are the peculiar phenomena during life, and a fatty degeneration of many parts of the body, but more especially of the heart, the characteristic changes detected after death. The term idiopathic is used to disconnect these cases from those instances of fatty change of organs which are found as accompaniments of other diseases.

Perhaps the symptoms and progress of a case of idiopathic fatty degeneration may be made more clear by the sketch of a typical example: A woman, thirty years of age, married but never pregnant, complains of great and increasing debility. For the last eighteen months she has had much mental anxiety; but her diet has been good, her home healthy, and she has not suffered from any exhausting disease, such as hemorrhage, diarrhœa, &c. Moreover, she has never had ague, nor lived in a malarious district. She has taken drugs of various kinds without any benefit for almost a year. The catamenia are regular, and there is no leucorrhœa; she is thin but not wasted; is weak, and she presents a marked pallid aspect; there is no arcus senilis; the pulse is quick, and there is an anæmic cardiac murmur; the lungs, lymphatic glands, liver, spleen, &c., appear not to be diseased; the urine contains neither albumen nor sugar; and on examining the blood microscopically no excess of white corpuscles is detected. We hope that by the careful administration of a nourishing diet, with bark, or quinine and iron, the symptoms may become ameliorated; but this expectation does not get realized, and at the end of a month or two we find that she has had frequent attacks of sickness and purging, the legs have become slightly œdematous, while she is reduced to such a condition of weakness that she cannot raise herself in bed. In a few days she is found in a half-conscious state, and at the end of some hours she dies. At the autopsy it is noticed that the body is spare, but not wasted as in phthisis; it is very pale, and the viscera appear bloodless. The brain, lungs, intestines, spleen, and supra-renal capsules are healthy; as are also the generative organs. But the liver is pale and fatty; while the muscular tissue of the heart has undergone an extreme degree of fatty degeneration, presenting a pale mottled appearance to the naked eye. This change is chiefly seen in the left ventricle, which exhibits the appearance of white striæ of fat, every part being occupied by this fatty change; the right ventricle is less affected, and the auricles look healthy. On examining with a quarter-inch object-glass some of the fibres from the left ventricle no traces of transverse striæ can be seen, but only a large number of small oil globules, with free fat globules which have escaped from the ruptured fibres. The kidneys are pale, and healthy to the naked eye; but on a microscopic examination the tubules and secreting cells are found to contain a considerable amount of fatty molecules.

Sufficient has now been said to show the importance of a careful examination of this subject, which will be again referred to in treating of the diseases of various organs. Its extensive bearing on the practice of medicine cannot be better summed up than by quoting the words of the late Mr. Barlow, of the Westminster Hospital: "Who, a short time ago," says this gentleman, "would have dared to assert, unless from some morbid desire to be ridiculed, hemorrhage of the brain, the heart, the lung, and the placenta was often the result of fatty degeneration

similarly affecting these parts and leading to their rupture? Who could have asserted that 'mollities ossium,' atheroma of arteries, and the arcus senilis, heretofore grand and unmeaning appellations, were only specimens of the same devastation? Who have affirmed that ramollissement of the brain and softening of the heart (I say not, invariably) examples of it too? Who could have spoken of degeneration of the liver and kidney as conditions associated with and dependent on general atrophy? Who could have traced gradual to the same cause as sudden death, as now we can? Surely, there has been, to speak most modestly, a great and evident advancement in pathology."* These remarks need no confirmation at the present time, for universal observation has proved their truth; while it is scarcely too much to say that it is owing to their importance having been recognized, that we have become better practitioners in the art of healing. We are able to see more certainly than our forefathers could what medical treatment will accomplish and what it will not. And it seems to me that it is owing to this enlightenment—forasmuch as we know that degenerated tissue cannot be repaired by bleeding, mercury, or antimony—that recourse is had much less frequently to such active remedies than formerly; and not because there has been any change in the type of organic disease.

XIV. AMYLOID DEGENERATION.

The discovery in the animal kingdom of starch, or, at least, of a substance which possesses properties allied to those of the amylaceous group in the vegetable world, is full of interest to the pathologist and physician. For some few years it has been known that the liver, spleen, and kidneys occasionally undergo a peculiar degeneration, which has been described under the names of the *Lardaceous*, *Waxy*, *Cholesterine*, or *Albuminous Infiltration;* though until the publication of the researches of Virchow (1854—1859), we were not only ignorant of the nature of this substance, but of its exact seat. Even now our knowledge of this morbid process is very imperfect.

What we do know of the matter, as far as I can gather from a careful study of the writings of Virchow, Wilks, Francis Harris, Gairdner, and the author of a very excellent article in the "British and Foreign Medico-Chirurgical Review" for October, 1860, together with the close observation of a case which was under my charge for some months, seems to be as follows: In the human body there are to be found, according to Virchow, two allied, but not identical substances. In the first place, we find bodies which, in their chemical properties, are analogous to real vegetable starch, and in their form bear an extraordinary resemblance to vegetable starch granules, inasmuch as they constitute more or less round or oval structures, formed by a succession of concentric layers. They are in fact *starch corpuscles* or *amylaceous concretions*. To this class belong the little corpora amylacea of the nervous system; the laminated bodies that are found in the prostate of every adult man, and which, under certain circumstances, accumulate in large quantities, so as to

* On Fatty Degeneration, p. 90. London, 1853.

form the so-called prostatic concretions; and rare substances of a similar kind which occur in certain conditions of the lungs. These formations assume a blue color by the action of iodine, as vegetable starch does; the blue becoming green if they are mixed up with much albuminous matter, for inasmuch as the nitrogenous material is rendered yellow by iodine, while the amyloid becomes blue, the result must be green. The greater the quantity of nitrogenous matter the browner does the color become.

In the foregoing instances the starch-like matter lies *between* the elements of the tissues. Very different are the cases of disease, where there is a degeneration of the tissues themselves; in which all their component parts become filled with a *starch-like* or *amyloid substance*, and get gradually infiltrated with it, just as lime is diffused through the tissues in calcification. The change commences in the muscular fibre-cells of the middle-coat of the small arteries; the walls of which vessels gradually get thickened, while their calibre becomes diminished. Then the morbid process involves the surrounding anæmic parenchyma; extending until the whole tissue in the neighborhood of the arteries is altered. This amyloid substance, thus infiltrated, has the peculiarity of not becoming blue under the influence of iodine alone, but of assuming a peculiar yellowish-red color; though it takes on either a blue or a violet tinge, if the application of iodine be followed by the very cautious addition of sulphuric acid. Hence this material seems less allied to starch properly so called, than to that substance which forms the external membrane of vegetable cells—cellulose; though it differs from this in becoming colored upon the application of a pure solution of iodine, whilst real cellulose is not at all colored by iodine alone. Owing to this multiplicity of reactions, it is difficult to say to what class the material really belongs; though we may assume, from its reaction with iodine and sulphuric acid, that it is analogous to the substances of the amylaceous group. Meckel, in an essay on "Lardaceous Disease" cites the chemico-physical appearances as favoring the presumption that the material is cholesterine, or some closely allied fat; but Virchow and others show that the substance does not in any way behave like a fatty matter, while the reactions of cholesterine and the apparent amylaceous compound are so different that the two cannot be confounded.

Whatever the particular substance may be, however, the important fact remains, that in the so-called *amyloid*, or *cellulose degeneration*, we have a remarkable constitutional disease; which generally invades several organs at the same time, and renders them incapable of performing their functions. The patients gradually assume a cachectic, broken-down appearance; they lose flesh and strength; dropsy often supervenes; the urine gets albuminous if the kidneys become affected; diarrhœa sets in when the digestive tract is involved; and in spite of remedies death soon takes place.

When the liver, spleen, or kidneys have been the organs affected, an unpractised eye may fail to detect the alteration in structure unless there is an extreme amount of disease. But when, for example, we incise a liver where the process of amyloid degeneration is far advanced, a feeling is communicated like that experienced on passing the knife through a piece of wax; while the cut surface presents a semi-transparent appearance. The gland is also found increased in size; it has

some resemblance to a fatty liver, though its increased weight distinguishes it; a sense on handling is given like that received from a lump of wax; and if the disease be very extensive, no trace of normal structure can be distinguished, though in an earlier stage the lobules are seen distinctly mapped out, owing to the matter being deposited within the lobule and in and among the secreting cells. Dr. Harris first employed chemical reagents to detect the presence of amyloid in the walls of the intestines; and he noticed that on brushing a solution of iodine over the mucous membrane of the affected portions, innumerable dark-red points corresponding with the villi appeared, which became changed to a bluish-steel color on the super-addition of a drop of dilute sulphuric acid.

Virchow speaks of the occurrence of amyloid degeneration of the lymphatic glands as an undoubted fact; and in all probability he is correct. Dr. Wilks, however, with more caution, says, that the change in these organs is not strictly lardaceous, but is either a variety of it, or has a close relationship with it. It produces a lingering form of fatal cachexia. "The enlargement of the glands is in most cases gradual, extending sometimes over a period of two, three, or more years, and often from commencing in the neck in weakly children, is called scrofulous. When the mischief is thus gradual in its commencement, and affecting only part of the glandular system, no marked symptoms ensue, but as time tends to its development in the thoracic and abdominal glands, a slow prostration ensues, terminating in death."* The glands often get an enormous size; they have a peculiar elastic feel; they may form large tumors in the neck and groin; while the posterior mediastinal and lumbar glands may all be affected, or only these latter glands along the course of the aorta may be involved without any affection of the external glands. When these diseased bodies are removed, they are found as distinct tumors, very tough and solid. On making a section of one of them, the cut surface looks to the naked eye as if dotted over with points of wax; and though Dr. Wilks says no effect is produced by the application of iodine, yet Virchow maintains that this agent colors the diseased parts of the gland red, whilst the normal portions are rendered yellow. If when the iodine-red hue is obtained we use sulphuric acid, a blue color may be procured if the exact proportion of acid necessary to effect this change be hit upon.—Sometimes the disease in the glands is associated with the peculiar wax-like substance in the spleen, or with lardaceous liver, and with tuberculosis. The symptoms in any case are those of anæmia, prostration, and final exhaustion. The lymphatic glands and spleen being connected with the blood-making process, if a gradual destruction of their texture goes on, the most injurious results must ensue.

There is only one more important point to be briefly noticed—viz., that amyloid degeneration may either exist alone, or it may be present in connection with tuberculosis, diseases of the bones, and syphilis. Thus, in phthisis, this form of hepatic disease is said to be much more common than fatty liver; while sometimes the amyloid and the fatty degeneration occur together. So frequently has amyloid degeneration been found connected with caries or necrosis, that at one time it was

* Guy's Hospital Reports. Third Series, vol. ii, p. 103. London, 1856.

thought the osseous disease exercised some determining influence on the production of the amyloid bodies. Multiplied researches have proved, however, that amyloid degeneration is as frequently associated with phthisis and syphilis, as with bone disease. So, also, it was considered that Bright's disease was often associated with amyloid degeneration, until it was found that the former was sometimes merely a symptom of the latter affecting the kidneys.

XV. MINERAL DEGENERATION.

The process by which mineral matter is infiltrated or deposited in a tissue must be briefly noticed. Every texture in the body is probably liable to mineral degeneration; but it is most frequently observed in the coats of arteries, and in the cartilages. Tubercular and cancerous growths may also undergo this change, while it not uncommonly occurs in fibrous tumors of the uterus.

The importance of discriminating between *calcification* and *ossification* has been well pointed out by Virchow. Formerly both these conditions were spoken of as "ossification." But a part does not become true bone because it takes up lime into its intercellular substance, and has stellate cells present in it. On the contrary, it is merely "calcified" or "petrified." At the same time it is not to be forgotten that "ossification" does sometimes take place, with the formation of dense or compact and spongy or cancellated tissue, and occasionally even of periosteum.

The coats of large arteries are often found brittle from petrifaction. And this earthy degeneration may occur alone, or in combination with fatty degeneration or atheroma. Sometimes plates of mineral matter are discovered imbedded in the middle coat of the vessels, rendering them hard and rigid tubes.

All varieties of exudation may undergo the calcareous transformation, the animal matter becoming absorbed, while the mineral constituents get aggregated and form laminæ. In this way Dr. Hughes Bennett states that he has seen the gall-bladder converted into a calcareous shell, and the pericardium into an unyielding mineral box inclosing the heart. The cardiac valves may thus likewise become petrified.

With regard to fibro-calcareous tumors, Mr. Paget describes two methods by which calcification may advance,—a peripheral and an interstitial. In the former, the most rare, a common fibrous tumor becomes coated with a thin, rough, nodulated layer of chalky or bone-like substance. By the latter method, a similar substance is more abundantly deposited throughout the growth; being often so arranged, that by maceration a heavy and hard mass can be obtained, knotted and branched like a lump of coral. In both forms the change is an earthy degeneration, consisting of a deposit of the salts of lime and other bases, in combination with, or in place of, the fibrous tissue. True bone is not formed in uterine fibroids.

XVI. BRONCHOCELE AND CRETINISM.

1. Bronchocele.—This affection, called *Goitre* (perhaps from *Gutter*, the throat) by the Swiss; popularly, in this country, *Derbyshire Neck*, from its prevalence in some parts of Derbyshire; and technically *bronchocele* (*Βρόγχος*, the windpipe, and *κήλη*, a swelling), consists of a morbid enlargement of the thyroid gland.

The characters presented by the swelling vary according to its duration. It may be soft, or firm, or very hard. The whole gland may be swollen, or the centre only, or either side. According to Alibert, the right lobe is more frequently affected than the left. The swelling is unaccompanied by pain, and usually causes but little inconvenience beyond the deformity which it produces. Sometimes, however, throbbing of the vessels, inordinate pulsation of the heart, great depression of spirits, dyspepsia and sickness are complained of; together with other symptoms indicative of an attenuated state of the blood. Moreover, distressing sensations may be induced by the pressure of the enlarged gland on the surrounding parts; while respiration and deglutition are rendered painful and difficult by the compression of the trachea and œsophagus. It is much more common in women than in men, almost in the proportion indeed of twelve to one. Whenever goitre prevails, popular opinion regards the water used for drinking as its cause. Mr. McClelland has affirmed, as the result of his personal inquiries, that goitre never prevails to any extent except in villages situated upon, or close to, limestone rocks. His views are, however, challenged by M. Chatin, who mentions that in Savoy there are two villages divided from each other by only a narrow ravine. Both villages stand on rock and soil of the same nature, their elevation is the same, and they seem subjected to the same influences. But in one goitre prevails, while in the other it is unknown: in the first, the water supplying it contains a trace of iodine; in the second there is no iodine in the water. In truth, however, there is a growing conviction that this disease is due to a combination of circumstances, rather than to a single cause; and it appears very probable that neither a marshy soil, nor the absence of the sun's rays, nor the configuration of the locality, nor the habits of the people, nor any peculiarity of the waters, will separately induce goitre.

Sometimes there appears to be a connection between bronchocele and irregularity of the uterine functions. Thus I have noticed in many cases that the enlargement of the gland is greatest at the catamenial periods, and especially when the flow is scanty. Some authors have also noticed that the disease makes the most progress during the puerperal state. Profuse leucorrhœa is a frequent accompaniment.

There is a peculiar form of this affection which has been named *exophthalmic goitre*, owing to the prominent condition which the eyes assume in it. Not only is there protrusion of the eyeball (proptosis oculi), but generally more or less short-sightedness; the thyroid body, as well as being enlarged, is the seat of strong pulsations; whilst the patient suffers from frequent attacks of palpitation of the heart, with occasionally a loud systolic bruit (anæmic?). The general health is always deranged, This exophthalmic condition has been attributed to

distension of the intraorbital vessels, pressing the eyeball forwards; to serous infiltration of the areolar tissue behind the globe of the eye; or to an increased growth of adipose tissue in the orbit. Whichever may be the correct explanation—the first is the most plausible—it usually happens that the ocular prominence and the thyroid tumor increase or diminish simultaneously. M. Trousseau believes that this complicated affection (which he describes as "La Maladie de Graves," since it was first recognized by this distinguished physician in 1835) is a neurosis, accompanied by local determinations of blood, and having as its proximate cause a modification of the vaso-motory apparatus. This theory explains the occurrence of disturbance in regions supplied by branches from the sympathetic.

Again, there is a *cystic variety of bronchocele;* in which cysts are developed in the thyroid body, instead of this gland becoming uniformly enlarged with solid matter. The lining membrane of these cavities is very vascular; so that if they be opened and their brown-colored serous contents evacuated, they require to be well stuffed with lint to prevent hemorrhage. As granulations are thrown out from the walls, the cyst contracts, and ultimately entirely closes. The use of iodine injections in such cases is not to be recommended.

The first point in the *treatment* of bronchocele is, if possible, the removal of the patient from the infected locality. Then, in women, care is to be taken that the menstrual functions are regularly established. As regards therapeutic agents, the introduction of iodine, by Dr. Coindet, of Geneva, has in a great measure superseded all other remedies. The iodide of ammonium (F. 38) is often very beneficial; especially if its internal administration be accompanied by its employment locally. Iodide of potassium is also useful (F. 31); and sometimes cod-liver oil, given with it, aids recovery. At the same time the tumor should be rubbed every night with the compound iodine ointment, or painted with iodine liniment diluted with an equal quantity of spirit or glycerine. The iodide of iron (F. 32), quinine and iron (F. 380), steel and aloes (F. 393) are all valuable medicines. A nourishing diet must be allowed, and the hygienic surroundings of the patient attended to.

A plan of treatment adopted in India by the late Major Holmes seems to have had great success.* This gentleman—who was barbarously murdered during the Indian mutiny—is said to have treated a large number of sufferers. The method, as practised at Fyzabad, Oudh, is as follows: Three drachms of the red iodide of mercury are carefully mixed in a mortar with nine pounds of suet. Sixty, one hundred and twenty, or one hundred and eighty grains of this ointment, according to the size of the tumor, are to be rubbed in with an ivory or wooden spatula for about ten minutes soon after sunrise, and the patient desired to sit with the goitre exposed to the rays of the sun. After six or seven hours' exposure, the pain is often considerable, and the surface generally becomes slightly blistered. Some more ointment is then to be gently spread over the tumor, and the person may be allowed to go home, but with particular directions not to interfere with the blistered surface, and to attend for a fresh application if necessary, as soon as the skin has healed. Major Holmes usually advised that the

* Lancet, p. 438. 10th October, 1863.

ointment should be used but once a year to the same patient. Mr. Whishaw, also of Fyzabad, says that small goitres, such as are seen in England, are cured by one application; but those of larger size require three or four. He mentions the case of a woman whose goitre measured nearly five feet in circumference, and hung down some inches below her navel. The ointment was used once a month for a year, when she left the hospital, the swelling having been reduced to the size of a small cocoa-nut. By some of the surgeons of the Indian army it is thought better to employ a stronger ointment than that used by Major Holmes. Mr. Greenhow uses one of the strength of an ounce and a half of the salt to three pounds of lard. A modification of this plan appears well deserving of trial,—viz., the simple inunction, every other night for some weeks, of the officinal ointment of red iodide of mercury (grs. 16 to the ounce). Care had better be taken not to blister the neck by the too free application of the remedy.

For exophthalmic goitre M. Trousseau objects to iodine and to iron; but recommends the use of bladders of ice to the neck, full doses of digitalis, bleeding during any temporary aggravation of the symptoms, and cold bathing with douches. This physician allows, however, that the malady seldom completely disappears; the swelling and enlargement of the thyroid usually persisting, the proptosis never entirely subsiding, and the palpitation reappearing under the influence of slight mental emotion.

In this country when medical treatment fails, surgeons have attempted to give relief by one of three operations. Thus some cases are recorded as having been cured by the introduction of setons into the diseased gland; and in three obstinate cases which were unrelieved by the iodide of ammonium, iodide of iron, quinine, &c., I effected cures by passing thin double iron wires through the glands and leaving them there for a week. In other instances this treatment has failed to effect any good; and unfortunately there are no means by which we can tell beforehand whether the seton will prove beneficial or useless. Some care is necessary in introducing the wires, to prevent enlarged vessels from being pierced. Occasionally the operation of tying the thyroid arteries has been practised; and these means having failed, attempts have been made to extirpate the gland. To most practitioners, however, the last operation seems unjustifiable.

2. Cretinism.—This is a strange disease, a sort of idiocy, accompanied by deformity of the bodily organs. Many authorities assert that it has a close but ill-understood connection with goitre. M. Kœberle, of Strasburg, who has written a work on cretinism, which is highly spoken of, disputes this connection. He attributes the disease to a miasmatic poisoning. Just as some marshy lands produce cholera, some yellow fever, and some ague,—so also he believes that cretinism may arise in certain malarious districts under suitable conditions of temperature and moisture. Dr. Macculloch, some years since, hinted that cretinage had its origin in malaria.* Whatever may be the cause, however, it is certain that most, if not all, cretins are goitrous; though bronchocele may prevail where there are no cretins.

* An Essay on Malaria, p. 435. London, 1827.

The cretin is found principally in the valleys of the Alps, the Pyrenees, and the Himalaya mountains. His stature is diminutive; his head of great size, flattened at the top, and spread out laterally; the countenance is vacant and void of intelligence; his nose flat, lips thick, lower jaw elongated, and mouth gaping and slavering. Then the tongue is large, and often protruding from the mouth; the eyes are red and watery; often there is squinting; the abdomen is sunken and pendulous; the legs short and curved; while the skin is cadaverous or dark-colored, coarse, and rough. In the females, menstruation comes on at a late period,—on an average about the eighteenth year; while in extreme examples of this disease the reproductive powers may remain undeveloped through the whole life. Idiotism of the lowest grade is frequently the cretin's lot; sometimes he is deaf and dumb, or blind; often he is voracious, and addicted to the most disgusting habits; and, in short, if neglected, he more resembles an animal than a human being. I say, if neglected; for, thanks to Dr. Guggenbühl,—the founder of the establishment at Abendberg, near Interlachen, for the treatment of cretins—it has been proved that even for these apparently hopelessly wretched beings much may be done. The chief remedies are pure mountain air; plenty of exercise; a simple nourishing diet into which milk largely enters; the occasional use of such medicines as cod-liver oil, carbonate of iron, phosphate of lime, valerianate of zinc, &c.; with moral control, and judicious mental training.*

Dr. Guggenbühl has also directed attention to the highly arched palate of the idiot, as indicative of atrophy of the base of the brain; just as depression of the vault of the cranium shows imperfect development of the cerebral convolutions. He also insists upon the necessity, in training the idiot, of ascertaining the prominent instincts, and the amount of intelligence which exists; so as to encourage those faculties which are not altogether wanting.

XVII. GOUT.

Few disorders have attracted greater attention from ancient and modern physicians than gout.† Sydenham, who was well able to describe its symptoms from a personal experience, inasmuch as he suffered from it for thirty-four years, says that "it kills more rich men than poor,

* An interesting account of this establishment is given by Sir John Forbes, in The Physician's Holiday. Third Edition, p. 180. London, 1852.

It is necessary to mention, however, that since Sir John's visit in 1848, the Institution on the Abendberg has been widely condemned; and it has been asserted, from actual observation, that not only does it fail to fulfil the objects it was established to promote, but that Dr. Guggenbühl's conduct as superintendent is not deserving of professional confidence. At the same time it is allowed that this physician's efforts were at first most disinterested and praiseworthy; and hence it is to be hoped that these efforts will be remembered, while his failings may be forgotten.

† The old Greek physicians named this disorder according to the part affected. Thus they speak of podagra (ποδάγρα, from πούς, the foot, and ἄγρα, a seizure); chiragra (χειράγρα, from χείρ, the hand); gonagra (γονάγρα, from γόνυ, the knee); and arthritis (ἄρθρον, a joint), when several articulations were simultaneously attacked. The term gout seems to have been first used about the year 1270; having been derived from the Fr. *goutte*, a drop, because it was thought to be produced by a humor which fell *goutte à goutte* into the joints.

more wise than simple. Great kings, emperors, generals, admirals, and philosophers, have all died of gout. Hereby Nature shows her impartiality: since those whom she favors in one way she afflicts in another—a mixture of good and evil pre-eminently adapted to our frail mortality." It has long been, and is still, a vulgar error, that an attack of gout is salutary, helping to prolong life and drive away other maladies. The truth is, however, that it produces local and general mischief, which increase with every paroxysm; and though the evil effects may at first be inappreciable, yet the physical powers become gradually undermined. Of course when the gouty fit is over, the blood is purer and the patient consequently in better health than before; but the cause of the attack has produced a permanent and injurious effect.

Gout may be defined as a specific inflammation, having a constitutional origin, and being much favored by an hereditary taint. It is accompanied by great pain and swelling of the affected joint, fever and general disturbance, and especially by some disorder of the digestive organs. The disease has a tendency to recur again and again, after variable intervals.

The inflammatory action most frequently invades the ball of the great toe, or the metatarso-phalangeal joint. Thus, out of 516 cases of gout, Sir C. Scudamore found that only the great toe of one foot was affected in 314; the great toe of each foot in 27; the ankle and great toe of the same foot in 11; the outer side of one foot in 10; the instep—one or both—in 31; the ankle—one or both—in 47; while in the remainder, the part was either the heel, tendo Achillis, the ham, knee, wrist, thumb, or fingers.

Symptoms.—The acute attack may be preceded by premonitory symptoms, or it may come on suddenly. In the former case, the patient complains for two or three days prior to the seizure of heartburn and flatulence, and of dull pain in the left side of the chest, with inability to lie comfortably on that side; while, in many instances, there is also fluttering irregularity, or intermission in the heart's action. There are also symptoms of impeded cutaneous action, the skin being dry and hot, and sometimes affected with scaly eruptions or with urticaria; while the urine is loaded with urates.

Very often, however, there is no warning. The victim goes to bed apparently well; but about two or three o'clock in the morning awakes with severe burning and throbbing pain in the ball of the great toe, or in the heel, or the fascia covering the instep of the foot, or the thumb. There is often a slight rigor succeeded by heat. The pain is most excruciating, but it abates towards the dawn, and the patient falls asleep. On again awaking the affected part is found red, swollen, and exquisitely tender to the slightest touch; the sufferer is feverish, restless, very irritable, and much depressed; his tongue is furred; his bowels are constipated; and his urine will be found high colored, rather scanty, acid, and loaded with urates or with uric acid, sometimes with phosphates or oxalate of lime, while occasionally it contains a little albumen. When the urine presents much uric acid—which is seldom the case—this circumstance is favorable; since it indicates that the kidneys retain their eliminating power, and hence it may be hoped the blood will be freed from this principle and the patient soon recover. Often the bladder is irritable, so that it has to be emptied frequently; while the urine in its

passage gives rise to a sense of heat in the urethra. On the second night the pain again becomes aggravated, and, perhaps, also on the third; but in a few days the attack passes off, the œdema disappears, the cuticle over the inflamed part desquamates, and the patient regains his usual health. Very frequently he is conscious of feeling better than he has been for a long time previously; for though the attack is permanently injurious, it is undoubtedly temporarily curative.

With improved strength and spirits, but little attention is paid to hygienic rules; forgetful that the disease will return. At first, a happy time of two or three years may elapse: with each paroxysm, however, the interval will shorten, until at length, perhaps, the patient is hardly ever free from an attack, except it may be for a few weeks in summer. At first, also, it confines itself to a single joint; by degrees, several joints in both feet or in the hands suffer. Deposits—called tophi, tophaceous deposits, or chalk-stones—are formed around and outside the joints, of a material resembling moist chalk, and consisting chiefly of urate of soda; small spots of which substance may often also be seen just beneath the skin of the auricle of the ear, and less frequently on the eyelids or in the integuments of the face.

The disease is generally spoken of as *chronic gout* when the attacks are numerous, and the constitution has become impaired by them. The actual pain, perhaps, is not quite so intense as in the acute form; but the distortion and partial or complete anchylosis of the joints, the impairment of the various digestive organs, and the effects upon the kidneys, render these cases very serious. The urine is pale, abundant, and of low specific gravity; the quantity of uric acid is below the healthy average; and there is often some albumen. As in acute, so in chronic gout, the urea is eliminated in due proportion. Sometimes the concretions round the joints give rise to suppuration and ulceration of the skin, and then masses of urate of soda mingled with pus-globules are discharged; such discharges, however, often proving beneficial to the general health, unless the ulceration is extensive.

Complications.—In one variety, called by Cullen *retrocedent* gout, metastasis occurs from a joint to some internal organ, more especially to the stomach. The application of cold to a gouty limb is one of the most frequent causes of this mishap.* In cases where the stomach is attacked we find sickness and vomiting, hæmatemesis, violent spasmodic pain, with great distress and anxiety. When the retrocession is to the brain, it produces intense headache, lethargy, and sometimes apoplexy or paralysis. In such instances, the membranes of the brain are probably affected by the gouty inflammation. Dr. Alexander has related a marked example of retrocession to the heart. In this instance, a gentleman suffering severely from gout, applied snow to the painful joint. At first relief was experienced, but soon a sense of intense burning and constriction around the lower part of the chest was experienced. He then lost sensibility; and was found sitting in his chair,

*A filthy practice is sometimes adopted, even by individuals who ought to know better, of soaking the gouty limb in urine every night. The patient collects his urine for the twenty-four hours, sometimes adds a little salt or soda to it, and then employs it as a cold foot-bath before going to bed. The most troublesome case of gout in the stomach which has ever fallen under my notice occurred in a man seventy-five years of age, who had adopted this practice for eight months.

with an almost imperceptible and slow (40) pulse, tardy catching respiration, and with a deathlike pallid complexion. His recovery was brought about by stimulants and counter-irritants.

Diagnosis.—The diagnosis of acute gout is in general simple enough. It is only likely to be confounded with rheumatic fever, but the following distinctions may serve to prevent any error. In gout the blood is impregnated with uric acid, in rheumatism this principle is absent; gouty inflammation is attended with the deposition of urate of soda in the affected tissues, but nothing of the kind occurs in rheumatism; gout occurs mostly in men, rheumatism in men and women equally; gout at first only attacks one or two joints,—usually the ball of the great toe—while rheumatism affects many and large joints; while, lastly, we must take into consideration the general history, with the assigned causes of the disease.

We sometimes meet with puzzling cases where the gouty diathesis seems to be developed in individuals who never suffer from its local manifestations. Thus many obscure pains, which are often regarded as simple local neuralgiæ, are really mere results of the poison of gout in the system; and this is true with regard to some dyspeptic symptoms, pains in the left side of the chest, palpitations of the heart, difficulty of respiration, attacks of syncope, pulsations in the head, with giddiness, imperfect action of the liver, and morbid deposits in the urine. So also, scaly eruptions on the skin, urticaria and eczema, hemorrhagic complaints, pains about the head and eyes, tonsillitis, toothache, and lumbago, may all be due to the gouty diathesis. The importance of rightly interpreting these symptoms has been particularly insisted upon by Dr. William Gairdner, who believes that the strumous is not more frequent than the gouty habit.

When the health and strength has been much diminished by frequent attacks of regular gout, decided paroxysms are rarely experienced; but the patient suffers severely and frequently from the disease in its irregular forms. The symptoms of anomalous or misplaced or atonic gout are then chiefly as follows: Painful dyspepsia, with heartburn, flatulency, acid eructations, piles, and constipation; frequent attacks of faintness, and palpitation of the heart; nervous weakness and great irritability of temper, so that the patient is feared by his relatives, who too seldom make allowance for his weakness and sufferings; frontal headache, with pain in the occiput and nape of the neck, with frequent flushings of the cheeks, and sometimes transient attacks of heat and redness about the nose. Moreover, there is often irritability of the bladder, with scanty high-colored urine; diminished strength, so that a little exercise fatigues, and noise or bustle alarms; a desire for quiet and seclusion; susceptibility to every atmospheric change; and frequent annoying neuralgic pains, with cramp, and an irresistible desire to grind the teeth. Sometimes the teeth are worn down to the sockets, the uneasy sensation in them being only alleviated by forcibly grinding them together. As these symptoms continue, the debility becomes greater, until the entire system is ruined. And then, ultimately, the patient either dies from apoplexy, or from hydrothorax, or from pulmonary congestion caused by the disturbance of the heart's action, or from ascites, due to disease of the liver and kidneys; or even perhaps suddenly, from profound syncope; or he gradually sinks exhausted and imbecile.

Causes.—Women are much less liable to this disease than men. It generally begins between thirty and forty years of age; few first attacks being witnessed before twenty, or after sixty. It is very often hereditary, but undoubtedly is frequently acquired by a luxurious mode of living, sedentary habits, and over-mental toil and anxiety—especially when stimulants are resorted to for the purpose of making such toil more supportable. Where a predisposition to this disease can be traced from the parents or grandparents, it usually first appears at an earlier time of life than when it is acquired.

Gout is especially induced by the use of port wine, sherry, strong ale, and porter. In some instances Madeira, champagne, cider, and perry have a similar influence. An undue quantity of animal food and over-rich diet are frequent causes, especially when combined with the employment of port, sherry, &c. Alcohol in the form of distilled spirits, particularly gin and whiskey, has but little effect in producing it. In Scotland, where whiskey is the chief drink, gout is very seldom seen—those who take this beverage to excess being punished by other and even more fatal diseases. Everything which, by inducing mal-assimilation of the food, leads to the formation of an excess of uric acid in the blood is an important cause. Thus, all depressing influences—great fatigue, cold and damp, venereal excesses, dyspepsia, hemorrhage, mental anxiety, poverty, &c.,—may produce an attack in one predisposed. The spring is the season in which the disease is most apt to occur, while the autumn ranks second. Plumbers, painters, and others who become the subjects of lead poisoning, seem to be particularly predisposed to gout.

Morbid Anatomy.—In examining the bodies of those who have died after repeated attacks of gouty inflammation, we shall often find important changes in the joints which have been affected, as well as in some of the internal organs.

As to the joints, they may be more or less completely anchylosed. Around and within them is the chalky matter—urate of soda—the deposition of which forms the characteristic feature of gouty inflammation, the amount of this salt varying in quantity, but often being so abundant as to produce considerable swelling and distortion. The articulations may even appear as if set in plaster. The synovial fluid is thick and creamy-looking. And the ligaments are rigid and contracted. Frequently, too, the cartilages are quite destroyed, and the bone denuded.

With regard to the internal structures it may be said that we often find morbid appearances in the heart, lungs, coats of bloodvessels, and membranes of the brain. But in these changes there is nothing characteristic of the disease under consideration, and it is probable that they are accidental complications. The kidneys appear to be the organs which are specially affected. Some years ago Dr. Todd drew attention to the condition of these glands in chronic gout. The gouty kidney is found contracted to one-half or one-third its usual size; and it has a shrivelled appearance. The capsule is thickened and opaque, and the surface is granular. The decrease in size takes place at the expense of the cortical portion. On making a section of a gouty kidney white streaks may sometimes be seen, chiefly running in the direction of the tubes of the pyramidal portion; which streaks, when microscopically examined, are found to consist of crystals of urate of soda. The urine in these cases is generally natural in quantity, of low

specific gravity, and contains a variable quantity of albumen. There may be also more or less dropsy with this condition; while the cases frequently end in convulsions, delirium, and coma.

A contracted kidney, with albuminous urine and granular and waxy casts, is found in other disorders than gout; but only in this affection is there the deposit of urate of soda.

Pathology.—If we analyze the blood in gout we shall find the globules in their normal proportion, unless the attack has been long and has much depressed the patient, or unless the disease has occurred in a previously debilitated subject, when they may be considerably diminished. The fibrin is increased in quantity if the local inflammatory action has been severe; so that it may be augmented to five or six parts in 1000, as happens also in non-specific inflammations. The specific gravity of the serum is lowered in the cases where the disease has been of long standing, as well as in those accompanied with albuminuria; but the important point with regard to the serum is this—that it invariably contains uric acid in the form of urate of soda in an abnormal quantity. Dr. Garrod points out that in health the merest traces of both uric acid and urea can be detected by very great care in manipulation; but this trace is by no means sufficient to be discovered by the thread experiment. This gentleman says that in several experiments on the blood in gout and albuminuria, where quantitative determinations were made, the amount of uric acid in the 1000 grains of serum was found to vary from 0.025 to 0.175 grain. Hence it seems highly probable that in uric acid we have found the actual *materies morbi.**

The amount of uric acid daily eliminated by the kidneys in health is about eight grains; and it can easily be understood that the same effect ensues from these organs performing their office inefficiently, as from the formation of an increased quantity of this salt in the system. Not that the mere accumulation of urate of soda in the blood will produce gout. For, as Dr. Garrod says,†—"the poison may lie dormant for a considerable time; but when crystallization of the salt takes place in any tissue, inflammation is suddenly lit up by its presence, and a paroxysm of gout ensues."

Treatment.—The treatment of gout naturally divides itself into that proper during an attack, and that to be adopted in the interval. That this malady is curable there can be no doubt; though it has been—and as Dr. William Gairdner insists ever will be—the *opprobrium medicorum*, if extirpation by means of the medicines of the Pharmacopœia be only aimed at. The fit may be postponed, mitigated, and often

* *Dr. Garrod's Plan of ascertaining the Presence of an Abnormal Quantity of Uric Acid in the Serum of the Blood.*—Take about two drachms of the serum and place it in a flat glass dish or watch-glass. To this add twelve drops of ordinary strong acetic acid, which will cause the evolution of a few bubbles of gas. When the fluids are mixed, introduce two or three threads of cotton, or one or two ultimate fibres from a piece of unwashed huckaback. Allow the glass to stand on the mantel-piece, or on a shelf in a warm room, for from thirty-six to sixty hours, until its contents set, from evaporation. If the cotton fibres be then removed and examined microscopically with an inch object-glass, they will be found covered with crystals of uric acid, if this agent be unduly present in the serum. The crystals form on the thread somewhat like the masses of sugar-candy on string. Hence this process is termed the uric acid thread-experiment.

† The Nature and Treatment of Gout and Rheumatic Gout. Second Edition, p. 333. London, 1863.

shortened by drugs; but only temporary relief from this source must be looked for. At the same time it should not be thought that Cullen's remedies—patience and flannel—are to be trusted to.

It is generally considered that *bleeding* during an *acute* attack is unnecessary. Dr. Gairdner well observes—"I am convinced that bleedings to such an amount as is necessary to subdue inflammation, are much to be avoided in gout. Those who prescribe them will not fail to find out, in a very short time, particularly in London practice, that they have sacrificed their best resource in the cure, namely, the strength of the patient; and have made a lengthened and distressing case, where they meant to make a short and brilliant cure."* Although, however, depletion is in every way contra-indicated, yet this physician states that he has often found a very small bloodletting (three to six ounces) productive of the greatest good by relieving the overloaded heart and congested vessels; but he never makes use of this remedy where the constitution is impaired or defective. Leeches are sometimes applied to gouty joints, but I have very rarely seen any benefit result from the practice.—*Laxatives* must almost always be employed; not violent, but mild warm aperients, such as aloes, senna, rhubarb, jalap, &c. A mixture of equal parts of the compound infusion of gentian and infusion of senna (the compound gentian mixture of the London Pharmacopœia) will agree well; or any one of F. 144, 145, 146, 148, 149, 151, &c. Anthony White, who had much experience in the treatment of this disease, maintained that the liver was the organ in which the poison of gout was elaborated; and hence that the physician's chief object should be to restore the natural functions of this gland, as indicated by a copious discharge of bile through the bowels. He relied almost exclusively on the use of a pill made of one grain each of calomel, colchicum, aloes, and ipecacuanha; which at first was given six times a day, and afterwards every eight or twenty-four hours, according to circumstances. But though this eminent surgeon's pathology was wrong, yet it is certain his remedies often did good; and consequently where there is hepatic congestion with urine free from albumen, his pill may be prescribed. When, however, the kidneys are affected, no preparation of mercury should be given; for not only will small doses of this metal be apt to produce severe salivation, but they seriously impoverish the already deteriorated blood.

With regard to *diuretics* and *diaphoretics* there can be no doubt that they often do great good. Hence we may give the acetate, citrate, or bicarbonate of potash; we may administer some preparation of opium; and often we may employ the hot-air or the vapor-bath with advantage. But in all cases, speaking generally, with these remedies we must combine *colchicum;* since there can be no doubt that this drug is to be regarded as a specific for the gouty paroxysm. It ought not to be administered until the bowels have been well opened; and it must be given not (as often recommended) so as to gripe and purge, but in small quantities, easily borne without pain or inconvenience. At the commencement one full dose should be exhibited, such as five grains of the acetic extract; and then ten or fifteen minims of the wine three times a day,

* On Gout: its History, its Causes, and its Cure. Fourth Edition, p. 307. London, 1860.

in Vichy water, or with sedatives and alkalies, or with iodide of potassium, will often suffice (F. 31, 46, 212, 351, 352).

Narcotics generally do harm by diminishing the secretions, though they cannot be withheld when the pain is very great. Henbane is less efficacious than opium, but it will also prove less injurious by not interfering with the secretion of bile.*

Then the patient is to be confined to his bed, at all events for the first few days. The affected limb must be kept elevated and warm; and the painful part should be covered with cotton wool and oiled silk, or else with an anodyne lotion (F. 265, 281, 297), or with a poultice on which some extract of belladonna has been freely spread, or some tincture of opium sprinkled. It is only in cases of chronic gout that small blisters can be of any service. If the foregoing local remedies give but little relief, they can do no harm, which cannot be said of cold applications. Several cases are known where death has occurred in a few hours from patients plunging their feet into cold water, with the idea of cutting short the fit. And, lastly, during the early stages the diet must be light, consisting chiefly of milk, arrowroot, tapioca, tea, &c. Diluents may be taken freely with advantage. Much mischief results from allowing animal food too soon. But when the fever has diminished, and the powers of digestion are strong enough, beef-tea, fish, poultry, and mutton may be gradually allowed; with perhaps a little good sherry or whiskey well diluted.

But the most important question remains—*How are we to prevent the return of gout?* Clearly, by enforcing the observance of a well-regulated diet; by exchanging a life of indolence for one of bodily activity; by adopting early and regular hours; by avoiding too great sexual indulgence; as well as by omitting all severe mental application, and by the aid of medicine. Moderate exercise in the pure air; warm, tepid, or sea-baths; and the fostering of a tranquil disposition,—these are remedies not to be despised. Starving the disease will not cure it. An animal and vegetable diet should be used; the point being to take care that, both as regards quantity and quality, the stomach can digest, and can consequently extract healthy chyle from the materials put into it. Salt meats have only the recommendation mentioned by Montaigne's friend, "that he must needs have something to quarrel with in the extremity of his pain, and that he fancied that railing at and cursing, one while the Bologna sausages, and at another the dried tongues and the hams, was some mitigation to his torments." Ale, porter, and our heavy wines—especially port—are injurious; whiskey, or gin-and-water may sometimes be allowed. It is very probable, also, that a moderate

* Many patients have told me that they have benefited by the use of the anti-gout liquid and pills of Dr. Laville. From an analysis, the *liquid* would appear to owe its properties to the active principle of colocynth, quinine, and cinchonine, with unimportant salts of lime. It is used at any period of the attack; a teaspoonful being taken in sugared water or tea, and repeated in six or seven hours if the pain continue or the bowels be not moved. Then twenty-four hours are to elapse before the next dose; when half the quantity may be employed daily for two or three times, unless the bowels are irritable. The *pills* consist of a peculiar extract, physalin, obtained from the Physalis Alkekengi, or winter cherry (a perennial herbaceous plant belonging to the natural order Solanaceæ), and of silicate of soda. They are employed to remove all traces of the disease, as well as to prevent future attacks. Of an alterative nature, one is taken at the commencement of a meal once or twice a day; sometimes being continued thus for many weeks.

quantity of some light wines—such as claret, hock, good dry champagne, &c.—may be of service rather than otherwise. The best medicines will be an occasional mild purgative, and some of the neutral salts frequently used. The citrate, tartrate, or phosphate of potash, are valuable remedies, taken in very small doses, in half a pint of water, once or twice a day; or one or two bottles of Vichy water or of soda water may be drunk in the twenty-four hours; or a tumblerful of a weak infusion of the leaves of the Fraxinus Excelsior or common ash—one ounce of the leaves infused in a pint and a half of water—may be taken on an empty stomach, night and morning. During the last two years Dr. Garrod has made many trials of *carbonate of lithia* as an internal remedy, both in cases of the uric acid diathesis connected with gravel, and in chronic gout (F. 64). When given internally, in doses of from one to five grains dissolved in plenty of simple water, or of aerated water, and repeated two or three times a day, in patients voiding uric acid gravel, it causes the deposits to become less, or even to cease altogether. If a large amount of alkali be desirable, the carbonate of lithia may be prescribed in combination with the carbonate or citrate of potash. My own experience with this remedy has been small; but so far it has only disappointed me.

In *chronic gout* the blood is to be purified and kept pure. With this object we must regulate the diet, prevent indigestion, maintain the proper action of the bowels and skin, and trust to such remedies as colchicum, alkalies, iodide of potassium, guaiacum, &c. The supply of animal food is to be limited; milk and eggs prove beneficial; and though malt liquors and port wine must be strictly forbidden, a little good dry sherry or brandy-and-water may be allowed. In weakly subjects, when the disease lingers about the system, tonics—such as quassia, calumba, gentian, or bark—do much good. The efficacy of quinine (except in combination with colchicum) is doubtful; and if from an anæmic condition iron be indicated, only small doses of some mild preparation ought to be employed (F. 394, 402, 403, &c.). The alterative and tonic effects of arsenic have led me sometimes to use this metal with benefit; administering it either alone, or with colchicum, iodide of potassium, or steel (F. 52, 399).

As a rule, the collections of chalk-stones should not be opened; unless from their size the skin is about to ulcerate. If the knife be used, the smallest opening which will permit of the escape of the creamy fluid ought to be made; otherwise an obstinate sore may result. Mr. Spencer Wells states that these accumulations may be often dispersed by the administration of the iodide of potassium, which possesses the power of dissolving urate of soda; while local friction with the same salt or with the iodide of ammonium (F. 280) will often do good.

In attacks of *irregular* or *misplaced gout*, salines and colchicum are generally needed; while we should try to bring the disease to the extremities by mustard pediluvia, &c. With regard to *retrocedent gout* we must especially avoid cold, as this is often the cause of the metastasis. Antispasmodics are the remedies which give most relief; chloroform, ether, ammonia, and brandy being often needed. If the stomach be affected, vomiting does good; and afterwards a sinapism or turpentine stupe should be applied over the epigastrium. Warmth or

counter-irritation may also be employed to the joints, to bring back the inflammation.

After an attack of gout in any shape a wise patient will take a thorough holiday. A visit to some of the mineral waters—to Bath (F. 460), Buxton (F. 464), Cheltenham (F. 461), Harrogate (F. 466), or Leamington (F. 463); or for a greater, and therefore perhaps better change, to Weisbaden (F. 489), Vichy (F. 479), Carlsbad (F. 496), or Aix-la-Chapelle (F. 483), will be productive of the greatest benefit. The mineral waters of any of these springs may be employed, provided the patient has no symptoms of any impending attack, nor any disease of the kidneys or of the heart. But I believe that these remedies are chiefly of use in so far as they improve the general health; though it is said, that an annual residence at Vichy for three weeks, will keep many a gouty man free from his enemy for the rest of the year.

XVIII. RHEUMATISM.

Rheumatism (*Ῥευματισμὸς*, a flux or looseness; *ῥευματίζομαι*, to be affected with looseness, from *ῥεῦμα*, a humor floating in the body causing disease), is one of the most common, painful, and severe diseases of this country. It arises from an abnormal condition of the blood. The action of the poison is not limited to any one texture or organ; though it particularly affects the white fibrous tissue which enters into the formation of the aponeurotic sheaths, fasciæ, ligaments and tendons, and the fibro-serous membranes. Consequently the parts most frequently involved are the joints and surrounding structures, with the pericardium and endocardium. There are two very distinct forms of rheumatism, the acute and chronic.

1. Acute Rheumatism, or Rheumatic Fever.—This disease is especially formidable from the suffering it causes, from the intensity of the fever, and from the damage which is so frequently produced by it to the heart.

Symptoms.—The earliest symptoms are usually restlessness and fever, with stiffness and aching pain in the limbs, following exposure to cold and damp, and similar depressing influences. The pain quickly increases; and in a short time is accompanied by swelling and great tenderness of one or more of the large joints, together with high fever and much constitutional disturbance. When the disease is established, the patient presents a pitiable spectacle of helpless suffering. He is very restless, yet dare not or even cannot move; the pain in the affected joints is so agonizing, that the weight of the bed-clothes can barely be borne; the skin is generally bathed in sweat, of a disagreeable acid or sour odor; the pulse is full, bounding, and quick; there is usually constipation, but occasionally the bowels are much relaxed; the tongue is moist, but thickly furred; the saliva is acid; and the urine is high colored, scanty, of high specific gravity, very acid, with perhaps scarcely a trace of chlorine, and loaded with uric acid, or more frequently with urates. It has lately been shown that the deposits formerly regarded as consisting of urate of ammonia have a variable

composition; being made up of the urates or lithates of lime, potash, and soda.* Relapses are very common. A chemical analysis of the blood shows the presence of a superabundance of fibrin (hyperinosis), with a deficient amount of salts and red corpuscles.

A remarkable feature in this disease is the great tendency to metastasis. Thus, the inflammation may suddenly leave one joint and appear in another, and then in a third, afterwards jumping back again to its original seat. But the most serious change is when it shifts its place, or extends to the membranes of the heart. This it is most likely to do in severe cases, when we may suppose the blood to be loaded with the materies morbi; in young persons; and when the irritability of the heart is great, as it is after bleeding and excessive prostration. Since, however, rheumatic endocarditis and rheumatic pericarditis do not differ from simple inflammation of the heart or pericardium,—except, perhaps, in being less fatal—I shall defer further notice of the signs of these affections until treating of the diseases of the heart generally; merely urging here, that as they are very likely to occur, their symptoms should be daily and carefully looked for.

Rheumatic fever may also, but more rarely, be complicated with bronchitis, pleurisy, pneumonia, or even with inflammation of the brain or its membranes: while very rarely the local effects are such as to lead to disorganization of one or more of the affected joints. Moreover, we sometimes meet with cases, especially where the heart has become implicated, in which irregular choreal movements come on during the progress of the disease. This complication is most likely to arise when the patient has become much depressed, and when therefore the irritability of the nervous system is increased. Whenever rheumatic fever is uncomplicated, its average duration under proper treatment is from twelve or sixteen to twenty or thirty days. In those cases which end fatally, death is almost always due to the cardiac inflammation. When recovery takes place after the heart has been affected, the patient has very often a sad time in store for him—future bad health, palpitation on any excitement, dyspnœa, and dropsy. By far the greater number of cases of acute rheumatism occur in persons between fifteen and fifty years of age, this disease being equally rare in the very young and very old. Undoubtedly it is sometimes hereditary.

Pathology.—Dr. Prout first suggested that the presence of a superabundance of lactic acid in the system was the cause of rheumatic fever; a view which has been since entertained by many authors. Dr. Richardson has made an interesting series of experiments; from which he infers that "lactic acid has the power, when existing in an animal body in excess, of producing a class of symptoms attaching themselves mainly to the fibro-serous textures, and which, regarded in all points of view, are essentially the symptoms of acute rheumatic inflammation."† Thus he injected into the peritoneum of a healthy cat, seven drachms of a solution of lactic acid with eight of water. Two hours after the operation the action of the heart became irregular; in four hours more the animal

* Urine containing an excess of urates may be distinguished by its high color, increased density, and turbid appearance when cold—somewhat resembling pea-soup. On applying heat to a portion in a test-tube, it becomes bright and clear. Examined by the microscope, an abundant amorphous precipitate is seen.

† The Cause of the Coagulation of the Blood, p. 389. London, 1858.

was left for the night; and in the morning it was found dead. The inspection showed no peritoneal mischief, but the most marked endocarditis of the left cavities of the heart. The mitral valve, thickened and inflamed, was coated on its free borders with firm fibrinous deposit. The whole endocardial surface of the ventricle was intensely vascular. On repeating the experiment on a dog, the inspection revealed the most striking pathological signs of endocarditis. The tricuspid valve was inflamed and swollen to twice its ordinary size. The aortic valve, swollen and inflamed, was coated on its free border with fibrinous beads. The endocardial surface was generally red from vascularity. The pericardium was dry and injected. As before, the peritoneum escaped injury. The joints were not attacked, but there was distinct sclerotitis in the left eye. Again, in a third instance not only did endocarditis result, but there was well-marked vascularity of the sclerotic, and various joints were affected; while there was metastasis, now one joint suffering, then another, and again the heart. As Dr. Richardson remarks, it has yet to be learned by experiment whether acids of an analogous character to the lactic—such as formic, acetic, lithic, and butyric—will produce the same results.

In rheumatic endocarditis, the left side of the heart only is affected as a general rule. Hence Dr. Richardson infers that the chemical change whereby the materies morbi of acute rheumatism is produced, is completed in the pulmonic circuit; that in the respiratory act the *acid* quality of the poison is produced; that thus formed, the poison is carried by the arterial circulation to be disposed of by decomposition, or elimination, or both; and that it does not return as an acid by the veins, but simply as a product which admits of retransformation in the pulmonic circuit into the acid state.

Regarding the origin of the lactic acid, Dr. Headland suggests that ordinarily the starch of the food is first converted into this agent, which then combines with oxygen to form carbonic acid and water, in which state it is excreted by the lungs: but that under conditions unfavorable to this oxidation, the lactic acid accumulates in the system.

Treatment.—A vast number of different plans have been recommended. And as this disease has a strong tendency to terminate favorably, it is not surprising that each authority can adduce numerous successful cases in proof of the efficacy of the drugs he employs.

Remembering the high fever and severe pain which accompany acute rheumatism, it can readily be anticipated that *venesection* has long been advocated. But most physicians are now agreed that bloodletting will merely give temporary relief, at the expense of future suffering; while recollecting also that it increases the irritability of the heart, and consequently predisposes to rheumatic inflammation of this organ, I should, as a rule, never resort to it.—*Saline purgatives* (F. 140, 141, 152, 155, 165, 169), given so as to obtain one free evacuation daily, will be beneficial; especially after the bowels have been well acted on by a large dose of calomel and jalap.—*Opiates* in full doses are usually necessary to relieve the pain, and to allay the general irritability; they will also help to encourage sweating, and thus aid nature in eliminating the poison by the skin. Two grains of extract of opium may be given every night; and unless the skin acts freely, five grains of the compound ipecacuanha powder every four or six hours will do good. The efficacy of

the latter will be increased if the nitrate of potash be substituted for the sulphate in making it (F. 213).—*Quinine* in large doses has been used by some physicians, but I am not in a position to speak of its effects. In combination with iodide of potassium (two grains of quinine to four or five of the iodide, repeated thrice daily) it is sometimes useful.—The *American Hellebore* (F. 321) is spoken highly of, as an arterial sedative; and has been employed in acute rheumatism with advantage.—The *Nitrate of Potash* is said by Dr. Basham to be the most efficacious remedy with which he is acquainted. Its action is thus explained: The blood in acute rheumatism contains excess of fibrin and diminution of salts; it has, moreover, an increased tendency to the formation of exudatory products, the most dangerous of which occur in the heart and its valves. As the nitrate of potash is known to have the property of preventing the separation of fibrin from the blood, it is rational to infer that it will prevent exudatory formations which consist of fibrin. Clinical observation, it is said, proves this view to be correct. The treatment adopted by Dr. Basham is to give a solution of nitre, *ad libitum*, to allay thirst; and also to apply it externally to the joints. Patients will sometimes take 480 grains in twenty-four hours. This remedy is preferred to the alkaline carbonates from being less liable to cause gastric derangements.—And then, *Lemon-juice*, in two or three ounce doses, repeated three or four times a day, has been recommended by Dr. Owen Rees; who considers that the citric acid undergoes changes in the stomach, supplying oxygen to such elements as tend to produce uric acid, and inducing thereby the formation of urea and carbonic acid instead. The result of its use, however, has not been such as to make me recommend it; for I have not only found it fail to do as much good as other remedies in the few instances in which I have tried it, but more than once alarming depression has been induced.

The treatment which I believe to be the best, under ordinary circumstances, remains for consideration. Essentially the plan is the same as that advised by Dr. Garrod, Dr. Fuller, &c. It consists in relieving the pain by opium; while the alkalies and their salts are freely administered to correct the abnormal condition of the blood and excretions. Thus, from twenty to sixty grains of the bicarbonate of soda or potash may be given every three or four hours, in half a bottle of soda water, or in an effervescing citrate of ammonia or potash draught; continuing it regularly until the articular affection and febrile disturbance are very much lessened, till the pulse is reduced, and the urine rendered alkaline. If the patient be robust, and the urine continues much loaded with lithates, ten minims of the wine of colchicum may be added to each draught. Or if the disease remain stationary in one or two joints, a couple of grains of iodide of potassium may be advantageously administered with each dose. So also the hot-air or vapor-bath can be simultaneously employed, if the perspiration be scanty, though the necessity for such baths is exceptional. During convalescence, few medicines will do so much good as bark and ammonia (F. 371); with subsequently some mild preparation of steel (F. 403) and perhaps cod-liver oil.

The *diet* must at first be low, consisting of slops, arrowroot, &c. Directly there are signs of depression, good beef-tea, milk and lime-water (F. 14), or prepared milk (F. 15) may be administered; with, if necessary, brandy-and-water or wine—especially sherry in soda-water. Light

puddings, potatoes, and white fish should be allowed as soon as the appetite returns, and the stomach appears capable of digesting them; while mutton, poultry, and beef ought not to be given until convalescence is thoroughly established. In the early stages, when there is much thirst, a refreshing saline drink (F. 355, 356, 360) will be beneficial; or plenty of good lemonade may be allowed. Sugar is bad for the dyspeptic, the gouty, and the rheumatic; since it is transformed into fat, lactic acid, and other substances which readily disagree with the organs of digestion. Malt liquors and port wine are equally injurious.—Moreover perfect rest must in every case be enjoined, and all sources of mental anxiety should, if possible, be removed.

With regard to *local remedies*, it may be remembered that great relief is often experienced from wrapping the affected joints in cotton wool and oiled silk, by which a sort of local vapor-bath is formed. So, when the wrists or ankles are chiefly affected, I have seen benefit arise from frequently soaking them in a hot alkaline bath; or from fomenting them with water to which a mixture of the bicarbonate of soda and opium has been freely added. When the acute symptoms have partially subsided, small blisters, the size of a penny piece, may be advantageously applied; or the swollen joints may be painted with iodine (F. 205), and then covered with wool. In many cases it will be better for the patient to sleep between blankets, rather than to have linen or calico sheets, which soon get damp and cold from the perspiration.

Supposing any signs of cardiac affection—such as violent and irregular action of the heart, præcordial pain, friction sounds or bruits, dyspnœa, and fever—manifest themselves, what is to be done? Most authors say, apply leeches over the region of the heart or resort to general bleeding, and quickly get the system under the influence of mercury. If the remarks which have been made in the section on inflammation, however, are true, no such remedies will be necessary; and, I believe, it will be better merely to get freedom from pain by full doses of opium, to apply hot moist linseed-meal poultices over the cardiac region, and to continue the bicarbonate of soda or potash draughts. Where the action of the skin appears at all insufficient, the vapor-bath should be employed. Perfect rest and abstinence are also needed; but the practitioner must not be overcautious in affording support, as soon as the powers of life appear to be failing.—I have now been able fully to carry out this plan in many severe cases of rheumatic pericarditis; and the rapid recovery of these patients, together with the general train of symptoms during the treatment, has convinced me that it may be strongly recommended. Should effusion take place into the pericardium, the application of a blister, or of a succession of blisters, will do great good; and, perhaps, diuretics with the iodide of potassium may, in certain instances, be beneficial.

2. Chronic Rheumatism.—This is sometimes the sequel of rheumatic fever, but more frequently I believe a separate constitutional affection, coming on quite independently of any previous acute attack. During the decline of life it is common, few old people being ignorant of its symptoms. It is apt to follow gonorrhœa; hence one variety of this disease has been termed *gonorrhœal* rheumatism.

In chronic rheumatism the fibrous textures around the joints, or the

fibrous envelopes of the nerves, or the aponeurotic sheaths of the muscles, the fasciæ and tendons, or the periosteum, are the parts that suffer. Whichever tissue may be affected, there is, at first, only slight constitutional disturbance; but the sufferer is constantly annoyed, and his existence at length made miserable with chronic pains, causing him to be restless at night, and destroying all comfort during the day. In some instances, the pains are worse at night, being aggravated by the warmth of the bed; in others, warmth affords the greatest relief: the former is usually the case when the blood is circulating a poisonous material through the system, as in venereal rheumatism, or in that due to derangement of the digestive organs and secretions; the latter, in rheumatism of an erratic kind, dependent on cold, &c.

There are two or three different *forms* of chronic rheumatism. Thus, rheumatic inflammation of the lumbar fascia is termed *lumbago;* the pain being referred to the fleshy mass of muscles on one or both sides of the loins, and being increased by every movement of the back. *Stiff* or *wry neck* is another variety, generally due to sitting in a draught. To relax the painful muscles the patient inclines his head to the affected side; and as the muscles soon become rigid, the proper position is not regained without a sharp twinge. In *sciatica* the suffering is due to disease affecting the neurilemma of the sciatic nerve; but it will be more correct to treat of this kind in describing the forms of neuralgia, than in the present section. When the intercostal muscles, or the fibrous fasciæ lining the chest, are affected, the disease is often called *pleurodynia*. The "stitch" which follows a deep inspiration must not be mistaken for the lancinating pain of pleurisy.

The *diagnosis* of chronic rheumatism is generally easy. There are, however, certain painful muscular affections which sometimes simulate it. These pains—*myalgia*—are familiar to us all as "soreness and stiffness," following upon some extraordinary exertion; but they are not always as readily recognized when they occur during convalescence from any long illness. Yet it is clear, that the mere sitting upright in a chair, without any support for the head or arms, may be as fatiguing to some of the muscles—*e. g.*, the trapezius—of an invalid, as the ascent of Mont Blanc may prove to an ordinary gentleman only accustomed to a daily desultory saunter through the London parks. Muscular pains of this nature are not uncommon, also, in persons suffering from general debility. They have their seat in the fleshy parts of muscles, in their tendinous prolongations, or in the fibrous aponeuroses. Dr. Inman, of Liverpool, in a pamphlet on this subject, states that they are usually described as hot or burning; they are absent on rising in the morning, and increase with fatigue; the pain is referred to some muscle or its tendon, and is relieved by relaxing or supporting this muscle; the pulse is generally weak and fast, but is unaffected by the pain; and the patient frequently suffers from cramps. The diagnosis is important, because if we hesitate to administer ferruginous tonics and nourishing diet, or to afford proper rest and support to the weak muscles until they regain their tone, we shall fail to give any relief to the poor sufferer; who possibly, in his justifiable contempt for medicine, will hasten to try the good diet and pure air of some hydropathic establishment, and then circulate reports of his extraordinary cure, "after being given over by the faculty."

Another disorder which has sometimes been mistaken for chronic rheumatism is *acute mollities ossium*. The latter usually commences with weakness, weariness, and pains in the limbs. But in this disease of the bones the suffering is much more severe, and more lasting; while, after a time, the softening of the osseous tissue and the accumulation of fatty matter in the Haversian canals leads to deformity. The urine also is generally loaded with phosphate of lime. When mollities ossium occurs during pregnancy, the deformity of the pelvis which may ensue from the bulging inwards of its sides by the pressure of the thigh bones against the acetabula, has necessitated the performance of the Cæsarean section. This disease occurs in the middle period of life and is usually fatal in from twelve to twenty-four months.

In the *treatment* of chronic rheumatism it is always necessary to attend to the general health, as by doing so the disease will generally be materially mitigated. Care must be taken that the function of digestion is performed naturally; while sleep must be afforded by sedatives, if necessary. There are several special remedies which give relief, one of the best being the iodide of potassium with tincture of serpentary or with bark (F. 31). If the secretions are very acid, liquor potassæ should be combined with it. The ammoniated tincture of guaiac (F. 43), cod-liver oil (F. 389), quinine with or without belladonna (F. 45, 386), iodide of iron (F. 32), ammonia and bark (F. 68, 371), oil of turpentine (F. 50), colchicum (F. 46), sarsaparilla (F. 26), corrosive sublimate (F. 27), the red iodide of mercury (F. 54), arsenic (F. 52), aconite (F. 330, 331), sulphur (F. 43, 148), and hydrochlorate of ammonia (F. 60),—all have their advocates. The tincture of Actea Racemosa in half drachm doses three or four times daily produces slight narcotic and eliminative effects. It will often cure lumbago, as well as pains in the back due to an irritable condition of the uterus, with great rapidity (F. 320). When the symptoms are very chronic, the cold sulphurous waters of Harrogate (F. 466), or the hot sulphur springs of Aix-la-Chapelle (F. 483), may be resorted to; or sea air and warm salt-water baths may be employed in this country. Sometimes the alkaline waters of Vichy (F. 479) do good; or, if there is constipation in addition to rheumatism, the antacid springs at Carlsbad (F. 496) may be advantageously visited. The latter, however, take a longer time to act on the system than the former.

Hot-water, or hot-air, or vapor-baths—either plain, or alkaline, or medicated with sulphur—are often very serviceable in this disease, especially when the pains are severe (F. 21, 125, 130). During the intervals of the attack, the tepid salt-water sponge-bath should be regularly employed every morning with a flesh-brush, coarse towel, &c.

Local applications to the painful parts, such as blisters (F. 208), iodine paint (F. 205), belladonna and aconite liniment (F. 281), chloroform and opium (F. 282), or an ointment of veratria (F. 304), often give temporary relief. In lumbago, a large belladonna plaster, or the emplastrum ferri, applied over the whole loins, will be productive of great comfort. The old woman's remedy of ironing the part, a piece of brown paper being placed between the hot iron and the skin, deserves mention. For rheumatism especially affecting the tendinous portions of the muscles we may recommend the external application of sulphur—either powdered or as an ointment—with band-

ages of new flannel; the latter being again covered with oiled silk, to increase the warmth, and obviate any disagreeable smell. Some patients merely dust the inside of their stockings with sublimed sulphur, when the legs or feet are the affected parts. Where the pains are decidedly relieved by heat, acupuncture is said always to give ease, and often to effect a cure; but I have had no experience in its use.—All sufferers from chronic rheumatism should wear flannel, and beware of exposure to damp or cold. They must also be careful in their diet, and should particularly avoid beer and heavy wines; as I am convinced that many paroxysms of this disease are brought on through disorders of the digestive organs. Ventnor (F. 434), Hastings (F. 432), Rome (F. 447), and Nice (F. 443), are good winter stations for rheumatic patients who can afford to leave their homes.

XIX. RHEUMATOID ARTHRITIS.

It has been a matter of some controversy whether gout and rheumatism can coexist—in other words, is there any disease which can be regarded as a compound of these two affections? Dr. Garrod has long maintained that such a disease as the term *rheumatic gout* implies, is never seen; and this opinion is now almost undisputed. The cases usually spoken of under this name are examples of *chronic arthritis*, or *chronic rheumatic arthritis—rheumatoid arthritis* seems a better term; which affection may be described as a chronic inflammatory affection of the joints, not unlike gout in a few of its characters, somewhat resembling rheumatism in other points, but differing essentially from both.

Rheumatoid arthritis (Ῥεῦμα, a humor floating in the body causing disease, εἶδος, appearance; and ἄρθρον, a joint, terminal-*itis*, inflammation) is often one of the most troublesome and obstinate affections which the practitioner can have to treat. Young and old, rich and poor, the careless and the cautious, equally suffer from this disorder. It may attack either the large or small joints, or the temporo-maxillary articulations, or the articular processes of the vertebræ—especially of the cervical region; but the hip, shoulder, and elbow or knee appear to be the most favorite seats of the morbid action. It may also be a constitutional, or simply a local disorder. Thus, Dr. Robert Adams remarks that, "when we observe it affecting all the joints in the same individual on both sides symmetrically, we may feel assured that the chronic articular affection in such a case has proceeded from some deep constitutional taint. In the majority of such cases we shall, I believe, discover that the general chronic affection has been immediately preceded by an attack of rheumatic fever, from the lingering remains of which the chronic rheumatic arthritis had evidently sprung."* On the other hand, as a local disease it may arise from accident or from the overuse of some particular joint. In the examples which have come under my own care the affection has been constitutional, and it has seemed to me that mal-assimilation has generally

* A Treatise on Rheumatic Gout; or, Chronic Rheumatic Arthritis of all the Joints, p. 6. London, 1857.

been at the root of it. Some of the most annoying cases, moreover, which I have met with, have occurred in women at the critical period of life; though I have also seen it in girls at puberty, in connection with disordered uterine functions, and in men at different ages.

The *symptoms* consist chiefly of pain, swelling, and stiffness of the affected joints. In acute cases the disease may come on abruptly with considerable fever and general disturbance; but usually the affection assumes a chronic form, commencing with languor, restlessness, loss of appetite, and vitiated secretions. The joints then become stiff and painful, while effusion into the synovial membranes causes them to appear swollen and distended; and if the hips, knees, or ankles be the parts affected, there is more or less lameness. If we place a hand on each side of the joint, fluctuation can sometimes be detected; or, if we grasp the part, a distinct kind of crepitus may often be felt. A peculiar crackling of the joints on movement is also appreciable to the patient. When the disease is of long continuance a degree of rigidity may occur from the thickening of all the articular textures, equal to that produced by bony anchylosis; or the joint may even become quite disorganized from a gradual wasting of the cartilages. In addition to the foregoing, the articulations become more or less deformed; there are frequently painful spasms in the muscles of the affected limbs; there is great mental depression, and general lassitude; dyspepsia, with acidity of the stomach and flatulence, is an exceptional occurrence; the rest at night is disturbed, and every change in the weather is felt; while owing to the languid circulation the patient suffers much from cold. Neither the heart nor the pericardium ever becomes affected. The complaint often lasts for several months or even years.

With regard to the *morbid anatomy* of rheumatoid arthritis, the following points are worthy of notice. If the disease be in an early stage, the synovial membranes are found thickened and distended with a quantity of synovial fluid; while internally the hypertrophied synovial fimbriæ are seen as vascular tufts. In a more advanced state the capsular membranes are of increased density; the articular cartilages are more or less absorbed; while the exposed surfaces of the bones either present an ivory-like appearance from the friction they have undergone, or the fine cancelli are laid bare. The heads of the bones are generally enlarged in an irregular way owing to new ossific deposit; while frequently the joints contain numerous cartilaginous or bony foreign bodies, either loose, or attached by little pedicles to the articular surfaces.

If mention be made of the *pathology* of this disease, it is only to show what the affection is not. Dr. Todd believed that this rheumatic affection of the joints might be most correctly described as an abnormal nutrition, occasioned by the presence of a "peculiar matter" in the nutrient fluid; affording certain points of resemblance to simple chronic inflammation, yet differing from it in a marked manner. What this "peculiar matter" in the nutrient fluid may be, we do not know; but it is certain that it is not uric acid, and there is no reason to believe that it is lactic acid.

The *treatment* is often very unsatisfactory, and always tedious. The general health must be attended to; and in women, any uterine disturbance that may be present is to be relieved. A generous diet, with animal food, ought to be allowed; while claret, good sherry, brandy-

and-water, whiskey, or bitter ale, will not be at all injurious. Sugar, pastry, pickles, and cheese, however, had best be forbidden. Walking exercise is often impossible; but the patient should be taken out in a carriage or chair as often as the weather will permit. Warm clothing is necessary. Then mild aperients, especially the sulphate of soda (F. 148, 153); cod-liver oil; warm douches over the affected joints; and simple water or vapor or hot-air baths, may be used in all cases. It is of the greatest importance to maintain a healthy action of the skin, and sometimes particular benefit seems to arise from sulphur or alkaline baths (F. 121, 125). In cases unattended by acute exacerbations M. Gueneau de Mussy recommends arsenical baths. About fifteen grains of arseniate of soda, with a quarter of a pound of carbonate of soda, are added to thirty gallons of hot water; the bath at first being employed every second day, and afterwards daily, with an occasional interval. Although slight diarrhœa, excitement, and insomnia sometimes result, yet often there is merely progressive improvement; the suppleness of the joints, and the power of motion increasing after each bath. From my own observation I cannot say anything about these baths; but that they are valuable would seem probable. For indeed arsenic is most beneficial in many of these cases, and from no other special remedy have I seen an equal amount of good result. This metal may either be given alone, or with quinine, iron, syrup of iodide of iron, iodide of potassium, liquor potassæ, taraxacum, or colchicum (F. 31, 32, 46, 52, 381, &c.). Each of these drugs has also been separately lauded by different writers. If the gums be pale and spongy, lemon-juice does good; or the mineral acids (F. 376, 378) are occasionally to be recommended. I have seen guaiacum (F. 43) prove useful; I have also occasionally been pleased with bark and serpentaria (F. 375); and where the skin is inactive and the nervous system depressed, twenty minims of the tincture of arnica montana thrice daily, combined with other remedies, is worth trying. Some practitioners recommend the repeated application of leeches to the affected part, but they must be used cautiously if at all. Blisters sometimes do good. I am fond of strapping the joint with the iodide of potassium or the mercurial plaster spread on chamois-leather; a proceeding which may be occasionally varied by covering the part with sulphur ointment and applying a flannel bandage, or by using a lotion made of equal parts of glycerine, tincture of iodine, tincture of aconite, and tincture of opium. To keep the affected articulations motionless by the application of splints, is to run the risk of causing stiff joints; an evil not counterbalanced by any great advantage.

Other means failing, recourse must be had to the internal and external use of the Harrogate (F. 466), Buxton (F. 464), or Bath waters (F. 460), at home; or to the springs of Aix-la-Chapelle (F. 483), Wiesbaden (F. 489), Baden-Baden (F. 492), Carlsbad (F. 496), or Vichy (F. 479), abroad.

XX. OBESITY.

The over-accumulation of fat under the integuments, and around some of the viscera, constitutes obesity (from *Obesus*, fat or gross). By some authors it is spoken of as polysarcia (*Πολὺς*, much; *σάρξ*, flesh).

The term "corpulency" may perhaps be retained for those cases where the amount of fat is not sufficient to constitute a disease.

A moderate amount of fat is a sign of good health; and physiologists generally allow that the adipose tissue ought to form about the twentieth part of the weight of man, and the sixteenth of woman. Independently of the importance of fat as a non-conducting substance, in impeding the too rapid escape of animal heat, it may also be regarded as a store of material to compensate for waste of tissue, under sickness or other circumstances entailing temporary abstinence from food. Nevertheless in excess this substance not only becomes burdensome and unsightly, but a real and serious evil. It is hardly necessary to give any description of obesity, since it is a condition recognizable at first sight. Yet it must be remembered that a man may be large, having the muscular system well developed, and the fat proportionately increased, without being obese. "This corpulency, or obesity" (says Cullen), "is in very different degrees in different persons, and is often considerable without being considered as a disease. There is, however, a certain degree of it, which will be generally allowed to be a disease; as, for example, when it renders persons, from a difficult respiration, uneasy in themselves, and, from the inability of exercise, unfit for discharging the duties of life to others."* The *accumulation* of fat must not be confounded with the *degeneration* of muscle and other tissues into this substance.

The obese condition may be partial, or more or less complete. Of *partial* obesity we have examples in fatty tumors; and in that condition known popularly as "pot-belly," from the enlargement of the omentum with fat. This structure has been known to weigh as much as 30 lbs., from excessive adipose deposit. In *complete* obesity we find the fat accumulated under the integuments, between the muscles, upon the heart beneath the pericardium, in the mesentery and omentum, around the kidneys in the mediastinum, and around the mammæ as well as about the nates of women.

Obesity is not peculiar to any particular period of life. The young, the middle-aged, and the old may suffer from it. Females, however, are more predisposed to this condition than males: and they appear more especially liable to it after the cessation of menstruation. Women, too, who have never borne children seem to be more frequently affected than such as have had several pregnancies. And I believe it will generally be found that in fat women the menstrual flow is more scanty and irregular, than it is in those whose organs are not so encumbered. The *causes* of obesity are numerous. It is often hereditary or constitutional, the inclination being derived from either parent. This tendency is seen not only in individuals but in nations: *e. g.*, the Dutch are as stout as the Americans are proverbially thin. Overfeeding will induce fat, and so will the habit of taking too much fluid. The obese are not always great eaters: but they invariably drink a great deal, even though it be only water. Farinaceous and vegetable foods are fattening, and saccharine matters are especially so. The instance of the slaves in Italy, who got fat during the grape and fig season, has been quoted by Galen. In sugar-growing countries, the negroes and cattle employed on the

* First Lines of the Practice of Physic, vol. iv, p. 219. Edinburgh, 1784.

plantations grow remarkably stout while the cane is being gathered and the sugar extracted. During this harvest the saccharine juices are freely consumed; but when the season is over, the superabundant adipose tissue is gradually lost. And then amongst other causes we must reckon insufficient exercise, prosperity and ease of mind, indulgence in too much sleep, and an absence of the sexual appetite. Eunuchs are often described as being flabby and fat; whilst amongst the lower animals, fattening is readily produced after the removal of the testicles or ovaries. The way in which the same fact can be made to tell in favor of two opposing theories is curiously illustrated by two writers on this subject. Thus, Wadd cites the butchers as examples of corpulence, alleging that their excellent condition is due to animal food. He speaks particularly of the advantages of the "butcher's steak;" and does not believe that these men and their wives owe their good looks to "the effluvia of the meat."* Dancel also speaks of the frequency with which the members of the same class become obese; but he says it is because the butchers eat meat and plenty of vegetables, while their wives generally prefer vegetable to animal food. He has no faith in the opinion that their embonpoint has some connection with the atmosphere of nutritive animal odors in which they live.†

Fats are obtained abundantly from both the animal and vegetable kingdoms. Their predominating elements are carbon and hydrogen. They never contain nitrogen, except as an accidental ingredient. They are made up of three closely allied bodies; viz., stearin (*στέαρ*, suet), margarin (from its lustrous appearance, *μάργαρον*, a pearl), and olein (*oleum*, oil) which is fluid. When fatty matters are heated with the hydrated alkalies, they undergo saponification, during which process a viscid sweet fluid—glycerine (*γλυκὺς* sweet)—is yielded. Now several physiological studies lead to the conclusion that oils and fats may not only be formed in the system from food which contains it ready prepared, but also from the chemical transformation of starch or sugar. Many experiments have been made on geese, ducks, and pigs, which have proved that these animals accumulate much more fat than could be accounted for by that present in the food. M. Flourens had the bears at the Jardin des Plantes fed exclusively on bread, and they became excessively fat. Magendie, in making experiments on the forage of horses, found that these animals constantly returned more fat in their excrements than their food contained. And several authors have shown that bees form wax, which strictly belongs to the group of fats, when fed exclusively on purified sugar. If with foods of this nature the animals be subjected to a warm atmosphere and allowed but little room for movement, the adipose tissue rapidly gets increased. At Strasbourg, the place of all others most noted for its pâtés de foie gras, the geese are fatted by shutting them up in coops within a room heated to a very high temperature, and stuffing them constantly with food. Here all the conditions for insuring obesity are resorted to—viz., external heat, obscurity, inactivity, and the cramming of the animals with

* Cursory Remarks on Corpulence; or Obesity considered as a Disease. Third Edition, p. 81. London, 1816.

† Traité Théorique et Pratique de l'Obésité, p. 84. Paris, 1863. This physician's first treatise on the subject—Préceptes fondés sur la Chimie organique pour diminuer l'Embonpoint sans altérer la Sante—was published in 1849.

nourishment. A still greater refinement for pandering to the appetite is resorted to by the Italians, who appear particularly to relish the fat of the ortolan. To procure this in perfection, the natural habits of the bird were watched; and it having been found that food is only taken at the rising of the sun, cunning men have arranged that this luminary shall rise much more frequently than nature has ordained. To effect this, the ortolans are placed in a dark, warm chamber, which has but one aperture in the wall. Food being scattered over the floor, a lantern is placed at a certain hour in the opening; and the birds, misled by the dim light, believing that the sun is about to shed its rays upon them, at once consume their rations. The meal finished, the lantern withdrawn, and more nutriment scattered about, the ortolans fall asleep, as in duty bound; though probably not without a feeling of surprise at the shortness of their day. Two or three hours having elapsed, and digestion being completed, the lantern is again made to throw its light into the apartment. The rising sun recalls the birds to the necessity of again feeding; and of again sleeping as they become enveloped in darkness. Thus this process is repeated several times in the twenty-four hours; until, at the end of two or three days, the ortolan becomes a delicious little ball of fat, ready to minister to the palate of the gourmand.

The *consequences* of obesity are often more serious than is generally believed. To put aside many minor inconveniences,—which, however, may be sufficiently annoying to make the sufferer desirous of reducing his weight, even at some risk to his health—it may be taken as a general rule that obesity does not conduce to longevity. The functions of various important organs being constantly impeded must cause many distressing disorders. Falstaff, whose "pelly was all putter" as the Welsh parson said, suffered more from his ridiculous figure than from any real evil. The chief fear of this "huge hill of flesh" seems to have been that they might "melt him out of his fat drop by drop, and liquor fishermen's boots" with him.—Daniel Lambert at one time weighed 52 st. 12 lbs., or 740 lbs.; but he died in 1809, in his fortieth year.—Bright of Malden, in Essex, who had attained to 616 lbs. at his death, and the capacity of whose waistcoat was said to be such that it could inclose seven ordinary persons, only lived to be twenty-eight. Dr. F. Dancel in his excellent work* quotes from the "Javannach-News," 1853, the following: There lived, eighteen miles from Batavia, a young man who weighed 565 lbs. (40 st. 5 lbs.) when he was twenty-two years of age. His size continued to increase until a little over 600 lbs. (42 st. 12 lbs.). He was comfortable and took care of a plantation. At the end of four weeks he began to increase again in weight, at first to the extent of 1½ lbs. daily, and then of 2 lbs. In the last week he died suddenly in his chair, suffocated by fat. Three days before his death he weighed 643 lbs. (45 st. 13 lbs.)

As a rule, to which every one can call to mind exceptions, excessive corpulence diminishes both bodily and mental activity. One of the most anomalous cases is mentioned by Maccary, who states that he met at Pavia the most enormously fat man he ever saw, but who nevertheless was a dancer, and was exceedingly agile and graceful in his movements.

* Opus jam citat. p. 26.

But generally obesity is accompanied with diminished vital power; there are disturbances of the organs of respiration, circulation, and digestion; the blood is proportionately deficient in quantity or quality; the muscles are weak, and have but little firmness; while the countenance is bloated and sallow. And although the disposition is often sanguine, so that the sufferer continues lively and cheerful, and has the happy habit of looking at the best side of everything, yet active mental occupation is generally as uncongenial as repose and idleness are in harmony with the inclinations. Lord Chesterfield is no great authority, but he mixed much with men; and in his opinion fat and stupidity were such inseparable companions, that he said they might be used as convertible terms.*

The *treatment* of obesity would now seem to rest upon a more sure basis than it has hitherto done, the investigations pursued by Dr. Dancel having been somewhat instrumental in leading to this result. In proof of the truth of this remark, we may look back for a moment to the curative agents formerly in use. Thus, we find a tolerable list of remedies in the pages of Maccary,† which includes—Bleeding from the arm or jugular vein; Leeches to the anus; Dry cupping; Prolonged blistering; Vegetable diet with vinegar; Acids—except nitric and phosphoric; Hot baths; Salt-water baths; Baths of Aix, Spa, Forges, Rouen, and Acqui; Occasional starvation; Decoction of guaiacum and sassafras; Scarifications; Salivation; Grief and anxiety to be induced; Purgatives; Issues; Pricking the flesh with needles; Walking with naked feet; and Removal of exuberant fatty tissue with the scalpel. Since this ridiculous catalogue was published, Turkish baths, sea-voyages, very little sleep, emetics, digitalis, soap (a relative of Mr. Wadd's ordered a quarter of a hundredweight of Castile soap for his own eating), salt, mercury to salivation, the inhalation of oxygen gas, purgatives, diuretics, the extract of the fucus vesiculosus, and preparations of bromine or of iodine have been freely tried.—Dr. Thomas King Chambers, believing that the chemical affinity of alkalies for fat points them out as appropriate alteratives in this complaint, has recommended liquor potassæ, in half drachm or drachm doses, thrice daily. The medicine is taken in milk and water; since milk covers the taste better than anything else, while the efficacy of the potash is not endangered because a part of it is saponified. Dr. Chambers of course regulates the diet, interdicting fat, oil, and butter; while he recommends very light meals of substances that can be quickly digested. The patient is also to devote many hours daily to walking or riding, while he may employ cold salt-water baths or vapor-baths, with friction to the skin.‡ But all these plans, however perseveringly carried out, fail to accomplish the object desired; and the same must be said of simple sobriety

* Lord Byron undervalued David Hume, denying his claim to genius on account of his bulk, and calling him, from the Heroic Epistle, "The fattest Hog in Epicurus' sty." Another of this extraordinary man's allegations was, that "fat is an oily dropsy." To stave off its visitation, he frequently chewed tobacco in lieu of dinner, alleging that it absorbed the gastric juice of the stomach, and prevented hunger.—Rejected Addresses. By James and Horace Smith. Twenty-fourth Edition. Note to p. 13. London, 1855.

† Traité sur la Polysarcie. Paris, 1811.

‡ Corpulence; or, Excess of Fat in the Human Body. London, 1850.

in eating and drinking.* For it must be remembered that, as physicians, we are called upon not only to prevent the increase of fat, but to diminish the redundant quantity which has already been formed, without lessening the normal vigor of the system.

Now I believe that we possess this power; and that we are indebted for it to the light which has been shed by physiological chemistry on the production of fat in the body, and the influence of respiration in removing carbon from the blood. The researches of Dr. Dancel have also served to reduce our knowledge to a system, and to direct attention to it. But it is only fair to allow, while giving every credit to this physician, that something is due to Mr. Banting; whose pamphlet ("Letter on Corpulence, addressed to the Public." Third Edition. London, 1864), appears to me a very sensible production. In August, 1862, this gentleman was 66 years of age, 5 ft. 5 in. in stature, and 202 lbs. in weight. He could not stoop to tie his shoe, was unable to attend to the little offices humanity requires, was compelled to go down stairs slowly backwards to avoid the jar of increased weight on the knee and ankle joints, and was made to puff and blow with every slight exertion. After trying many remedies—including fifty Turkish baths, with gallons of physic—without the slightest benefit, he consulted Mr. William Harvey, who cut off the supply of bread, butter, milk, sugar, beer, soup, potatoes, and beans, and ordered the following diet:

Breakfast. Four or five ounces of beef, mutton, kidneys, broiled fish, bacon, or cold meat (except pork); a large cup of tea without milk or sugar, a little biscuit or one ounce of dry toast.

Dinner. Five or six ounces of any fish except salmon [it would have been as well also to have forbidden herrings and eels], any meat except pork, any vegetable except potato, one ounce of dry toast, fruit out of a pudding, any kind of poultry or game, and two or three glasses of good claret, sherry, or Madeira. Champagne, port, and beer forbidden.

Tea. Two or three ounces of fruit, a rusk or two, and a cup of tea without milk or sugar. [Coffee might have been allowed.]

Supper. Three or four ounces of meat or fish, and a glass or two of claret.

For *nightcap*, if required, a tumblerful of grog (gin, whiskey, or brandy without sugar) or a glass or two of claret or sherry.

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* The inutility of a diet restricted to slops is well shown in the following case, related by Wardell. The subject of the history was a female patient at the Edinburgh Royal Infirmary. She was forty years of age, of short stature, and so obese as from the first to make her case an alarming one. The features were grown up with fat, so that the eyes looked small and sunken. Even walking up and down the ward was attended with difficulty, the exertion giving rise to great embarrassment of breathing. "The appetite was preternaturally large; somnolency so persistent that whenever left but a few minutes to herself, she dozed over into slumber. There was a torpor of mind, an aversion to all exercise, a listless apathetic state, which so characterize this curious disease. She was ordered a diet not more nourishing than allowed to the fever patients, consisting of panado and slops, yet the polysarcia progressed, and after being some time an inmate in the hospital she died, with comatose symptoms."—Remarks on Obesity, p. 11. London, 1849. Reprinted from the London Medical Gazette.

Wadd has also told us that, "Among the Asiatics, there is a sect of Brahmins who pride themselves on their extreme corpulency. Their diet consists of farinaceous vegetables, milk, sugar, sweetmeats, and ghee. They look upon corpulency as a proof of opulence; and many arrive at a great degree of obesity, without tasting anything that has ever lived."—Opus jam citat., p. 80.

Dr. Fothergill stated that a strict vegetable diet produces exuberant fat more certainly than other means. And Mr. Moore mentions the case of an enormously fat woman who exhibited herself in some house in the Strand, in 1851. Upon questioning her and the exhibitor, he found that they were both rigid vegetarians, and were not a little proud of belonging to this sect.—Corpulency, *i. e.* Fat, or Embonpoint, in excess. Fourth Edition, p. 14. London, 1860.

At the same time a draught containing a drachm of the aromatic spirits of ammonia, with ten grains of carbonate of magnesia, was given once or twice daily, on an empty stomach. The result of this treatment was a gradual reduction of 46 lbs. in weight, with better health than had been enjoyed for the previous twenty years.

The explanation of all this is very simple. Food consists of azotized or nitrogenous, and non-nitrogenous principles. The *former*—the nutritive or plastic class—includes all fibrous and albuminous matters, such as animal food: these matters aiding the formation of blood and muscle, but not entering into the composition of adipose tissue. The *latter*—the calorifacient or respiratory class—consists of oily and fatty matters; with sugar, gum, starch, and vegetable acids, all of which contain carbon and hydrogen, the elements of fat. Man undoubtedly requires a mixed diet: that is to say, nitrogenous food is needed for the formation or renewal of the tissues and other nitrogenous parts of the body; while the respiratory food is required for the production of the fatty components of the body, and as affording materials for respiration and the production of heat. Hence it is clear that while we may limit the non-azotized substances, they must not be altogether cut off. Moreover, it is of practical importance to remember that the elements which are chemically convertible into fat are rendered more fattening if alcoholic liquids be added to them in the stomach; probably because of the power which stimulants possess of lessening or delaying the destructive metamorphosis. It may be said that a diet such as Mr. Harvey recommended is calculated to induce the lithic acid diathesis with gout. The only answer is that Mr. Harvey provides against this occurrence by his draught of ammonia and magnesia. Moreover, as a matter of experience, he tells me he has not found any indication of gout to follow his treatment; and, in cases which I have successfully treated according to his rules, not the slightest symptom of the kind has occurred. But even should an attack of gout result, it is really a disease of minor importance compared to obesity, except as a confirmed affection.

It only remains to say that every patient under treatment for this disease should be regularly weighed, while the condition of his health is to be carefully watched. Particularly, heed is to be taken that the appetite does not fail, the power of digestion fall off, constipation take place, the action of the heart become enfeebled, or the blood get impoverished. On the part of both physician and patient firmness of purpose and steady perseverance will be needed. As a rule, the diminution should not be allowed to progress more rapidly than at the rate of one pound a week; and it ought not to be carried to too great an extent. In the section on Phthisis the reader will find a table of the normal weight in proportion to the stature; which table may form a guide for the practitioner, serving to show him the extent to which redundant fat may be safely reduced.

PART II.

FEVERS.

Fever (from *Ferveo*, to burn), or Pyrexia (*Πῦρ*, fire; *ἔχω*, to hold), may be defined thus: After a preliminary stage of languor, weakness, defective appetite, and some degree of chilliness or shivering, there follows preternatural heat of body, increased waste of tissue, acceleration of pulse, great muscular debility, and disturbance of most of the functions. This morbid state accompanies many diseases as one of their phenomena—*symptomatic* fever; but under certain circumstances we meet with *idiopathic* or *essential* fevers, which are quite independent of any local inflammation.

Much has been written on the classification of idiopathic fevers, each author having some favorite arrangement which does not always simplify the subject. In order to be as clear as possible, I shall consider the different varieties of fever according to the following plan:

I. Continued Fevers.
   1. *Simple Continued Fever*, or *Febricula.*
   2. *Typhus Fever.*
   3. *Typhoid*, *Enteric*, or *Pythogenic Fever.*
   4. *Relapsing*, or *Famine Fever.*

II. Intermittent Fever, or Ague.

III. Remittent Fevers.
   1. *Simple Remittent Fever.*
   2. *Yellow*, or *Hæmogastric Fever.*

IV. Eruptive Fevers.
   1. *Variola*, or *Small-pox.*
   2. *Vaccinia*, or *Cow-pox.*
   3. *Varicella*, or *Chicken-pox.*
   4. *Morbilli*, or *Measles.*
   5. *Scarlatina*, or *Scarlet Fever.*
   6. *Erysipelas.*
   7. *Pestis*, or *Plague.*

Two of the Continued fevers resemble the Eruptive in being contagious, in having a peculiar eruption on the skin, and in the fact that one attack generally confers immunity from any subsequent assault of the same disease. Moreover, in typhoid fever, the symptoms often remit, as in remittent fever. And, then, the varieties of continued fever have their origin in preventible causes; in this respect resembling intermittent fever, and differing from the so-called eruptive fevers.

I. CONTINUED FEVER.

Continued Fever is so termed from the fact that it pursues its course without any well-marked remissions.

The cause of fever is the contamination of the blood by some morbific agent. When this change—the nature of which is unknown—has proceeded to a certain extent, the researches of Dr. Parkes teach us that the nervous system, or rather that part especially connected with nutrition and organic contractility, begins to suffer alterations in composition. The muscles, and probably some of the organs deprived more or less of nervous influence, begin to disintegrate, this disintegration producing undue heat; the condition of the vagus and vasi motor nerves induces increased action of the heart and dilatation of the vessels; the contaminated blood is still further deteriorated by receiving the rapidly-disintegrating tissues, by the continued action of the morbid agent, as well as by the functions of the lungs, liver, spleen, &c., being impeded; while, as no food is taken, the various alkaline and neutral salts no longer pass into the system.

There are four varieties of Continued fevers: 1. *Simple continued fever*, or *febricula*, which is non-contagious, and arises from over-fatigue, errors in diet, and exposure to the sun's rays. 2. *Typhus*, which is infectious, occurs among the poor, and is due to some poison generated by famine and destitution, as well as by overcrowding in prisons, workhouses, or ill-ventilated rooms. 3. *Typhoid*, *enteric*, or *pythogenic fever*, met with equally amongst rich and poor, generated by the putrid emanations from decaying animal matter, most prevalent in autumn, and which, though infectious, is less so than typhus. And 4. *Relapsing*, or *famine fever*, very contagious, and which Dr. Murchison believes will be proved to be produced by famine alone.—To show the relative prevalence of the different forms, it may be mentioned, that during the ten years ending with December, 1857, there were admitted into the London Fever Hospital 6628 cases of fever; of which 861 were Febricula, 3506 Typhus, 1820 Typhoid, and 441 Relapsing fever. With the exception of the years 1850 and 1851 there was a preponderance of typhus; but in one of these two years the typhoid cases, and in the other the relapsing were in excess. There seems to be a comparative immunity from typhus during certain years in London; as may be shown by the returns for 1858 and 1859, in which years there were admitted into the hospital only 63 examples of typhus against 356 of typhoid fever. Moreover, in neither of these years was there a single instance of relapsing fever, although in 1851 there were more cases of this kind than of any other.

According to the reports of the Registrar-General, the deaths from all forms of continued fever, in England, during the ten years from 1852 to 1861, were 169,978.

1. Simple Continued Fever, or Febricula.—This variety of fever, when it runs an uncomplicated course, is always a mild disease; having a variable duration of from one to ten days.

It commences for the most part without any warning; the patient being suddenly seized with lassitude, disinclination for bodily or mental

exertion, loss of appetite, sickness, headache, dull aching of back and limbs, coldness of the surface—especially of the back, and often shivering. At the end of a few hours, in most cases, the chilliness passes off, and the skin becomes dry and hot. There is no eruption. The pulse is then found hard—sometimes full and bounding—often small, wiry, and rapid, 100 or 120, or even 130, in a minute; there is increased headache and restlessness; a dry and furred tongue; urgent thirst; constipation; and the urine is scanty and high colored. Moreover, the patient usually complains of pains in his limbs, or of a feeling of soreness over his body; he rapidly emaciates; his countenance becomes pale and haggard; he may have slight delirium; and he seems very seriously ill to his friends. An exacerbation or aggravation of all the symptoms frequently occurs towards night; with a slight remission at the approach of morning, when sleep is often obtained. These symptoms usually continue for three or four days: when, frequently on the fourth day, sometimes on the fifth or sixth, the tongue becomes moist; the skin gets less harsh and dry; the headache and pains in the limbs abate; and then a profuse sweating follows. This sweat proves the natural crisis or termination of the disease; leaving the patient languid and exhausted, but with a pulse of the natural standard, and a complete freedom from the fever. Where perspiration does not occur, a critical hemorrhage from the nose, or rectum, or uterus, may set in; or there may be an attack of diarrhœa; or an eruption of herpes may break out on the face; or there may be an increased action of the kidneys, the urine being loaded with urates.—Convalescence gradually and slowly takes place, some weeks often elapsing before the patient thoroughly regains his flesh and strength.

Simple fever is very seldom attended with any danger; and inasmuch as it is not due to any specific poison, is non-infectious. Nosologists have divided it into different classes, according as one particular organ has been more affected than another; so that in some books we find unnecessary distinctions into brain, catarrhal, gastric, mesenteric, and bilious fevers.—Dr. Murchison says, that from his own observations in India and Burmah, he is convinced "that the Common Continued Fever, the Ardent Fever, and the Sun Fever of the tropics, are nothing more than severe forms of the Simple Fever or Febricula of Britain."*

All fevers seem disposed to run a certain course, and to terminate naturally in the re-establishment of health when uninterfered with by art. But, as in the treatment of other disease, there are certain general objects, called the *indications of cure*, which must be kept in view. In fever these indications are—1, to moderate, where necessary, the violence of arterial excitement by saline laxatives, rest in bed, and low diet; 2, to support the powers of the system as soon as they begin to flag; 3, to obviate local inflammations and congestions; and 4, to relieve any urgent symptoms as they arise. It was well observed by Pitcairn —"I do not like fever-curers. You may *guide* a fever; you cannot *cure* it. What would you think of a pilot who attempted to quell a storm? Either position is equally absurd. In the storm you steer the ship as well as you can; and in a fever you can only employ patience and judicious measures to meet the difficulties of the case." What

* A Treatise on the Continued Fevers of Great Britain, p. 598. London, 1862.

these *judicious measures* are the reader will be able to deduce from the remarks on the treatment of typhus.

In the febricula of India and other tropical countries, emetics, purgatives, diaphoretics, low diet, and tepid sponging are employed. In some plethoric subjects, venesection, leeches to the temples, cold applications to the head, with the administration of tartar emetic, have been required. When the urgent symptoms are removed, quinine should be given.

2. Typhus Fever.—This form of fever* is eminently contagious and infectious; it often prevails epidemically, during seasons of general scarcity, attacking individuals of all ages; and it is the accompaniment of destitution, being generated in overcrowded and ill-ventilated dwellings. Its duration is from fourteen to twenty-one days.

Symptoms.—After the reception of the fever-poison there is commonly a period of *incubation*, during which the patient may complain of slight chilliness, nausea, loss of appetite, thirst, languor, and headache. The duration of this precursory stage varies; but it is usually short, from one or two to twelve days, and it ends suddenly in the symptoms which are common to many acute affections. These are chiefly dryness with heat of skin, thirst, a heavy dull look, constipation, rapid pulse, dry tongue, stupor, prostration, and muscular pains; while towards the evening of each day there is great irritability and restlessness, causing a wakeful night. The peculiarity of the disease is the *typhus rash*—sometimes called a *morbilliform* eruption, from its resemblance to the efflorescence of measles—which appears between the fourth and seventh days from the commencement of the disorder; and which consists of irregular spots, of a dusky or mulberry hue, disappearing on pressure, and feeling as if slightly raised above the skin. These spots may be few and single, or they may be numerous and large, owing to the coalescence of several, or they may be pale and produce merely a mottled appearance; their number and depth of color will be found to be in proportion to the severity of the attack; they are most commonly first seen on the abdomen, and then on the chest and extremities; in a day or two they become of a brick-dust color, and only slightly fade on pressure; while each patch of eruption remains permanent till the end of the fever. This eruption is often accompanied by, or becomes converted into, petechiæ. It is very rarely indeed absent in adults; but in children, particularly in mild cases, it may perhaps be present in only three cases out of four.

During the first week the patient generally complains much of headache and noises in the ears; while subsequently there may be deafness. The conjunctivæ are injected: when delirium sets in the pupils may be contracted, and insensible to light. The sense of taste is impaired, as is also that of smell; there is loss of appetite, but no symptom of intestinal irritation, no flatulence, no diarrhœa; while the tongue is brown and dry, and in grave cases becomes almost black and covered

* Prior to 1759 the disease was known as Putrid, Pestilential, Malignant, Jail, Ship, or Hospital Fever. Sauvages then described it under the name of Typhus. This word is derived from Τῦφος, stupor; an expression employed by Hippocrates to denote a lethargic disease, in which the patient is suddenly deprived of his senses, as if thunderstruck.

with offensive bloody sordes.—In most cases there is more or less wakefulness, particularly at night. Perhaps the patient sleeps, however, though when he awakes he declares he has not closed his eyes. Now and then, especially about the ninth or tenth day, there is profound somnolence, which may end in fatal coma. Or there may be that condition described as coma-vigil by Dr. Jenner; in which the patient lies with his eyes wide open, evidently awake, but indifferent or insensible to all going on around him. This state may last from one to four days, when death always occurs.—The urine is often diminished in quantity, and is of high specific gravity; while it contains an increased amount of urea, and has little or no chlorides. Sometimes there is albuminuria; and occasionally a complete suppression, with convulsions and fatal uræmia.—The weakness which affects the muscular system, almost from the first, is very remarkable; the prostration gradually increasing until those who have been strong and robust become so powerless that they cannot turn in bed.—The countenance is of a dusky tint, the gaze dull and vacant, while the features get wasted and pinched to an extreme degree.—Muscular twitchings of the face and hands are not uncommon; or there may be some irritation of the diaphragm causing troublesome hiccup.—Delirium is seldom present before the end of the first week, and the way in which it then comes on is worthy of notice. The patient from being perfectly rational passes through every grade of delirium, perhaps in the course of two or three hours, to the most wild and furious perversion of mind. At first there is merely "wandering," and the sufferer is conscious every two or three minutes that he is talking nonsense; then there is confusion of ideas with vague rambling talk, from which he can be roused: this is followed by illusions, especially of the senses of hearing and vision; and then every function of the mind becomes disordered by unreal images and aberrant trains of thought, which cannot be corrected by any external impressions. These ravings, however, are usually remembered, and the sufferer is able to explain the reasons for his shrieks and violence. He recollects that he was confined in some dungeon, or was pursued by enemies bent on murdering him. He visited distant countries to seek concealment, but in vain. His foes were at hand; he would not yield, however, without a struggle. And then he raved, sprang from the bed, and attempted to reach the door or window to fly from his tormentors.—In a case of erysipelas with great prostration, which I nursed through a long night, the delirium was of the same character as occurs in typhus. The patient every few minutes became furious, shouting out "Police," "The villains are coming," "Help," &c., at the same time attempting to jump out of bed. It afterwards appeared that he was being made an example of for his sins; that strong men took and forced him into a brass box the size of an orange; and that then he was carried to a height and hurled down. As he escaped from the broken cage he became somewhat calmer, asked for a drink, and said it was dreadful torture; until suddenly starting again, with a wild look, he would cry out, at the top of his voice, "There, look,—they are coming. Police," and so on.—Sometimes this delirium ends in coma; but in favorable cases it gradually passes off in two or three days, the patient enjoys a long quiet sleep, and then begins to recover his memory and other mental powers.

With regard to the condition of the heart, Dr. Stokes points out that it is liable, in common with other organs, to suffer from organic and functional alteration; in one set of cases there being excitement of the heart, while in another class we may find depression, but neither of these results being due to inflammation. A progressive loss of impulse as well as of the systolic sound, slow pulse, sighing respiration, and a tendency to syncope, are the principal indications of the depressed state of the heart; this depression being generally due to a softened state of the walls of the ventricles, especially on the left side, though undoubtedly the heart may be found simply weakened without softening. Conversely, a strong and jerking impulse, with distinctness of both sounds, indicates the excited condition; in which, however, the pulse will be found feeble and the extremities cold, while occasionally there is loss or diminution of the second sound. The production of a murmur, in connection either with the excited or depressed state of the heart, is of rare occurrence.

The lungs may also become secondarily affected; and the danger may thus be increased by the occurrence of acute bronchitis, or pleurisy, or pneumonia. The latter may run on to pulmonary gangrene, which is almost always fatal. In a few instances there has also been inflammation of the larynx and pharynx; and in a still smaller number of cases, inflammation of the brain or its membranes.

The approach of convalescence is in the majority of cases gradual, being indicated by a diminution in the nervous symptoms, by the eruption completely fading away, by the tongue getting cleaner, and by the partial return of the muscular power; while the pulse also beats more quietly and with less rapidity, the appetite improves, and the patient sleeps at night. The amendment generally begins between the tenth and sixteenth days—most frequently on the thirteenth or fourteenth;—and only occasionally is preceded by some *crisis*, such as a prolonged sleep, or copious sweating, or an attack of diarrhœa, or the deposit of a large quantity of urates in the urine.

Prognosis.—Amongst unfavorable symptoms may be noticed,—a presentiment of death: a pulse above 120, especially if this rate be present at an early stage: absence of cardiac impulse with an inaudible systolic sound: excited action of the heart, with a feeble pulse at the wrist: pulmonary complications: sleeplessness, with delirium: coma-vigil: great contraction of the pupil, and squinting: extreme prostration, muscular tremor, and hiccup: a brown, hard tremulous tongue: great lividity of the surface, with abundant eruption: and albuminuria, or especially suppression of urine.

When the disease proves fatal, it usually does so between the twelfth and twentieth days. And then death is immediately preceded by very great prostration, retention or suppression of urine, involuntary defecation, the formation of bed-sores, great rapidity and weakness of pulse, subsultus tendinum or involuntary muscular twitchings, convulsions, lividity of countenance, very rapid breathing, coma-vigil and syncope, or somnolence passing into stupor and coma.—According to Dr. Murchison, one person out of every five attacked by typhus dies. Out of 4787 cases admitted into the London Fever Hospital during 14½ years (from 1848 until June, 1862), there were 1000 deaths; making a mortality of 1 in 4.78. Many of the cases, however, were moribund on admission.

The greater the age of the patient, the greater the danger; the mortality in youth is small.

Diagnosis.—A great deal has been written as to the identity or non-identity of typhus or typhoid fever; and the subject is sufficiently important to demand considerable attention.* Until about the year 1840 these fevers were generally confounded together, and regarded as merely two stages of the same affection; being frequently described as typhus, or low nervous, or jail, or hospital, or camp, or malignant fever. There appear very good grounds for believing, however, that they are essentially distinct diseases,—as distinct as small-pox and measles; being attended by different important symptoms, and being due to different blood-poisons. They commence much in the same way, and at first present the same features, as simple fever; and, like it, they occasionally become complicated with inflammation of the brain or its membranes, with bronchial congestion, or even with pneumonia. But they differ from *febricula* thus: instead of early terminating in the crisis of sweating, in typhus and typhoid fever the symptoms increase in severity; the febrile action becomes much more intense; in each case the pulse becomes more frequent, weaker, and more compressible; the tongue grows drier and browner; certain eruptions show themselves; more sordes, and of a darker color, accumulate on the teeth and lips; the hands are moved restlessly to and fro;† the fæces are often passed involuntarily; bed-sores are produced unless great care is paid to keeping the patient clean and dry, &c.; delirium ensues; there is great prostration of the vital powers; and often a strong tendency to death by exhaustion or coma.

The way in which typhus and typhoid fever differ from each other may be best shown by a comparison of their most prominent symptoms. Thus, in *typhus*, the eruption consists of a mulberry rash, coming out between the fourth and seventh days, and lasting until the termination of the disease; the general hue of the skin being at the same time dusky and mottled. In *typhoid fever* the eruption is formed of rose spots; appearing upon the thorax, back, and abdomen between the

* Dr. Murchison strongly and very properly insists that, in many points of view, the recognition of the several species of Continued Fever is highly important. For example, there can be no doubt that true typhus is a more contagious affection than enteric fever. Consequently, while cases of the latter may, perhaps, be distributed with impunity among the patients of a general hospital, it seems highly probable that it would be most unwise to allow of such an arrangement with regard to typhus patients. Then, again, the use of bloodletting has been recommended in fever, owing to the reduced mortality said to result from this remedy. But on examining the facts upon which this statement is advanced, it is found that the patients treated by bleeding were in all probability suffering from relapsing fever, the fatality of which is extremely small compared with that of typhus and pythogenic fevers. And further, in studying the causes of continued fever in a sanitary point of view, while we find some observers arguing that this disorder results only from putrid emanations, there are others who teach that destitution is its great source, and that putrid emanations are perfectly innocuous. We have here the old fable of the gold and silver shield, the opposing parties having drawn their conclusions from observing different diseases.—See a review of the works of Murchison and Tweedie on Fever, by the author, Lancet, 7th February, 1863.

† These movements of the hands were well described by Hippocrates more than 2000 years ago: "I have made these observations upon the movements of the hands. In acute fevers, in peripneumonias, in phrenitis, and in headaches, the hands moved to and fro before the face, hunting through the void, as if gathering bits of straw, picking at the coverlet, or tearing objects from the wall, are all so many bad and deadly symptoms."—The Book of Prognostics.

seventh and fourteenth days; being thinly scattered, so that they often require to be carefully looked for, and even then probably are not found in at least ten or twelve per cent. of the cases; and then in two or three days fading and giving way in one place to a new and equally sparing crop on another part.—In *typhus*, diarrhœa seldom occurs, and hemorrhage from the bowels never. In *typhoid*, diarrhœa is very common, and there is hemorrhage from the bowels in about one case out of every three. In an excellent monograph on these fevers, by Dr. Jenner, published in 1850, this gentleman shows that in all the fatal cases of *typhoid fever* which he examined, the agminated glands or Peyer's patches, situated in the ileum, were found ulcerated; the ulcerations increasing in extent as they reached the ileo-cæcal valve. In a few instances, also, the solitary glands were ulcerated; and one-eighth of the cases recorded died from extension of the ulceration, with perforation of the intestine. As regards the cases of *typhus*, ulceration did not exist in a single instance.—*Typhus* is a very rare disease among the better classes (making the exception of the visiting clergy, medical men, and students); whereas *typhoid fever* is probably more common among the rich than the poor. Again, *typhus* may occur at any age, while *typhoid fever* rarely attacks persons after forty, and is most common in youth; the former slightly less dangerous than the latter; and lastly, relapses do not occur in *typhus*, while they occasionally happen in *typhoid*.—Both diseases are contagious, but each propagates itself, and not the other; an attack of the one does not act as a preventive to infection by the other at any future period.—In *typhus* the duration of the symptoms is from fourteen to twenty-one days, whereas in *typhoid* it is seldom less than from twenty-two to thirty days: moreover, in the former the danger increases until the end of the second week, when the disease reaches its maximum; whereas in the latter the maximum is not attained for at least a week longer. In either case it occasionally happens that the patient falls a victim to the disease at the very onset; knocked down, and killed at once, as it were, by the virulence of the poison. Speaking generally, Dr. Murchison shows that the rate of mortality from continued fever, during a series of years, has differed but little in the various hospitals of England and Scotland, being about one in eight. The fatal cases in typhus and typhoid are one in between five and six; whereas in relapsing fever they only average about one in forty.*

* It is very difficult to draw correct conclusions as to the value of any particular form of treatment from a comparison of the mortality at various hospitals. Even in the same institution the physician or surgeon of greatest repute may have a larger proportion of fatal cases than his less celebrated colleague. The beds of the latter are filled with ordinary cases from the out-patient room: those of the former receive confirmed invalids from all parts of the country,—often sufferers coming as a forlorn hope, having been deemed incurable by others. With regard to fever, Dr. Murchison shows that the percentage of deaths at King's College Hospital between 1840 and 1858 was high. But one circumstance of importance is to be noticed,—viz., that in this small institution very bad cases were frequently admitted to the exclusion of others. Thus, when I was House-Physician in 1847, it often happened that there were only two or three empty beds out of the sixty devoted to medical patients, although some eight or ten applicants for admission presented themselves. In selecting from this number, but one rule guided me, and it was to choose the most severe forms of disease. And, moreover, rather than send away any very bad case, an extra bed would often be put up Clearly, under such circumstances, the death-rate must appear greater than where all comers can be received for treatment.

In some very few cases both typhus and typhoid fever have existed together in the same individual; a circumstance which is no more remarkable than the coexistence of typhus and erysipelas, or of measles and small-pox.

Morbid Anatomy.—A case of typhus may run its course and end fatally, without leaving any traces of its existence. In the majority of cases there is nothing more than slight congestion of the mucous surfaces of organs.

When the case has been complicated with secondary affections, we of course look to the organs which have suffered. The brain is seldom altered; but there may be engorgement of the sinuses, or congestion of the cerebral substance. The pia mater is occasionally loaded with blood, and sometimes there has been found slight hemorrhage into the cavity of the arachnoid. The effects of inflammation may, perhaps, be discovered in some part of the respiratory apparatus; while occasionally the muscular substance of the heart is found soft, so that it is easily torn. The condition of the alimentary canal is normal; the liver is healthy; while in about half the cases the spleen is softened, and in a much smaller proportion is likewise enlarged.

The blood contains a deficient amount of fibrin; and according to most authorities the blood-cells have a great tendency to liquefy. Dr. Richardson says that in a case of typhus which he examined during life, the presence of ammonia in excess in the body was indicated by prominent signs. The chief of these were that the breath was so markedly ammoniacal that it coated acidified glass with crystals of the chloride of ammonium, and restored the blue color to reddened litmus; the blood-corpuscles were misshapen, agglomerated, and partially dissolved, precisely as they are found when weak solutions of the alkali are added to healthy blood; while the symptoms were also those of alkaline poisoning. The foregoing tests are more delicate than that of holding a glass rod moistened with dilute hydrochloric acid before the mouth; though if, when this is used, there is distinct evidence of white fumes, it is sufficient to prove that the amount of ammonia expired is beyond the normal proportion.

Treatment.—To prevent the generation of the typhus poison the poor must be supplied with wholesome food, and must be housed in properly ventilated dwellings. The first requisite is not always possible; but man can live with a comparatively small amount of food, though to secure health an uninterrupted supply of pure air is necessary. We read with horror the stories of the Black Hole in Calcutta and of the Westminster Round House; but the effects of overcrowding among the poor are just as destructive, though less speedily so.* In the common

* It was on the 21st June, 1756, that the Black Hole in Calcutta was the scene of suffering alluded to. The night was close and sultry; and at eight o'clock 146 human beings, the majority Europeans, were placed in a dungeon 18 feet by 14. There were only two small windows, looking to the west, strongly barred with iron, from which those confined could scarcely receive any circulation of fresh air. In a few minutes every prisoner fell into a profuse perspiration, causing great thirst. Before nine o'clock every one's thirst was intolerable, and respiration difficult. In the ravings for water and the attempts to get a little which was brought, some were trampled to death. Before eleven o'clock one-third were dead. By half-past eleven most of the living were delirious. At six o'clock the next morning the prison was opened: only 23 were alive; and several of these died afterwards from fever. The

lodging-houses of the metropolis the police can enforce an allowance of 250 cubic feet of space for each inmate. Insufficient as this is, the regulation is evaded. Every hospital, workhouse, lodging-house, &c., should be thoroughly cleansed, and the walls lime-washed, at the least, once a year; and of course much oftener if any cases of fever have been in them. The propagation of the poison is to be checked by disinfecting the clothes, bedding, &c., of every typhus patient (F. 74, 75): by not allowing him to be taken to the hospital in a street cab or omnibus: and by the greatest attention to cleanliness. The room in which a case has been treated ought not to be reinhabited until it has been purified with chlorine gas, whitewashed or repapered, and been left with the doors and windows widely open for many days.

The curative treatment consists of the following measures. When it is possible the practitioner should choose for his patient a large, well-ventilated apartment; which ought to be free from bed and window curtains, carpets, and all superfluous furniture. The windows should be open. The chloride of lime (F. 75), or a weak solution of the chloride of zinc (F. 79), may be used as a disinfectant. Iodine (F. 81) is valuable for the same purpose. A fire in the room acts as a ventilator.

event is graphically described by Mr. Holwell, one of the survivors, in the Annual Register for 1758. Second Edition, p. 278. London, 1761.

In the year 1742, the high constable and others of Westminster, committed to the Round House several persons whom they found in the street. Twenty-eight were sent to that of St. Martin, the keeper forcing them into a place called the Hole, not above six feet square, and with the ceiling scarce five feet ten inches high. He paid no regard to their cries of murder; so that four women were suffocated, one of whom was big with child. The keeper was afterwards found guilty of wilful murder, and transported.—The Principles of Forensic Medicine. By John Gordon Smith, M.D. Third Edition, p. 221. London, 1827.

Of course it will be said that such atrocities as those committed by Surajut Dowla and the keeper of the Round House could not take place in the present day. Perhaps not. But before we boast of our civilization it would be as well to look at the dwellings of the working and dangerous classes in Bethnal Green, Spitalfields, Saffron Hill, the Coal Yard, Great Wyld Street, Dudley Street, &c. The admirable way in which the guardians of the poor save the pockets of the rate-payers, and generate crime and fever and death, would satisfy the most ultra disciple of Malthus. This is what Mr. Godwin saw in a cellar-dwelling at Bethnal Green: "Through the narrow space of the window that is left open there came a glimmering light, which fell upon two figures on a broken truckle, seemingly naked, with the exception of some black rags passed across the middle of the bodies; but the greater part of the room, small as it is, was in total darkness. In this profound depth our sagacious guide, Mr. Price, thought that there were more figures visible; and on asking if any were there, a female voice replied, 'Yes; here are two of us. Mother is out.' And gradually, as the eye became accustomed to the gloom, two other figures were to be seen lying in a corner upon rags. This was between twelve and one o'clock in the day. We were not disposed to look further into this mystery; but it was evident that one of the unfortunates was resting close to the damp and poisonous wall. Neither words nor drawing can convey a complete idea of this den and its thick and polluted atmosphere. Instead of being filled with the pure life-giving air which is needful for human existence, it seemed occupied by something which might be moved and weighed. The height of the room, all of which is below the surface, is not quite six feet. The window would not open; the ceiling was ready to fall; and the walls, so far as the light showed, were damp and mildewed. The lodgers here were a widow and her four children; one a girl of twenty years of age, another girl eighteen, a boy of fourteen, and a boy of twelve."—Another Blow for Life, p. 14. London, 1864.

And we are told nothing can be done for evils similar to the foregoing,—they are as unavoidable as the authorities in the days of Howard believed the generation of jail fever to be. There is a "Law of Suffering," it is argued. Some of our fellow-creatures must be allowed to rot in the wealthiest city of the world; though we complacently guard them from "spiritual destitution," and afford them the opportunity of praying for deliverance "from plague, pestilence, and famine."

All unnecessary intercourse between the patient and his friends should be forbidden; while care must be taken to select one or two cheerful, experienced nurses, since much depends upon their fidelity and competency.

If the patient be treated in an hospital, Dr. Murchison's suggestion should be followed, of allowing at least 1500 cubic feet to each bed, and of having the beds six feet distant from one another.

In the early stages, and in the whole course of mild cases, it is particularly necessary to beware of doing too much—of interfering too actively with Nature. It ought to be remembered that we are able to treat but cannot cure these maladies, any more than we can cure small-pox or measles; and therefore our aim must be to keep the patient alive until the fever-poison has expended itself. In opposition to this opinion, however, I must mention that Dr. Goolden, Physician to St. Thomas's Hospital, informs me that, after more than ten years' experience, he regards quinine in large doses as almost a specific for cutting short cases of typhus and typhoid fever. He gives ten grains in solution with a few drops of diluted sulphuric acid, every two hours, until an effect is produced—*i. e.*, until either the fever is lessened, or cinchonism is induced; and he has thus continued it for three days. He states also that it may be given even if there be diarrhœa with bloody stools; that he has never seen it do harm; and that it has saved hopeless cases. Quinine when thus administered acts on the nervous system and on the heart as a depressant; hence the patient's powers must be supported with beef-tea, and wine or brandy.*

It is often very advantageous, when the patient is seen early, to commence the treatment by the administration of an emetic; the ipecacuan wine, in doses of one ounce, with plenty of warm water, being preferable to antimony or the powdered ipecacuan. At the same time a purgative, to thoroughly clear the intestines, will generally be useful. The dilute phosphoric or hydrochloric acids, or the aromatic sulphuric acid, in doses of twenty or thirty minims every three hours, freely diluted, may be administered with benefit. It is often desirable to give them as the daily drink (F. 357, 358, 359). If it be true that the blood contains an excess of ammonia, these acids must act as valuable alteratives. All other medicines had better be avoided. At this stage the patient's uneasy sensations will be much soothed by sponging the surface of the body with cold or tepid water two or three times in the day. Dr. Armitage speaks highly of the use of cold affusion, especially where there is a tendency to stupor, or where the delirium threatens to merge into coma; but I cannot help thinking that the tepid sponging is a much safer proceeding. When there is a great degree of irritability, the warm bath, 93° to 95° Fahr., prolonged for three-quarters of an hour, may be very useful. In cases where the acid drink is not prescribed a free supply of toast-water, barley-water, plain water, raspberry-vinegar and water, or ice, ought to be allowed. The diet should be restricted to milk, farinaceous food, and thin broth well salted. Tea and coffee are probably useful in aiding the elimination of urea from the blood.

* Dr. Dundas, of Liverpool, has also given evidence in favor of Dr. Goolden's views in his Essay on Fever, Medical Times, October, 1851. On the other hand, it has been shown, by a large number of eminent authorities, that quinine thus administered not only fails to arrest the disease, but often does much mischief.

Directly the powers of life begin to fail—as soon as there is a signal loss of strength, a dark-brown tongue, a rapid feeble pulse, or an abruptness and weakness of the first or systolic sound of the heart—a stimulating plan of treatment should be commenced. This consists in ordering strong beef or chicken tea, with wine or gin, or the Mistura spiritus vini Gallici of the London Pharmacopœia, or brandy. The last is, in my opinion, the agent generally to be preferred. It should be given in such quantities as the extent of prostration may demand. Two teaspoonfuls, or one tablespoonful, or two tablespoonfuls, may be administered in water or beef-tea, every two hours, or every hour, or even—in bad cases—each half-hour; the effect produced being closely watched, and its repetition guided by such effect, remembering that severe febrile symptoms do not contra-indicate it. Most care is needed in the use of alcohol when the urine is scanty or albuminous; or when there is violent delirium, with throbbing pains in the head. A few doses, however, will show whether the delirium is increased or diminished by its use, and thus form a guide for the practitioner. When its frequent administration is called for, care must be taken not to allow the patient to sleep too long without it. One is naturally unwilling to rouse a patient who may have previously been without sleep for days, to give him his nourishment; but unless we do so at each appointed hour, he is not unlikely to awake and pass into a state of fatal collapse.

When there is much general irritability and sleeplessness, without any lung complication preventing the due aeration of the blood, a well-timed dose of opium will work wonders; it being better to give about half a grain of the extract every three hours until the patient is calmed, than to administer a single large dose. Frequently I combine it with henbane. Where the sense of hearing is very sharp, Dr. Corrigan recommends stuffing the ears with wool. If there be much headache, injected conjunctivæ, or active delirium, the opium should be guarded with a small dose of ipecacuanha, or perhaps even of tartar emetic, as recommended by Dr. Graves. Some cold lotion, or a bladder containing ice, may also be cautiously applied to the scalp; cold affusion over the head can be tried; or, if we fear any cerebral effusion, small blisters may be put on to the temples.

The secondary affections which occasionally arise are not to be looked upon as contra-indicating the use of stimulants. I am sure that I have seen fever prove fatal, because the practitioner has thought that pneumonia was also present, and has been consequently afraid to administer wine or brandy. But while giving stimulants in these pulmonary disorders, we ought also to apply turpentine stupes to the chest, or sinapisms, or plain linseed poultices.—In every case, the skin over the hips, sacrum, and other prominent parts of the body should be frequently looked to; so that if there be found any redness or tenderness, we may at once order a water-bed. After the first three or four days the patient is not to be allowed to use the night-stool, or to get out of bed; but is to be provided with a bed-pan, containing some of Condy's Fluid. The bladder ought also to be daily examined, lest there be retention of urine.—Under this management, the patient may often remain in a very precarious state for some days; but at last he will begin very gradually to recover, sleeping much as he improves. A course of the

mineral acids and bark (F. 376), or of quinine and steel (F. 380), with a gradual return to solid food, will ultimately complete the cure.

3. Typhoid, Enteric, or Pythogenic Fever.—An endemic, slightly infectious and contagious fever, most prevalent in autumn, and generated by putrefying animal matter. The effluvia from foul drains, or the contamination of drinking water by the decomposing sewage making its way into the wells, are frequent sources of this disorder. It attacks rich and poor indiscriminately; but is particularly a disease of early youth and adolescence.

Typhoid fever has been described under many names; such as *abdominal typhus*, *febris putrida*, *gastro-bilious fever*, *febris gastrica*, *febris mesenterica maligna*, *night soil fever*, and *typhia*. In some parts of America it is known as the *autumnal* or *fall fever*. In the present day many writers justly object to the appellation Typhoid; since, in the first place, this term literally means "like Typhus" (*Τῦφος*, stupor, and *εἶδος*, appearance), and the disease is essentially different; while, secondly, the word is often used as an adjective, to designate a set of symptoms which come on in the course of many acute diseases, whence may arise confusion. It has therefore been proposed to call it *Enteric fever* (*Ἔντερον*, an intestine); but it would seem undesirable to have a name derived from the abdominal lesion, as such may lead to the supposition that the intestinal ulceration is the cause, instead of the result, of the fever. Dr. Murchison, therefore, looking to the origin of the affection, suggests the appellation of *Pythogenic fever*,—*πύθογενης*, from *πύθων* (*πύθομαι*, *putresco*), and *γεννάω*,—literally, "born of putridity."

Causes.—Dr. William Budd has urged with great force that the poison of typhoid fever, instead of originating in decomposing sewage, is merely transmitted by it, being derived from the infectious stools of an individual affected with fever. The contagious matter cast off by the intestine may communicate the fever to other persons in two principal ways, either by contaminating drinking water, or by infecting the air. But in opposition to this hypothesis, Dr. Murchison states that,—(1) There are many facts which show that enteric fever often arises from bad drainage, independently of any transmission from the sick. The danger ensues when the drain becomes choked up, when the sewage stagnates and ferments, and when the transmission of a poison from any distant locality is impeded, if not completely arrested. (2) There are numerous instances of enteric fever appearing in houses having no communication by drains with any other dwelling: *e. g.* isolated country houses. (3) There is no evidence that the stools of enteric fever are of such a virulent nature as has been stated. The attendants on the sick are rarely attacked. Pigs suffer from enteric fever; yet a pig fed for six weeks on the excreta of typhoid fever patients, got very fat and continued well. (4) The fact that the prevalence of the disease is influenced by temperature is opposed to the idea that it depends on a specific poison derived from the sick; but is readily accounted for on the supposition that the poison is generated by fermentation or decomposition.*

Allowing therefore that the disease is generated spontaneously by the

* "On the Causes of Continued Fevers." London Medical Review, p. 505.—April, 1863.

decomposition of fæcal matter, we should expect to find it most prevalent after the long heat of summer. Hence it is most prevalent during the autumn and early winter, subsiding as great cold sets in. As it is not dependent on overcrowding, so the rich and poor suffer equally from it; but it is most common in youth and adolescence. Enteric fever proved fatal to Prince Albert, on the twenty-first day from the time of seizure, on the 14th December, 1861. The disease may be carried by the infected into healthy localities; but it is much less contagious than typhus or relapsing fever. The infantile remittent fever of England is a modified form of enteric fever.

Symptoms.—The attack may occur immediately on exposure to the poison, especially where the latter is concentrated, with vomiting and purging; so that such cases have sometimes given rise to a suspicion of poisoning. In most instances, however, there is a period of incubation; which, according to Dr. W. Budd, varies from ten to fourteen days. Then the disease usually sets in slowly and insidiously; so that the sufferer feels languid and uneasy without being exactly able to define the nature of his sensations. In a day or two, however, he has chills, headache, intolerance of light, thirst, complete loss of appetite, and pains in his limbs; followed by a sense of weakness, a quick soft pulse, a tendency to sickness and diarrhœa, more or less wakefulness, and a disinclination to sit up. At night there is great heat of skin and restlessness; while the bed is hot and uncomfortable, change of posture gives no relief, and the patient is tormented by a fierce thirst which nothing seems able to assuage. The expression of the countenance now gets altered; being either very languid and pale, or marked with a circumscribed flush on each cheek, and sunken eyes. The urine is diminished in quantity, highly colored, and acid; with an increased amount of urea and uric acid, while the chloride of sodium is lessened perhaps to a trace. In severe cases the pulse rises above 120, and gets feeble and irregular; the respiration is rather hurried, and the breath offensive—perhaps ammoniacal; the lips become parched and cracked, and the tongue dry and brown or red and glazed; there is great depression; and some abdominal tenderness.

These symptoms slowly become aggravated; until at the commencement of the second week the characteristic eruption generally begins to show itself on the chest or abdomen, in the shape of rose-colored dots. These spots hardly exceed a line in diameter, they are few in number, are circular, disappear temporarily on pressure, and fade away in two or three days, to be replaced by a fresh crop; this latter going through the same course, and so on again and again until the end of the fever. They are seldom accompanied by true petechiæ. Although the rose-colored rash is never met with in any other cases, yet it is certain that typhoid fever may sometimes run its career without our being able to discover a single spot. Dr. Tweedie thinks that in ten or twelve per cent. the rash may be absent. Occasionally sudamina also appear on the neck, chest, abdomen, or inguinal regions, about the end of the second week; while the skin is very warm, and at times covered with sweat.

Amongst the other symptoms which may be present after the middle of the second week, we frequently have somnolence, followed by delirium, at first slight, but soon getting violent; spasmodic contractions of many of the muscles, and hiccup; tinnitus aurium, or deafness; mus-

cular pains with debility; bed-sores on the sacrum; increasing, and often extreme, loss of flesh and strength; dilatation of the pupils, unless there be great stupor, when they are contracted as in typhus; and occasional attacks of epistaxis. The belly is also enlarged, and resonant on percussion; while careful pressure in the right iliac fossa often produces pain and causes gurgling. At a later stage, meteorism or tympanitis, from the accumulation of air in the colon, may give rise to much distress, and require to be relieved by the passage of a long stomach-pump tube. There is sometimes nausea and sickness, but almost always diarrhœa; which generally increases towards the end of the second week, so that there may then be eight or ten stools a day, some of them containing blood. These stools are remarkable in being alkaline (instead of acid, as healthy ones are), of a putrid character, and for containing a large quantity of ammoniaco-magnesian phosphates. Occasionally we have also serious attacks of hemorrhage from the ulcerated patches in the ileum and cæcum; one of which losses may either produce fatal syncope, or so depress the patient that he has no power left to bear up against the continuance of the disease. Another danger to be feared is the extension of the ulceration till the coats of the bowel are perforated; an occurrence which may take place and cause fatal peritonitis at an advanced stage of the fever, or even just as we hope that convalescence is setting in. This chance of rupture must also be remembered by the physician in examining the abdomen by palpation; while it ought certainly to forbid the employment of purgatives after the lapse of the first two or three days from the setting-in of the disease. The symptoms of intestinal perforation are well and curtly laid down by Louis, who says that "if in the course of a severe or slight typhoid affection, or even under unexpected circumstances, the disease having been latent to that moment, there supervene suddenly, in a patient with diarrhœa, abdominal pain aggravated on pressure, altered expression of the features, and more or less quickly nausea and vomiting, there must be perforation of the small intestine."

There are other perils, too, which jeopardize the patient's safety. Thus, as in typhus, we may have some cerebral complication; or congestion of the kidneys, impeding the elimination of urea; or a pulmonary affection may set in, such as bronchial catarrh, pleurisy with effusion, and pneumonia. So, too, the disease may destroy life from the simple exhaustion which it induces, though this occurrence is rare. When this fever occurs during advanced pregnancy, abortion, followed by death, mostly takes place. Typhoid fever is often prolonged to the thirtieth day, and in some instances is followed by a relapse. During convalescence—as happens also after relapsing fever—a venous murmur in the neck may not unfrequently be heard; while on auscultating the heart an inorganic systolic bruit can often be detected, having the soft blowing character generally observed in anæmic murmurs. Dr. Stokes states, that it usually disappears or diminishes on the patient assuming the erect position; while it is quickly cured when tonics and suitable nourishment can be borne.

Morbid Anatomy.—It is only necessary to allude, under this head, to those alterations which are found in the ileum, probably as the *result* of the fever poison; since they constitute the true pathological peculiarities of typhoid fever. We may find, it is true, congestion of

the brain or its membranes, or ulceration of the œsophagus, or softening or ulceration of the mucous membrane of the stomach, or enlargement and softening of the spleen, but these changes are in no way to be regarded as essential elements of pythogenic fever.—The two lesions which may be said to be invariably present, are certain changes in Peyer's patches, and in the corresponding glands of the mesentery. The *alterations in the agminated glands or Peyer's patches* are the most marked in the groups of glands which are nearest the ileo-cæcal valve. If the case has terminated fatally at an early stage, we may merely detect a swollen condition of the mucous membrane over the diseased patch; or we may, perhaps, find the typhoid deposit more or less copiously effused into the solitary glands, as well as into the tissue of Peyer's patches. But death generally happens at a later period—towards the end of the third week—and then we find that the patches have undergone ulceration; the fever product having been transformed into a brownish slough, which has become detached, and has left a cavity or ulcer of a size varying from a pea to a florin. Perhaps one or more of these ulcers, instead of cicatrizing, may have been the immediate cause of death; owing to their extension until perforation has happened and allowed the escape of the intestinal contents into the peritoneum. The *mesenteric glands* in the neighborhood of the patches are very generally enlarged and softened; and occasionally they have been seen in this condition when the intestinal lesion has only been very slight.

Treatment.—The prevention of this disease is to be accomplished by good drainage. If an old cesspool be found in or under any house, the inhabitants of the latter should leave while the contents of the privy are being carted away. Water contaminated by leakage from a sewer is poisonous. To guard against the transmission of the fever, the patient's excreta should be passed into a bed-pan containing Condy's Fluid (F. 74).

The curative measures are in most respects the same as those required in typhus; but there are two or three exceptional points which require notice. When the disease is seen at its commencement emetics do good; and we may prescribe an ounce of ipecacuanha wine every eighteen or twenty-four hours for the first three days. Aperients, however, should seldom be given, as the bowels will most probably act spontaneously; but if they do not do so, a simple enema may be administered.

With regard to the intestinal irritation and diarrhœa, no remedies are so useful as astringents combined with opium; which may be administered by the mouth or rectum (F. 96, 97, 100, 105, 106, 107, and 113). If there be hemorrhage from the bowels, we must carefully apply cold over the abdomen, and administer gallic acid with opium (F. 103). In such instances the patient ought to be assiduously watched by his medical attendant, while wine or brandy is to be administered in exact proportion to the demand for stimulants by the system. The skill of the physician is shown by his commencing the remedy at the proper time, and administering it to the requisite amount; but this power can only be acquired by assiduous study at the bedside.

During convalescence greater care will be required than after other forms of continued fever; since any irritation applied to a cicatrizing

ulcer in the ileum will possibly affect it unfavorably, and re-excite that morbid action which may end in perforation. Tonics are to be carefully given; none being more suitable in the commencement than some preparation of bark: The return to a generous diet must be very gradual, no solid food being allowed until the tongue has become clean and moist, the pulse soft, and till all feverish excitement has vanished; until which time, also, the patient should neither be allowed to leave his bed, nor even to sit up much in it.

4. Relapsing, or Famine Fever.—The name of *relapsing* or *recurrent fever* has been bestowed upon this infectious disease, owing to the fact that at a certain period of the convalescence there is a relapse of all the symptoms. Epidemics of it have been recognized, during seasons of famine and destitution, since 1739; and have been described under the various names of *five-day fever*, *seven-day fever*, *bilious remittent fever*, *mild yellow fever*, *synocha*, *Irish famine fever*, and *typhinia* (Farr).

This disease is more common in Ireland and Scotland than in England. In the latter country, the Irish poor are the chief sufferers from it. All ages are attacked. The poison may remain latent in the system for from two to four days, or its effects may be manifested immediately. It is less infectious than typhus; but one seizure does not insure immunity from a subsequent attack.

The *symptoms* commence abruptly with rigors, frontal headache, and muscular pains; while soon febrile reaction sets in, and we find great heat of skin, anxiety of countenance, intolerance of light and sound, a white tongue, and a full rapid pulse. Complaint is made of urgent thirst; and often there is pain at the epigastrium, with vomiting of a bitter bilious fluid. In some cases there is a great desire for food, but usually the appetite fails. When night comes on the symptoms become aggravated, giving rise to much irritability with sleeplessness, and sometimes to delirium. As the disorder advances there is also constipation, scanty high-colored urine, sometimes jaundice, and increasing prostration; though there is never any characteristic eruption. True petechiæ and spots of purpura may form, as may also sudamina at the period of crisis. The pulse is rapid (perhaps 140 in the minute), the pains in the back and limbs are severe, and there is much distress and restlessness; but just as matters seem to be assuming a very threatening aspect, on about the fifth or seventh day, a profuse perspiration breaks out over the whole body, the fever disappears, the pulse falls to its normal standard, the appetite returns, the urine increases in quantity, and the patient is left almost free from the disease, though weak. The convalescent, of course, fancies that his troubles are over, and that tonics and nourishment will soon restore him; but the apyretic interval is short, for about the fourteenth day from the commencement of the disorder, or the seventh from the critical sweating, there is an abrupt relapse with a repetition of all the symptoms. Generally about the third or fourth day perspiration again sets in, and for a second time is followed by complete relief; the return to perfect health, however, being somewhat slow, especially in the aged and such as were previously in a bad condition. Moreover, it is very rare that a second or third relapse takes place.

Troublesome sequelæ sometimes greatly retard recovery; such as muscular weakness, rheumatic pains in the limbs and joints, œdema of the legs and feet, boils, or ophthalmia. When relapsing fever occurs in pregnant women it has a greater tendency than many acute disorders to cause abortion or premature labor. The disease is seldom fatal; but sometimes death takes place during the progress of the fever from sudden syncope, and occasionally more slowly from uræmic poisoning. No special lesion can be detected upon making a post-mortem examination; but often the liver is discovered to be enlarged from congestion, and still more frequently the spleen is found considerably increased in size.

The *treatment* is very simple. Gentle aperients will at first be required; while afterwards we should order refrigerating drinks, a farinaceous diet, and perfect repose. Where there is much irritability and pain opiates are useful; and if the prostration be great, wine and nourishment will be needed. Sponging the body twice or thrice in the twenty-hours, with vinegar and water, or tepid water, does good. The jaundice is best treated with the nitro-hydrochloric acid (F. 378). The headache may sometimes be relieved by dry cupping to the nape of the neck, by frequently repeated doses of nitrate of potash—which also keeps up the action of the kidneys, and by allowing the patient to drink freely of tea or coffee. Quinine has been frequently given in the hope of preventing the relapse; but neither this drug, nor any other, appears to have exerted a beneficial influence in this respect.

II. INTERMITTENT FEVER, OR AGUE.

Intermittent, or *Paludal* (*Palus*, a fen or marsh), or *Periodic Fever*, or *Ague*, may be defined as a disease chiefly due to marshy miasms; in which the febrile phenomena occur in paroxysms, are ushered in by rigors, and end in a critical sweat. During the remission there is good health; but at the end of a definite interval the phenomena are repeated, and this happens again and again until a cure is effected.—In England, in 1862, the deaths of 72 males and 78 females were registered as due to ague and its complications.*

* Two hundred years ago, when the soil round London was neither drained nor cultivated, and when the marshes of Cambridgeshire and Lincolnshire were covered during some months of every year by immense clouds of cranes (Macaulay), ague was a most fatal disease in England. The tertian form was the cause of death to James I., in London, in March, 1625. When told by his courtiers that "An ague in the spring is physic for a king," James answered that the proverb only applied to a *young* king. Oliver Cromwell died from it at Somerset House, in 1658, after disregarding the advice of his physicians. "I tell you," he cried, with characteristic confidence, to the latter,—"I tell you, I shall not die of this distemper: I am well assured of my recovery. It is promised by the Lord, not only to my supplications, but to those of men who hold a stricter commerce and more intimate correspondence with Him. Ye may have skill in your profession; but nature can do more than all the physicians in the world, and God is far above nature." (Hume.)

The minute description given by Robinson Crusoe of his attack of ague has excited every boy. Defoe must have narrowly watched this disease, even if he had no experience of it in his own person. The latter supposition is not improbable; for the fen district in Suffolk was of large extent when he retired to this country, in August, 1704, on his liberation from Newgate. Robinson Crusoe was not published until 1719.

Varieties.—There are three species of intermittent fever or ague, viz., *Quotidian*, *Tertian*, and *Quartan Ague:* of which the tertian is the most common in this country, and the quotidian in India. When the paroxysm occurs at the same hour every day, it is called quotidian ague; when every other day, tertian, though secundan would be more appropriate; and when it is absent for two whole days, and then recurs, quartan. In the first species the interval is twenty-four hours; in the second, forty-eight; in the third, seventy-two. The time between the commencement of one paroxysm and the beginning of the next is termed the *interval;* that between the termination of one paroxysm and the commencement of the next, the *intermission.* In quotidians the paroxysm occurs, for the most part, in the morning; in tertians, at noon; in quartans, in the afternoon. The first is most common in the spring; the second, in the spring and autumn; the third, in the autumn.

A peculiar form of intermittent fever, which affects brass-founders and other workmen exposed to the fumes of deflagrating zinc, has been noticed by Mr. Thackrah and more fully described by Dr. Greenhow. All that Mr. Thackrah says, is this: "The brass-melters of Birmingham state their liability also to an intermittent fever, which they term the brass-ague, and which attacks them from once a month to once a year, and leaves them in a state of great debility. As a preventive, they are in the habit of taking emetics. They are often intemperate."* Dr. Greenhow's observations show that the symptoms have some resemblance to an imperfect fit of ague; but the paroxysms occur irregularly. The attack commences with malaise, and a feeling of constriction or tightness of chest, occasionally accompanied by nausea. These phenomena always happen during the after-part of a day spent in the casting-shop; and are followed in the evening or at bedtime by shivering, sometimes succeeded by an indistinct hot stage, but always by profuse sweating. The sooner the latter follows the setting in of the cold stage, the shorter and milder is the attack and the less likely is the caster to be incapacitated for work on the following day. Headache and vomiting frequently accompany the paroxysm, which at the worst is only ephemeral; but the attacks are sometimes of frequent occurrence. Persons who have but lately adopted the calling, or who only work at it occasionally, and regular brass-founders who have been absent from work for a few days, are more liable to suffer from this disease than those who are employed at it continually. The men themselves attribute it to inhaling the fumes of deflagrating zinc or "spelter," and their opinion is probably correct. For, on the one hand, several other classes of operatives are habitually exposed while at work to conditions exactly similar to those of the brass-founders, except the liability to inhale the fumes of zinc, and yet do not suffer from this ailment; and, on the other hand, brass-founders suffer from it in almost exact proportion to their liability to inhale these fumes. A belief prevails that milk has a strong prophylactic and curative influence, and hence many of the workmen habitually drink it. The occasional use of emetics has a tendency to prevent the disease.†

* The Effects of Arts, Trades, and Professions, and of Civic States and Habits of Living, on Health and Longevity. Second Edition, p. 101. London, 1832.

† "On Brass-Founders' Ague." Transactions of the Royal Medical and Chirurgical Society, vol. xlv, p. 177. London, 1862.

Causes.—The *predisposing causes* of ague are fatigue, travelling, restlessness, exhaustion, mental depression, improper or insufficient food, intemperance, exposure to night air, and the circumstance of once having suffered from it. It is worth remembering that malarious districts are most dangerous at night, and that this poison lies low; or as Dr. Watson says, "loves the ground." Dr. Macculloch observes that it is a common remark in many parts of Italy, that as long as the laborers are in the erect posture, they incur little danger; but that the fever attacks those who sit or lie on the ground.* The *exciting cause* consists of certain emanations or invisible effluvia from the surface of the earth, known as malaria. These effluvia or miasms emanate chiefly from marshy lands; but their nature is still a mystery, for though chemists have analyzed the air of malarious districts they have not been able to detect any poisonous principle. The general belief, that malaria is produced by decomposing animal and particularly vegetable matter, is probably true; the air being more noxious where both matters are undergoing decay, than where vegetable matter alone is doing so. At all events, it is found in the tropics that malarious diseases are most common in the season succeeding the cessation of the rains; when the temperature is high; and in parts where the surrounding country abounds in dense jungle and low swamps, and where insects and reptiles are abundant.

The form of disease which arises from exposure to malaria varies possibly according to the constitutional predisposition of the individual: that which will produce ague in one person, giving rise to remittent fever or to dysentery in another. So again when the poison has been imbibed, it may remain latent in the system for some weeks or even months; a point necessary to remember in the diagnosis of obscure cases where the ague-fit is not well developed.

Symptoms.—The disease may set in suddenly; or the symptoms may come on gradually with a feeling of general indisposition, which at the end of a few days culminate in a regular paroxysm. An ague-fit is composed of three stages—the cold, hot, and sweating. The *cold* stage is ushered in with feelings of languor and chilliness; though the heat of the body, as ascertained by a thermometer in the axilla, is really increased, and gradually rises through this and the succeeding period. Then sensations as of streams of cold water running down the back are complained of, with shivering, the skin is shrivelled and the papillæ rendered prominent—goose skin or cutis anserina—from the contraction of microscopical muscles called the arrectores pilorum; while the teeth chatter, the nails turn blue, and the whole frame is shaken. There is exhaustion; often urgent thirst; the countenance appears anxious, the features shrunk and pale, and the eyes dull and hollow; the pulse is quickened; the respiration hurried and oppressed; and there is a peculiar mental irritability. The duration of this stage varies from half an hour to three or four hours, and is gradually succeeded by the *hot* stage, which is one of reaction. The surface of the body then becomes dry and intensely hot, the temperature being raised considerably above the natural standard, for Dr. Mackintosh says that he has known it to be as high as 110° F. in Great Britain; the mouth is

* An Essay on Malaria, &c., p. 268. London, 1827.

parched; there is excessive thirst; frequent bounding pulse, with a painful sense of fulness in the head, and great restlessness, general uneasiness, with sometimes delirium. This condition continues rarely less than three or more than twelve hours, and then follows the *sweating* stage; commencing with a gentle moisture, which appears first on the forehead and breast, increases, and gradually extends over the whole body. The pulse and breathing now become natural; the headache, heat of skin, and thirst abate; and all the distressing symptoms are relieved, so that the patient, if the case be recent, often feels in perfect health. Occasionally, however, and especially in tropical climates this stage ends in great exhaustion; so that the free use of alcohol is required to prevent fatal collapse.

The water, urea, and chloride of sodium of the urine are all increased during the cold and hot stages; the quantity of each of these constituents diminishing as the sweating sets in. The urine occasionally contains albumen and renal casts during the fit.

Effects.—Disease of the *spleen* is a very frequent concomitant or result of intermittent fever. This gland is found enlarged, sometimes to a great extent, and occasionally indurated; in which condition it is popularly spoken of as *ague cake.* Some authors say that the spleen may be found invariably to enlarge during the cold stage; owing to the blood being driven from the surface of the body to the viscera, but especially to this organ. The enlargement subsides during the intermission, but not completely; so that after each attack the size of the gland is a little greater than it was previously. In like manner, morbid changes occur in the *liver;* giving rise to depraved secretions and disturbance of all the digestive organs, and in a few cases to permanent enlargement and induration. The *kidney* is sometimes permanently affected in consequence of ague; chronic Bright's disease resulting.

In protracted cases *complications* are not unlikely to arise; and the brain, or the lungs, or the stomach and bowels, may become the seats of inflammatory action.

Treatment.—When the patient is obliged to remain in a malarious district, the difficulty of curing ague will be very much increased. The diet should be good and nourishing, with a regulated supply of stimulants, from the first; unless there is evident derangement of the alvine secretions, and then we must commence with beef-tea, arrowroot, &c. In the cold stage, warm diluent drinks—as barley-water, weak tea, or weak negus, or white-wine whey—may be freely allowed; while the application of external warmth is to be assiduously employed, by means of warm-clothing, hot bottles to the feet, and hot-water or hot-air baths. The latter may be easily prepared by means of a long wicker-work cradle, closed at one end by a board. This is laid over the patient and covered with blankets: a curved tin tube is then passed through a hole in the centre of the board, the other end of the tube, expanded into a bell-shape, looking downwards, and having a spirit lamp placed beneath it; and thus the air under the wicker-work soon becomes very hot. An opiate given a little before the cold stage is often beneficial. During the hot stage an opposite plan should be pursued; cooling drinks being then required, while the surface of the body is to be sponged with tepid or cold water. When the hot has subsided into the sweating stage, the action of the skin ought to be encouraged by tepid drinks.

Purgatives must always be given at the outset; none being better than four or six grains of calomel, with the same of rhubarb, followed by an aperient draught. The bowels having been thoroughly emptied, the use of one of the two specific remedies for ague—bark or arsenic—may be commenced. The best plan, as a rule, is to give two or three grains of the sulphate of quinine dissolved in the acid infusion of roses, every four or six hours, during the intermission; taking care to continue its use for some short time after an apparent cure has been effected. The subcutaneous injection of this salt (F. 379) has been recommended; and it is said that four grains so employed are equal in power to four times the quantity taken by the mouth. In Indian intermittents the exhibition, during the sweating stage, of quinine in a dose of twenty or thirty grains, instead of smaller portions frequently repeated, has been strongly advocated. These quantities are generally well borne unless there is exhaustion, when they would be dangerous; cinchonism being less readily produced in ague than in other affections. According to Ranke, quinine diminishes the quantity of uric acid in the urine.—If it be desirable, on account of its cheapness, to employ arsenic, it must be remembered that large doses will be needed (F. 52). Dr. Morehead calculates that half a grain of arsenious acid—one drachm of the liquor arsenicalis—is equivalent in power to fifteen grains of quinine; but as such a dose of arsenic can hardly be given without some risk, he has suggested that it is better to prevent the expected fit by quinine, and then trust to moderate doses of arsenic to complete the cure.—The salt of the willow bark (salicine) has been recommended as a substitute for quinine; but it is by no means as efficacious.—In cases of enlargement of the spleen, great benefit will be derived from a combination of quinine and sulphate of iron, perseveringly used (F. 380); or perhaps from the bromide of potassium (F. 42). Cod-liver oil may also be recommended.

In treating the complications, we must carefully avoid depletion. Quinine is still the remedy to trust to, the dose being large in proportion to the urgency of the symptoms. In tropical regions it sometimes happens that a patient is not seen until he is delirious or comatose; but even then an active purgative, followed by a scruple or half a drachm of quinine, may soon restore consciousness and health. If troublesome vomiting prevent the retention of the remedies, a large blister should be applied over the stomach; while an enema of quinine and infusion of coffee is administered. In malarious districts it will probably be found that good diet, warm clothing, and a due amount of repose, are much more effectual prophylactics than any preparation of bark.—When the disease threatens to become chronic, change of climate is an absolute necessity.

III. REMITTENT FEVER.

1. Remittent Fever.—The causes of remittent fever are the same as those of the disease just described; and hence we might appropriately speak of it under the designation of *miasmatic* or *paludal remittent fever*. The symptoms also bear a resemblance to those of intermittent fever; with this notable difference, however—that in the

intervals there is no cessation of the fever, but simply an abatement or diminution. The period of remission varies from six to twelve or fourteen hours; at the end of which time the feverish excitement increases, the exacerbation being often preceded by chilliness and rigors.

This form of fever varies much in severity according to the nature of the climate in which the poison is generated. The autumnal remittents of countries like England and France are comparatively mild; whereas the endemic remittents of tropical climates are often very severe and fatal. Moreover the locality where the fever prevails seems often to impress some peculiarity upon it, especially as regards the nature of the complications which arise; and hence we find remittent fever described under the names of the *Walcheren fever*, the *Mediterranean fever*, the *Jungle* or *Hill fever* of the East Indies, *Bengal fever*, the *Bilious remittent* of the West Indies, *Sierra Leone fever*, *African fever*, &c.

Symptoms.—The paroxysm of remittent fever commences usually with chilliness, languor, lassitude, mental depression, a feeling of cold down the back, and headache. To these sensations soon succeed febrile symptoms, constituting the hot stage: the prominent phenomena consisting of great heat of skin; severe headache and giddiness, often accompanied by delirium; a frequent and full pulse; a dry and furred tongue; nausea and vomiting—generally of bilious matter; sense of pain at the epigastrium, and tenderness on pressure; with signs of pulmonary congestion, such as dyspnœa, a feeling of oppression at the chest, cough, and a livid color of the countenance. The urine is often scanty, high colored, and loaded with lithates; but it is passed in increased quantities during the remissions.

The remissions usually occur in the morning, and have a duration ordinarily of ten or twelve hours. The principal exacerbation generally takes place towards the evening, and continues for the greater part of the night; though sometimes the paroxysm lasts for twenty-four, or even thirty-six hours. The disease may run on for about fourteen or fifteen days, unless shortened by proper treatment, and then terminate rather abruptly in an attack of sweating; or its symptoms may merge into those of low fever. The period of convalescence is usually short, except some organic mischief has occurred; in which case considerable time may elapse before a restoration to health is effected, the debility being kept up by night-sweats, sleeplessness, dyspepsia, hypochondriasis, neuralgia, jaundice, and even dropsy.

In tropical climates remittent fever may prove very dangerous. This arises from the general severity of the symptoms and the high degree of febrile reaction; or from a depressed condition of the vascular and nervous systems, with defective secretions; or from the sudden setting-in of great exhaustion towards the close of an exacerbation, which exhaustion has a great tendency to end in fatal collapse; or, lastly, from the disease being complicated with convulsions, or with delirium passing into drowsiness and coma, or with great gastric irritability, or with bronchitis and pneumonia, or with hepatitis and jaundice.

Treatment.—The principal indications to be followed must be the same as are demanded in the treatment of ague; if the supposition that both are due to malaria be correct. At the same time it is to be remembered that, as the febrile exacerbation is of much longer duration in remittent than in intermittent fever, so there is a greater fear in the

first of internal organs being damaged, and ultimately of more severe depression ensuing. Our object will therefore be to shorten the period of the exacerbation, and lengthen that of the remission. This we attempt to do by saline and effervescing draughts (F. 348, 349, 354); cold drinks, such as water, lemonade, cold tea, cream of tartar, &c. (F. 356, 360); an aperient (F. 139, 140, 144) if the bowels are confined; an emetic of ipecacuan (one scruple of the powder, or an ounce of the wine) if there be nausea without vomiting; and frequent tepid sponging (F. 138) of the whole surface of the body. Immediately remission takes place a dose of quinine, varying from two to six grains, should be exhibited, and repeated every third or fourth hour; taking care to omit this remedy directly the hot stage again sets in. At the next remission we again resort to the bark, and so on until it seems certain that the febrile phenomena have permanently disappeared.—If the bowels are sluggish, one or two of the doses of quinine may be combined with one hundred and twenty grains of sulphate of magnesia; or, in the event of the stomach being irritable, with an effervescing draught; or, if there be diarrhœa or restlessness, with half a grain of morphia.

In tropical climates the complications of remittent fever must be treated very cautiously. Where there is much cerebral derangement, an active purgative, with the constant application of cold to the head, or the occasional use of cold affusion may prove very beneficial, in addition to the remedies already mentioned; while if there be great drowsiness during the remission, a blister should be applied to the nape of the neck. On the contrary, the low delirium with drowsiness from exhaustion demands the free use of stimulants and nourishment. When the stomach is irritable, or when there is jaundice, the application of a few leeches or of a blister to the epigastrium will give relief; while we may allow ice to be freely taken. In all cases quinine is to be given during the intermissions. Bleeding has been recommended by some authorities when there are symptoms of cerebral or abdominal oppression; but although the views as to its value are very contradictory, yet depletion would seem only to give temporary relief, while subsequently it produces alarming depression. And lastly, where there seems any reason to fear the occurrence of any permanent structural disease, the patient must be sent to a temperate region, free from malaria.

2. Yellow, or Hæmogastric Fever.—This remarkable disease is due to malaria. Its prominent characters are,—great headache, yellowness of the skin, and black vomit. From this latter symptom the term *hæmogastric* fever has been applied (*Αἷμα*, blood; and *γαστὴρ*, the stomach). There are exacerbations and remissions, but they are so connected that the disease resembles a continued fever.

Yellow fever is a disease of warm climates; an average temperature for some weeks of at least 72° Fahr. being necessary for its production. It is not of infrequent occurrence in cities on the borders of low marshy plains, as well as in the sea-port towns of the West Indies, Africa, the southern parts of Spain, and some parts of America. Yellow fever has been described under the various names of *Bulam Fever*, *Mal de Siam*, *Typhus Icterodes*, &c. It occurs, like all other fevers, in different degrees of severity. At one time it attacks only a few individuals sporadically, at another period it prevails epidemically; its outbreaks

are generally preceded by some unusual meteorological conditions; and it is still a matter of dispute whether it be infectious or not, though the balance of evidence is greatly in favor of its being so.

The striking *symptoms* of this peculiar disorder, in addition to the general pyrexia, are the suddenness with which the attacks come on—often in the middle of the night; the peculiar lemon yellowness of the skin; the loaded tongue, deep-red at the tip and edges; the anxiety of countenance, with the dirty and often livid hue of the face; the severe headache—referred to the forehead and bottom of the orbit; the pain in the back and loins, as well as in the calves of the legs; the mental and bodily prostration; and the great irritability of the stomach, with forcible eructations and pain about the epigastrium. The matters vomited are at first white, slimy, and tasteless; but soon they may assume the appearance of coffee-grounds, owing to blood being effused into the stomach, where it is acted upon by the acid contents of this viscus. This forms the *black vomit*. Then, the dejections generally have a tarry appearance, from admixture with blood; while there may also be hemorrhage from the nose, gums, and bronchi. There is sometimes more or less complete suppression of urine; or this secretion may be smoky-looking, and loaded with albumen and casts of tubes. A copious and natural renal secretion is the most favorable sign. The fever in women always causes the catamenia to appear—or at all events produces uterine or vaginal hemorrhage—even if the normal menstrual period has only just ceased.

The usual duration of the fever is from three to five or even seven days; though in some severe cases the patient is at once "knocked down" by the poison, and dies in a state of collapse at the end of a few hours. When the sixth day elapses without the occurrence of black vomit or suppression of urine, there is great hope of recovery; but if all other symptoms are absent, and only one of these present, our prognosis must be very unfavorable. The occurrence of black, watery, shreddy stools, is also indicative of great danger. The mortality seems to be at least 1 in 3. At Lisbon, in 1857, the fatal cases in the unhealthy quarters of the city were nearly forty-three per cent. But occasionally epidemics of a much milder character have occurred in the West Indies and America. Death usually occurs from exhaustion, or uræmia, or apoplexy.

The special poison of yellow fever appears particularly to affect the liver; and Professor A. Clark, of New York, has suggested that the change so constantly observed in this organ, in fatal cases, is an acute fatty degeneration. Dr. La Roche confirms this opinion; for he says that in all the examinations made during the epidemic of 1853 at the Pennsylvania Hospital, this change in the liver was discovered.*

The indications for *treatment* are not very prominent. Hence it will be better to follow Dr. La Roche's advice, and treat the urgent symptoms as they present themselves; leaving the rest to the reparative powers of the system. Removal from the infected locality is not only a valuable prophylactic measure, but where it can be had recourse to in affected cases, the change is often followed by amelioration of the symp-

* Yellow Fever considered in its Historical, Pathological, Etiological, and Therapeutical Relations, vol. i, p. 404. Philadelphia, 1855.

toms. Nothing so soon and so thoroughly arrests yellow fever on board ship, as running into a cold latitude. The diet must be very simple; consisting of barley water, arrowroot, broth, brandy-and-water, &c. Purgatives are at first almost universally employed; being sometimes combined with large doses of quinine. Bark or quinine can also be administered after the bowels have acted; or the tincture of perchloride of iron with a mineral acid may be tried, or the nitro-hydrochloric acid, well diluted. Morphia (not more than gr. ¼) may be given once in the twenty-four hours, if there is pain or restlessness, provided the urine be copious and free from albumen. Turpentine, by its action on the skin and kidneys, is thought useful by many observers: if tried it should be administered in small doses—mv xx to 1 fl. dr., frequently repeated, almost from the commencement of the attack. The prolonged use of the warm bath, or wrapping the patient in the wet sheet, may occasionally be advisable. Blisters or sinapisms to the nucha, calves of the legs, &c., are recommended to relieve headache and pain; as well as to stimulate the system in cases of collapse. Cold applications to the head are useful. M. Guyon states that the intense cephalalgia may be relieved by compressing the temporal arteries; which can be done effectually with a semicircular curved band of steel, having a pad at each end like that of a common truss.

A word or two of caution is necessary as to the selection of stimulants. And, in the first place, we should carefully avoid giving ammonia; for Dr. Blair particularly notices the ammoniacal state of the blood, breath, and vomited matters. In some cases, this observer says that the blood was found as fluid as port wine, the corpuscles being all dissolved; while it was strongly ammoniacal.—Secondly, alcoholic stimulants may prove very injurious where the action of the kidneys is embarrassed. The congestion of these organs will be increased; death probably following from suppression of urine, though the patient be drenched with brandy.

About the year 1448, when Venice was the great emporium of Eastern trade, quarantine regulations appear to have been first promulgated. Since then, they have prevailed in most countries. At the present day, able men have advocated their abolition on the grounds that, while they are injurious to commerce and very vexatious to travellers, they do not prevent the spread of epidemic disease. For it has been shown that yellow fever is local or endemic in its origin; while there is no evidence that it has ever been imported. In fact many epidemics have been stayed by removing the sick from the infected locality, and dispersing them through healthy districts. It has, however, been pointed out, that "besides the common external localizing causes, there is one constitutional predisposing cause of paramount importance, namely, non-acclimatization—that is, the state of the system produced by residence in a cold climate; in other words, European blood exposed to the action of tropical heat; the practical lesson being that the utmost care should be taken to prevent individuals or bodies of men, recently arrived within the yellow fever zone, from going into a district in which the disease actually exists or has recently been present."* It may be hoped from all the foregoing that the day is not very distant when sanitary works will be substituted for quarantine restrictions.

* Second Report on Quarantine. General Board of Health, p. 135. London, 1852.

IV. ERUPTIVE FEVERS.

The eruptive fevers may be regarded as continued fevers having an eruption superadded. The chief are—*small-pox*, *cow-pox*, *chicken-pox*, *measles*, and *scarlet fever;* to which it is convenient to add *erysipelas* and *plague*.

The principal diseases of this class have these common characters: A variable amount of time elapses between the reception of the poison and the setting-in of the symptoms, called the period of incubation; they are preceded by rigors, and are accompanied by a fever which runs a defined course; they are attended by an eruption, which goes through a regular series of changes; they for the most part affect every individual once, and once only, during life; and they arise from specific contagion. Of all the eruptive fevers scarlatina is probably that which most frequently affects the system a second time.

The mortality from these fevers in England, in different years, varies considerably. To exhibit the contrast, as well as to show how each year is distinguished by the occurrence of some one or two master epidemics, the deaths from seven of the principal zymotic (*Ζυμόω*, to ferment) diseases may be thus arranged:

	1858.	1859.	1860.	1861.	1862.
Estimated Population, ...	19,471,291	19,686,701	19,902,713	20,119,314	20,336,467
Deaths from all Causes, . . .	449,656	440,781	422,721	435,114	436,566
Measles, ...	9,271	9,548	9,557	9,055	9,800
Scarlet Fever, ...	30,317	19,907	9,681	9,077	14,834
Small-pox, ...	6,460	3,848	2,749	1,320	1,628
Continued Fever, ...	17,883	15,877	13,012	15,440	18,721
Diphtheria, ...	4,836	9,587	5,212	4,517	4,903
Hooping-cough, ...	11,648	8,976	8,555	12,309	12,272
Croup, ...	6,220	5,636	4,380	4,397	5,667

The following table shows the period of incubation, together with the date of eruption and time of its disappearance, in the three chief eruptive fevers:

Disease.	Period of Incubation.	Eruption appears.	Eruption fades.
Measles, . . .	10 to 14 days.	On 4th day of fever.	On 7th day of fever.
Scarlet Fever, .	4 to 6 days.	On 2d day of fever.	On 5th day of fever.
Small-pox, . .	12 days.	On 3d day of fever.	Scabs form on 9th or 10th day of fever, and fall off about the 14th.

It is doubtful whether the features of a disease should be sketched, which presents many of the characters of measles and scarlet fever conjoined; and which has been described as *Rubeola* or *Rötheln*, or *Scarlatina morbillosa* or a *Hybrid of Measles* and *Scarlet fever*. I think, however, any special description unnecessary, because we know that measles and scarlatina may exist in the body at the same time;

and hence the affection will merely be a compound of the two. As, however, the scarlatinal symptoms generally preponderate, rubeola should be treated according to the rules laid down in the section on Scarlet Fever. Care is particularly to be taken to maintain the functions of the skin; while it may be remembered that the use of colchicum has been strongly recommended.

It is necessary further to mention that measles may coexist with small-pox, or hooping-cough, or chicken-pox, &c., as Mr. Marson has well shown.*

1. Variola, or Small-pox.—This affection is the most remarkable of the eruptive fevers. It is due to the reception into the blood of a specific poison, which begins to give indications of its power about twelve days after its absorption. In its entire course each case of variola (from *Varius*, spotted) goes through four stages—that of incubation, of primary fever, of eruption, and of secondary fever.

Small-pox may be defined as a continued fever; which, after a period of latency or incubation, commences with lassitude, headache, vomiting, and well-marked muscular pains in the back. These symptoms are succeeded on the third day by an eruption of small red pimples, which in the course of a week inflame and suppurate. In many instances the disorder is accompanied by a similar affection of the mucous membrane of the nose and mouth; in some, by swelling and inflammation of the subjacent areolar tissue; and occasionally by marked irritation of the nervous system. When the vomiting and pain of the back are violent, they are generally the precursors of a severe form of the disease.

The peculiar eruption of pimples or papulæ always begins to show itself on the third day of the fever. It appears in the following order —first, on the face, the neck, and wrists; secondly, on the trunk; and lastly, on the lower extremities. The papulæ then gradually ripen into pustules, the suppuration being complete by the ninth day; at which time the pustules break, and crusts or scabs form. In four or five days more these scabs are falling off.

Now the severity of the disease almost always bears a direct relation to the quantity of the eruption. When the pustules are few, they remain distinct and separate from each other; when very numerous, they run together, coalesce, and lose their regularly circumscribed circular form. We thus have a division of small-pox into two varieties—variola *discreta*, and variola *confluens*. The former is seldom attended with danger; the latter is never free from it. The eruption on the face may be of the confluent form, while it is scanty elsewhere; still the disease is of the confluent kind. Sometimes the pustules are so numerous that they touch each other, but nevertheless do not coalesce; the disease has then been said to be of the *cohering* or *semiconfluent* form.

In *variola discreta*, the eruption, in the words of Willan, is papular. On the third day a small vesicle, with a central depression, appears on each papula, containing some thin transparent lymph; around this an inflamed areola forms. About the fifth day of the eruption, or the eighth of the disease, the vesicles lose their central depression, become turgid, and hemispheroidal. Suppuration has occurred, and the vesi-

* Medico-Chirurgical Transactions, vol. xxx, p. 129. London, 1847.

cles have become pustules containing yellowish matter. A peculiar disagreeable odor now begins to emanate from the patient, which once smelt cannot be forgotten; so that from it alone the disease may be diagnosed. About the eighth or ninth day a dark spot appears on the top of each pustule, the cuticle bursts, the matter oozes out, and the pustule dries into a scab. In some ten days more the crusts fall off, leaving a purplish red stain, which slowly fades; or where the pustule has gone so deep as to destroy a portion of the true skin, that permanent disfigurement—the so-called pitting or pock-mark—results.

Variola confluens is usually ushered in by more violent fever than is the distinct variety. The eruption comes out earlier; the eyelids swell, so that by the fifth day the patient is often unable to see; the tonsils and parotid glands become affected; there is salivation also, or in children a vicarious diarrhœa; and the limbs swell. The urine is diminished in quantity, while the urea and uric acid are increased; and sometimes there is albumen for a few days, or even blood with renal casts. The vesicles on the face run together into one bleb, containing a thin brownish ichor; the face is also pale and doughy. The vesicles on the trunk and extremities, though often not confluent, have no areola and are pale. On the breaking of the pustules, large brown or black scabs are formed, exhaling great fœtor; while the pulse gets rapid, great debility sets in, and there is much restlessness. The mucous membranes become involved; those of the nose, mouth, larynx, and trachea being the seat of an eruption. The tongue and palate become covered with vesicles; the throat is very sore, there is difficulty of swallowing, hoarseness, dyspnœa, and cough; while the glottis often becomes narrowed, and suffocation perhaps ensues. Delirium frequently occurs. When to the foregoing symptoms malignancy and putrescency are added, the disease becomes *malignant small-pox.*

But the greatest difference between the distinct and confluent forms of the disease is in the *secondary fever;* which, slightly marked in the first, is intense and perilous in the second. It sets in usually about the eleventh day of the disease, or the eighth of the eruption, and occasionally at once proves fatal; the system appearing to be overwhelmed by the virulence of the seizure. During its course, various troublesome complications may arise; such as erysipelas, swelling of the glands in the groin and axilla, abscesses, pyæmia, phlebitis, pneumonia, ulceration through the cornea, suppuration of the ear, &c. Hence if the patient escape with his life, he may find himself permanently afflicted with blindness, deafness, or lameness.

There is no contagion so powerful or so certain as that of small-pox. One attack exhausts the susceptibility of the system to the future influence of the poison, as a general rule. This law is subject to very few exceptions, many of the recorded cases of recurrent small-pox not bearing a rigid investigation. It is sure to lead to error if the statements of patients on this head be trusted to. A great sensation was created in 1774, in France, by the death of Louis XV from variola at the age of 64; it being generally believed that he had gone through the disease when he was 14 years old. From a careful inquiry, however, Dr. Gregory convinced himself that his Majesty never had small-pox in early life at all, but only varicella. The Small-pox Hospital was founded in 1746; and Mr. Marson informs me (June, 1864) that no in-

stance has occurred of a patient being twice admitted, each time with variola. Nevertheless it must not be thought that recurrent attacks never take place. I only wish to show that they are very uncommon. One gentleman, according to Dr. Gregory, said that he had met with between eighty and ninety examples in his own practice. This was clearly impossible. Even Dr. Jenner may have been mistaken in his allusion to "the lady of Mr. Gwinnett, who has had the small-pox *five* times."* But the most incredible case recorded is that of a surgeon of the South Gloucester Militia, who—according to Dr. Baron—was so susceptible, that he took small-pox every time he attended a patient suffering from this disease.†

Variola occurring in persons unprotected by inoculation or vaccination is fatal on the average to one in every three; whilst in those attacked after efficient vaccination the mortality is very small—perhaps only two or three per cent. The calculation has been made by the Registrar-General that the average number of deaths annually from small-pox, in London, during the years 1660–1679, were 357 to every 100,000 inhabitants; whereas in 1859 they were 42 for the same proportion.—When the variolous matter is introduced into the skin by a few scratches—*inoculated small-pox*—the disease is in all respects of a remarkably mild nature. The practice of inoculation, introduced into this country by Lady Mary Wortley Montague, is now illegal.‡

* The Life of Edward Jenner, M.D., &c. By John Baron, M.D., vol. ii, p. 265. London, 1838.

† Quoted from Dr. W. Aitken's Science and Practice of Medicine. Second Edition, vol. i, p. 246. London, 1863.

‡ When and where inoculation originated is unknown. From time immemorial the Chinese have practised a method of "sowing or disseminating" the disease; which consists in introducing the scales of the eruption into the nostrils.—At a very remote period, in Hindostan, a tribe of Brahmins resorted to it as a religious ceremony. A small incision was made, and cotton soaked in the virus applied to the wound. Offerings were devoted to the Goddess of Spots, to invoke her aid; this divinity having first hinted at inoculation,—"the thought being much above the reach of human wisdom and foresight."—But the merit of introducing the practice into this country, from Turkey, is due to Lady Mary Wortley Montague. Writing from Adrianople, in April, 1717, she observes: "Every year thousands undergo this operation; and the French Ambassador says pleasantly, that they take the small-pox here by way of diversion, as they take the waters in other countries. There is no example of any one that has died in it: and you may believe I am very well satisfied of the safety of the experiment, since I intend to try it on my dear little son. I am patriot enough to take pains to bring this useful invention into fashion in England." (The Letters and Works of Lady Mary Wortley Montague. Third Edition, vol. i, p. 309. London, 1861.) The debt which our ancestors owed to this lady is not diminished by the fact that inoculation had been practised for very many years in South Wales, where it was known as "Buying the Small-pox;" for this circumstance only became generally recognized as Lady Montague's views engaged attention, and while she enjoyed the privilege of being the best-abused person in England.

That the effects of inoculation were most remarkable is undoubted; though even to the present day, no satisfactory explanation has been given for the mildness of the disease when thus introduced into the system. The reports of the London Small-Pox Hospital for 1797, 1798, and 1799, show that among 5964 cases of inoculated small-pox, there were only 9 deaths, or 1 in 662; and this appears to have been the average mortality. There is also much evidence to lead to the belief that infection does not spread from an inoculated patient. Mr. Holwell, who inoculated multitudes in India, during a residence of thirty years, affirmed that "it never spreads the infection, as is commonly imagined in Europe." (Quoted from Dr. Chapman's Lectures on the Eruptive Fevers, Hemorrhages and Dropsies, and on Gout and Rheumatism, p. 46. Philadelphia, 1844.)

With regard to this subject it is most interesting to notice, that a method which has proved of such value to the human race has been employed for the relief of a

The less drugs are used in the *treatment* of small-pox, the better; since they will neither shorten the disease, nor exert any favorable influence upon the eruption.* In the early stages, the patient should be kept quiet in bed, in a well-ventilated room; iodine (F. 81) or some other disinfectant being employed. His diet should consist of arrow-root, gruel, weak beef-tea, tea with milk, and ripe fruits; he should be allowed plenty of lemonade, barley-water, plain water, raspberry-vinegar and water, soda-water, or ice; and when the skin is very hot, tepid sponging will prove very refreshing, especially if its use be followed by a change of linen. Supposing that the bowels are confined, a few doses of some mild saline laxative (F. 139, 141, 155, 169, &c.) may be administered; or if there be great irritability and nervousness, a dose of opium and henbane (F. 315, 318, 325, or 340) at bedtime will do good. When the maturation of the pustules goes on tardily, good broths and stimulants—wine or ammonia—are indicated.

A decoction of the root of the Sarracenia Purpurea, or pitcher-plant, has been extensively tried, owing to the statement of Dr. Chalmers Miles, that this remedy is regarded as a specific by certain tribes of

disease in the sheep, corresponding to, but not identical with, small pox. In June, 1862, a very severe outbreak of *Variola Ovina* occurred in a farm at Allington, in Wiltshire. The epidemic spread to eight or nine other farms, and was fatal to 800 sheep. When Professor Simonds was summoned to Allington in August, after 400 cases had occurred with nearly 200 deaths on this farm alone, he resolved "as the best means of saving the rest of the flock, and of putting a definite term to the outbreak," to inoculate the whole flock. This was done; and in consequence, the disease appeared in the very mildest form in the majority of the cases.

A valuable report of experiments made under the direction of the Lords of the Privy Council, as to the influence of the vaccination of sheep in preventing sheep-pox, has been prepared (June, 1864) by Mr. Marson and Professor Simonds. They state that sheep-pox is not known to have existed in England except on three occasions—in 1710–11, 1847–50, and 1862, and that it is always the result of infection. They find that vaccination cannot be relied upon as a preventive or mitigant, as the vaccine disease in these animals is but very imperfectly developed even in the most successful cases. But they consider that inoculation is a measure which, if rightly carried out, offers considerable advantages. It gives security against a natural attack, for as a rule, sheep-pox occurs but once. It limits the period of the existence of the disease in the flock, mitigates the severity of the malady, saves the lives of many sheep which would otherwise be sacrificed, and produces comparatively but little loss of condition. It controls the extension of the disease, as one confluent natural case does more to diffuse the poison than probably fifty ordinary inoculated cases would do. Lastly, the mortality of the inoculated disease when compared with the natural, is on the average only as three per cent. in the one case, and fifty per cent. in the other.

The student who is desirous of investigating this subject more fully should refer to The Address in Medicine, by Dr. William Budd, in the British Medical Journal, p. 141, 8th August, 1863; to A Practical Treatise on Variola Ovina, by James B. Simonds, Lecturer on Cattle Pathology at the Royal Veterinary College, London, 1848; and to the report of Experiments made under Direction of the Lords of the Council as to the Vaccination of Sheep, &c. London, 1864.

* "It is a melancholy reflection, but too true, that for many hundred years the efforts of physicians were rather exerted to thwart nature, and to add to the malignancy of the disease, than to aid her in her efforts. Blisters, heating alexipharmics, large bleedings, opiates, ointments, masks, and lotions to prevent pitting, were the great measures formerly pursued, not one of which can be recommended. What think you of a prince of the blood royal of England (John, the son of Edward the Second) being treated for small-pox by being put into a bed surrounded with red hangings, covered with red blankets and a red counterpane, gargling his throat with mulberry wine, and sucking the red juice of pomegranates? Yet this was the boasted prescription of John of Gaddesden, who took no small credit to himself for bringing his royal patient safely through the disease."—Lectures on the Eruptive Fevers, p. 78, by George Gregory, M.D. London, 1843.

Indians. But while we must acknowledge ourselves indebted to Dr. Miles for the trouble he has taken in investigating the supposed properties of this plant, yet it is to be feared that he has labored in vain. It will suffice to give the experience of Mr. Marson, who employed it in fifteen severe cases at the Small-pox Hospital. They all died, as they would probably have done under any treatment. Mr. Marson remarks: "I cannot say that the Sarracenia had any effect whatever. It did not save life; it did not modify in the least the eruption; it did not influence any of the secretions; it did not increase the secretion of urine; in only one instance it seemed to act on the bowels; the seeming effect might, however, easily have been from other causes."*

In managing the *secondary fever*, the physician ought to keep the bowels gently open by mild laxatives; to administer sedatives, if needful, once or twice a day; and to support the system by a nourishing but digestible diet, such as strong beef-tea, good soup, milk or cream, the yolk of one or two eggs daily, &c. Stimulants are to be given in proportion to the weakness of the patient. Sloughy and gangrenous sores demand the liberal administration of quinine or bark and nitric acid, of light bitter ale, or of wine, or even of brandy. When there is the least fear of the occurrence of ulceration on the back or nates, the patient should be placed on a water-bed, or on one of Hooper's large water-pillows.—To relieve the intolerable itching, the pustules may be smeared with cold cream; or, with what is better, the officinal lime liniment. When the pustules have burst, some dry powder—as the oxide of zinc, or powdered starch—is often freely applied, to absorb the matter, and perhaps to prevent the pitting. For the latter purpose, moreover, the application of poultices, oils, ointments, collodion, and mercurial plasters, over the face and hands, has been recommended; the object generally being to exclude air, lessen irritation, and to keep the tissues moist.

2. Vaccinia, or Cow-Pox.—Since the discovery of the protective influence of vaccination by Jenner, towards the close of the eighteenth century, the fatality of small-pox has been very much diminished.† It is now highly probable that efficient vaccination confers a degree of immunity almost, if not quite, equal to that obtained by inoculation; while it is safer, much less disgusting, and does not tend to perpetuate a loathsome disease, as the practice of inoculation did.

When vaccination has been successfully performed on a healthy child, an elevation may be felt over the puncture on the second day, accompanied by slight redness; on the fifth, a distinct vesicle is formed, having an elevated edge and depressed centre; on the eighth, it is of a pearl color, and is distended with a clear lymph. The vesicle is composed of a number of cells, by the walls and floor of which the lymph

* British Medical Journal, p. 22. 4th July, 1863.

† Not only has the mortality from small-pox been very much lessened, but the good looks of the people have been preserved by vaccination (Vacca, a cow). "Unless the reader has scanned the long list of villainous portraits exhibited by the Hue and Cry in the old papers of the last portion of the seventeenth and first portion of the eighteenth centuries, he can form but a faint conception of the ravages committed by the small-pox upon the population. Every man seemed more or less to have been speckled with 'pockholes;' and the race must have presented one moving mass of pits and scars."—Quarterly Review, July, 1855. Article "Advertisements."

is secreted. An inflamed ring or areola then begins to form round the base of the little tumor, and to increase during the two succeeding days; about the eleventh day it fades; and the vesicle, which has now burst and acquired a brown color, gradually dries up, until by the end of the second week it has become converted into a hard, round scab. This falls off about the twenty-first day; leaving a circular, depressed, striated cicatrix, which is permanent in after-life.—According to the official instructions issued to the public vaccinators in England, four or five separate punctures or scratches are to be made, "so as to produce four or five separate good-sized vesicles." The skin over the deltoid offers a good site.—The first vaccination certainly affords protection for from seven to ten years, and perhaps for longer; but it is clearly a safe proceeding to revaccinate after this lapse of time.

The constitutional disturbance which accompanies vaccination is usually very slight. Some interesting experiments lately made by Dr. Gustav Wertheim, of Vienna, tend to show that the frequency of the pulse is permanently increased by the process of vaccination. Thus, a man, aged thirty-eight, and a woman, aged thirty-three, neither of whom had suffered from small-pox, were vaccinated for the first time; the pulse, in both cases, increased in frequency up to the sixth day after vaccination, when it began to decline; never declining—not at least for the four months during which the observations were continued—as low as it was before the introduction of the vaccine virus. For example, before vaccination, the man's pulse was on an average 66; afterwards the average was 78.

A popular belief has long existed that vaccination is occasionally the means of engrafting upon the constitution some impure disease. This opinion must no longer be ignored. As nothing is more common than to hear a mother assert in the hospital out-patient room,—"This child has never been well since he was vaccinated," so it is not surprising that a large number of the poor ignore the Act of Parliament rendering vaccination compulsory, and decline to submit their children to what they regard as a certain evil for the sake of a doubtful benefit. There can be no question that vaccination is often most carelessly and inefficiently performed. There is as little doubt but that in vaccinating we may not only introduce the cow-pox into the system, but by using a dirty lancet or foul lymph we may possibly induce that condition of blood-contamination known as pyæmia. And then, again, it is impossible to disbelieve the abundant evidence which now exists as to the fact of syphilis having been communicated by vaccination.

In 1856, Dr. Whitehead, of Manchester, wrote that he had "seen several instances of the transference of the syphilitic taint through the medium of vaccination."* This opinion, though almost unsupported at the time by the experience of others, is doubtless true. Numerous corroborative facts could be adduced, but it will probably suffice to mention one,—certainly a very startling instance. It occurred at Rivalta, a village in Piedmont, containing about two thousand inhabitants, where syphilis was said to be previously unknown. Here, on the 24th May, 1861, a child eleven months old was vaccinated with a clean lancet from lymph out of a capillary tube. It was at the time apparently healthy;

* Papers relating to the History and Practice of Vaccination, presented to the Board of Health by Mr. Simon, p. 114. London, 1857.

though it is probable that it had been infected two or three months previously with constitutional syphilis, through being suckled on a few occasions by an unhealthy woman. From this child, on the 2d June, forty-six children were vaccinated. And ten days subsequently one of these forty-six children furnished lymph for the vaccination of seventeen others. What is said to have followed has not been denied, and cannot be explained away. Within two months forty-six of the whole number of children were affected with a disease which was said to be syphilis by a commission of medical men appointed to examine the subject. Seven of the children died, the earliest death occurring three months after the vaccination. The first vaccinifer, after suffering from marasmus, alopecia, &c., recovered. The disease was also communicated by the children to twenty nurses or mothers; in three cases by the mothers to their husbands; and in three other cases by the children to their little playmates.*—The only inference which it seems possible to draw from the foregoing is this: That the lymph by which the first child was vaccinated was pure; but that the lymph taken away from it, ten days subsequently, was contaminated with syphilis. Hence, from this vaccinifer there was communicated the cow-pox, and, in a great majority of the cases, syphilis. The cow-pox appeared first and ran its natural course, because its period of incubation is only a few days. The syphilitic ulceration made its appearance on the inoculated part some time afterwards, and in due season was followed by secondary symptoms. The time of incubation in constitutional syphilis is from three to seven weeks.

But if the reader is still incredulous, and requires more confirmatory evidence, I would refer him to an admirable paper by Dr. Viennois.† This gentleman, after a full and careful investigation of the question, has come to the conclusion that if the lymph from a vaccine vesicle alone be inoculated, the cow-pox alone will be introduced; but if, in addition, the blood of a person with constitutional syphilis be also inoculated, then syphilis may likewise be communicated.

Now what is to be learnt from these observations? Are they to shake our faith in the value of vaccination? Or are they to be set aside as being very exceptional cases? I believe that neither proceeding will follow; for the facts merely prove what has long been known, that vaccination, like every other operation on the human body, demands care and skill in its performance. The evils of pyæmia and syphilis which have ensued in certain cases have been due either to the use of a foul lancet, or of lymph which from remaining too long in the vesicle had begun to decay, or from employing lymph mixed with the blood of a diseased subject. The remedies are therefore very simple. Practitioners being forewarned will be forearmed. They must (1) be careful to employ a clean lancet. (2) The subject supplying the lymph must be healthy. And (3) pure lymph should be taken, on the eighth day, *unmixed with blood or any other secretion.* Let these rules be followed, and we shall hear no more of vaccino-syphilitic inoculation.

It only remains to say that vaccine lymph may be well preserved in

* The facts are given at great length by Dr. Giacinto Pacchiotti, Professor of Clinical Surgery at Turin, in his pamphlet, entitled Sifilide trasmessa per Mezzo della Vaccinazione in Rivalta presso Acqui. Torino, 1862.

† Archives Générales de Médecine, vol. i, p. 641; vol. ii, pp. 32, 297. Paris, 1860.

hermetically sealed capillary tubes, a plan of keeping the matter, in my opinion, much to be preferred to any other. But when desired, the virus may be taken from a healthy child—arm-to-arm vaccination,—or even, if practicable, from the cow. Dairy-women are often infected from milking cows with the eruption of vaccinia on their teats.—According to the Act of Parliament—16 and 17 Victoria, cap. 100—which was passed in 1853, every infant is to be vaccinated within three calendar months from birth, unless its health renders the proceeding objectionable; or unless the father and mother are dead, or ill, or unable to attend, when a month's grace is to be granted. In July, 1855, another bill was passed—18 and 19 Victoria—making it compulsory on all adults, not protected by vaccination or an attack of small-pox, to undergo vaccination; while the time for infants was limited to three months, under all circumstances. And then, again, in March, 1856, it was finally enacted—19 Victoria—that all children born after the 1st January, 1857, should be vaccinated within four calendar months of birth. Yet with all this, it is most unsatisfactory to find that the intentions of the legislature are very imperfectly fulfilled,—so imperfectly, that according to Mr. Simon, "the public defences against small-pox are in great part insufficient and delusive."* When small-pox occurs after vaccination, as it sometimes will, the disease is much milder and shorter, and is unaccompanied by secondary fever. It is spoken of under these circumstances as *varioloid or modified small-pox.*

3. Varicella, or Chicken-Pox.—A trifling complaint almost peculiar to infants and young children; which completely runs through all its phases in six or eight days.

Varicella (the dim. of *Variola*) has some resemblance to modified small-pox; and there can be no doubt that in many of the cases which have been recorded of recurrent variola, one of the attacks has been simply chicken-pox. The disorder consists of an eruption of pimples, which on the second day become converted into transparent vesicles surrounded by slight redness. The rash commences on the shoulders and back, and afterwards affects the scalp, but often spares the face; while about the fourth day the vesicles form small scabs, which rapidly desiccate. In a very few instances permanent "pitting" may perhaps result. There is no constitutional disturbance of the least importance; and the accompanying pyrexia is slight. Dr. Gregory says that when the eruption is abundant, the body presents the appearance of having been exposed to a momentary shower of boiling water; each drop of which has caused a small blister.

Chicken-pox occurs but once to the same person; it has a short incubation, probably of four days; it is slightly infectious and contagious; and it requires no treatment beyond attention to the bowels, confinement to the bed-room, and restriction of the diet.

4. Morbilli, or Measles.—This disease may be described as a continued infectious and contagious fever; the result of the absorption of, and contamination of the blood by, a morbid poison. It is preceded by

* Fifth Report of the Medical Officer of the Privy Council, p. 6. Ordered, by the House of Commons, to be printed, 14th April, 1863.

catarrh, accompanied by a crimson rash, and often attended or followed by inflammation of the mucous membrane of the organs of respiration. Severe epidemics of morbilli* occasionally prevail. As a rule, the susceptibility to this disease is destroyed by one attack. Some authors divide measles into two grades,—the *morbilli mitiores*, and the *morbilli graviores;* but the latter only differs from the former in its greater severity, and in the fact that the eruption assumes a dark purple color.

The length of incubation—or in other words, the time which elapses between the date of infection and the appearance of the disease—is from ten to fifteen days. Dr. Watson has known several instances in which it was exactly a fortnight. Occasionally, the patient suffers from languor, cough, and a sense of discomfort, during the breeding or incubative period.

The early *symptoms* of measles are lassitude, shivering, pyrexia, and catarrh; the conjunctivæ, Schneiderian membrane, and mucous lining of the fauces, larynx, trachea, and bronchi being much affected. Very soon there is swelling of the eyelids, with eyes suffused and watery, and intolerant of light; sneezing; dry cough, hoarseness, and severe dyspnœa; drowsiness; great heat of skin; together with a frequent and hard pulse. Headache, and even pains in the back are sometimes complained of; and there may be nausea, epistaxis, diarrhœa, convulsions, &c. Occasionally albuminuria is found, or the urine may contain blood. The morbillous eruption comes out on the fourth day of the disease, seldom earlier, often later. It consists of little circular dots, like flea-bites, which gradually coalesce into small blotches of a raspberry color; these presenting often a horseshoe shape, and being slightly raised above the surface of the skin. The rash appears first on the forehead and face, and gradually extends downwards; it begins to fade on the seventh day in the same order; and is succeeded by slight desquamation of the cuticle, with great itching.

It is worthy of notice that the fever does not abate on the appearance of the eruption, as in small-pox; nor does the severity of the attack at all depend upon the quantity of the rash. The contagion of measles is strong; but less powerful than that of variola. The disease is mostly seen in children.

The *prognosis* must depend upon the mildness or severity of the chest symptoms; the complications most to be feared being croup, bronchitis, collapse of the lung, pulmonary abscess, and pneumonia. Among the children of the very poor, gangrenous stomatitis may occur; but fortunately this fearful complication is seldom met with. The diarrhœa, which often sets in as the rash declines, is for the most part beneficial. The mortality is greater in large cities than in the country. And moreover this disease is as fatal now as formerly. In the years 1660-79, the annual deaths from measles, in London, averged 40 to 100,000 persons; whereas in 1859 they were 47 to the same number.

The *treatment* must not be too active. Exposure to cold is to be carefully avoided. The patient should be confined to bed, in an apartment moderately warm. Putting the feet in hot water every evening is often beneficial. Milk diet, mucilaginous drinks, gentle aperients, and mild diaphoretics may be had recourse to. A draught, containing half

* Morbilli, the dim. of Morbus, a disease. Μόρος βίου, the fate of life, *i. e.* death.

a drachm of the liquor ammoniæ acetatis, ten or twenty drops of the spiritus ætheris nitrosi, and half an ounce of camphor-water, may be given to a child six years old every four or six hours. The cough may often be relieved by a sinapism to the chest, and by very small doses of morphia.

The state of the three great cavities ought to be carefully watched, especially towards the decline of the eruption. Should any complications arise, they must be treated according to the rules which will be laid down in speaking of each affection. After the disease has subsided, the patient is to be warmly clad, fed on easily digested nourishing food, and not allowed to go out of doors too early.

The inoculation of measles has occasionally been practised since 1758. The description of the results, however, is too contradictory to admit of any safe deduction. In this country it does not appear to have been resorted to subsequent to the commencement of the present century; and it would hardly be advisable to revive the proceeding now.

5. Scarlatina, or Scarlet Fever.—This well-known disease may be defined as an infectious and contagious febrile affection, which is characterized by a scarlet efflorescence of the skin and mucous membrane of the fauces and tonsils; the efflorescence commencing about the second day of the fever, and declining about the fifth. It is often accompanied by inflammation of the throat, and sometimes of the submaxillary glands. Like measles, it is essentially a disease of childhood; but it is more to be dreaded. As a rule, scarlet fever occurs only once during life; but in the event of a second attack there is often no rash, little or no throat affection, and the disorder runs a favorable course. From my own personal experience, I can state that *scarlatina sine exanthemate* may be followed immediately by desquamation of the cuticle; and subsequently by renal congestion with albuminuria.

The scarlatinal poison is of a subtle nature, and does not appear to lose its power for some time. It attaches itself to bedding, carpets, clothes, &c.; or in other words it may be transmitted by fomites, as is proved by many medical men having carried the disease to their own families. The poison appears to be destroyed by a temperature of 205° F. The infecting power is probably greatest at the beginning of desquamation.—I believe that there is some relation between the severity of the disease in the recipient, and that in the individual yielding the poison. I know of cases somewhat like the following: A servant girl at a small school at Hampstead visited a relative suffering from severe scarlet fever. In due time she was attacked with the disease, together with three of the pupils. All died. One of the boys was removed directly the first symptoms set in, and brought to a healthy locality in London. I saw him a few hours afterwards, and gave a very unfavorable prognosis; which was unfortunately justified, for he sank completely exhausted three days afterwards, in spite of the most careful nursing.—It has long been known that when puerperal women are attacked with this disease, the danger to life is very great. Attention has also been of late directed to the circumstance that patients who have recently undergone a surgical operation, or who have wounded themselves accidentally, may suffer from a rash which cannot be distinguished from scarlatina, and which is followed by desquamation, although

no history can be obtained of their having been exposed to infection. Dr. George May, of Reading, has reported* the case of a boy who suffered from a scarlet rash with fever, on the sixth day after receiving a scalp wound. The rash lasted a few days, was succeeded by complete desquamation, as well as by swelling of the glands on the left side of the neck. Yet the patient was believed to have prevously suffered from scarlet fever; while there was no case of it in the village at the time of his illness, neither was any one else in the house affected by it. Dr. Wilks, Mr. Paget, and Mr. Hutchinson seem to have met with similar instances.

There are three varieties of this disorder. Scarlatina *simplex*, in which the skin only is affected; scarlatina *anginosa*, in which both skin and throat are implicated; and scarlatina *maligna*, in which all the force of the disease seems to be expended upon the throat.

It may just be mentioned, that in certain parts of the East Indies, in the Southern States of America, as well as in Philadelphia and New York, a peculiar infectious fever now and then prevails, in which the eruption of scarlatina is combined with severe rheumatic pains in the limbs and joints. Sometimes the throat is implicated, occasionally the testicles enlarge, and often the lymphatic glands of the neck and groin swell. The disease (known as *scarlatina rheumatica*, or *dengue*) generally lasts about eight days; and demands no special treatment beyond the use of opiates to relieve pain.

Scarlatina simplex, or *scarlatina sine anginâ*, commences—after a latent period of from four to six days—with slight fever, lassitude, and headache. The eruption appears on the second day, in the form of numberless red points; which show themselves first on the face and neck, then on the arms and abdomen, and lastly on the lower extremities. Sometimes the rash comes out so quickly that in twenty-four hours from the first appearance it covers the whole body; but more commonly a day intervenes between each crop. On the limbs, but especially about the fingers, there is a diffused, continued efflorescence; but on the trunk the rash is distributed in irregular patches. The eruption is of a bright scarlet color, most distinct about the loins and the flexures of the joints. It very generally terminates by desquamation of the cuticle; which begins about the end of the fifth day upon those parts where the rash first appeared. On the face and trunk the desquamation is in the form of scurf; while on the hands and feet large flakes of cuticle are detached, so that sometimes a glove or slipper of scarf-skin comes away at once.

At the same time that the efflorescence has been spreading on the surface of the body, the mucous membrane of the mouth, fauces, and nostrils has also been affected. The tonsils are often congested and swollen, but the tongue especially puts on an appearance characteristic of scarlatina. This organ is at first covered with a thick white fur, through which the red elongated papillæ project; but as this fur clears away, it becomes clean and preternaturally red, and of a strawberry appearance. The affection of the mucous membrane of the mouth, &c., terminates by resolution; with the disappearance of the rash the febrile

* British Medical Journal, p. 428. 8th October, 1864.

symptoms subside; and the disease terminates at the end of eight or nine days, leaving the patient very weak.

In this form, as well as in the other varieties of scarlet fever, the urine should be frequently examined, particularly as to its quantity, reaction, and freedom from albumen. The latter abnormal ingredient is seldom met with before the sixth day, while it occurs most frequently towards the end of desquamation. The two great sources of danger in this disease are the more or less complete suppression of urine, with uræmia; and the deposition of fibrin in the right cavities of the heart.

Scarlatina anginosa is ushered in with more violent symptoms than the preceding. There is headache with some delirium, more pungent heat of the skin, nausea or vomiting, restlessness, and marked prostration. About the second day there is stiffness of the neck, uneasiness, in the throat, hoarseness, and pain on swallowing. The fauces, palate, uvula, and tonsils get red and swollen; while the inflamed surfaces are found covered with an exudation of coagulable lymph. As this inflammation goes on, all the febrile symptoms increase, and the skin becomes very dry and hot. The tonsils get gorged with blood; and foul, deep ulcers form on them. The efflorescence does not observe the same regularity as in the simple form: it does not appear so early, is delayed to the third or fourth day, comes out in scattered patches on the chest and arms, and shows a tendency to vanish the day after its appearance, and to reappear partially at uncertain times. With the fading of the eruption about the fifth or sixth day, the fever and inflammation of the throat begin to abate; although the latter often remains sore, causing the act of deglutition to be painful and difficult, for a week or ten days after the disappearance of the rash. Occasionally this variety of scarlet fever assumes a more aggravated form; being accompanied with an acrid discharge from the nostrils and ears, deafness, and inflammation of the parotid and cervical glands—sometimes going on to suppuration.

During the progress of the disease particular attention should be paid to the internal organs, since there is a great predisposition to inflammation of the serous and mucous membranes.

Scarlatina maligna, described by Cullen under the title of *Cynanche maligna*, differs but little in its symptoms, at first, from scarlatina anginosa. The fever, however, soon assumes a malignant or typhoid character; considerable cerebral disturbance being superadded to the affection of the fauces and skin. There is great irritability, restlessness, a feeble irregular pulse, oppressed respiration, obstruction of the fauces with viscid phlegm, occasionally diarrhœa, and generally delirium; the latter being sometimes of a violent, but usually of the low muttering kind. The tongue is dry and brown, tender and chapped; the lips, teeth, and gums are covered with sordes; and the breath is extremely fetid. The throat is not much swollen, but appears of a dusky red hue; while the velum, uvula, and tonsils are coated with dark incrustations, consisting of exudations of lymph. In some cases there is gangrenous inflammation of these parts, followed by sloughing. The cervical glands are often involved in the inflammation. The rash is exceedingly irregular as to the time of its appearance and duration; often coming out late, disappearing after a few hours, and being renewed several times during the progress of the disorder. It is at first of a pale hue, but soon becomes

changed to a dark livid red; while petechiæ also often appear upon the skin.

In many instances this malignant form of scarlet fever terminates fatally on the third or fourth day. It is always a disease of such extreme danger that only patients with vigorous constitutions survive it: great hopes may be entertained, however, if the seventh day be passed.

Sequelæ.—Children who have suffered from scarlatina are very liable to have their health permanently affected, and to become afflicted with some of the many forms of scrofula; especially strumous ulcers, ophthalmia, scrofulous enlargements of the cervical glands, abscesses in the ears, diseases of the scalp, &c. They also seem predisposed to suffer, either during the attack or shortly afterwards, from *acute rheumatism*, and from *rheumatic pericarditis*.

Not unfrequently, after the decline of the eruptive stage, a mucopurulent discharge takes place from the nares, and even from the mouth and fauces; while in a few instances an acrid secretion, similar in character, has flowed from the vagina in female children and women. Considering how extensively the various mucous tracts are affected in this disease, it seems strange that *scarlatinal vaginitis* is not of more common occurrence. In one case (a girl twelve years of age) about which I was consulted, the nares, mouth, and pharynx were also affected; but the vaginal inflammation was the most obstinate, and persisted for some time after convalescence had been firmly established. A cure was effected by the administration of steel and cod-liver oil, and by the local use of astringents. Dr. Robert Barnes and Dr. J. R. Cormack have noticed the occasional occurrence of this form of vaginitis;* though most authorities omit all mention of it.

But the most frequent, and by far the most serious, sequel is *anasarca*—serous infiltration of the subcutaneous areolar tissue—often accompanied by dropsy of the larger serous cavities; which occurs about the twenty-second day from the commencement of the fever. Now it is curious that this scarlatinal dropsy is more frequent after a mild than after a severe attack, owing probably to the want of caution which is often observed in such cases during the period of desquamation. The patient gets exposed to cold, and immediately the escape of the fever-poison through the pores of the skin is checked; which, as a consequence, is directed to the kidneys in larger quantities than they can bear, giving rise to *acute desquamative nephritis*. This renal affection has its origin from many causes (intemperance, cold, the cholera poison) besides the one we are considering; but, however produced, its symptoms are the same. It commences usually with rigors or chilliness; which are succeeded by feverish reaction, headache, restlessness, pain and tenderness in the loins, and often vomiting. The dropsy is an early symptom: the eyelids and face first become puffy, and then follows general swelling of the areolar tissue throughout the body, with effusion of fluid (which often contains urea) into one or more of the serous cavities. At the same time there is a frequent desire to pass urine; which is scanty, of a dark smoky color, and on being tested by heat and nitric acid, is found to be highly albuminous. Examined microscopically, it is seen to contain

* London Medical Gazette, pp. 65 and 128. July and August, 1850.

masses of coagulated fibrin, blood-corpuscles, epithelial casts and cells, with occasionally crystals of lithic acid. When the progress of the case is favorable, the earliest signs of improvement are the disappearance of the dropsy and an increase in the quantity of urine. It is not uncommon for a patient, during convalescence from acute desquamative nephritis, to pass from four to six pints of urine in the twenty-four hours; the natural quantity averaging only from a pint and a half to two pints.*

Mortality.—In England in 1862, the deaths from this disease were 14,834; of which number 9569 occurred in children under five years of age, while of these 903 were less than twelve months old. It is thus clear that young infants are not exempt from severe attacks of scarlet fever, as some authorities have asserted.

The fatality varies much in different epidemics. But speaking generally, the mortality would seem to be from 5 to 15 per cent. The most severe epidemics have generally occurred between the middle of the months of September and the commencement of December. And, lastly, it occurs equally in both sexes.

Treatment.—The treatment of scarlatina yet remains to be considered. The *simple form*, says Sydenham, is "fatal only through the officiousness of the doctor." It requires no treatment beyond confinement to the bedroom, a warm bath or two, proper clothing, spare diet, plenty of cold water acidulated with vinegar as a common drink, and attention to the bowels. Medical advice ought always to be sought, however, in these cases; since they are just those in which the most troublesome sequelæ are apt to occur.

The patient should be separated from his family; but there will be little fear of the fever spreading through the house provided his room is kept efficiently ventilated, and his attendants are not allowed to mix with the other domestics. Moreover, the danger of infection can scarcely be regarded as over until some few days after the termination of desquamation; while the sick-room is not again to be inhabited until it has been thoroughly purified.

By some practitioners the administration of ammonia, by others the use of acetic acid, is recommended in all cases of scarlet fever from the commencement. The chief value of these remedies seems to be, that they possess the property of keeping the fibrin of the blood fluid. The ammonia has appeared to me to prove most beneficial where there has been any tendency to depression: while the acid has been preferable when a cooling refrigerant drink has been indicated.

In *scarlatina anginosa* the treatment is often much the same as that for many cases of continued fever. Cold or tepid sponging with vinegar-and-water (F. 138), where there is great heat; emetics of ipecacuanha when the tongue is much coated, and when nausea and irritability of stomach exist; shaving the scalp and the application of cold lotions, where there is much delirium; and the cautious administration of aperients when the bowels are confined. Saline effervescing medicines are grateful and cooling; or, where the pulse is feeble, good beef-tea, milk,

* For the more full consideration of this renal affection, as well as for its treatment, &c., the reader must consult the Section on Acute Desquamative Nephritis, in Part XI.

and raw eggs, port wine, and ammonia (F. 361, 364, 371), may be beneficially ordered.

In *malignant scarlet fever*, a stimulating plan of treatment, such as that recommended in typhus, alone offers any chance of success. The vital powers are so prostrated by the deadly force of the poison, that unless we support them by the free administration of brandy, wine, or ammonia and bark, they will fail altogether. When seen early, however, the treatment may often be advantageously commenced by a mild emetic (F. 232, or 233). The gangrenous ulceration of the fauces, which often complicates this form, will be also best combated by the use of stimulants; and perhaps by the free local application of the nitrate of silver, or the employment of gargles where patients are old enough to use these agents properly (F. 249, 252, or 254). Sucking ice or calf's-foot jelly gives temporary relief, at least. The chlorate of potash drink (F. 360) will be useful. Chlorine itself is used by some practitioners, who speak highly of its good effects, in even the worst cases (F. 77).

In *dropsy following scarlet fever* the compound jalap powder is an excellent remedy. Elaterium also often does great good; provided it be given early in the disease, and before the patient is very weak. Its effects must be carefully watched, however, as the severe purging and vomiting which it induces may give rise to great exhaustion. It can be given to children of ten years of age, in doses varying from the twelfth to the sixth of a grain; repeating it every two hours until its action is freely manifested. On the day following the exhibition of the purgative, the tincture of the perchloride of iron may be commenced, or the syrup of iodide of iron with cod-liver oil. The diet should be very generous, without any stimulants. Warm baths are particularly useful, as is the vapor bath. After an attack of acute desquamative nephritis great care should be taken for a long time to clothe the patient warmly, with flannel next to the skin; to send him to the coast, if possible; to continue some preparation of steel until all symptoms of anæmia have subsided; and to feed him with wholesome food, containing plenty of fatty matters.

Belladonna, in very minute doses, has been recommended as a *prophylactic* against scarlatina. In an epidemic of this disease which occurred on board her Majesty's ships Agamemnon and Odin, in 1853, this remedy was freely tried without the slightest benefit. It has also now been used by many practitioners, and found useless.

6. Erysipelas.—This disease—popularly called in Scotland the *Rose*, in this country *St. Anthony's fire*—is a diffused, spreading, inflammatory affection of the skin, and very commonly of the subcutaneous areolar tissue.

Erysipelas (from *Ἐρύω*, to draw, and *πέλας*, near—expressive of its tendency to spread; or, according to German lexicographers, from *Ἐρυθρὸς*, red, and *πελλος*, livid—livid redness) is characterized by the general phenomena of fever, and by the affected part becoming of a deep red color, hot, painful, and swollen. It is a miasmatic disease, due to the absorption of a specific poison. The miasm is most readily generated by the assembling together, in one ward, of patients with unhealthy discharges or secretions.

No portion of the surface of the body is exempt from attacks of this disorder. But the integuments of the face and head are most commonly the seats of *idiopathic* erysipelas—that which arises from internal causes; while *traumatic* erysipelas—that which follows wounds—commences at, or around, the seat of injury.

Idiopathic erysipelas resembles the other eruptive fevers; inasmuch as its phenomena are preceded by a period of incubation which varies from three to seven days, and are accompanied by fever and general constitutional disturbance. It often sets in with chilliness followed by distinct rigors; sore throat is an early and frequent accompaniment of it; occasionally the urine contains albumen, but the chlorides are always diminished; and disturbance of the cerebral functions, nausea, vomiting, and diarrhœa may also be present. The delirium may be of the low, muttering kind often observed in fever; or the patient, especially if he be of intemperate habits, may be noisy and violent.—Then, on the second or third morning from the rigor, redness and swelling appear on some part of the skin; frequently on one side of the nose, spreading to the rest of the face, and often extending over the scalp, neck, and shoulders. The lips swell, the cheeks enlarge, the eyes become closed by their puffy lids, and all traces of the natural features are completely lost. After three or four days, the redness fades, the swelling subsides, and the cuticle desquamates. In most cases the inflammation is merely superficial, and the disorder is then spoken of as *simple* erysipelas; but occasionally it affects the subcutaneous areolar tissue—*phlegmonous* erysipelas—and is then apt to be followed by suppuration and sloughing, or even by gangrene.

Erysipelas may prove fatal, by the extension of the inflammation to the brain or its membranes, giving rise to effusion and coma. The same result may occur from the mucous membrane of the glottis becoming affected, so that the chink gets closed, and the patient dies unexpectedly from suffocation. In other cases, death is owing to the failure of the vital powers.

Erysipelas may arise from infection or contagion, and it spreads by fomites.—One attack is no safeguard against subsequent seizures.—A medical man should never visit a lying-in patient on the same day that he attends a case of this disease, without changing his clothes and using some disinfectant solution to his hands. The poison of erysipelas may undoubtedly give rise to puerperal fever.—When erysipelas prevails epidemically, as it sometimes does, intemperance, insufficient food, foul air, and trifling injuries favor its occurrence. If the disease breaks out in a hospital, the ward where it has appeared should be cleared out and thoroughly cleaned, to prevent the spread of the poison through the entire building.

The *mortality* from erysipelas in England averages about 2000 annually. It is remarkable that the figures fluctuate very slightly. Thus, for ten years (1851—1860) the highest number for any one year is 2256, while the lowest is 1576. Both sexes suffer equally.

The *treatment* must be conducted on the principle that it is more important to lead the disorder to a safe termination, than to try and cut it short by active remedies. At the commencement, an active purgative—such as from 40 to 60 grains of the compound rhubarb powder, or a full dose of the neutral salts—will be beneficial, while the diet ought to be

light; cooling drinks may be freely given, and the patient must be confined to bed in a well-ventilated room. In the country, when the patients are young and vigorous, bleeding is commonly considered necessary: in London such practice would almost invariably be bad. In the cases which have fallen under my own notice, there has always been marked evidence of debility; and I have consequently followed the practice of those physicians who adopt a tonic mode of treatment as the great rule in idiopathic erysipelas. The late Dr. Robert Williams, of St. Thomas's Hospital, gave all his erysipelatous patients milk diet, sago, very gentle purgatives, and from four to six ounces of port wine daily, from the very first appearance of the disease, irrespective of the symptoms or the part affected; and he says, in his admirable work—"I have pursued this system for several years, and I hardly remember a case in which it has not been successful."* The carbonate of ammonia (F. 361, or 371) will often prove an excellent substitute for wine.

In addition to the administration of wine, there are some cases where the tincture of sesquichloride of iron does great good. This medicine must only be given when the secretions of the liver and bowels have been got into a healthy condition; and the dose must vary from twenty minims every four hours in mild cases, to half a drachm every hour in urgent instances. According to some writers, attacks of erysipelas which would probably run on for eight or ten days, may be cured in three or four days by this preparation of iron.

Of all the local applications which have been recommended, that which gives the most relief is the fomentation by flannels wrung out of a hot decoction of poppy-heads, assiduously applied. Flour freely dusted over the inflamed part has often a soothing, cooling effect in mild cases; but it is apt to form a crust, which adheres to and irritates the inflamed part. Some surgeons recommend painting the affected region with collodion; which not only serves to protect the skin, but to contract the congested vessels. To check the extension of the inflammation, boundary lines may be drawn on the sound skin with tincture of iodine or the solid nitrate of silver.

In the phlegmonous form of the disease, when suppuration has taken place, and pus has become infiltrated through the areolar tissue, long and free incisions ought to be made to give it exit. In these cases opiates, tonics, wine or brandy, and nourishing food, will have to be assiduously given.

In *infantile erysipelas*, the child's strength must be supported. If the mother's milk be deficient in quantity or quality, a vigorous wet-nurse should be obtained. Cordials, as white-wine whey, wine-and-water, &c., may be given to the youngest patient. In unhealthy children the slightest wound may cause the development of this disease. Two infants are reported by the Registrar-General to have died in England, from erysipelas following vaccination, during 1861.

7. The Plague.—This most malignant disease, though generally classed among the exanthemata, is said to be, strictly speaking, a continued contagious fever, bearing a striking resemblance to severe typhus. Indeed, among those practitioners who have had the opportunity of

* Elements of Practical Medicine. Morbid Poisons, vol. i, p. 284. London, 1836–39.

observing both diseases, the opinion is almost unanimous that the plague of the torrid is the typhus of the temperate climate.

The plague is now a disease exclusively of Eastern occurrence. The sanitary condition of Egypt is in many respects the same as it was a century ago. Dr. Mead, in assigning the reason why Cairo is the birth-place and cradle of the disorder, says—"Cairo is crowded with vast numbers of inhabitants, who live poorly, and nastily; the streets are narrow and close; the heat is stifling; a great canal passes through the city, which at the overflowing of the Nile is filled with water; on the decrease of the river this canal is usually dried up, and the people throw into it all manner of filth, carrion, and offal; the stench which arises from this and the mud together is intolerably offensive, and from this source the plague, constantly springing up every year, preys upon the inhabitants, and is stopped only by the return of the Nile, the overflowing of which washes away this load of fifth. In Ethiopia the swarms of locusts are so prodigious that they sometimes cause a famine by devouring the fruits of the earth, and when they die create a pestilence by the putrefaction of their bodies. The effluvia which arise from this immense quantity of putrefying animal substance, combined with so much heat and moisture, continually generate the plague in its intensest form; and the Egyptians of old were so sensible how much the putrefaction of dead animals contributed towards breeding the plague, that they worshipped the bird ibis from the services that it did in devouring great numbers of serpents, which they observed injured by their stench when dead as much as by their bite when alive."*

The plague may be defined as a fatal contagious fever, which is due to the absorption of a poison that infects the blood. There is a period of incubation, probably varying from a few hours to three weeks. The force of the poison is chiefly exerted on the cervical, axillary, inguinal, and mesenteric glands, as is shown in the production of buboes; on the skin, causing carbuncles; and on the heart, liver, and spleen, giving rise to great congestion and softening. The disease produces at once great restlessness; extreme and rapidly increasing exhaustion; an indescribable feeling of oppression about the præcordia; fever of greater or less intensity; a peculiar rolling of the eyes; nausea and vomiting; emaciation; bleeding at the nose; swelling of the tongue; laborious breathing; darting pains in the axillæ and groins, with large buboes, carbuncles, &c.; constipation; and sometimes suppression of urine. The powers of life soon give way, and death either ensues without a struggle in two or three days, or is ushered in by an attack of convulsions. This intense form of the disease is generally observed at the commencement of an epidemic, when the deaths may be 90 per cent.; but after a time a milder—but still very dangerous—variety sets in. When recovery is going to take place, profuse sweats occur about the fifth day.

At the time this fearful pestilence—described as the *Black Death*, and the *Great Mortality*—desolated Europe, Asia, and Africa, in the fourteenth century, the mortality must have been immense; for it has been computed that Europe alone lost 25,000,000 of inhabitants by it. The last epidemic which raged in England—the "Great Plague"—was

* Quoted from the Report on Quarantine. General Board of Health, p. 37. London, 1849.

in 1665, the year preceding the great fire of London; when nearly one-third (68,596) of the population of the City perished from it. Supposing that this disease had occurred in London in 1859, when the population was 2,774,338, and proved fatal in the same proportion, it would have been the cause of 600,000 deaths.

Most authorities now agree that the only place in which the plague originates is Egypt, from whence it is imported into other countries. To prevent the crew of a vessel with plague on board infecting the inhabitants of a tropical seaport town, recourse is still had to quarantine; which I believe is generally of not less than twenty-one days' duration. —One attack probably affords only slight security against another.—In attendance upon any case the practitioner had better carefully avoid all contact with the patient, or his clothes, or bedding; while he should endeavor so to time his visits as not to pay them when exhausted from want of food or rest.

The principal remedies appear to consist of emetics, mild aperients, and diaphoretics. Some authorities speak highly of the mineral acids; which on theoretical grounds would seem to be valuable. Opium is often needed to allay irritation. Disinfectants should be systematically used, free ventilation ought to be enforced, and the patient must be kept scrupulously clean. Friction of the body with oil has also been recommended as a preventive measure.

PART III.

VENEREAL DISEASES.

I. BALANITIS.

BALANITIS (*βάλανος*, the glans penis; with the terminal *-itis*—from *Ἰημί*, to impel, and signifying inflammation when added to the Greek name of an organ), or *external clap*, or *gonorrhœa præputialis*, consists of inflammation, with redness and patches of excoriation, of the glans penis and internal surface of the prepuce. Some practitioners call the affection balanitis when only the glans is affected, and balano-posthitis (*βάλανος*, *πόσθη*, the skin covering the glans, and the terminal *-itis*), when it is complicated with inflammation of the lining of the prepuce: but this refinement is unnecessary, as the two conditions are very rarely seen separate.

Causes.—The presence of the prepuce predisposes to this disease, by keeping up the delicacy of the mucous covering of the glans, and by permitting retention of the sebaceous secretions from the numerous glandulæ odoriferæ about the corona. It is not met with in men who have been circumcised.

The exciting cause is the application of some irritant,—as menstrual blood, the muco-purulent secretion of vaginitis, gonorrhœal matter, or acrid leucorrhœal discharges. Inattention to cleanliness will alone induce it, however, without any sexual intercourse. Secondary syphilitic discharges from the uterus may produce balanitis of a specific nature, which may be followed by thickening of the prepuce and constitutional infection. Mr. Langston Parker very properly insists, that in these cases, a positive inoculation takes place, and he gives examples of its occurrence.

A similar affection to balanitis, due to causes of a like kind, may arise in the female. *Vulvitis* is most frequently met with in women under twenty years of age; and it has been observed in young children from the irritation of teething or of worms, or during the progress of one of the eruptive fevers (particularly scarlatina), especially where there has been inattention to cleanliness.

Symptoms.—Heat and itching, with a muco-purulent discharge, are the first indications. On denuding the glans, its surface—as well as that of the prepuce—will be found coated with discharge, or covered with flakes of curd-like matter; beneath which are patches of redness and occasionally of excoriation. There is seldom any pain in passing water.

Sometimes the prepuce becomes œdematous, and from this cause, or because the orifice is naturally very contracted, it may be impossible to draw it back over the glans. This condition is known as *phymosis*, and as long as it exists the practitioner should give a guarded opinion as to the nature of the discharge, since the long narrow prepuce may be concealing a chancre. Moreover a similar condition of the foreskin has sometimes led to the formation of an abscess, and even to gangrene. Occasionally simple balanitis gives rise to a sympathetic *bubo*, which, however, very rarely suppurates. Balanitis may also be complicated with gonorrhœa.

Treatment.—Simple balanitis is readily removed by cleanliness, a light touch with lunar caustic, or the application of any astringent wash. Painting the parts with the solution of subacetate of lead, or with a solution of the nitrate of silver (two or three grains to half an ounce of distilled water), or the injection under the foreskin of an alum wash, often suffices. Sometimes the mere washing and drying of the part, twice in twenty-four hours, with the application of a fine layer of cotton-wool between the glans and prepuce, will quickly effect a cure.

Where the disease has induced phymosis, cold bread-and-water poultices should be applied, or the penis may be enveloped in lint kept wet with the dilute solution of subacetate of lead. Such remedies will soon remove all swelling and permit of retraction of the foreskin. But when this condition is congenital, and the muco-purulent discharge continues in spite of the proper use of injections, it will be desirable to perform circumcision; or if this be objected to, the prepuce ought to be slit up. Where, however, there is insuperable dread of any operation, the opening of the foreskin may be stretched by introducing and separating the blades of a fine pair of dressing forceps, or by using a sponge-tent (F. 426) for a few hours. When the glans has been uncovered and the remedy applied, the foreskin should always be drawn forwards again; since, if this be neglected, paraphymosis will probably ensue, the constriction leading to great swelling with pain about the glans.

II. GONORRHŒA.

Gonorrhœa (from *Γονή*, the semen; and *ῥέω*, to flow. Hence improperly applied to the disease under consideration), or blennorrhagia (*βλέννα*, mucus or slime; and *ῥήγνυμι*, to burst forth), or blennorrhœa (*βλέννα*; and *ῥέω*), is a specific inflammation, more or less acute, of one or more parts of the genito-urinary passages, accompanied by a discharge. It demands notice under three heads: As it occurs in an acute form in the male, in a chronic form (gleet), and as it affects the female.

1. Gonorrhœa in the Male.—This disease is an inflammation (a specific urethritis) of the mucous membrane lining the urethra,—generally of the anterior portion; and it is accompanied by the flow of a contagious purulent or muco-purulent fluid.

Causes.—The common cause is the application of gonorrhœal matter during sexual intercourse. Although the existence of this animal poison can only be inferred from its effects, yet there can be little doubt

but that there is such a poison of a special nature; and that it does not arise simply from indiscriminate sexual intercourse. Though at first it produces only a local disease, yet it subsequently infects the system, manifesting its power particularly on the fibrous tissues; for only on this supposition can the occurrence of such a disease as gonorrhœal rheumatism be explained.

At the same time it must be remembered that the application of many kinds of irritants will produce a disease closely resembling the clap. These non-specific inflammations are attended with a muco-purulent discharge, but the latter is perhaps thinner and less abundant than that which is poured out in true gonorrhœa. They may arise from connection with a woman who is free from any specific disease. A female suffering from severe leucorrhœa, inflammation of the vagina, simple excoriation of the lips of the uterus, or from malignant ulceration of the cervix, may communicate a discharge having the characters of a gonorrhœa. She may do the same if inattentive to cleanliness, or if she permit intercourse during menstruation. And if suffering from an acrid purulent discharge, owing to constitutional syphilis affecting the uterus, she is very likely to irritate, and perhaps to inoculate, whoever has connection with her. Moreover, it is not unlikely that too frequent intercourse, between parties quite healthy, may beget simple inflammation. While it is quite possible for a prostitute to have true gonorrhœal matter left in her vagina, that will infect her next visitor, but which exerts no unfavorable influence upon the insensible mucous membrane of her own genital organs.

A spurious gonorrhœa may also arise without any sexual congress. Thus, it is sometimes met with in young children, owing to the irritation of worms or teething. So it may be induced in adults by masturbation, habitual costiveness, by the immoderate use of alcoholic stimulants, or by calculi in the bladder or ureters. I have even heard a credulous surgeon suggest that making water in the cold night air might induce urethritis, just as exposure to wet may cause common catarrh.

Symptoms.—Between the date of exposure to the source of contagion and the appearance of the symptoms, there is an interval varying from twenty-four hours to a few days. Probably the third day may be taken as the average; at which time there will be heat and itching about the glans, a fulness and redness of the urethral orifice, and shortly a milky purulent discharge. The latter soon increases in quantity, becomes muco-purulent, and has a greenish or yellowish tinge. On passing water a burning pain or scalding is experienced, this symptom being most acute in first attacks. And then there may be pain in the groins, tenesmus, irritability of the bladder, with a sense of weight and dragging in the testicles; while occasionally there is feverishness, with more or less severe constitutional disturbance.

When the disease is located in the fossa navicularis—that portion of the urethra within the glans penis—the pain of micturition is confined to this part, and the discharge is comparatively small in quantity; when in the spongy portion, extending from the glans to the bulb, chordee is frequent, and the discharge abundant; when the bulbous portion is affected, there is pain in the perineum, chordee, and considerable irritability of the bladder; while when the membranous part has to bear the brunt of the disease there is most severe pain in the

perineum, a frequent desire to micturate, tenesmus, and perhaps swelling of the prostate and testicles. In all cases, the rule is that the symptoms diminish between the tenth and twentieth days; and shortly afterwards the inflammation either subsides entirely, or it takes on a chronic character, and a gleet becomes established.

Diagnosis.—The only disease with which a gonorrhœa can be confounded is a primary sore in the urethra. In the latter the ulcer will frequently be visible on everting the edges of the urethra; while the discharge is found to be small in quantity, sanious, and bloody. On examining the urethra a circumscribed induration will generally be felt.

Complications.—The most frequent is *chordee*, in which there is erection with a bending of the penis into the form of a bow. It is said to be due to inflammation of the corpus spongiosum, impeding expansion of its erectile tissues; but the explanation is not very satisfactory. Voluptuous dreams, warmth, and alcoholic stimulants are likely to excite it. When the chordee is severe it may cause rupture of one or more small vessels, so that there is *hemorrhage from the urethra*. *Balanitis*, perhaps with œdema of the prepuce, may occur from the irritation of the discharge: this being most common when there is phymosis. *Sympathetic bubo* may take place, the inguinal glands, however, rarely suppurating. *Abscess* may form, either in the urethra, or in the perineum,—perhaps owing to inflammation of Cowper's glands. *Prostatitis* and *cystitis* are occasionally induced, probably in consequence of an extension—not a metastasis—of the inflammatory action. So, in the same way, *epididymitis* may be set up; the inflammation being confined to the epididymis, though the whole testicle looks swollen, perhaps from accumulation of serum in the tunica vaginalis. And lastly *gonorrhœal rheumatism* may supervene, either during the acute stage, or in the decline of the disease, or after the discharge has ceased.

Treatment.—In the choice of remedies something must depend upon the stage at which the disorder is seen. But the object of the practitioner should always be to stop the discharge,—which indeed is synonymous with effecting a cure.

No one remedy can be strongly recommended—there is no specific. On the other hand, a caution is necessary with regard to two drugs, which are still very frequently employed, are generally inefficient, are very nauseous, and which often do much mischief to the stomach. These are balsam of copaiba and cubeb pepper. Without saying that these agents are never to be prescribed, yet I would guard their administration with so many "ifs," as almost to amount to a prohibition. Thus, if the disease be in an early stage, and the inflammatory symptoms urgent, they are inadmissible; if there is constitutional disturbance, they are to be avoided; and so also, if the bladder be irritable, if there be chordee, if there be a sense of dragging weight in the testicles, if there be a tendency to skin eruptions, or if nausea is readily induced. With regard to mercury and turpentine, nothing need be said, as no educated practitioner would now think of attempting to subdue a gonorrhœa by them.

There are some few cases where, if the disease be seen almost at the outset, it may be checked by what is called the *abortive* treatment. This consists essentially in the injection, by the practitioner, directly after the patient has passed water, of a strong solution of nitrate of

silver (from 5 to 10 grains in one ounce of distilled water); together with the administration of an active purgative, the enforcement of perfect rest, and abstinence from all stimulating food and drink. After each micturition the patient may employ an injection of one drachm of the solution of subacetate of lead, or five grains of sulphate of zinc, to three ounces of water. If there be much pain, the penis should be perseveringly bathed with hot water; while a suppository of two grains of opium can be introduced into the rectum after the bowels have acted freely. Supposing this treatment to be successful, the discharge will be found very much diminished in quantity and consistence at the end of twenty-four or thirty-six hours; and then a cure may be effected in two or three days more by continuing the use of the lead or zinc injections (gradually increasing the intervals between each use of the syringe), by a diet free from stimulants, and by the avoidance of much exercise. Now this plan of treatment has not merely the disadvantage of being applicable only at the commencement of the disease, but it may lead to most serious results. In some cases it has induced very violent inflammation of the urethra, ending in abscess, or in stricture; it has caused severe testitis; and in a few instances has even produced peritonitis. Hence it will only be advisable to resort to it under exceptional circumstances, and when a rapid cure is demanded at all hazard; while it should never be practised without warning the patient of the risk he is incurring, and the necessity for his strict attention to the rules laid down.

In the ordinary class of cases the remedies which promise most are, —aperients, a careful diet, as much rest as attention to business will allow, and injections. If the pain be considerable, warm baths will afford much relief. The best aperients are jalap, compound scammony powder, or the colocynth and henbane pill. The neutral salts, and all salines are objectionable. Fish, mutton, vegetables, eggs, tea, and milk may be allowed; but we ought to forbid all salt meats, soups, "made dishes," pastry, cheese, coffee, beer, and spirits. It is sometimes impossible for the patient to avoid taking wine; and a little sherry, or claret, with water or soda-water, will form the least injurious beverage of the kind. As regards the injection, some prefer the sulphate of zinc or copper, some the chloride of zinc, some the nitrate of silver or alum, &c. But that which has appeared to me to be generally the most useful is made with one drachm of the solution of subacetate of lead to four ounces of water; and this should be employed every eight or twelve hours. If, in a few days, it appears to lose its effect, the sulphate of zinc (two grains to the ounce of water), or the chloride of zinc (one grain to the ounce), ought to be substituted.

To prevent erections and chordee, a combination of camphor and belladonna will be found valuable. Five grains of the former, with half or two-thirds of a grain of the latter, in a pill at bedtime, will generally succeed; especially if the patient sleep on a mattress, without too much covering. To prevent his lying on his back, a reel for cotton may be fastened over the spine by means of a tape. For the scalding, warm baths, and drinking freely of weak tea or plain water may be recommended. Hemorrhage from the urethra may be checked by the application of cold, or by pressure. If there be retention of urine, a catheter had better not be used until a hot bath and a dose of opium

have failed to remove the obstruction. And then any other complications which may arise must be remedied according to the rules which will be found in the sections on Rheumatism, Ophthalmia, Testitis, &c.

The practitioner is occasionally asked how the danger of contagion may be obviated? There are perhaps some who would refuse to answer the question, or who would reply in the words of John Sintelaer,—"The only preservative against catching the venereal, is to keep the finger out of the red-hot frying-pan." But it seems better to admit that there is no specific for this purpose; and that the only precautions which can be taken are, not to prolong the congress, to pass water immediately afterwards, and to bathe the penis thoroughly.

2. Chronic Gonorrhœa, or Gleet.—This disease consists of chronic inflammation of some portion of the urethra, attended with a slight discharge, and unaccompanied by scalding or pain during micturition. It is not unfrequently the sequel to an acute attack of gonorrhœa.

A gleet may depend upon many circumstances, but in a large number of cases it would seem that the urethra is appreciably affected. In other words, on passing a bougie, one or more portions of the mucous membrane of this canal will be found irritable and somewhat contracted, perhaps in a condition resembling that observed in granular conjunctivitis; or there may be detected a permanent stricture, from thickening of the mucous membrane or from the effusion of coagulable lymph into the areolar tissue around the urethra. Irritation of the prostate or of the neck of the bladder may be the cause of the discharge, in another class of cases; and it may also be kept up by constitutional debility arising from debauchery and malpractices. The discharge is generally transparent, and of a mucous character; but on a minute examination it will be seen to contain pus-corpuscles with scales of epithelium. Where there is irritation of the prostate or of the neck of the bladder, the patient will be troubled with oft-repeated calls to pass water; while the urine will be found on standing to deposit more or less tenacious mucus. Pain in the perineum is frequently complained of, sometimes with irritation at the end of the penis.

A gleet, unless properly treated, may continue for many months; occasionally ceasing for a few days and then returning, much to the patient's disgust. It is therefore important to discover the cause of the discharge, as only on the removal of this can a permanent cure be looked for. In all cases a temperate mode of life is necessary, and care should be taken that the digestive organs act efficiently. Then, if there be an organic stricture, this must be dilated; the discharge generally ceasing as the effused lymph becomes absorbed.—If patches of the urethra are contracted and over-sensitive, the use of a bougie smeared with some astringent ointment, twice or thrice a week, will be needed. The nature of the ointment should vary with the irritability of the urethra, as it is necessary to cause moderate smarting. Equal parts of mercurial and subacetate of lead ointments may suffice; or the ointment of nitrate of mercury, diluted with from two to eight parts of lard, will often be better; or the spermaceti ointment, with from twenty to sixty grains of nitrate of silver to the ounce, may be needed. The bougie ought generally to be allowed to remain in the urethra for from ten to forty minutes. In very obstinate cases the solid nitrate of silver, ap-

plied by means of Lallemand's porte-caustique, can be recommended. Moreover, it is sometimes advisable, while the medicated bougie is being thus employed by the practitioner, for the patient to use an injection night and morning, of subacetate of lead (twenty or thirty minims to the ounce of water), or of chloride of zinc (one or two grains to the ounce).

When there is irritation about the prostate or neck of the bladder, bougies and astringent injections will only increase the mischief. The treatment then resolves itself into the removal of this irritation; the best remedies being warm baths, opiate suppositories at night (F. 340), and frequent doses of the officinal infusion of bearberry (uva ursi), or of buchu (bucco), or of decoction of pareira. In some troublesome cases the iodide of potassium (F. 31) has given relief more speedily than other remedies; while, sometimes, painting the under surface of the urethra and the perineum with tincture of iodine is useful. With Mr. Milton and some practitioners, blisters to the perineum and penis are favorite applications.

In cases where the gleet is kept up by constitutional debility, tonics will be required. An excellent mixture may be made with phosphoric acid, nux vomica, and bark (F. 376); or gallic acid (F. 103), or the iron alum (F. 116), or steel and cantharides (F. 400) may be ordered. There is one disadvantage, however, in ferruginous tonics which is generally overlooked, viz., that they are apt to induce a desire for sexual intercourse; this drawback being scarcely removed by the fact that obstinate gleets have sometimes been cured by connection. It is no doubt true that the thin mucous discharge of a gleet is harmless to a healthy female; but it must be remembered that any excess in spiced food, wine, &c., may quickly render the secretion purulent, and then there is at least a possibility of infection. Lastly, it must be mentioned that when a gleet continues obstinate in an individual of a strumous constitution, cod-liver oil, sea-bathing, and a nourishing diet will be required: that when the system is gouty, colchicum can be given: and that in the rheumatic, iodide of potassium may effect a cure. At the same time that such remedies are being employed, astringent injections will be found useful auxiliaries.

3. Gonorrhœa in the Female.—This disease is of a somewhat different character to gonorrhœa as it occurs in man. It consists of acute or chronic inflammation of the vulva, urethra, vagina, or canal of the cervix uteri; and it is accompanied with a muco-purulent discharge. But neither in the actual condition of the parts, nor in the symptoms, do we find anything by which positively to distinguish an inflammation due to ordinary causes common to the most chaste female, from that which is produced by the specific discharge of a clap. Yet it is impossible to doubt that women do suffer from true gonorrhœa. Dr. Henry Bennet, while expressing his belief in the existence of a contagious and a non-contagious form of vaginitis, says,—"I am bound to confess that the only difference that I can see between the two is, that vaginitis apparently contracted by contagion—or blennorrhagia—appears to be more acute than ordinary vaginitis, that there is a greater quantity of pus secreted, greater redness, congestion, and swelling of the mucous membrane, that the inflammatory action has a greater tendency to spread to

the urethra, and that it is very much more intractable to treatment. These conditions, merely implying degrees of inflammatory violence, do not evidently constitute a distinction as to morbific characteristics. It is, however, I repeat, a remarkable fact, that simple vaginitis in the immoral portion of the population should usually assume the severer form of the disease, and be readily communicated; whereas with the moral part of the community it should usually affect the milder form and be seldom communicated."* My own experience quite confirms this opinion, and is perhaps the more valuable because it has been drawn from a different class of patients to that seen by Dr. Bennet. For whereas he has had great opportunities of observing uterine and vaginal disease in the higher classes of society, my views have been derived from a very large practice amongst hospital patients: and I may certainly say that I have never yet seen any woman suffering from such a train of symptoms that I could go into a court of law and assert that she was affected with gonorrhœa, in the meaning commonly attached to this term. I have undoubtedly seen many instances where I have thought such was the case,—where there has been a discharge from the meatus urinarius and vagina, of a thick muco-purulent matter; but a very different conclusion might have been come to by an *intelligent* jury, had I been submitted to a cross-examination.

This subject will again be brought under the reader's notice in the section on the Diseases of the Female Genital Organs. But it may here be mentioned that when, in my practice, the diagnosis has been—a specific gonorrhœa, the treatment has been as follows. In the acute stage, prolonged hot hip-baths; with the injection of large quantities of warm water every eight or twelve hours, by means of a syphon syringe. Mild aperients, rest, and low diet have also been needed. If there have been an abscess in either labium, as is not uncommonly the case, it has been opened. Directly the symptoms have moderated, astringent injections (F. 425) have been employed; and then when the discharge, in diminished quantity, has constituted the sole remaining symptom, a medicated pessary (one containing tannin or acetate of lead, see F. 423) has been used every night, or for two or three nights in the week. The cervix uteri has also been examined by the speculum, and any inflammatory or excoriated patch freely touched with nitrate of silver. It need scarcely be added that until an apparently complete cure has been effected, sexual intercourse has been strictly prohibited; for where this rule has been disregarded, the treatment has proved of little value.

III. NON-SPECIFIC EXCORIATIONS, VEGETATIONS, &c.

To prevent mistakes in the diagnosis and treatment of venereal diseases, it is necessary to give a brief description of certain non-specific affections, which sometimes follow sexual intercourse, and hence are apt to be regarded with suspicion by the public. The affections thus grouped together are,—vegetations, excoriations, herpes præputialis, and eczema.

*A Practical Treatise on Inflammation of the Uterus, &c. Fourth Edition, p. 229. London, 1861.

1. Vegetations, or Warts.—These growths consist of hypertrophied papillæ covered with epithelium. They form around the corona glandis and on the frænum; either as the result of balanitis or of gonorrhœa, or independently of these diseases from inattention to cleanliness. They may occur in females, from any irritating discharge, and are found in clusters about the perineum, the vaginal labia, &c. They must not be confounded with mucous tubercles or condylomata; which are formed of raised patches of skin, are of a flattened, irregular shape, red and moist on the surface, and are generally covered with a dirty-white secretion. These condylomata are usually accompanied also by other secondary symptoms, or even by primary sores.

The *treatment* of warts is simple. Occasionally great cleanliness and the use of an astringent wash will cure them, when they are small. Frequently they are dry and horny; but if any moisture exudes from their surfaces it will be well to cover them with a fine layer of cotton-wool, or to dust them with the oxide of zinc. If these means fail or are not applicable, the growth should be removed with the curved scissors, so as not merely to cut away the projecting portions, but the whole of the enlarged papillæ. Any bleeding which results may be checked by cold, or by pressing a pellet of cotton-wool on the cut surface, or by applying a drop of the solution of perchloride of iron. Sometimes, however, this treatment will be thought too violent, and then the solid nitrate of silver must be rubbed into the structure, the surrounding parts being covered with olive oil; or in the same way we may use the glacial acetic acid, or the dried sulphate of zinc, or the acid solution of nitrate of mercury. Without subsequent ablution once or twice daily, the vegetations will probably be reproduced.

2. Excoriations.—An abrasion of the epithelium or epidermis is often met with as the result of sexual intercourse. There is no ulceration; but either an excoriation, or a slight rent or tear near the frænum. Men with a delicate skin and a long narrow prepuce, sometimes suffer in this way after every connection. Free ablution with tepid or cold water will soon effect a cure. If, by chance, an abrasion should fail to heal, the general health will probably be found depressed; and then a mild astringent wash had better be ordered, while bark with some mineral acid is given internally. It must be remembered that an excoriation, at the time of its occurrence or subsequently, may have become inoculated with chancre-virus. There will be some difficulty in deciding whether this has happened, at all events until after the lapse of thirty-six or forty-eight hours from the occurrence.

3. Herpes Præputialis.—Clusters of herpetic vesicles frequently form on the integument of the prepuce; being accompanied with troublesome itching and more or less burning pain. The vesicles either desiccate, or their heads are rubbed off; and then a thin crust remains, which in two or three days falls away, leaving a red unbroken surface. Herpetic eruptions are rather more troublesome when situated on the inner surface of the prepuce. The milky-looking contents of the vesicles become purulent about the third day; while the cells coalesce into a slight ulcer, which may assume a very suspicious appearance, if it be improperly irritated with caustic.—The usual history of these cases is

that the patient, after dining out, has had intercourse with a loose woman. The itching and heat soon remind him of his indiscretion, and he hurries off to his physician. Probably the dinner has had more to do with his complaint than the subsequent weakness. However this may be, a seidlitz-powder, or a dose of the granulated effervescing magnesia will do good, while the rash runs its course and soon gets well.

4. Eczema.—This disease will be more completely treated of in a subsequent page. But it may be mentioned here that it sometimes occurs on the glans, or inner surface of the prepuce, or low down on the penis, or on the scrotum from inattention to cleanliness. It is not uncommon in prostitutes, the rash being generally situated about the labia and perineum.

The minute vesicles are attended with itching, heat, and redness: and then the sero-purulent exudation forms small scales, with cracks in them. Sometimes the scratching resorted to for relieving the itching caused by the pediculus pubis or crab-louse (for an account of which see the section on Diseases of the Appendages of the Skin), produces scabs which may be mistaken for eczema. An examination of the part with a lens will readily expose the blunder.

Bathing and washing the eczematous patches with Goulard-water will generally effect a cure. But if the eruption be chronic, a mild course of arsenic may be needed.

IV. PRIMARY SYPHILIS.

Primary syphilis* occurs as a specific ulcer or chancre, the ulcer appearing on the part to which the virus has been directly applied. In the present day all practitioners allow that gonorrhœa and syphilis are essentially distinct diseases, due to poisons entirely different in their nature. Whether there are also varieties of the syphilitic virus is at present contested; but there is no doubt that four distinct kinds of ulcers may result from the inoculation of the syphilitic poison. Occasionally these varieties of action succeed each other,—that is to say, the patient receives the virus of both the infecting and non-infecting sores, both of which may show themselves together in the same part, one before the other, conformably with the fact that the first-named have a somewhat long period of incubation. According to Mr. Henry Lee,†

The first form of ulcer, is the *indurated, Hunterian, infecting*, or *true chancre*. It is accompanied by the adhesive inflammation; "and produces a peculiar chronic enlargement of the inguinal glands, which does not involve the skin or the cellular membrane. This variety is followed by secondary symptoms; and requires, both in its primary and secondary forms, mercurial treatment."

The second is the *simple, soft, non-indurated chancre*. It is accom-

* Several derivations have been given of the word syphilis; but, as Dr. Mayne states, none seems better than that of Blancardus—Σύν, together; and φιλέω to love.

† A System of Surgery. Edited by T. Holmes, M.A., &c. Vol. i, p. 461. London, 1860.

panied by suppurative inflammation. It does not affect the inguinal glands, and is a local disease which is neither accompanied nor followed by secondary symptoms. Hence only local treatment is needed.

The third, is the *phagedœnic chancre*. It is accompanied by ulcerative inflammation. "It produces suppuration, generally of one inguinal gland only, which yields an inoculable secretion. It is not followed by constitutional syphilis, and may be treated by local means."

The fourth, is the *sloughing chancre* or *gangrenous phagedæna*. It "is accompanied by mortification. It does not affect the inguinal glands, is not followed by constitutional infection, and requires only local treatment."

The fact must not be forgotten that primary venereal sores sometimes have their seat in the urethra, when the discharge is apt to be mistaken for that of a gonorrhœa. Hence (as before advised) in all cases of the latter disease the urethra should be pressed between the fingers, so as to detect any induration if an ulcer be present; while the lips of the meatus also ought to be separated, so that if a sore exist it may be properly treated.

Chancres in the female are most commonly situated on the labia majora, on the nymphæ, on the walls of the vagina, or in the folds about the clitoris. In very rare cases they have been found on the lips of the uterus, or even just within the canal of the cervix uteri. And it is an important point that the infecting chancre in women is seldom accompanied with induration.

1. The Indurated, Hunterian, Infecting Chancre.—In a typical example we find that this disease consists of a superficial circumscribed abrasion or sore, situated on an indurated base. The loss of substance is slight. The surface appears glossy, or as if covered with a thin coating of gum. There is no inflammatory areola, but the edges terminate abruptly; so that the sore looks somewhat cup-shaped, from the elevation of its margin.

The disease does not generally commence until after many days have elapsed from the date of exposure to infection. Some authorities deny, while others assert (and I agree with them), that there is a period of incubation, varying from a fortnight to seven weeks. During this interval nothing suspicious may be observed. Then, a small red pimple appears; or a slight abrasion or fissure assumes an unhealthy appearance; or an indurated tubercle is found without loss of tissue. Generally the cuticle very soon gives way, and a circular excavated sore results. This gradually extends for a few days, successive fine layers of the surface perishing and being thrown off. The secretion from it is small in quantity, consisting of a little serum and lymph globules, with epithelial débris; but the character of this discharge is readily altered, and the amount increased, by the application of caustic or of any irritant.

The characteristic features of these sores is the induration of their margins and bases, from the adhesive inflammation giving rise to effusion of lymph. Sometimes this induration is superficial, and not thicker than a piece of parchment; but, as Mr. Lee points out, it is only entirely absent when the sore has its seat on the upper and central portion of the glans penis. In this case the sore is most like an abrasion: and

"although it does not become indurated itself, it may be followed by induration of neighboring parts, which have not themselves ulcerated." Most commonly the infecting chancre is solitary; two or more distinct sores occurring simultaneously on the same patient not being met with more frequently than in one case out of five or six.

When the disease has arrived at the stage of induration,—in other words, when the system has become altered by the specific action of the virus—the patient cannot be inoculated with the secretion from the sore. Out of 99 cases of indurated chancre in which inoculation was attempted by Ricord, a characteristic pustule was only produced once. In this case inoculation was performed at an early period, while the chancre was increasing in size.

As the specific induration of the chancre appears, the absorbent glands in direct connection with the lymphatics of the part become affected. It is an exceptional occurrence for only one inguinal gland to suffer. Generally two or more become indurated; being felt under the skin, like foreign bodies, the size of almond-shells. Hence Mr. H. Lee describes these tumors as *amygdaloid indolent buboes*. They are very chronic, painless, and hard; this hardness remaining even after all induration about the original sore has disappeared,—until indeed the disease is thoroughly cured. They only suppurate if accidentally irritated to the extent of producing inflammation; thus differing widely from the bubo which accompanies the non-infecting chancre.

In the *treatment* of infecting chancre it must be remembered that we have a constitutional affection to deal with. We must distinguish between effecting an apparent and a perfect cure; only resting satisfied with the latter, so that the general system may not subsequently suffer. If any blood-contamination be left, plastic matter will afterwards be effused upon the iris, or on the bones, or in the muscles or areolar tissue, or in the substance of internal organs, giving rise to what are known as secondary symptoms.

Local applications are of comparatively little use. The healing of the sore may perhaps be facilitated by using mercurial ointment to it, or by dressing it with black-wash—calomel combined with a little mucilage and lime-water. If the part to which the syphilitic virus has been applied can be destroyed with caustic within four days from the application of the poison—before there has been time for systemic contamination, then a permanent cure may be effected by such treatment; but the opportunity of doing this is very rarely offered to the practitioner. As soon as there is induration, it is certain that the virus has become disseminated. Then constitutional remedies are needed, and must be persevered with until all hardness at the seat of inoculation or of the inguinal glands has entirely disappeared. To avoid useless repetition, these remedies will be treated of in the section on Constitutional Syphilis; but it may be mentioned that I believe mercury to be the only agent which has the power of completely destroying the syphilitic virus. And were I asked to give any proof of the truth of this view, I would point to those cases of constitutional syphilis which we meet with in married women. A female so affected may conceive again and again, and as often as she does so the gestation ends in abortion or in the birth of a dead child. She takes drugs of every kind—except that one especially needed—without the slightest benefit. But let her, and the husband if

necessary, undergo a judicious mercurial course, and the most direct evidence will be afforded that the real antidote or remedy has been employed. To my mind it appears that the cure of ague by quinine is not more certain than that of true syphilis by mercury.

2. The Simple, Soft, Non-indurated Chancre.—This variety of syphilis consists of a suppurating sore. As it is often produced by the inoculation of an abrasion or fissure, so it does not generally commence with a pimple or pustule. There is no period of incubation. Frequently, when the patient first comes under observation, there are two or more circular sores, with well-defined edges, looking somewhat as if portions of the healthy tissue had been punched out. The ulcer gradually extends for a time; its surface gets covered with indolent granulations; and the comparatively abundant secretion from it becomes purulent, within five or six days from the time of contagion. This secretion is auto-inoculable. The absorbent vessels and glands do not necessarily become affected; but if lymphatic absorption does occur, then a suppurating bubo will follow. This variety of chancre is a local disease, which will heal spontaneously in a few weeks, frequently leaving a scar but no induration.

When the disease extends below the mucous membrane so as to involve the areolar tissue, it spreads more rapidly, and the inflammation causes a certain amount of induration. But even here, the purulent discharge will suffice to distinguish this *phlegmonoid suppurating sore* from the infecting chancre. On minutely examining the secretion it will be found to consist of well-formed pus globules.

If the sore be seen within five days from the application of the poison, effective cauterization will cure it. For this purpose nitrate of silver will hardly suffice, since it is too irritating without being sufficiently destructive. The affected part must be destroyed with nitric acid, or potassa fusa, or with the acid solution of nitrate of mercury; great care being taken to limit the action of these powerful escharotics. In other cases, simple dressing of the sore with an astringent lotion may hasten cicatrization. If there be a suppurating bubo, it should be freely opened. At the same time ferruginous tonics, nourishing food, and exercise in the open air will prove useful.

3. The Phagedænic Chancre.—In this form of syphilitic inflammation we generally find a small, irritable, ragged ulcer, secreting unhealthy pus. Its peculiar character is the tendency it has to spread irregularly. When it extends from several points, in the form of portions of circles, it is known as the *serpiginous* chancre. Whether it spreads in this manner or simply in a circular form, an inguinal gland soon becomes swollen and very tender, so that the patient walks somewhat lamely; there is generally a rigor, with constitutional disturbance; and relief is not obtained until after suppuration has taken place, and the pus been discharged. The destruction of the affected gland and the skin over it, gives rise to a regular syphilitic ulcer in the groin. At this bubo the poison appears to be arrested; so that systemic infection does not take place. In some instances a syphilitic sore is phagedænic from the commencement; while in others this eroding character

is engrafted, as it were, upon one of the other varieties of chancre. The secretion from such a sore is inoculable upon the patient.

The *treatment* of these cases must be mostly palliative. Fomentations and poultices, with full doses of opium internally, are generally very beneficial. As a rule, caustics and irritants are hurtful. In one very obstinate case of serpiginous chancre which was under my care, all remedies were useless until they were employed in conjunction with mercurial fumigation (F. 131). Where there is general debility, bark and nitric acid, or some ferruginous tonic, will be indicated. If there be much inflammatory action, iodide of potassium with sarsaparilla usually controls it. The diet ought to be nourishing, without stimulants.

4. The Sloughing Chancre, or Gangrenous Phagedæna.—In these cases we have a syphilitic sore in combination with destructive gangrenous inflammation. Sometimes the death of the tissue to which the virus has been applied is so complete that the poison is destroyed by the same action, as if by a powerful caustic; so that when the slough is cast off a simple sore alone remains. The general health is always impaired, and occasionally to a very marked degree. Although this variety of sore is so severe that sometimes the whole prepuce gets destroyed, and perhaps even a portion of the glans, yet when cicatrization commences it generally goes on quickly. The inguinal glands do not become affected, neither do secondary symptoms follow.

The *treatment* is much the same as that required in the phagedænic chancre. Stimulants and very nourishing food will be needed; while the pain must be relieved by large doses of opium. The use of mercury is inadmissible. The patient ought to be confined to bed, in a well-ventilated room.

When this disease occurs in poor enfeebled prostitutes, it sometimes proves very severe. The whole of the labia and nymphæ may slough away, and death ensue—perhaps from hemorrhage. Happily such cases are very rarely met with in the present day.

V. BUBO.

A bubo consists either of a simple or of a specific inflammatory enlargement of a lymphatic vessel, or of one of the glands in connection with such vessel. The superficial glands are alone affected,—those directly connected with the seat of irritation by the lymphatic vessels. The poison, when there is one, seems to be arrested in these glands, and does not pass to the deeper series. Women very rarely suffer from this affection.

There are several varieties of bubo:

1. *Simple Sympathetic Bubo.* Whatever causes lymphatic irritation may give rise to simple inflammatory adenitis. Hence it may occur in balanitis, or in gonorrhœa, or from the irritation of any kind of sore on the penis, or merely from excessive sexual intercourse. Perhaps strumous subjects are more liable to it than others. Frequently, not only the gland itself but the lymphatic vessel leading to it is found enlarged

and indurated, feeling like a piece of whipcord. The inflammation may end in resolution; or by its severity suppuration may be established. In the latter case, a simple abscess results; the pus from which is healthy and free from any specific quality. After its evacuation, healing is seldom long delayed. The great object of *treatment* must be to obtain resolution, and perfect rest is more likely to accomplish this than anything else. Warm bathing will be useful. Tonics and cod-liver oil may often be advantageously prescribed. When suppuration does take place a free opening ought to be made at the lowest part of the bubo, in order to avoid the burrowing of the pus in the surrounding areolar tissue.

2. *Primary Bubo.* In this case a bubo is said to form from the direct absorption of syphilitic matter, without the occurrence of any chancre or sore on the penis. The pus produced by the suppuration of a gland so affected will give rise to venereal sores when inoculation with it is practised. This *bubon d'emblée*, as it is designated by the French surgeons who first described it, is so rarely met with that many practitioners of experience doubt its existence.

3. *Amygdaloid Indolent Bubo.* This form of bubo has been already described in the section on Infecting Sores. It generally comes on simultaneously with the occurrence of induration in the chancre; and as the latter is indolent, so are the buboes which almost necessarily accompany it. Suppuration only occurs from some accidental cause; but should it take place the pus is not inoculable upon the patient. Usually the whole chain of superficial glands, in the groin corresponding to the side of the penis on which the sore is seated, is indurated. These buboes are the least painful and troublesome locally, but the most important as regards the patient's general health; since they are a proof of constitutional infection.

4. *Virulent, or Inoculable Bubo.* The absorption of the syphilitic virus from a soft, or from a phagedænic chancre, produces this variety of bubo. In the greater number of cases it happens towards the end of the second week from the first appearance of the disease. The poison may not only affect the first gland to which it is conveyed, but in its passage may also inoculate the lymphatic vessel. The gland, and perhaps the vessel, then suppurate; and when the abscess opens, we find its walls forming a syphilitic sore, the pus from which is inoculable.

The attempt to prevent suppuration will be useless. As soon as pus has formed it should be evacuated by a free incision. If the skin be thin and undermined, it may be sometimes better to make an opening by means of potassa fusa rather than by the knife. Subsequently, soothing dressings, and frequent syringing with warm water, will usually be more useful than severer measures. If any sinuses form, they are to be laid open. Quinine and iron, good nourishing food, and pure air, will be needful.

VI. CONSTITUTIONAL SYPHILIS.

There is probably no poison which has a more powerful yet insidious influence in deteriorating the constitution than the syphilitic. And not only does it render the sufferer a confirmed invalid for the time, but it works its dire effects upon several of the most important tissues of

the body. Many cases of chronic ill-health are due to it; while it is often the cause of obscure diseases of the vital organs, affections of the bones, rebellious ulcers of the cutaneous or mucous surfaces, troublesome skin diseases, impotence or sterility, abortion, and the death of the fœtus in utero.

When syphilis was first recognized in Europe about 1483, we learn from the description of the symptoms that the disease was more severe and ran a more rapid course than it does in the present day. This, however, was not owing to a greater virulence of the poison; but was probably due to the more free use of intoxicating drinks, inattention to cleanliness, delay in seeking advice, and to the treatment being ill-understood.

It is only in the present century that the phenomena of syphilis have been artificially divided into different stages,—viz., the primary, the secondary, and the tertiary. The primary symptoms are due to the application of the venereal poison by sexual intercourse or by inoculation, and they have already been treated of. The constitutional or secondary symptoms are the result of the indurated or infecting chancre. They may make their appearance two or three weeks, or not for several months, after the healing of the primary sore; being due to the tainting of the blood by the syphilitic virus. The longer the duration has been of the primary infecting sore, and the more marked the induration with which it has been attended, the greater will be the severity of the secondary symptoms. Moreover, the worse the general health at the time of contracting the primary ulcer, the greater the risk to the constitution subsequently.

There is every reason to believe that constitutional syphilis may be communicated from an infected to a healthy person directly—*i. e.*, without the intervention of primary disease—especially where there is frequent contact between the two parties. Secondary skin diseases and condylomata may be so communicated from the husband to the wife; the seminal fluid of a tainted man deposited in the vagina of a healthy woman may act thus, without pregnancy occurring; or the husband being constitutionally affected may taint the ovum, and through the latter the mother may get infected. It also seems proved (see the section on Cow-pox, p. 180) that the poison of syphilis may be introduced into the system by practising vaccination with impure lymph.—Tertiary symptoms generally appear at a long period after the primary disease, and usually some time after the secondary symptoms have disappeared. The diseases which have been termed tertiary are commonly deep-seated affections of the skin, as tubercles; and morbid actions in the bones, as periostitis, exostosis, caries, and necrosis. Possibly the children of parents suffering from tertiary symptoms are predisposed to scrofula, or pulmonary consumption, or tabes mesenterica, or hydrocephalus.

Symptoms.—Constitutional syphilis usually manifests itself in the beginning by a certain amount of general systemic disturbance. There is fever, mental depression, lassitude, pains in the limbs, and the skin assumes a sallow hue. Then unmistakable evidence is afforded by the production of well-marked cutaneous diseases; by ulcers on the skin; by warts, and condylomata or mucous tubercles; by tumors of the skin and subcutaneous areolar tissue; by alopecia or baldness, with loss of

the eyebrows and eyelashes; by syphilitic iritis; by inflammation and ulceration about the roots of the nails; by superficial ulcerations on the tongue, lips, and pillars of the fauces; by ulceration of the larynx; by enlargement of the testicle—syphilitic sarcocele; by diseases of the periosteum and bones; and, in a few instances, and as late tertiary symptoms, by diseases of the brain, spinal cord, lungs, heart, liver, spleen, &c.

The *syphilitic cutaneous affections* are of various kinds; for they may belong to either of the orders Exanthemata, Vesiculæ, Pustulæ, Papulæ, Squamæ, or Tubercula. Probably the squamous or scaly diseases are most common; the eruption appearing in patches, being of a red copper color, having the scurf renewed as fast as it is shed, often showing a tendency to excoriate or ulcerate, and being attended with fever or some constitutional disturbance. The syphilitic tubercle varies in size from a pea to a pigeon's egg, is of a polished brown hue, is very prone to ulcerate, and most frequently has its seat on the chest, face, or abdomen. Small groups of tubercles sometimes attack the nose, or forehead, or tongue; usually terminating in the formation of inveterate ulcers. The syphilitic maculæ or stains may be of a brown or dirty yellow color, and as they often prove incurable it is fortunate that they are of little consequence.

Condylomata or *mucous tubercles* may occur as small rounded tubercular elevations of the integument, or as large irregular patches owing to the coalescence of several tubercles. In women, particularly, they are often amongst the earliest of the constitutional affections, appearing on the labia, perineum, and about the anus. In men they form chiefly on the scrotum, around the anus, on the nates, thighs, prepuce, &c. Sometimes the elevated patches are of a whitish color, as if nitrate of silver had been rubbed over their surface; while in other cases they are copper-colored, and exhale an acrid fetid discharge.

Secondary syphilitic affections of the uterus are by no means uncommon. They may either prevent conception, or failing to have this effect, may be the source of infection to the embryo. In these cases, the vaginal portion of the uterus is found enlarged and tender; the lips are indurated; there are often one or more patches of excoriation around the os; and there is a constant muco-purulent discharge from the uterine cavity. When the throat or the skin is likewise affected, the diagnosis will be much facilitated. These symptoms are rebellious, and only removed with difficulty; a combination of local with constitutional treatment being required.

Syphilitic tumors of the skin and subcutaneous areolar tissues, or of the muscles—sometimes called muscular nodes—generally appear long after the cure of the primary sore. They may have their seat on any part of the body, the forearm and outer part of the leg being the regions in which I have most often met with them. If their resolution is not effected in the earlier stages, they gradually soften and ulcerate; or if in ignorance of their true nature they be lanced, or if attempts be made at their excision, the most foul and painful and inveterate sores will be produced.

Inflammation of the iris originating in syphilis is often associated with other forms of secondary disease. In tertiary affections this modification of iritis has a tendency to become chronic. The chief features

which it presents are these: There is rapid effusion of lymph on the iris, especially at the edges of the pupil, in the form of reddish-yellow nodules, which are sometimes so large as nearly to close the pupil; or the lymph may be spread over the area of the pupil as a film, which gradually increases in thickness. Blue irides assume a greenish tint, owing to the presence of yellow albumen in the aqueous humor. The cornea may remain transparent, or become hazy throughout its lower half from the presence of numerous minute spots. There is a vascular zone in the sclerotic, but the diffused redness of the eyeball characteristic of rheumatic iritis is wanting. There is but little intolerance of light. One or both eyes may be affected; but in cases of relapse the right and left eyes are often attacked alternately.

Loss of hair from syphilitic poisoning seldom occurs without other symptoms; and it may take place not only on the head (*alopecia* or *baldness*), but may affect the eyebrows, eyelashes, whiskers, &c. This result is frequently combined with the excessive formation of scurf on the scalp; as well as with inflammation of the roots of the nails, so that these structures become thick, crack or break easily, and even fall off.

The *syphilitic ulcers of the fauces, tonsils, and pharynx* are in many instances excavated, covered by an ash-colored slough, and surrounded by a livid unhealthy appearance of the mucous membrane. Occasionally they slough, and extend rapidly; they cause pain, and difficult deglutition; and they are always attended with more or less constitutional disturbance.—*Ulcerations of the nostrils* are also not uncommonly the only symptoms of the general infection of the system. They give rise to offensive and profuse discharges, a marked alteration in the voice, and, if not checked, to disease of the cartilages or nasal bones.—*Deep fissures, ulcerations, and fungoid vegetations upon the tongue* may arise from the poison of syphilis, or from the use of mercury. In the former case there will generally be found other symptoms of this disease; while, in the latter, the submaxillary glands are frequently also swollen and tender. The venereal ulcer which shows itself at the side of the tongue is callous to the touch, is often covered with a slight dirty-yellow secretion, and looks as if a portion of tissue had been punched out. The smooth bald patch sometimes met with on the same organ is believed by certain authorities to be always venereal. Dr. Colles states, as a remarkable fact, that syphilitic ulcers invariably occur on the upper lip, while cancer as invariably invades the lower.

The partial enlargements of the bones called *nodes*, arise only when the system has been much affected by the poison of syphilis: they are the result of effusion between the periosteum and bone, and are perhaps caused by superficial inflammation of the osseous tissue. A careful examination of the sternum, and especially of the lower half, will sometimes detect a tender spot, technically known as *substernal tenderness*. In many of these cases some of the superficial inguinal glands will also be found enlarged, hard, and painless; or even one or more of the posterior cervical glands may be swollen and indurated. All the syphilitic affections of the periosteum and bones are attended with pains; which latter are increased by warmth, are aggravated at night, and are relieved by iodide of potassium. This agent, however, seldom effects a permanent cure; mercury in some form—best by the vapor bath—being required to prevent a relapse.

Diagnosis.—The longer the interval which elapses between the primary disease and the appearance of the secondary symptoms, the greater will be the difficulty of diagnosis. It may be of assistance to remember that syphilitic cutaneous affections generally occur in connection with various forms of ulceration about the soft palate and fauces; and that the skin disease repeatedly assumes a dusky copper color. Sometimes the sub-occipital lymphatic glands are enlarged in these cases. Of symptoms which exist singly, syphilitic sarcocele is the most common. The syphilitic tubercle of the face, when ulcerated, is not unfrequently mistaken for lupus; but it may be distinguished by its greater depth, the sharpness of its edges, and its dusky copper color. The history of the case may serve to throw light upon its nature; but a truthful report is not always to be obtained. When the patient is a married man, the health of his wife and children will form a guide in enabling us to make a correct diagnosis.

Many cutaneous diseases have been erroneously referred to the poison of syphilis, and much unhappiness thereby produced. Suicide has even been attempted under the distress thus engendered. See the section on Syphiliphobia.

Prognosis.—Constitutional syphilis, if neglected, is very likely ultimately to destroy life. It may do so directly by inducing some affection of the larynx, nervous system, liver, or intestines; but very often it acts indirectly by bringing out latent pulmonary disease. Certain authorities state that a perfect cure is never effected; but in patients under forty, at all events, complete recovery generally follows well-directed treatment. I am rather skeptical of cases getting well when left alone; but there are writers who think the disease may wear itself out.

In many cases of constitutional syphilis the symptoms are relieved by remedies, without a complete cure being effected. Periods of latency then occur, during which the patient appears well; but even after a long time the poison may be roused into activity, and especially by causes which depress the powers of life. Moreover, during the period of latency the individual may beget a tainted child.

Treatment.—Directly the constitutional affection clearly manifests itself, attempts should be made to effect a cure; pregnancy even being no bar to the treatment, since abortion is much more likely to follow from the disease than from the remedies.

The therapeutical agents required in the treatment are not very numerous, but they demand great caution and discernment in their application. The *diet* should usually be light but nutritious: fish and meat may be allowed; cream, milk, and raw eggs are excellent articles; but with the exception of a little claret or of sherry-and-water, stimulants are commonly to be forbidden. Warm clothing is requisite, and generally flannel ought to be worn next the skin during the day. Confinement to the house is very seldom necessary, but care is to be taken to avoid exposure to wet or to the night air. In all cases the use of *warm water* or *vapor baths*, once or twice a week, will prove of great service; and, provided they do not induce debility, cannot be productive of any mischief. *Opium*, also, will be needed when there is much pain, or when there is an inability to sleep at night, or when there is general irritability; and it may be given to the extent of three or four grains in the twenty-four hours. The extract is the preparation which I usually

prefer. But the essential remedy, and that which is absolutely necessary to effect a permanent cure, is *mercury*. "Nothing," says John Hunter, "can show more the ungrateful or unsettled mind of man than his treatment of this medicine. If there is such a thing as a specific, mercury is one for the venereal disease in two of its forms."* There are two principal ways in which this mineral may be introduced into the system —viz., either by the stomach or by the skin. In the former case, we administer a solid or liquid preparation,—as blue pill, calomel, or the solution of corrosive sublimate; in the latter we resort to inunction with the mercurial ointment, or we use the mercurial vapor-bath. In my own practice recourse is always had either to inunction or the bath. Both methods I believe to be equally efficacious; but whereas one plan is dirty and disagreeable, the other is cleanly and pleasant. If it be thought preferable to trust to inunction, from the eighth to the fourth of an ounce of the mercurial ointment should be well rubbed into the body (the inside of the thighs is a convenient part) every night at bedtime, until the gums are slightly touched. This proceeding is particularly valuable in the treatment of young children; sixty grains of the ointment being spread on a flannel roller, which is then wound round the body. When mercurial fumigation is employed, the bath (F. 131) ought to be used at first every night, and then for two or three nights a week. By such baths I have frequently cured cases which have resisted all other plans of treatment. In many chronic examples the corrosive sublimate (F. 27) repeated for many weeks, proves very useful. In the squamous cutaneous diseases, the green iodide of mercury (F. 53), or the red iodide of mercury (F. 54), can be advantageously used; especially if the mercurial vapor bath be employed at the same time. The subcutaneous and muscular tumors may generally be dispersed by the green iodide of mercury, the mercurial vapor, blisters, and pressure with the mercurial plaster.

Amongst other remedies which deserve a brief notice, mention may be made of *Donovan's solution* (F. 51), which will often cure the squamous cutaneous diseases: the *iodide of potassium* (F. 31), which is invaluable when the bones are affected, if the mercurial vapor be gently used at the same time: the *iodide of sodium* (F. 39): and of the *iodide of iron* (F. 32), which is particularly valuable in advanced stages of the disease, or in weak anæmic subjects.

In tertiary syphilis, when the patient's constitution will generally be found broken down, we must try and effect a cure by nourishing food, cod-liver oil, opium, iodide of potassium, and the calomel vapor bath. Such cases, however, are very intractable.

These remarks would be incomplete without a notice of the treatment of this affection by *syphilization*. A few years only have elapsed since Auzias Turenne, in performing some experiments on animals with the poison of syphilis, ascertained that each succeeding chancre produced by inoculation became less and less, until a period arrived when no sore of any kind could be produced by the application of the venereal virus. From this the inference was drawn that, by prolonged inoculation with the syphilitic poison, a constitutional state was produced in which the system was no longer capable of being affected by syphilis; just as hap-

* The Works of John Hunter. Palmer's Edition, vol. ii, p. 427. London, 1835.

pens, *mutatis mutandis*, in inoculation for small-pox. Hence, to obtain perfect syphilization or immunity, an individual must undergo constitutional syphilis; but he must be forced rapidly through this state by repeated inoculations, in order that his organization may not be injured. This practice has found—and will find—but little favor in our country; but recently in France, Germany, and Italy attention has been paid to it, and curious phenomena brought to light. Sperino, Physician to the Venereal Hospital of Turin, published in 1833 a detailed account of 96 cases of syphilization; of which 53 were examples of aggravated primary syphilis, and 43 of severe constitutional disease. Of the primary cases 50 were cured, 2 failed, and 1 was treated by other means in addition to syphilization: of the 43 with constitutional syphilis, 26 were treated by syphilization alone, 25 of these being cured; 17 were treated by syphilization, with mercury and iodine. Sperino inoculates for from 6 to 10 chancres at each sitting; and allows about three or four days to elapse between each operation. By continued inoculation the ulcers become less and less until no effect is produced; but the individual is still susceptible, though in a less degree, to another kind of matter, again to a third, and so on until at last no effect is produced by any syphilitic poison. It is strange that the general health does not suffer —indeed it improves during the process of inoculation. The time required to produce immunity varies; in one case it was obtained after 71 chancres, but this number seems to be much smaller than usual; for in most instances upwards of 300 were produced, the treatment lasting for nine or twelve or twenty months and more. The majority of Sperino's patients were prostitutes, and they submitted themselves most readily to the treatment. It may be practised at any age. To obtain a complete cure when the patient has previously been mercurialized, the use of iodine has often to be combined with syphilization. Dr. Boeck asserted in 1858, in consequence of results he had obtained from syphilization alone in those who had not been previously mercurialized, that *in no disease have we a more certain method of cure.* The disadvantage of the method is its offensive nature, and the length of time necessary for effectually carrying it out; but then, on the other hand, the immunity produced is thought probably to last for life.

In conclusion it must be allowed that if syphilization be capable of effecting all the good that its supporters assert, we have still something to learn as to the varieties and effects of the syphilitic poison. For these gentlemen deny that the cure is due to the lapse of time, or to the production of simple suppurating sores which act on the principle of depuration. Some authorities get rid of the difficulty by throwing doubts upon the nature of the virus used for inoculation. Mr. Henry Lee is of opinion that the matter employed in these cases was obtained from the soft non-infecting sore, since Boeck states that the best kind is that derived from a chancre attended by a suppurating bubo; while the phenomena of the artificial disease, excited by inoculation, are characteristic of the soft and not of the hard chancre. Supposing this view to be true, syphilization is only an "inoffensive playing with soft chancres." But its correctness has been denied, and amongst others by one of M. Boeck's friends, M. Bidenkap; who asserts that the virus of the infecting chancre has been constantly used for curative syphiliza-

tion in the Hospital of Christiana. He does not say, however, that indurated sores result,—a circumstance which seems impossible when the system is contaminated.

VII. INFANTILE SYPHILIS.

Syphilis in the infant may be hereditary or acquired. *Hereditary* syphilis happens thus: The mother during pregnancy suffers from constitutional syphilis; and she either supplies a vitiated ovum, or her blood contaminates the nutritive elements furnished to the fœtus during intra-uterine life. Or the taint is derived entirely from the diseased semen of the father; the mother having been, and continuing healthy, unless she becomes infected by the poisoned fœtus. Or again, both parents may be suffering from constitutional syphilis at the time of fecundation, in which case there is a very slight chance of the offspring escaping. In *acquired* syphilis the delicate infant's body gets infected by inoculable matter on the mother's genitals at the time of birth; or its system suffers from sucking at the breast of a syphilitic nurse; or inoculation occurs from the use of impure lymph in vaccination. The disease in two of these forms of acquired syphilis may manifest itself by a primary sore, resembling a chancre in the adult. But such cases must be very rare, as I have never yet seen an instance of it; whereas examples of constitutional syphilis in nurslings are daily met with in hospital practice.

Symptoms.—For the first two or three weeks after birth, the infant may be apparently healthy; or, as rarely happens, it may be born with its skin of a dull color, and having its features contracted, so that it looks like a little old man. Supposing when it comes into the world there are no manifestations of disease, yet often within the month symptoms of coryza gradually set in; attended with a peculiar snuffling during breathing, hard cough, slight difficulty in sucking, and dryness of the lips and mouth. The skin soon gets harsh and dry, the voice shrill and hoarse (it has been compared to the squeaking of a penny trumpet), the mucous membrane of the mouth and throat becomes affected with superficial ulcerations, and an erythematous blush appears upon the soles of the feet and palms of the hands. The nails also crack or split in many cases. When the disease runs on unchecked, large patches of the skin assume a light brown color; the epidermis exfoliates; and the parts around the mouth, nostrils, buttocks, anus, and flexures of the joints become copper-colored and fissured and excoriated. The eyes are either specially affected, or they may simply get weak, while the margins of the eyelids are sore. The hair gets dry and thin, or it falls off. Moreover, the child becomes irritable, wastes rapidly, and daily grows weaker; and it often suffers from sickness and diarrhœa.

There are certain special diseases to which syphilitic children are liable, and which therefore demand attention. Amongst these may be mentioned *disease of the liver*. According to Diday, when the lesion has reached its maximum the gland is hypertrophied, hard and globular. It is resistent to pressure; and when cut into, it creaks slightly under the

scalpel. Its appearance is peculiar; for there is seen on a yellowish ground a layer of white opaque granules, like grains of semola. This fibro-plastic matter obliterates the capillaries, and diminishes the calibre of even the larger vessels; it compresses the hepatic cells; and hence there is an arrest of the secretion of bile.*

Our knowledge of the *syphilitic pulmonary affections* is scanty. A form of lobular pneumonia, due to indurations of the parenchyma of the lung, has been described by Depaul. The indurated nodules soften, cavities form in their centres, and thus collections of purulent fluid take place. They are generally found developed at birth, and they early lead to a fatal termination. Syphilitic abscesses may form in the thymus gland, as well as in the lungs.

Syphilitic iritis in infants is very uncommon. In 23 cases collected by Mr. Hutchinson, the average age at which it began was 5½ months. When it occurs we shall generally find other symptoms of inherited syphilis,—such as copper-colored eruptions, mucous tubercles about the genitals, aphthæ, and the snuffles. According to Mr. Dixon the lymph which is effused does not assume the form of tubercular masses on the edge of the pupil, as in the adult; but either fills the area of the pupil as a pale yellow or reddish semi-fluid mass, or sinks down to the bottom of the anterior chamber, like ordinary hypopyon. The pupil is irregular, and the iris discolored. This disease is to be treated by mercurial inunction, good pure milk, beef tea, and cod-liver oil if necessary. Dilatation of the pupil ought to be kept up by the daily use of atropine drops or paper.

Chronic interstitial keratitis—often called strumous corneitis—has been especially studied by Mr. Hutchinson. From his researches it seems proved that this is essentially an heredito-syphilitic disease, often accompanied or preceded by iritis. It appears between 5 and 18 years of age. In the commencement there is a diffused haziness near the centre of the cornea of one eye, without ulceration, and with very slight evidence of the congestion of any tunic. There is, however, always some irritability of the eye, with dim sight. On careful examination, dots of haze—

* The syphilitic nature of the hepatic affection in the following cases is perhaps not quite certain, but it seems sufficiently probable to render it worthy of notice. On the 26th February, 1862, I saw, in consultation with Mr. Holding, an infant ten days old suffering from jaundice. The liver appeared increased in size, and seemed more dense than was natural. A healthy wet-nurse was ordered to be procured, and the infant was put in a weak nitro-hydrochloric acid bath, night and morning. Five days afterwards death took place.

The mother was thirty-seven years of age and healthy, though far from strong. The father appeared well, but had lost his hair. The mother had been pregnant eleven times. The first child died when fifteen months old; the second is living, and is twelve years old; the third is living, and is ten years old; then there were two abortions; and subsequently six children were successively born, who were apparently healthy at birth, but who in a few days became affected with fatal jaundice. The yellow tinge was not generally well marked. My opinion was that after the delivery of the third child, the husband suffered from constitutional syphilis, which had left a slight taint; and that his infants had waxy disease of the liver, from the effect of this poison.

At the end of August, 1863, the mother applied to me, being about five months advanced in her twelfth pregnancy. I at once put her upon a course of corrosive sublimate; and this medicine was continued until 29th December, when I delivered her of a fine healthy girl. About ten days afterwards the infant had a slight attack of jaundice, which however passed off; and on the 22d October, 1864, she remained strong and well.

"microscopic masses of fog"—are perceptible in the structure of the cornea; which increase until the whole transparent tissue, except a band near its margin, has become as opaque as ground glass. Now, there is a zone of sclerotic congestion, intolerance of light, and pain round the orbit. After six or eight weeks the other cornea gets attacked. Then follows a period in which there is nearly complete blindness, after which the eye first affected begins to clear. In the course of a year a surprising degree of improvement has probably taken place. In milder cases, and under suitable treatment, the duration may be much less and the restoration to transparency complete; but in many instances patches of haze remain for years, if not for life. In the best recoveries the eye usually remains somewhat damaged as to vision, and often a degree of abnormal expansion of the cornea is apparent. The subjects of this disease almost always present a very peculiar physiognomy; of which a coarse flabby skin, pits and scars on the face and forehead, cicatrices of old fissures at the angles of the mouth, a sunken bridge to the nose, and a set of permanent teeth peculiar for their smallness and bad color *and the vertically notched edges of the central upper incisors*, are the most striking characters. Moreover, in many cases one or more of the following suspicious forms of disease have either been coincident with it, or have occurred previously; viz.: ulcerated lupus, nodes on the long bones, psoriasis about the face, otorrhœa, chronic enlargement and subsequent atrophy of the tonsils, ulcers in the throat, a thickened condition of the parts under the tongue, and chronic engorgements of the lymphatic glands.

Deafness is not very infrequent in the subjects of inherited syphilis. It is usually partial. The sense of hearing fails, without any local cause being apparent.

Amongst other marks of the heredito-syphilitic diathesis, the condition of *the permanent teeth* is deserving of attention. According to Mr. Hutchinson the peculiarities they present are the most reliable amongst the objective symptoms, if the patient be of age to show them. This gentleman says,—"Although the temporary teeth often, indeed usually, present some peculiarities in syphilitic children, of which a trained observer may avail himself, yet they show nothing which is pathognomonic, and nothing which I dare describe as worthy of general reliance. The *central upper incisors of the second set are the test teeth*, and the surgeon not thoroughly conversant with the various and very common forms of dental malformation will avoid much risk of error if he restrict his attention to this pair. In syphilitic patients these teeth are usually short and narrow, with a broad vertical notch in their edges, and their corners rounded off. Horizontal notches or furrows are often seen, but they as a rule have nothing to do with syphilis. If the question be put, are teeth of the type described pathognomonic of hereditary taint? I answer unreservedly, that when well characterized, I believe they are. I have met with many cases in which the type in question was so slightly marked that it served only to suggest suspicion, and by no means to remove doubt, but I have never seen it well characterized without having reason to believe that the inference to which it pointed was well founded."*

* A Clinical Memoir on Certain Diseases of the Eye and Ear, consequent on Inherited Syphilis, p. 204. London, 1863.

Prognosis.—The duration of the disease varies. Death may occur at an early period; but under efficient treatment, recovery, or apparent recovery, usually takes place speedily. When a child survives the first year, the danger to life is very much lessened. In some few instances death occurs suddenly,—perhaps just as the disease appears to have yielded to the remedies.

Treatment.—If the mother present any symptom of syphilitic disease, she ought not to be allowed to suckle her infant. A vigorous healthy wet-nurse must be procured, or the child must be carefully brought up by hand. The latter is the only alternative when the infant is already suffering, lest the nurse herself become diseased. For although Ricord and others deny the possibility of this occurrence, yet I cannot but think there is more risk than a healthy woman should be allowed to run. At all events, no nurse should be employed under these circumstances without warning her, in the presence of both parents, of the chance of infection.

Then, as a general rule, directly symptoms show themselves in the child, mercury, in some form or other, is the remedy to be resorted to. It has been recommended to cure the infant through the medium of the mother by getting her system under the influence of mercury; but this practice is too uncertain to be depended upon, and is unjustifiable if the parent have no symptoms demanding a mercurial course. The best plan is either to administer the hydrargyrum cum cretâ, or to apply the mercurial ointment, as long since recommended by Sir Benjamin Brodie. To an infant six weeks old, one grain of gray powder, with two or three of the aromatic chalk powder, may be given twice or thrice in the day until all the symptoms cease: or should this medicine gripe or purge, or appear inefficient, as it frequently will, the mercurial ointment is to be used. This is easily applied by spreading sixty grains, or a little more, on the end of a small flannel roller, and then winding the band round the infant's abdomen or knee, repeating the application daily. The movements of the child produce the necessary friction; and the cuticle being thin, the mercury speedily enters the system. "Very few of those children ultimately recover in whom the mercury has been given internally; but I have not seen a single case in which the other method of treatment—mercurial inunction—has failed."* Without believing in the absolute correctness of the inference to be drawn from this sentence, I still think more highly of inunction than of any other procedure.

When the use of mercury appears objectionable, the iodide of potassium in half-grain, or the chlorate of potash in two-grain doses, repeated every six hours, may be tried. The latter salt, with a few drops of tincture of bark, has often appeared serviceable in cases attended with great feebleness.

The local treatment for the excoriations consists in great attention to cleanliness, and the application of the oxide of zinc ointment; or a cerate composed of sixty grains of the unguentum hydrargyri nitratis to one ounce of lard may be employed. The child should be put in a warm bath at least once a day.

* Sir Benjamin Brodie's "Lectures on Pathology and Surgery," p. 245. London, 1846.

VIII. SYPHILIPHOBIA.

Syphiliphobia (*Syphilis ;* and *φοβέω*, to dread), or Monomania Syphilitica, may be described as a morbid or hypochondriacal fear of syphilis, producing imaginary symptoms of the disease. And inasmuch as it is one of those nervous disorders which cause much unhappiness, and by which the advertising quacks thrive, it demands a short notice.

All classes of society may suffer from this affection,—the rich and poor, those without occupation and the busy workman. In men the symptoms are very much allied to those presented in fictitious cases of spermatorrhœa or of impotence. The amount of mental torture which the patients undergo is often sufficient to impair the general health ; and then this impairment is regarded as a convincing proof that the system is contaminated. The symptoms are also further aggravated by the sufferer perusing works on diseases of the generative organs, and perhaps by visiting indecent museums. But some of the most troublesome cases which have fallen under my notice have been in women. A lady is under my care at the present time (May, 1864), whose condition is becoming really serious. About ten years since, when abroad with her husband, the latter contracted a gonorrhœa. This he appears to have communicated to his wife, for she suffered from an abundant purulent discharge with burning pain during micturition. She was told that her sufferings were due to the venereal disease, and that it must have been contracted by sitting in a dirty water-closet. Although she seems to have been thoroughly cured in a few weeks, and soon to have dismissed the matter from her mind, yet two years ago when her health began to fail she recollected the attack. Living near the banks of a river, in a very dull locality, she suffers from ennui and rheumatism ; and now the one idea constantly present to her mind is, that the venereal poison has attacked her bones. She is unwilling to reside away from her home during the damp foggy months of the year, and hence will not listen to the suggestion that her house is unhealthily situated. And though after each interview with me she appears convinced that her opinions on the subject are erroneous, yet a night's rest suffices to banish the recollection of all she has been told, and the delusion becomes as strong as before.

In the management of these cases it has to be remembered that the patient experiences much mental distress. This suffering is not to be lightly treated. The practitioner must exhibit considerable tact and great patience ; he should show that he really feels an interest in the case ; while, instead of roughly controverting the delusion, he must gain the patient's confidence, and gently endeavor to prove the non-existence of disease. As regards drugs, the remedies which I have found most efficacious are the various preparations of zinc, and small doses of strychnia or nux vomica (F. 407, 411). But sometimes ferruginous tonics (F. 380, 387, 408) appear to be necessary, sometimes the mineral acids (F. 376)—perhaps with cod-liver oil, and sometimes the hypophosphite of soda with bark (F. 419). In all cases a good nourishing diet should be ordered ; and tepid or cold baths (especially sea-bathing) may be recommended, together with free exercise in the open air.

PART IV.

DISEASES OF THE NERVOUS SYSTEM.

The nervous system may be said to consist of two portions,—the cerebro-spinal and the sympathetic. The former is composed of the brain, spinal cord, and the nerves proceeding from them and their ganglia; and it constitutes Bichat's nervous system of animal life. The latter, or the sympathetic or ganglionic portion, consists of a ganglia, arranged on either side of the vertebral column, united by intercommunicating nerves, and supplying branches to the thoracic and abdominal and pelvic viscera, as well as to the coats of blood-vessels. It forms Bichat's nervous system of organic life.

Both portions are made up of gray or vesicular, and white or fibrous matter. In the vesicular substance, impressions are received and stored up; while from it we say theoretically that nervous force originates. The fibrous matter conveys impressions from without to the ganglia, and transmits impressions from the latter to organs or tissues where it is distributed. Hence, without any apparent difference in the structure of nerve-fibres, we find variety of function; one distinct set of fibres (centripetal, or afferent, or sensitive nerves) conveying impressions from the periphery to the centre; while another set (centrifugal, efferent, or motor nerves) conducts central impressions to the muscles.

The sagacity of an animal is in accordance with the amount of vesicular matter in the brain; the latter being abundant in proportion to the depth of the convolutions. In disease, the time at which the mental faculties become affected gives us some clue to its situation. Thus, there is disordered mental power at an early period, when the morbid action commences in the membranes of the brain, proceeding from without inwards; while this symptom is delayed in the case of tumors originating in the fibrous structure, the growth proceeding from the centre towards the circumference. In the one case the vesicular matter is early implicated, in the other it only becomes so at an advanced period.

The nervous ganglia require a certain amount of repose, and a due supply of pure arterial blood, for their nutrition and healthy action. Venous or impoverished blood, or blood contaminated by certain drugs, or poisoned by bile or urea, blunts the intellectual faculties and indisposes for muscular action, in proportion to the amount of deterioration. When the oxidizing power of the blood is artificially increased, or where the blood is sent to the nervous centres in too great a quantity, an increase of mental and muscular power is manifested; but such increase being accompanied by undue waste must lead to rapid

exhaustion. The products of decay are removed through the urine; the urea, chlorine, phosphoric and sulphuric acids being augmented in quantity when there is increased mental exertion. Both tea and coffee are excitants of the brain and nervous system, while they retard the decay of tissue and hence diminish the urinary constituents just mentioned.* Dr. Hammond, after experimenting upon himself with alcohol and tobacco, concludes that these agents increase the weight of the body by retarding the metamorphosis of the old tissues, promoting the formation of new, and limiting the consumption of fat.†

The average weight of the adult male brain (cerebrum, cerebellum, pons Varolii, and medulla oblongata) may be said to be 47 or 48 ounces. That of the female organ is some 4 or 5 ounces less. The composition of nervous material is roughly shown in the following table by L'Heritier:

Analysis of the Brain at different Periods of Life.

	Infants.	Youths.	Adults.	Aged.	Idiots.
Water, ...	827.90	742.60	725.10	738.50	709.30
Albumen, ...	70.00	102.00	94.00	86.50	84.00
Fat, ...	34.50	53.00	61.00	43.20	50.00
Osmazome and salts, .	59.60	85.90	101.90	121.80	148.20
Phosphorus, ...	8.00	16.50	18.00	10.00	8.50
	1000.00	1000.00	1000.00	1000.00	1000.00

In speaking of the symptoms of brain diseases there are certain expressions in common use, which demand a few words of explanation:

Convulsion (from *Convello*, to pull together), signifies the paroxysmal or temporary occurrence of general and involuntary muscular contraction.

Epileptiform or *Epileptoid* (from *Epilepsia*, epilepsy; and terminal *-ides*, resembling epilepsy) *attacks*. These expressions though bad, since the severity of an epileptic fit varies so much, are convenient. With this reservation, Dr. Russell Reynolds uses them to express the following symptoms: "Sudden loss of perception and voluntary power, with more or less generally distributed spasmodic movement; the latter being quasi-tonic at first, then clonic, and appearing to impede the respiratory process: the attack lasting from two to twenty minutes, and being followed by some exhaustion and sleep."‡

Clonic (from *Κλονέω*, to put in commotion) *spasm*, is that condition in which there is rapidly alternating contraction and relaxation.

Tonic (from *Τείνω*, to strain or tighten) *spasms*, or *spastic* (from *Σπάω*, to draw; terminal *-τικος*) *contractions*, consist of involuntary contrac-

* Sydney Smith said: "I am glad I was not born before tea. I can drink any quantity when I have not tasted wine; otherwise I am haunted by blue-devils by day, and dragons by night. If you want to improve your understanding, drink coffee. Sir James Mackintosh used to say, he believed the difference between one man and another was produced by the quantity of coffee he drank."—A Memoir of the Reverend Sydney Smith. By Lady Holland, vol. i, p. 283. London, 1855.

† Physiological Memoirs, p. 55. Philadelphia, 1863.

‡ The Diagnosis of Diseases of the Brain, Spinal Cord, Nerves, and their Appendages, p. 45. London, 1855.

tions of the muscles, lasting a certain time. Common cramp is a good example of them.

Coma (from *Κῶμα*, sound sleep) denotes a state of stupor with loss of consciousness, from which the patient is roused with difficulty. In *carus* (from *Κάρος*, heavy sleep) or *intense coma*, there is not only loss of perception and volition, but usually stertorous breathing, flaccid limbs, and dilated pupils. From this condition the patient cannot be roused.

Determination of blood to the head consists of active arterial hyperæmia (*Ὑπὲρ*, in excess; and *αἷμα*, blood): while, in *congestion of the head*, there is passive venous hyperæmia.

I. INFLAMMATION OF THE BRAIN.

Our knowledge of the effects of inflammation of the parts within the cranium (the *Encephalon*, from *ἐν*, in; *κεφαλή*, the head) is scarcely sufficiently perfect to enable us to point out with certainty the symptoms which indicate inflammation of the substance of the brain—*cerebritis*, as distinguished from that of the membranes—*meningitis*. Fortunately the distinction is not of much practical importance; for if we allow that in a very few cases cerebritis occurs simply, or that meningitis happens alone, still it is certain that in the majority of instances the two affections are combined.

Before treating of this combination (*encephalitis*), however, a few words may be said as to what we do know of the diagnosis of meningeal from cerebral inflammation.

1. Simple Meningitis.—Inflammation of the arachnoid and pia mater, or meningitis (*Μῆνιγξ*, a membrane, with the terminal-*itis*) may arise without any apparent cause; or it may be produced by a fall or blow, or by disease of the ear or nose, or by exposure to the sun. The poison of syphilis or rheumatism may also induce meningitis, as may the deposit of tubercle. See the section on *Tubercular Meningitis*.

The chief *symptoms* are fever, acute pain in the head, irritability with early and violent delirium, frequent flushing of the face followed by pallor, rapid pulse, muscular twitchings, prostration and coma.

In a typical example of *inflammation of the membranes over the convexity of the brain*, there is first a rigor, or instead—especially in children—a convulsion. The skin then becomes hot and dry, the pulse hard and rapid, and the bowels are confined; while there is intense pain in the head, which is increased by any sound or movement. The face is alternately flushed and pallid; the conjunctivæ are injected, while the eyes are suffused and staring. The delirium sets in early, the patient being noisy and very violent. There is great restlessness, muscular twitching, and sometimes strabismus. Vomiting is such a constant and important feature that it will be again referred to. The symptoms now noticed generally last from three to four days; when the fever lessens, the pulse flags, the tongue gets brown and dry, the excitement diminishes, and the delirium is apt to pass into coma. In a few days more the prostration has become extreme, and the symptoms resemble those presented

n the last stage of typhus. When the disease ends favorably, the improvement is usually very gradual, and unattended by any critical sweat or looseness of the bowels.

Before proceeding further it will be better again to notice the sickness which occurs in cerebral diseases. Dr. Russell Reynolds remarks,* that headache from gastric disturbance is as common as vomiting from cerebral derangement. In children, obstinate vomiting is particularly indicative of brain disease. The same author mentions certain peculiarities, which may be thus arranged to aid our diagnosis:

Gastric or Hepatic Vomiting.	*Cerebral Vomiting.*
1. The nausea is relieved, at all events temporarily, by the discharge.	1. There is little or no nausea, and the vomiting continues in spite of the discharge of the contents of the stomach, directly any liquid or solid is introduced.
2. Tongue foul, conjunctivæ often yellowish, and headache secondary in point of time.	2. Tongue clean, conjunctivæ colorless or injected, and headache primary.
3. Griping abdominal pain, diarrhœa, and disordered stools.	3. Generally, obstinate constipation.
4. Retching, and increased salivation.	4. Stomach emptied without effort, while there is no increased action of salivary glands.

Thus, in one case, the vomiting depends upon derangement in the gastro-intestinal canal; in the other, it is owing to increased sensorial or reflex action. I would only add, as a caution, that vomiting due to increased reflective mobility is not always caused by cerebral disease. Thus, it occurs during pregnancy, as well as in certain uterine and ovarian disorders. Moreover, the most severe case of constant vomiting which has ever fallen under my notice was due to a slight ring of cancerous deposit around the œsophagus, nearly an inch above its termination in the cardiac orifice of the stomach. In this instance the morbid product seemed to act upon the stomach by reflex action, for it was so inconsiderable in amount that it could not directly interfere with the normal functions of this viscus. In the sickness of pregnancy, as well as in cases resembling that just mentioned, there are no symptoms of gastric or hepatic derangement.

In *meningitis confined to the base* the diagnosis is very difficult. Andral† relates the particulars of two fatal instances where the symptoms were very dissimilar. In one there was delirium at the commencement, great fever, contracted pupils, raving, frequent pulse, teeth clenched as in trismus, and a retraction of the head. The tongue was natural. The patient seemed as if in profound sleep; and as the coma got more profound, the respiration became embarrassed, and death occurred as in apoplexy. On examination the entire lower surface of the cerebral hemisphere was found covered by a thick layer of pus contained in the pia mater.—The second example presented at first pain in the temples, vomiting, constipation, symptoms of wry-neck, loss of appetite, and a desire for rest. When seen a few days afterwards the face was pale and dejected, the look vacant, the eyes sensible to strong light, intelligence clear, with pulse and skin natural. The headache

* Opus jam citat. p. 56.
† The Clinique Médicale. Spillan's Translation, p. 16. London, 1836.

was the only important symptom; and it was unrelieved by bleeding, leeches, and blisters to the leg. Coma gradually set in, became profound, and ended in death. Up to the termination the pulse continued natural, and only at the last was respiration disturbed. At the autopsy the upper part of the brain and meninges was healthy; but the lower surface of the pia mater was infiltrated with a purulent layer from seven to eight lines in thickness.

Inflammation of the dura mater is generally the result of violence, or of disease of the bones of the skull—particularly of the petrous portion of the temporal bone or of the ethmoid. With children, chronic affections of the ear and nose, which are often long regarded as trifling, sometimes terminate fatally by a rapid extension of the morbid action to the dura mater. In an instance of this kind about which I was consulted at the last moment, the acute symptoms came on so insidiously that no danger was apprehended until the child suddenly became comatose. In fact, up to the time that the latter occurrence supervened, nothing was complained of but headache and a desire for repose; the pulse continuing natural until death, and there being neither fever nor sickness. A discharge from the left ear had persisted since an attack of scarlatina some two years previously.

2. Cerebritis.—Partial inflammation of the brain, without meningitis, is of rare occurrence. The most remarkable symptoms appear to consist of persistent, deep-seated pain in the head; general malaise and vomiting; impairment of vision and hearing; confusion of ideas, with failure of memory; and convulsive paroxysms, ending in paralysis or coma. The mental disturbance varies considerably according to the seat of the disease. At the end of three or four days there may be a copious effusion of serum, followed by all the symptoms of compression. Sometimes the inflammation ends in abscess, the latter perhaps forming without exciting any suspicion in the minds of the attendants.*

* The following remarkable instances serve well to exemplify the obscurity which surrounds some of these cases:

A youth, aged eighteen, applied as an out-patient at the Hôpital St. Louis, on account of a purulent discharge from the ear. So little inconvenience did he feel, that it was with difficulty he could be persuaded to enter the hospital. Though appearing in excellent health, death took place suddenly the next day, immediately after the occurrence of a convulsive paroxysm. At the autopsy, the petrous bone was found diseased, but the dura mater covering it had not undergone any change. The cavity of the tympanum was filled with pus, which obtained an exit both by the external auditory meatus and the Eustachian tube. All the convolutions of the left cerebral hemisphere had become effaced, while a collection of pus occupied the whole of the middle and posterior lobes of the brain. Very small abscesses were scattered throughout the anterior lobe. This patient had never manifested the slightest intellectual disturbance; and no symptom indicated the existence of cerebral lesion, until the pus, bursting into the lateral ventricle, caused instant death.—Gazette Hebdomadaire de Médecine et de Chirurgie, p. 743. Paris, 15 Novembre, 1861.

A soldier of the French line, being on parade, was suddenly seized with vertigo. He passed his musket to a comrade, staggered a moment, and dropped senseless. Carried to the hospital, he remained for some time comatose; with his limbs relaxed, his pupils dilated and immovable, and his pulse full and slow. He then fell into a series of epileptiform convulsions, and died. The following history was obtained: Two years previously this man had stolen out one night from barracks, and in order to re-enter unperceived, had to climb a rampart. He tumbled into the ditch, pitching on his head; but on recovering consciousness, returned to his quarters without saying a word about the accident. He continued to perform actively the duties of sergeant, and was never suspected of ill-health; nevertheless, it was remembered that

3. Acute Encephalitis.—This disease may be roughly described as a morbid process which gives rise to more or less complicated phenomena during life, according to its degree and the extent to which the brain and its membranes are involved. After death, traces of its power are found in the form of meningeal congestion, with effused lymph or serum or pus; an appearance of vascularity, varying from bloody points, or a scarlet tinge, to a dusky redness about the affected part of the brain; with occasionally softening, or suppuration of the cerebral substance.

Symptoms.—The chief and earliest indications of encephalitis or meningo-cerebritis,* as it is appropriately termed, are—fever, nausea and vomiting, acute headache, frequent and irregular pulse, constipation, impatience of light and sound, watchfulness, a look of oppression or sullenness, suffusion of the eyes, and confusion of thought or even delirium. These symptoms are most marked when the meningitis predominates. At the end of from twelve hours to two days, the second stage of the complaint sets in—the period of collapse. The patient falls into a state of stupor; his articulation gets difficult or indistinct; his vision and hearing become dull; the pupil—from having been contracted to a pin's point—becomes dilated; there may be squinting, and paralysis of the muscles of the eyelids; there are frequent twitchings of the muscles; the countenance is ghastly; sordes form on the gums and teeth; the body is covered with cold sweats; the sphincters relax; and there are a few convulsive paroxysms, paralysis, and profound coma, which usually soons ends in death. Occasionally the first symptom that attracts attention is a sudden attack of convulsion; in some cases occurring without any previous illness, sometimes preceded for a few days by headache and slight complaints which have passed on unnoticed. The convulsion is generally long and severe; it may be followed immediately by coma, which in a few days is fatal; or it may recur frequently at short intervals, and pass into coma at the end of twenty-four hours.

from time to time he had complained of violent headaches attended with great prostration, and the sufferer himself seems to have attributed them to the fall. These headaches, after lasting from six to twenty-four hours, would pass off in a very heavy sleep. Not the slightest disturbance of intellect or locomotive power made its appearance. A few months before death, the surgeon of the regiment had noticed that the sergeant was much changed in appearance; the face was pale and of a *leaden hue*, and there was considerable loss of flesh. A careful physical examination produced no elucidation of the mystery. On *post-mortem* inspection, no external trace of wound was found upon the head, nor was there any evidence of fracture, old or recent. The veins of the dura mater were gorged, but there was no bloody effusion. The left hemisphere was much enlarged, and on palpation of its convex surface extensive fluctuation could easily be perceived. On slicing the brain, the left lateral ventricle was found distended with liquid blood, which seemed recently effused; the third ventricle was similarly filled, and a rent communicated between the two. The cerebral substance in front of the left lateral ventricle was the seat of a spherical cavity the size of a walnut, full of blood, and communicating with the ventricle by an opening which would admit a common quill. Along with the blood in this cavity there was also found a considerable layer of concrete pus, lining its walls, from which, however, it was separated by a whitish gray pyogenic membrane. The series of events, then, in this case were: 1. Formation of an abscess in the anterior lobe, in consequence of a blow on the head; which abscess was the cause of the intermittent headache, and latterly of the failure in general nutrition. 2. Rapidly fatal hemorrhage into the ventricles, produced by the sudden rupture of the wall of the abscess. —Gazette des Hôpitaux. Quoted from the London Medical Review, p. 333. December, 1862.

* The *Phrenitis* of some authors; from φρήν, the mind; terminal *-itis*.

Dr. Watson thinks that when nausea and vomiting are the earliest symptoms, the inflammation has had its origin in the cerebral pulp—in the substance of the brain; and that when the attack commences with a convulsion, the inflammation has started from the pia mater or the arachnoid.

In all the forms of this dangerous complaint there is great variety in the symptoms, and much observation is necessary to put us on our guard against the insidious characters which many of the cases assume, and the deceitful appearances of amendment which often take place. Fortunately the disease is not of frequent occurrence. It may terminate fatally in a few hours; or the patient may struggle on for two or three weeks.

Causes.—These are often difficult to detect. Inflammatory affections of the brain sometimes arise without any appreciable cause. Plethoric persons, and such as have short necks, are said to be more liable to them than others. Occasionally they come on in the course of continued fever, or of measles, or of scarlatina; or they may follow upon wounds, blows, or other injuries; or they may be due to disease of the bones of the ear or of the nose; or to poisoned blood, or to intemperance; or they may be owing to suppressed evacuations. Dr. Abercrombie states that—"One of the most common examples of this is suppression of the menses, which in young women of unsound constitution is very often followed by dangerous affections of the brain. Headache, or any symptom in the head occurring under such circumstances, is always to be considered as requiring most minute attention."*

Diagnosis.—To distinguish encephalitis from the delirium of fever and from delirium tremens is sometimes difficult. The history will often throw light on the matter. In phrenitis the delirium is an early symptom, and it is usually violent; the pulse is sharp, hard, and often irregular; and there is generally sickness. In fever, the delirium is an after symptom. In delirium tremens,—the busy delirium, the soft and compressible pulse, the loquacity of the patient, the trembling of the hands, and generally the ease with which he is temporarily roused to answer questions rationally, are important diagnostic signs. Moreover, as Dr. Bence Jones has shown, in acute inflammation of the brain there is an increase in the earthy and alkaline phosphates of the urine; while in delirium tremens there is a marked diminution of them.

Morbid Anatomy.—The post-mortem appearance most commonly found is more or less vascularity of the substance of the brain; a condition indicated by the existence of numerous bloody points in the medullary portion, giving an appearance as if it had been sprinkled with red dots. In other instances the vascularity is much greater, sometimes being so excessive that the part is of a dusky red hue. There may be an exudation of pus, either upon the convolutions, or collected in one or more abscesses in one of the hemispheres. Softening of a part of the cerebral substance is not uncommon; the softened portions sometimes resembling thick cream, so that they are readily washed away by a gentle stream of water. Moreover, we may have serous effusions beneath the pia mater and into the ventricles.

The dura mater is seldom involved in the morbid action, unless the

* On Diseases of the Brain and Spinal Cord. Fourth Edition, p. 148. Edinburgh, 1845.

inflammation is the result of violence. In such cases there may be a deposition of false membranes between the bone and dura mater, or between the dura mater and arachnoid; or we may find thickening of all the membranes.

Treatment.—The principal measure usually recommended is a strict observance of the antiphlogistic regimen. In other words, the practitioner has been advised to put his trust in a diet of the lowest kind, general and local bleeding, antimonials in some stages of the disease, digitalis, active purgatives, mercury, blisters to the back of the head and neck, mustard pediluvia, and the constant application of cold to the scalp after the hair has all been shaved off. With regard to venesection it has been suggested that the blood ought to be allowed to flow until a decided impression is made upon the pulse, or until the patient faints; which will perhaps happen when some twenty-four ounces have come away. Afterwards, it is said that leeches or cupping may be resorted to.

When it is remembered that encephalitis is one of the most quickly depressing and fatal diseases which can affect the human body, it may readily be imagined—from what has been already stated—that its dangers are not lessened by the foregoing treatment. And such seems really to be the case; for one of the strongest advocates of this practice, Dr. Abercrombie, in speaking of the results of a course of these remedies, says: "The cases which thus terminate favorably, form, it must be confessed, but a small proportion of those which come under the view of a physician of considerable practice; but they hold out every encouragement to persevere in the treatment of a class of diseases, which, after a certain period of their progress, we are too apt to consider as hopeless." With the greatest respect for this clever physician's opinions, it rather seems to me that the extensive failure of one plan of treatment should decidedly lead us to try another; and more especially, perhaps, to see if Nature unaided, or only gently guided, will not carry a patient through a disease where the efforts of Art are notoriously so futile. Be this as it may, let us determine not to thwart the natural efforts at reparation, as we may easily do by acting upon the fallacious notion that the free loss of blood is well borne; neither let us credit those who assert that antimony or mercury is capable of effecting a cure in these cases. On the contrary, we shall do much more good if we can but be contented with prescribing for the urgent symptoms as they arise—endeavoring to calm excitement by sedatives, to lessen increased heat of body by diluents and tepid sponging, to prevent accumulations in the intestines by purgatives, and to diminish maniacal delirium by the application of cold to the head.

Active cathartics of calomel and jalap, followed in three or four hours by an aperient draught, are often deemed indispensable (F. 140, 159). Jalap and senna (F. 151) forms a favorite remedy with me; or simply such a saline aperient as F. 152 may be recommended. Croton oil (F. 168) is a most valuable purgative in some of these cases where there is obstinate constipation. Dr. Abercrombie rather illogically says: "Although bloodletting is never to be neglected in the earlier stages of the disease, my own experience is, that more recoveries from head-affections of the most alarming aspect take place under the use of very strong purging than under any other mode of treatment."*

* Opus jam citat. p. 153.

The application of cold to the head, after it has been shaved, is a remedy of importance. Pounded ice in a bladder, or a cold evaporating lotion (F. 273), or especially the pouring of cold water in a stream upon the vertex of the head, will best effect our object of reducing the temperature and calming excitement. By the cold douche, used with discretion, a strong man in the highest state of maniacal delirium may often be subdued in almost a few minutes; but it must be remembered that this practice, if long continued, or too often repeated, has a very depressing influence.

With regard to medicines for directly modifying the morbid action, I know only of one on which the least reliance can be placed, and that is the iodide of potassium. I have seen this agent, in doses of three to eight grains repeated every four or six hours, do so much good in a few apparently hopeless cases, that I think it ought always to be tried. I have, of course, found it fail; but in my hands it has never done mischief. It may often be advantageously given at the same time that stimulants are being cautiously employed.

When, from exhaustion of the nervous force, an extreme degree of collapse sets in, the only chance of rescuing the patient will consist in the administration of stimulants; such as ammonia, spirit of ether, strong beef-tea, wine, or brandy. In all stages of the disease the practitioner ought to watch his patient almost hour by hour, must ascertain that he is kept dry and clean, and will have to be careful that the bladder does not become distended.

Should the disorder happily yield to these measures, great attention will be requisite for some time—especially with regard to diet and the avoidance of all excitement—to prevent a relapse.

4. Chronic Encephalitis.—A disease which may follow an attack of acute meningo-cerebritis, or may come on independently as the primary disorder. The term *chronic* is used not merely in the sense of prolonged duration, but also as implying a series of symptoms of a subacute character.

The phenomena presented by chronic encephalitis are singularly diversified; but they may be briefly said to be commonly allied to those which mark the commencement of insanity. Hence we find either great mental excitement or depression; some absurd whim exists, to gratify which everything must be sacrificed; and the patient either believes that he is about to make a fortune, or to become a parish pauper. Amongst the general symptoms, hesitation in speaking or a slight stammering, a stiffness of some of the muscles, slight headache, loss of appetite, constipation, and irregularity of the pulse, are perhaps the most prominent. As the disease slowly progresses, however, the evidences of cerebral disorder become fully developed; the memory fails, the external senses become impaired, paralysis shows itself, and the general health completely breaks up.

Chronic meningitis sometimes runs its course in a few months, or it may last for years. In our treatment we can only attempt to combat the symptoms as they show themselves, while we try by judicious hygienic measures to support the general health. Repeated blisters behind the ears, the use of a seton in the nucha, and perhaps the free inunction of the shaved scalp with the iodide of potassium or red iodide

of mercury ointment, may be of some utility.—The state of the bowels, and of the uterine functions in women, ought to be looked to.

5. Softening, Induration, and Tumors of the Brain.—The general symptoms of *cerebral softening* are, more or less severe and persistent pain in the head; attacks of vertigo, coming on suddenly and soon passing off; a diminution of intellectual power, embarrassment in answering questions, depression of spirits, and a tendency to shed tears on any excitement; prickings and twitchings in the limbs, sometimes pain, and sometimes numbness; a tendency to sleep, especially after meals; and more or less impairment of vision and hearing. In inflammatory softening the headache is more acute than in the other variety; the limbs are more frequently the seat of painful cramps, stiffness, or contractions; and the general sensibility is more acute.—In the second stage of either form, there may be paralysis of a limb, or of one half of the body; questions are answered slowly, and the patient has a difficulty in making himself understood; there is great general feebleness, with a weak and intermitting pulse; there may be sickness and constipation; there is a difficulty in emptying the bladder, while the stools are passed involuntarily; the respiration is labored, towards the last becoming stertorous; and a state of coma comes on, which may perhaps pass off in a day or two, but only to return and become more profound, until it ends in death. Although softening may occur at any period of life, it is most common after the fiftieth year.

Acute ramollissement, or *red softening* of the brain, is one of the terminations of the inflammatory process; being due perhaps more often to the acute than to the chronic form of the disease. The ramollissement is usually partial; the softened parts becoming pulpy, and ultimately of the consistence of thin cream. It may sometimes be diagnosed by the occurrence of the symptoms already described, together with paralysis combined with spasm; or by the permanent contraction of the flexor muscles of one or both extremities. When resulting from acute inflammation, the corpus callosum, septum lucidum, fornix, and the cerebral substance surrounding the ventricles, are the parts which usually suffer. In such instances, too, the softened structure is often infiltrated with pus; while occasionally the purulent matter is contained in a well-defined cavity, forming *abscess of the brain*. Inflammatory red softening must be distinguished from *white softening* of the cerebral substance; which is a morbid process that may occur in aged persons, from an opposite condition to the inflammatory—from an insufficient supply of blood, owing to disease of the cerebral arteries, probably inducing fatty degeneration of the brain tissue. The gray matter of the convolutions at the base of the brain, the optic thalami, and corpora striata are the regions then affected. It has been already pointed out that the detachment of fibrinous deposits from the valves, or interior of the left side of the heart, and their circulation with the systemic blood until they become arrested in one of the cerebral arteries, may—by impeding the transit of a due quantity of blood—lead to imperfect nutrition, and hence to softening.

In one of his clinical lectures Dr. Brown Séquard related some interesting examples of *softening of the cerebellum*. He alluded to the great variety of symptoms in these affections, and pointed out the chief

differences between cerebral and cerebellar inflammatory ramollissement. In all except two of his cases there was a fixed pain at the back of the head, and generally on the side corresponding to the diseased cerebellum. Amaurosis occurred complete in both eyes in two of eleven instances, though the disease only existed in one-half of the cerebellum; in one case it existed only in the right eye, with disease of the left half of the cerebellum. Hemiplegia was complete in two cases, incomplete in one. Paraplegia existed in only two. The other symptoms were a tendency to walk backwards, tottering gait, vertigo, an emotional and semi-convulsive agitation of the limbs, obtuse hearing, and aphonia. Vomiting existed in none, though frequent in other diseases of the cerebellum. No two of the cases recorded were alike, but all showed great differences from cerebral softening. There were none of the referred or local sensations or pains in the paralyzed limbs which are so characteristic of inflammatory cerebral softening. The various kind of involuntary movements were absent; no muscular rigidity; and no irregularity of pulse, either as regards rapidity or strength.

Induration of the brain is another termination of either acute or chronic inflammation. The indurated portion is generally of small extent; presenting the appearance of wax, or of white of egg boiled hard. The change is probably due to a great increase of the albumen.

Tumors—both simple and malignant, *deposits of tubercle*, *syphilitic gummatous growths* and *hydatids* have also been found in the brain. Within the last few years Dr. Jenner has discovered *sarcinæ ventriculi* in the fluid removed from the ventricles of a child who died of acute tnberculosis. The indications of either of these occurrences are usually very obscure; varying with the situation of the morbid product, its size, and the condition of the nervous tissue around it. Probably the most common symptoms are headache, sickness, giddiness, mental depression with confusion, partial paralysis, and epileptiform convulsions.

6. Tubercular Meningitis.—Acute inflammation of the brain is a very common disease of early life—of children under five years of age. It rarely occurs, however, in such as are previously healthy; when it does so, it may be regarded as simple encephalitis. When it is the result—as it most frequently is—of tubercular deposit in the brain or its membranes, when it occurs, in fact, in scrofulous children, it is then known as tubercular meningitis. Formerly the name of acute hydrocephalus was given to this disorder; but this term was evidently badly chosen, since it referred only to one of the possible results of the disease, not to the disease itself.

Symptoms.—The symptoms of tubercular meningitis are various and uncertain. For convenience, they may be arbitrarily considered as exhibiting three stages. The *first* or *premonitory stage* is attended with indications of mal-nutrition; and there are more or less perfect signs of the strumous diathesis in the child or its parents. There is often a short dry cough; much peevishness, intolerance of light and sound, headache, giddiness, and other warnings of cerebral congestion; together with general fever, presenting exacerbations and remissions at irregular periods. The skin is hot; the appetite capricious—sometimes bad, sometimes voracious; the tongue is furred, and the breath offensive; there is often nausea and vomiting; and the bowels are disordered—

generally constipated. The child is drowsy, yet restless; he sleeps badly, moans or grinds his teeth, screams and awakes suddenly in alarm without any apparent cause; while often there is delirium.

At the end of four or five days, the disease, if unchecked, passes into the *second stage;* when its nature becomes very apparent, and a cure almost hopeless. The child only wishes to remain quiet in bed; his countenance is expressive of anxiety and suffering, and is alternately flushed and pale; the eyes are closed, and eyebrows knit; and he is annoyed by light and the least noise. If old enough to reply to questions, the little one complains of headache, weariness, and sleepiness; crying out frequently, "Oh, my head!" As this stage advances, the pulse—which has hitherto been rapid—becomes irregular and diminished in frequency, often falling in a few hours from 120 to 80; the slightest exertion, however, at once accelerates it. Moreover a remarkable remission of all the symptoms may now take place; so that pain ceases, while the general condition improves. But the amendment is not of long duration. Stupor and heaviness gradually come on; there is often squinting; the helpless patient lies on his back almost in a state of insensibility, perhaps picking, with tremulous fingers, his nose and lips; convulsions frequently occur, with now and then paralysis; while, at the same time, the urine and fæces are passed unconsciously.

The transition to the *third stage*, at the end of a week or two, is not unfrequently effected very gradually by the drowsiness passing into profound coma, from which it is impossible to rouse the child; while the pulse gets feeble, the extremities lose their warmth, and a cold clammy sweat breaks out over the body. In other instances the child becomes comatose quite suddenly; immediately afterwards being attacked with paralysis and convulsions, which often put an end to the painful scene. Occasionally, however, death does not occur until the lapse of several days.

M. Bouchut was the first to make use of the ophthalmoscope in the diagnosis of tubercular meningitis; and he asserts that in some cases, but not in all, characteristic appearances may be observed before the convulsive period sets in. These are,—1. Peripheral congestion of the papilla, with spots of congestion in the retina and choroid. 2. Dilatation of the retinal veins around the papilla. 3. Varicosity and flexuosity of these veins. 4. Thrombosis of the same. And 5. In some instances, retinal hemorrhages from rupture of the veins.*

When tubercular meningitis occurs in the adult, there is generally a history of previous lung affection; which affection seems to become ameliorated as the cerebral disorder sets in. The symptoms may early assume an apoplectic or a convulsive form. More frequently they come on gradually with vomiting, slight fever, and most acute pain in the head; the patient seems unable to collect his thoughts, and is peevish and irritable, desiring only to be left quiet; there may be mutism and somnolence; and the pulse is irregular and feeble. In the second stage the depression increases, there is greater mental dulness or delirium, and there are clonic or tonic spasms. Then in the third stage the sphincters relax, and there is increasing stupor, paralysis, and death.

Post-mortem Appearances.—Those usually found are—traces of in-

* Gazette des Hôpitaux, pp. 225, 469. Paris, 15th May and 9th October, 1862.

flammation of the membranes of the brain; especially effusion of serous fluid beneath the arachnoid and in the meshes of the pia mater, as well as the presence of false membranes between the arachnoid and pia mater at the base of the hemispheres. The cerebral substance often contains scrofulous tubercles; while granular tubercular deposits may be seen scattered upon and between the membranes, and especially in the pia mater lining the fissure of Sylvius. But the characteristic morbid appearance consists of softening of the central parts of the brain, with effusion of thin watery serum into the ventricles. In the majority of cases tubercular matter is found in the lungs.

Treatment.—The treatment of tubercular meningitis has always been said to be beset with difficulties; inasmuch as, being an inflammatory affection, it was thought to demand remedies which the patients—strumous subjects—could not bear. Fortunately, the difficulty is abolished, if the observations made in the preceding pages are at all sound; and, having acted upon rules deduced from these doctrines, I can express my firm belief, from the cases I have seen, that the more we act up to their spirit, and the less we deplete in this disease, the greater the chance of the ultimate recovery of our patient. It is only fair to mention, however, that several authors agree that depletion is not to be had recourse to without great consideration; that if there is much doubt, the practitioner should first try the effect of a strong purgative; and that if it be necessary to take blood, local bleeding (by leeches) will generally answer every purpose. But these gentlemen forget that it is impossible to effect local bleeding, in the sense intended.

In almost all instances purgatives are very useful; and I think perhaps that most good is derived from such as contain or consist of mercury. After the bowels have freely acted, I am in the habit of trusting to the iodide of potassium; which is administered in doses varying from half a grain to three or four grains, every four or six hours. The employment of cold to the scalp is likewise an important remedy. A rag wetted with cold water, or the evaporating lotion (F. 273), laid on the child's head and frequently renewed, will prove soothing.

When the infant is teething, many practitioners resort, as a matter of course, to scarification of the gums; unmindful of the fact that the irritation often arises from the passage of the tooth through the bony canal of the jaw, rather than from pressure on the gum. Such practice is a piece of barbarous empiricism. On the other hand when the gum is really tender and hard and swollen, then the use of the lancet gives great relief. Supposing that the vital powers become much depressed, either from the course of the disease or from the action of the remedies, stimulants must be freely had recourse to. I have frequently given a child of from six to twelve months old a teaspoonful of equal parts of port wine and water, or of port wine and beef-tea in the same proportions, every hour, or every second hour, with the greatest advantage. If physic be preferred, some ammonia or a mineral acid, with spirit of ether (F. 364, 365), may be ordered.

7. Hypertrophy and Atrophy of the Brain.—*Hypertrophy* of the cerebral hemispheres has occurred in children, but in the majority of recorded cases the individuals have been between 20 and 30 years of age. In some instances, the skull increases in size as the

brain itself becomes over-developed; and then there may be an absence of all symptoms, until perhaps death takes place in a sudden attack of convulsions. But if the bony case does not become enlarged, indications of compression necessarily ensue; and hence there will be mental disturbance varying from slight dulness of intellect to complete idiotcy. The other prominent symptoms consist of paroxysms of headache, attacks of vertigo, impairment of the power of motion ending sometimes in general paralysis, an unaltered or very slow pulse, and more or less severe epileptic convulsions. Death may occur during one of the latter attacks, or in a state of coma coming on subsequently.

The opposite condition, that of *atrophy*, may vary from a complete absence of the cerebral hemispheres incompatible with extra-uterine life, to a simple incomplete development of certain convolutions above the ventricles. When the atrophy exists only on one side, life may not be interfered with for a long time. Andral states that he has seen cases of the following kind: Above the lateral ventricle of one side there has been no nervous substance, the arachnoid usually covering the convexity of the hemispheres, being found in apposition to that which should line the parietes of the ventricles; while these two folds of one and the same membrane have been separated from each other by an areolar tissue, provided with a great many vessels. He mentions one remarkable instance where this alteration seems to have commenced twenty-five years before death; the latter being produced by an attack of peritonitis. Up to the last moment there was a perfect preservation of intelligence; although the autopsy revealed no trace of nervous substance between the meninges and the ventricles on the right side.

II. HYDROCEPHALUS.

Hydrocephalus (Ὕδωρ, water; κεφαλή, the head), or dropsy of the brain, is met with in children at various ages, as the result of a great variety of circumstances. When congenital, as it often is, we generally find it associated with some cerebral malformation. It is sometimes the result, sometimes the precursor, of tubercular meningitis; and it is then frequently spoken of as *acute hydrocephalus*. When congenital, or when it arises slowly from constitutional causes, it is termed *chronic hydrocephalus*.

The head attains a very great size in this disease, the unossified sutures readily yielding to the pressure of the liquid. One side of the cranium is now and then larger than the other, the bones are mostly thin and transparent, while the membranes of the brain are thickened. The serum is usually contained in the lateral ventricles, which are often expanded into one large cavity; but occasionally it is collected in the sac of the arachnoid, and may then compress the brain to a remarkable extent. The quantity of the fluid varies from two or three ounces to as many pints. In the well-known history of a man named Cardinal, it is reported that the head measured in circumference thirty-three inches; while after death nine pints of water were found in the cavity of the arachnoid, together with one pint in the ventricles.

The bodily functions are frequently but little impaired, occasionally

not at all, till a short time before death; while it is remarkable also how little the mental powers are affected in some subjects. Heberden has related an instance where there were no signs of dropsy of the brain during life, and yet eight ounces of fluid were found in the ventricles after death. Although essentially an affection of childhood, yet cases are recorded in which it has affected adults; and amongst others the celebrated Dean Swift suffered from it. According to Dr. West, almost every example is fatal. Professor Gölis, of Vienna, affirms, on the contrary, that of the cases which commenced after birth, and which were seen and treated early by him, he saved the majority.

The *symptoms* generally begin to show themselves before the infant is six months old, in cases where they do not exist from birth. Although the child takes its food eagerly, it does not thrive; and consequently, after a few weeks, the marasmus becomes extreme. The wasted appearance of the body makes the increased size of the head more remarkable; so that he who has once noticed the small face with the prominent heavy forehead, the protrusion and downward direction of the eyes, and the extended globular cranium with its open sutures and fontanelles, needs no pen-and-ink sketch of the hydrocephalic infant to fix the features upon his memory. The intelligence may—as before mentioned—be unaffected, but often it is much enfeebled: there is great irritability and peevishness, a morbid susceptibility to noise and light, ofttimes a liability to epilepsy, while the muscular weakness is occasionally very great. A peculiar rolling movement of the eyeball can often be noticed; and there may be strabismus, with occasionally amaurosis. Recurring attacks of headache and nausea are complained of; there is constipation, with dark-colored offensive stools, and pains about the belly; and there is grinding of the teeth during sleep, with frantic screams on awaking. Moreover, the position of the head, often drooping helplessly on one side, is remarkable; this being due to the muscles and vertebræ being too weak to maintain it in the erect position.

In the second stage there is generally more stupor, great pallor, a slow pulse, dilatation or contraction of the pupils, while the little fingers are constantly picking the nose and lips. When the disease is about to terminate favorably the lethargy, pallid hue of skin, and irritability gradually subside; while a desire for food is evinced, the muscular power increases, and the emaciation gets less marked. But in other instances excessive prostration sets in, the pulse becomes rapid, there may be paralysis, and coma or convulsions follow, ending in death.

The *causes* of this affection are obscure. The children of drunken, scrofulous, or syphilitic parents seem most likely to be sufferers from it. Exposure to cold, insufficient nourishment, breathing impure air, blows upon the head, the sudden retrocession of cutaneous disease, dentition, intestinal worms, tubercular deposit on the membranes of the brain, or the extension of inflammation from the petrous portion of the temporal bone, may all be regarded as likely to excite it. In some instances it has followed the eruptive fevers—especially scarlatina and measles.

With regard to the *diagnosis*, care must be taken to distinguish dropsy of the brain from *spurious hydrocephalus* or *hydrocephaloid disease*. Weakly children are especially the subjects of this morbid condition; which produces heaviness of the head, drowsiness, great languor, un-

healthy stools, alarm at slight noises and at strangers, freaks of temper, irregular breathing, and coolness of the skin. Above all, the surface of the fontanelle is found depressed; whereas it is prominent in dropsy. If these symptoms are insufficient to teach the practitioner the difference between the two disorders, the treatment will show him how little they are allied to each other. Purgatives, diuretics, and poor diet will rapidly increase the severity of the symptoms in spurious hydrocephalus; which disease demands the administration of pure milk, beef-tea, steel or bark, and port wine or brandy in arrowroot.

Many plans of *treatment* have been practised in hydrocephalus with a small amount of success. The favorite remedies appear to have been purgatives, bloodletting, blisters, and mercury to salivation. The cases which have come under my own care have occurred chiefly in hospital practice; and I have trusted to gentle aperients, plain but nourishing food, cod-liver oil or glycerine, with sometimes iodide of potassium or iodide of iron. As regards the iodide of potassium I can only say that my faith in its efficacy yearly increases: but to do any good it ought to be freely given (one grain every six hours to a child one year old), and must be persevered with for many days or even for a few weeks.

The course advocated by Professor Gölis, after great experience, consists in the administration of calomel in quarter or half-grain doses twice daily; together with the inunction of one-eighth and one-fourth of an ounce of the mild mercurial ointment (Phar. Lond. 1836) into the shaven scalp once in twenty-four hours. At the same time the head is to be kept constantly covered with a flannel cap, to prevent all risk of the perspiration being checked. If no improvement be perceptible after a lapse of six or eight weeks, diuretics—as the acetate of potash, or squills, or both—are to be combined with the treatment; and an issue may be made in the neck or on each shoulder, to be kept open for months. When convalescence is once established, he thinks benefit is derived from small doses of quinine—a quarter of a grain three or four times daily.

Two remedies—*compression* of the head, and *puncturing* it—have been strongly advocated by some writers. Compression is best effected by bandaging, or by the application of strips of adhesive plaster applied over the whole of the cranium, so as to make equal pressure on every part. In cases where there are no symptoms of active cerebral disease, pressure will probably do good; and from my own experience I am inclined to think favorably of it. Puncture is performed with a small trocar and canula at the coronal suture, about an inch and a half from the anterior fontanelle, so as to avoid the longitudinal sinus; while the fluid is to be evacuated slowly, as much as will flow may be allowed to come away, and gentle pressure must be kept up both during its escape and afterwards for some weeks. This operation is only to be had recourse to when other means have failed. It has occasionally proved successful in very young children.

Dr. Watson mentions two hopeless cases successfully treated on a plan suggested by Dr. Grower.* Ten grains of crude mercury were rubbed down with twenty grains of manna and five grains of *fresh* squills. This formed a dose which was taken every eight hours, for three or four

* Principles and Practice of Physic. Third Edition, vol. i, p. 458. London, 1848.

weeks. It caused a profuse flow of urine, great debility, and emaciation; but no ptyalism. When the symptoms of hydrocephalus had disappeared, the health was restored by steel.

The foregoing remarks show the necessity of attending to *prophylactic* measures. A child with any tendency to hydrocephalus should be reared so as to strengthen its system as much as possible; and therefore it ought to have a nourishing diet, with plenty of milk, a salt-water bath every morning, and plenty of exercise in pure air. In some instances residence at the sea-side, with the administration of cod-liver oil, may be needed. Stimulants had better always be avoided; and only the most gentle attempts at education are to be permitted. Such a child is generally precocious; and often is only too happy to over-work its brain, if permitted to do so.

III. APOPLEXY.

By the term apoplexy (Ἀπὸ, from, or by means of; πλήσσω, to strike,—because those attacked fall down, as if from a blow) is meant sudden insensibility—the loss of sensation, thought, and power of voluntary motion; together with a more or less severe disturbance of the functions of respiration and circulation. It is a state of coma occurring suddenly from pressure upon the brain; the compressing power having its seat within the cranium.

There is a popular belief that patients suffer from three different attacks of apoplexy; the first being mild, the second followed by paralysis, and the third ending in death. Whether or not this be exactly true, it is at least certain that the danger greatly increases with each attack.

Causes.—Whatever tends to induce cerebral congestion may produce apoplexy; and therefore amongst the causes we must set down the immoderate use of intoxicating drinks, tobacco, and opium. These agents may act as direct provocatives of a fit, or indirectly by inducing disease of the nervous or vascular structures. Great heat or cold, sudden excitement, mechanical violence, plethora from the sudden suppression of an accustomed hemorrhage, and in short anything which tends to produce congestion and to lower the tone of the capillaries, may give rise to an attack.

In the greater number of instances some disease of the cerebral blood-vessels is found. Fatty degeneration of the arterial tunics is perhaps the most common; but there may be ossification or calcification, or some intra-cranial aneurism. Cases of renal disease not unfrequently end in apoplexy, the same degeneration of the coats of the vessels occurring in the brain as in the kidney. Hypertrophy of the left ventricle, independently of valvular affection, may cause a fit, owing to the blood being propelled with greater force than the vessels can bear. So also valvular disease of the heart, ossification of the aorta, the pressure of an overloaded stomach, &c., may be the source of a seizure by offering an impediment to the natural circulation of the blood.

Diagnosis.—It is often a matter of difficulty to discriminate between apoplectic coma, and that due to a narcotic poison or to drunkenness. The distinction is most important as regards the treatment. The coma

is profound in each instance, though arising from so different a cause; the history of the case, the general appearance and age, and the presence or absence of the odor of spirits in the breath, are the points which chiefly help to solve the embarrassment.

Speaking generally, it may be said that in intoxication the person may often be momentarily roused, the pulse is quick, and stertorous breathing is either absent or not loud. The pupils may be contracted or dilated, though the latter appearance is most common. The characteristic odor of alcohol is generally appreciable. In poisoning from opium contraction of the pupils is not always present in the advanced stage. In apoplexy the patient cannot be roused, the pulse is slow rather than rapid, and the stertor often well marked. (See p. 241.)

So many cases of apoplexy occurring in the street have been mistaken for intoxication, that no person found insensible by the police (whatever the *supposed* cause may be) ought to be placed in a cell until an examination has been made by a medical man. Even if the individual be "dead-drunk," remedies are urgently demanded, to prevent fatal poisoning or apoplexy; and especially ought the stomach-pump to be employed for the removal of any alcoholic fluid not already absorbed. But in the case of apoplexy, putting aside the question of treatment, the feelings of relatives deserve some consideration; for it must be no small aggravation to their grief to find that one they have respected has been locked up on a charge of drunkenness.

Varieties.—The state of coma in apoplexy may cease in three different ways. Either it may gradually pass off, leaving the patient well, or it may terminate in incomplete recovery, the mind being impaired, and some parts of the body paralyzed; or it may end in death. In the latter case, on examining the brain we find either no appearance whatever of disease; or extravasated blood is discovered; or there is effusion of serum into the ventricles or beneath the arachnoid. Dr. Abercrombie calls the first—that which is fatal without leaving any traces—*simple* apoplexy; the second *sanguineous* apoplexy, or *cerebral hemorrhage;* the third *serous* apoplexy. During life we are unable positively to distinguish by the symptoms these three varieties.

Warnings.—This dreadful visitation is seldom experienced without some previous threatenings; which, properly interpreted, should put the patient on his guard.

The following individuals may be said to be predisposed to apoplexy: those whose ancestors suffered from it; men of a peculiar habit of body, of sedentary habits, accustomed to high living, with protuberant bellies, large heads, florid features, and short thick necks; and individuals advanced in life, beyond fifty. A predisposition may also be engendered by disease of the kidneys, of the heart, or of the cerebral bloodvessels; by intemperance; and by the cessation of habitual discharges.

Among the threatenings, such as these are the most important: headache and giddiness, experienced particularly on stooping; a feeling of weight and fulness in the head, with noises in the ears, and temporary deafness; transient blindness, or sometimes double vision; repeated epistaxis; fits of nausea, and a sense of numbness in the limbs; loss of memory, great mental depression, incoherent talking, drowsiness, with indistinctness of articulation; and partial paralysis, some-

times affecting a limb, sometimes the muscles of the face, sometimes the eyelids.

Modes of Seizure.—Dr. Abercrombie has shown that the apoplectic seizure commences in three different ways. "In the *first* form of the attack, the patient falls down suddenly, deprived of sense and motion, and lies like a person in a deep sleep; his face generally flushed, his breathing stertorous, his pulse full and not frequent, sometimes below the natural standard. In some of these cases convulsions occur; in others rigidity and contractions of the muscles of the limbs, sometimes on one side only."

In the *second* form, the coma is not the first symptom, but complaint is made of a sudden attack of pain in the head. Then the patient becomes pale, sick, and faint; sometimes he vomits; while frequently he drops down in a state resembling syncope. Occasionally he does not fall, the sudden attack of pain being merely accompanied by slight and transient loss of consciousness. After a few hours, however, the headache continuing, he becomes heavy and oppressed and forgetful; and gradually sinks into perfect coma, from which recovery is rare. A large clot is usually found in the brain.

The *third* form of apoplectic seizure begins by an abrupt attack of paralysis of one side of the body, sometimes with deprivation of power of speech, but no diminution of consciousness. The paralysis may pass gradually into apoplexy; or the loss of power may remain without further urgent symptoms; or, in certain favorable cases, it slowly goes off and the patient recovers.

Phenomena during the Fit.—The duration of the apoplectic fit varies from two or three hours to as many days. There is total unconsciousness. The pulse, at first generally small, becomes full and strong, according as the system recovers from the shock; it is usually slower than natural, sometimes intermitting. Respiration is slow, embarrassed, often accompanied by stertor; and there is frothy saliva about the mouth.—In bad cases, the body is covered with a cold clammy sweat; the face is pale, and the eyes dull and glassy, with dilatation of the pupils; the teeth are firmly clenched, and all power of deglutition is lost, or much impeded; and there is stertorous breathing. The bowels are torpid, or, if they act, the motions are passed involuntarily; and there is either involuntary micturition, or—as most frequently happens—retention of urine, until the bladder becomes distended and overflows, as it were, causing the urine to be constantly dribbling away. When the patient recovers incompletely, more or less paralysis of the limbs often remains.

Prognosis.—A guarded opinion must always be given. The danger at the time is great; being somewhat in proportion to the prostration, stertorous breathing, and the difficulty of swallowing. During the first fortnight there is especially a fear that the hemorrhage may recur; or that the clot may act as an irritant, and set up inflammation in the nervous tissue.

When the symptoms gradually diminish, there is first a recovery of the mental power. This may be imperfect, so that the patient may become childish; on his memory will be impaired, so that he cannot express his wants in proper language, or he cannot read, &c. Then, sensibility is restored to the affected limbs; and at a still later stage

there may be a gradual improvement in the power of motion. In the latter case, the sense of movement is first experienced in the paralyzed lower extremity, then in the arm, and subsequently in the hand.

According to Dr. Duchesne, contraction of the muscles is evidence of spinal action, increased by the persistent central mischief removing cerebral control. Flaccidity of the muscles, on the other hand, is the secondary result of long-continued inaction; this inaction having been produced by the cerebral disease. According to the same author, active tonic contraction of the muscles is indicative of inflammation in the walls of the cyst.

Post-mortem Appearances.—It is only necessary to notice those which are discovered in cases of sanguineous apoplexy. The blood may be effused upon or between the membranes of the brain; into one of the ventricles; or into the cerebral substance itself. In the latter case, it is usually found in the corpora striata, the optic thalami, or in that portion of the hemispheres of the brain which is on a level with these bodies. Dr. Craigie arranges the parts which may be the seat of the hemorrhage in their order of frequency, thus: The corpora striata, optic thalami, hemispheres, pons Varolii, crura of the brain, medulla oblongata, and cerebellum.

Where death occurs within a few hours of the effusion upon or between the membranes of the brain, the cerebral substance will usually be seen simply flattened from the pressure which the extravasated blood has exerted; this blood being either liquid or coagulated. But if some days have elapsed, there will probably be evidence of meningitis as well as of softening of the convolutions. Moreover, in the latter case, the blood may be found fixed to the arachnoid by a delicate transparent membrane.—Supposing the vital fluid to have been poured into the substance of the brain, a cavity (varying in size from a barleycorn to a hen's egg) will be seen containing semi-coagulated blood and softened cerebral matter. At a rather later period the clot will probably be much firmer, while the walls of the cavity have undergone some amount of inflammatory softening.—And lastly, if life has been prolonged for about twenty-five days, the coagulum may be discovered small and isolated, a membrane can be detected around it, and the cerebral walls of the cyst will be found to be perceptibly getting indurated. At this time, moreover, the walls of the blood-corpuscles will have ruptured through endosmosis; and the contents of these cells having escaped and crystallized, blood- or hæmatoid-crystals may be discovered on a microscopic examination.

The point of rupture in the vessel cannot always be made out. When the walls of the carotid, basilar, or meningeal arteries have given way through ossification, or aneurismal dilatation, there is no difficulty in showing the source of the hemorrhage; but it is not so easy when some of the minute vessels have broken down, probably owing to fatty degeneration of their coats.

Treatment.—This may be divided into that which is prophylactic, and that required when an attack has occurred.

Only a few remarks are needed on the *prophylactic* management.—When a predisposition to apoplexy is suspected, the individual should avoid strong bodily exertion, venereal excitement, the stimulus and irritation of anything approaching to drunkenness, violent mental emo-

tion, exposure to extremes of temperature, straining at stool, long-continued stooping, tight neckcloths, and warm baths. He ought to observe a moderately spare diet, free from alcoholic drinks; heavy meals being bad, partly because an over-loaded stomach will obstruct the circulation by its pressure, and also for the reason that any sudden increase in the quantity of the blood may cause a diseased vessel to give way. He should sleep with his head high, on a mattress rather than on a feather bed, in a cool well-ventilated room, and for not more than eight hours. He ought to take daily exercise in the open air; and must pay great attention to his bowels. Washing the head in the morning with cold water is often useful; or establishing a drain near the occiput, by means of an issue or seton in the neck, will perhaps do good. When giddiness, headache, throbbing of the arteries of the head, and epistaxis are present, much benefit will result from active purging, as well as from blistering the nape of the neck. On the contrary, where there is anæmia, small doses of steel, good easily digested food, and plenty of milk will be needed.

But supposing that *an attack has occurred*, what are we to do? Formerly the treatment of every case of apoplexy was commenced by bleeding; and statistics prove that the more freely the blood was taken away the greater was the mortality.* This is what might be expected, for we only see the patient when the mischief is done: rupture with extravasation of blood has taken place, and bleeding will not remove it. Moreover we are seldom able to learn the cause of the fit,—the nature of the antecedent disease of the cerebral vessels, or of the brain itself. When such disease has existed, the process of repair is not encouraged by loss of blood. But, it is said, depletion will prevent further extravasation. I believe, with Mr. Copeman, that so far from doing so, it promotes it, by inducing greater thinness of the blood, and by diminishing the power of coagulation. In proof of this it is only necessary to read the reports of not a few cases, where it is distinctly stated that the abstraction of blood was immediately followed by an aggravation of the symptoms and by paralysis. As regards my own practice, it may be mentioned that among the several cases which came under my care when house physician to King's College Hospital, I never saw one in which I considered bleeding necessary; and certainly the majority of the cases, at least, recovered. The lessons then learned have since guided me in treating this disease, for I very rarely meet with an instance where venesection or leeching appears to be called for. And, moreover, the most unfavorable cases which I have seen in consultation have been those where one or the other has been employed.

* "The universal *remedy*, as it is called, for apoplexy is bloodletting; at least so generally has it been employed, that of 155 cases in which the treatment is specified, 129 were bled, and only 26 were not: of the 129 who were bled, 51 recovered and 78 died—the cures being 1 in 2½, the deaths 1 in 12; of the 26 who were not bled, 18 were cured and 8 died, the proportion of cures being 1 in 1½, and of deaths 1 in 3¼. But the mortality varies a good deal according to the particular method in which bloodletting was performed. In 2 cases the temporal artery was opened; both died. In 11 cases cupping only was employed; 6 were cured and 5 died. 14 were treated by leeching; 4 cured, 10 died. 17 were bled in the foot, a plan strongly recommended by M. Portal, of which 13 were cured and 4 died. 85 were bled generally and copiously, of which number 28 recovered and 57 died; that is to say, 2 in every 3 cases terminated fatally."—A Collection of Cases of Apoplexy, p. 6. By Edward Copeman. London, 1845.

The best rule to adopt is that laid down by Cullen—*to obviate the tendency to death.* If the tendency be towards death by coma; if the pulse be full, or hard, or thrilling; if the vessels of the neck are congested; and if the face be flushed and turgid, then bloodletting may be called for. But, on the contrary, when the patient is dying from syncope, with a feeble or almost imperceptible pulse, and a cold clammy skin, then bleeding will only insure a speedily fatal termination. In either case, the patient ought to be removed into a cool, well-ventilated room; his head should be well raised; all the tight parts of his dress must be loosened, especially his cravat and shirt-collar; and cold is to be applied to the head by means of pounded ice in a bladder. Supposing the practitioner thinks it proper to bleed, let him do so by opening a vein in the foot, as recommended by Portal: or let him take only a very small quantity of blood from the nape of the neck by cupping.

Active purgatives are usually very serviceable. If the patient can swallow, a full dose of calomel and jalap followed by the common black draught may be given (F. 140). Where the power of deglutition is lost, three or four drops of croton oil should be put on the back part of the tongue. Stimulating enemata (F. 189, 190, or 191) ought also to be thrown up the rectum. Pediluvia containing mustard can seldom do any harm. Blisters are often subsequently of use, applied over the scalp or to the neck. Some practitioners recommend emetics; but unless the attack were clearly due to an overloaded stomach, I should avoid them. Even then it must be remembered that these agents cause a determination of blood to the head; and hence their effects must be narrowly watched.

Supposing the patient to recover from the fit, great care will afterwards be required to prevent a second attack. Strong medicines, great excitement, or much mental occupation, are to be avoided. The diet ought to be light but nutritious; milk is useful, taken to the extent of a pint and a half or two pints in the day; and, as a rule, only light French wines should be allowed.

IV. CONCUSSION OF THE BRAIN.

Concussion of the brain is signalized by fainting, sickness, stupor, insensibility, or loss of all muscular power, succeeding immediately to a heavy blow or to some act of external violence. The patient may rally quickly, or not for many hours; or he may die suddenly, or at the end of some days. After death, either no lesion of the brain can be detected, or a laceration of some portion of it will be found, or there may be discovered a general softening of its substance.

Symptoms.—These will vary according to the degree of concussion. When the shock has only been slight, the person soon recovers from the state of unconsciousness, and complains merely of confusion of ideas, faintness, sickness, chilliness, a desire to sleep, and ringing noises in his ears. In a more severe case, the insensibility continues longer; the patient lies as if in a deep slumber, his pupils are insensible to the stimulus of light, he is pale and cold, the muscles are flaccid, the pulse fluttering or feeble, the sphincters relaxed, and the breathing

is often scarcely perceptible. When—after a variable interval—partial recovery ensues, there is great confusion of thought, often an inability to articulate distinctly, frequently severe vomiting, and sometimes paralysis of one or other of the extremities. In the worst forms of concussion, the individual is felled to the ground by the shock—whatever it may be—and dies upon the spot.

The whole nervous system seems now and then to receive a jar by railway accidents, without any immediate indications of mischief being developed. But in the course of a few days, some slight diminution of the power of motion may be noticed, or there may be an attack of epilepsy, or the sense of sight may become impaired, or squinting may take place, or there may be deafness or troublesome noises in the ears. These symptoms perhaps persist for a longer or shorter time, and then pass off; while occasionally they prove to be the precursors of serious cerebral or spinal disease.

Diagnosis.—The following circumstances—according to Chelius—distinguish concussion from pressure upon the brain caused by extravasation of blood. In concussion which immediately follows external violence, the patient usually recovers himself to a certain degree. In extravasation he lies in an apoplectic state, with snoring and difficult breathing; he has a hard, irregular, intermitting pulse; his pupils are widely dilated; but there is no vomiting. In concussion, the body is cold; the breathing easy; the pulse regular and small; the countenance little changed. Extravasation and concussion may, it must be remembered, occur together. It is often difficult to distinguish between concussion and drunkenness. The history of the man, his general appearance, and the smell of his breath, are the chief points to attend to. But where there is any doubt, the practitioner had best refrain from giving an opinion, while he also keeps the patient under close observation so long as the insensibility continues. (See p. 237.)

Prognosis.—This must in all cases be guarded. In a severe form of concussion, there is peril at first from the depression, and afterwards from excessive reaction. Moreover, it is difficult to say that there is no compression. These dangers being passed, the convalescence is always tedious; and it frequently leaves behind it permanent impairment of the memory, loss of smell or taste, squinting, and weakness of sight, or even amaurosis.

Treatment.—It is essential that the patient be carefully watched. If—a few hours after recovery from the shock—the reaction seem to be intense, the head should be elevated, and cold applied: two or three drops of croton oil may also be placed on the tongue. Generally speaking, however, the shock to the system is so great, that mild stimulants are necessary; and a little wine, or brandy-and-water, should be cautiously administered. At the same time, while the surface remains cold, warmth must be applied by means of blankets, bottles of hot water, hot bricks, &c. In the after-treatment of these cases, a mild unstimulating diet, absolute rest from all mental occupation, bodily repose and quiet, together with gentle bitter aperients, will alone be necessary.

V. COUP DE SOLEIL.

Coup de soleil (*Sun-stroke*, *Insolatio*, *Heat apoplexy*, or *Erethismus tropicus*) is a disease allied to simple apoplexy. The mortality is variously estimated at from 40 to 50 per cent.

Causes.—In its perfect form it is met with only in the tropics; in which region it is often fatal to the European soldier, especially at seasons when the heat is very oppressive. The more severe the regimental duty, the more the men are harassed or depressed, the more defective the commissariat arrangements, the worse the supply of drinking water, and the more contaminated the atmosphere, the more liable will the soldier be to this affection. It has been noticed that those attacked have often been affected for a few days previously with suppression of perspiration; the urine, at the same time, being abundant and limpid, and the desire to pass it recurring very frequently. The nights have been sleepless, while attacks of vertigo and a sense of weariness have been complained of. Such men, too, may have been irregular in their habits; while perhaps they have also been indulging freely in alcoholic drinks, and prowling about under exposure to an almost vertical sun for two or three days previous to the seizure.

Symptoms.—There is generally faintness, thirst, great heat and dryness of the skin, with prostration. In many cases, vertigo, and a sense of tightness across the chest are complained of. Frequently the pulse is quick and full, but sometimes it is thin and so feeble that it can scarcely be felt. As the disease advances the heart's action becomes violent, the man can scarcely be roused, the face gets pallid, and perhaps an attack of vomiting ushers in the stage of coma. When the patient is comatose the skin is found very hot, the breathing is performed with difficulty, the pupils are contracted, the conjunctivæ are congested, and the action of the heart is intermittent. Just before death the pupils dilate, the respiration gets gasping, and the patient perhaps vomits.

This affection sometimes comes on very insidiously. A man will be seen to be listless and stupid; but he makes no complaint beyond saying that his head feels a little queer. Yet in twelve hours he may be dead. In several instances, after exposure to the sun, the individual has fallen down insensible, made one or two gasps, and at once died from syncope. Mr. Cotton, surgeon of a regiment of infantry, met with twelve cases of sun-stroke when at Meerut. The seizure usually happened towards the evening, with symptoms of stupor and insensibility. Then followed loss of speech; burning of the skin; at first contraction, and afterwards dilatation of the pupils; with great rapidity, hardness, and fulness of the pulse. In some of these soldiers tetanic convulsions occurred. They almost all sank very rapidly; death ensuing in the greater number within two or three hours from the commencement of the attack.

In the event of recovery taking place, the convalescence may be retarded by deranged secretions, continued fever, some pulmonary complication, partial paralysis, and great prostration of strength. It is usually allowed that the patient cannot be considered free from danger until the skin gets cool and moist. Moreover, many months after an

apparent cure, symptoms of paralysis or of insanity may set in: while if these miseries be escaped, the individual will seldom be the man he was prior to the attack.

Post-mortem Appearances.—It is seldom that any cause for the symptoms can be detected. Sometimes there is found an effusion of serum at the base of the brain; or the vessels of the membranes may be congested. The brain itself is usually healthy. The kidneys are very often much congested; the lungs are sometimes engorged; but the other viscera present no changes of any importance.—Dr. Morehead agrees with those observers who refer the phenomena of sun-stroke to depressed function of the cerebro-spinal and sympathetic nervous systems.

Treatment.—The course which has often been pursued consists of venesection, cold to the head, and blisters to the back of the neck. The fatality attending bleeding has been such, that the practice is only mentioned in order that it may be avoided for the future.

The remedies upon which it is probable that most reliance may be placed are cold to the scalp, and the frequent administration of stimulants. The cold should be applied by pouring a continuous stream of water over the head and chest, and afterwards by the use of evaporating lotions. The douche must not be resorted to, however, if the pulse be very weak and the skin cold. The nape of the neck may be painted with the liniment of cantharides. The best stimuli are ammonia and brandy; given in doses proportioned to the depression, and persevered with to the last. Sinapisms or turpentine stupes to the extremities may do good. Attempts have been made to induce sweating by wrapping the patients in the wet sheet; but the proceeding has not been successful.—Dr. Edward Smith has proved that all animal foods, alcoholic drinks, and coffee lessen the activity of the skin, in the first stages of their digestion; but that tea and sugar have the opposite effect. He therefore urges that an infusion of good tea should be very freely given in this disorder; since beyond its effects on the skin it tends to directly stimulate the nervous system, and has also a powerful effect in increasing the respiratory functions. Consequently it may be found to meet three of the most urgent wants in sun-stroke, viz., cooling of the body, removal of the listlessness and oppression, and increase of the respiratory action. The same writer also suggests that, as the act of vomiting tends to induce perspirations, so it might be useful to give ipecacuanha as an emetic early in the attack.

Assistant-Surgeon Chapple, of the Royal Artillery, says that he has saved a few cases which had advanced to the stage of coma; and he attributes his success chiefly to the employment of stimulant enemata. He remarks that there is a failure of nervous energy from the commencement, and that therefore our chief endeavors ought to be directed towards supplying this defect. The patients, in fact, generally die quite worn out.

Amongst the means of *preventing* this disease, the most important of those mentioned by Dr. Aitken are the following: When a march is to be undertaken in India during hot weather, the weak and sickly should be left behind. The costume should be suitable for the early morning hours before sunrise, as well as for the scorching heat which follows. A flannel shirt is a safeguard against sudden chills; a flannel belt is an advantage, except in the hottest weather. The shirt collar ought to be

open. A light knapsack should be allowed, which does not require the use of cross-belts over the chest. The troops should march "easy" and loosely clad; at a pace not exceeding three and a half miles an hour: with halts when the men are exhausted; and with a longer halt half way, so that each man may have a biscuit and cup of coffee. They ought to arrive on the *new* ground about an hour after sunrise. The camp should be formed on as high and open ground as possible. The men ought to be provided with an ample supply of water. And rations of spirits should be discontinued.

VI. ALCOHOLISM.

Alcohol is an agent which directly affects the nervous system, and particularly the brain. When taken in a large dose it may immediately destroy life, like any other active poison. In smaller quantities, frequently repeated, its effects are very prejudicial; for it has a tendency to accumulate in certain structures (the nervous centres and the liver), in spite either of its destruction within the economy, or of its elimination by all the excretory organs,—especially the lungs. The consequences of alcoholism may be considered under the two divisions of delirium tremens, and dipsomania.

1. Delirium Tremens.—Delirium Tremens (*Delirium è potu*, or *Delirium ebriositatis*) is still, unfortunately, a common disease in this country. It may be described as an acute attack of poisoning by alcoholic drinks. The delirium is characterized by hallucinations, fear, trembling of the muscles of the extremities, weakness, and watchfulness. The natural tendency of this disorder is to terminate in a critical sleep, at the end of from forty-eight to seventy-two hours from the commencement of the delirium.

Symptoms.—These are chiefly—sleeplessness, a busy but not a violent delirium, constant talking or muttering, tremors in confirmed dram-drinkers, hallucinations of sight and hearing, a dread or suspicion of every one, mental with bodily prostration, and a generally excited and eager manner. The skin is commonly moist or clammy, from copious perspiration; the face is sometimes pale, but often flushed and wild-looking; the tongue is moist and covered with a white fur; and the pulse is frequent and soft. In severe cases there is an increase in the sulphates and in the urea, with a diminution in the quantity of phosphates contained in the urine; while in phrenitis, on the contrary, the phosphates are in excess. There is a complete loss of appetite, attacks of sickness are common, the bowels are confined, and pain may be complained of in the epigastric or right hypochondriac regions. The symptoms generally become aggravated towards night, while early in the morning there appears to be greater weakness.

The delirium is always peculiar. Often the patient will not allow that there is anything the matter with him; but he answers questions rationally, puts out his tongue in a tremulous manner, and does whatever he is bid at the moment. Then he begins to wander again, gives orders about his business to absent servants, refers to some imaginary appointment he must keep, or speaks of all he has been doing through

the night. A publican will have been drawing beer for hosts of customers, a lawyer has been making an effective appeal to a jury. A medical man who was under my care three or four times was engaged during each attack in delivering "no end of women." The patient is also distressed or perplexed, and suspicious of all around him. Rats, mice, beetles, or other animals, are about or under his clothes; strangers are in his room, or they will insist upon getting into his bed; listeners are at the door or behind the curtain. With all this, there is incessant restlessness; his hands are in tremulous motion, while his features are constantly twitching; and he talks continuously. He is perpetually wanting to get out of bed, though easily persuaded to lie down again; but if not watched, will soon be down stairs, and perhaps out in the street. There is but little fear of his harming himself or others, yet it is a wise precaution to remove his razors, fasten the windows, and so forth.

In favorable cases the critical sleep comes on about the beginning of the third or fourth day, when the patient falls into a sound slumber, which lasts for twelve or more hours. From this he awakes very feeble, but cured of his disease. In fatal examples the watchfulness continues; there is muttering delirium, subsultus tendinum, and exhaustion; followed by great prostration, coma, or convulsions. Death most commonly takes place between the third and seventh days. Occasionally this result occurs rather suddenly, the patient being active in his delirium until the moment of his ceasing to breathe.

Causes.—Men are much more subject to this disorder than women. It arises from the excessive use of ardent spirits, wine, beer, or some fermented liquor. The habitual use of opium, excessive mental excitement, and venereal excesses, will occasionally produce an affection resembling, but not identical with, it. Individuals with an irritable nervous system, who are subjected to any prolonged mental strain, may induce this disease by smaller quantities of alcoholic drinks than would excite it under other circumstances. But in all instances it is almost certain that the poison, in some form or other, has been taken; for there seems to me every reason to believe that delirium tremens is a specific toxæmia, due to alcoholic excess.

According to some authors the symptoms of delirium tremens may set in after a protracted debauch of six or eight days, or upon the sudden withdrawal of the accustomed potations. The latter observation has been repeated so frequently that at last it has almost become a sort of recognized law; but for all that it is probably thoroughly untrue. Evidence derived from hospital practice, and from the reports of convict prisons, seems directly to negative it; and it may now be said to be at least highly probable, that a person accustomed to the very free use of stimulants may at once give them up without any danger whatever. In fact, as with other poisons, the only risk to be feared is from continuing their employment.

Treatment.—The great point, it has always been thought, is to procure sleep. For this purpose opium has been given in full doses; either morphia, or solid opium, or Battley's liquor opii sedativus, or the common tincture. At the same time stimulants have been deemed necessary; and as a rule, that stimulant has been considered the best to which the patient has been accustomed. Thus, if he has generally besotted himself with beer, good ale or porter has been freely administered; while

if brandy or gin has been his favorite liquor, he has been supplied according to his depraved taste.

Now it is not pretended that this plan of adding fuel to the fire is always prejudicial; but it seems certain that when indiscriminately practised, as it has been, great mischief must often result. The cases to which it is applicable are, indeed, the exceptional ones; while in the majority of instances, it is as absurd as it is injurious to treat a case of alcoholic toxæmia by continued doses of the poison that has caused all the mischief. The practice to adopt is to bring about the critical sleep as soon as possible by removing the cause of the disease; to give ice and perhaps salines, to cool the irritable, if not inflamed stomach; and to support the strength by milk, raw eggs, beef-tea, &c.—Sometimes a cold shower-bath affords so much relief, that the patient will ask to have it repeated. When the depression is very great, stimulants must undoubtedly be administered, as in other cases of prostration; and in such, a well-timed dose of opium with ipecacuanha or tartarated antimony will often prove useful. In three or four instances, where the delirium and constant talking seemed to be exhausting the patient, I have resorted to the use of chloroform with manifest advantage; but I have also seen this anæsthetic act prejudicially, the excitement returning in an aggravated form so soon as the influence of the vapor has subsided.

The late Mr. Jones, of Jersey, stated that for twelve years he treated all his cases of delirium tremens by large doses of digitalis, with a remarkable degree of success. He was accustomed to give half an ounce of the tincture (Phar. Lond. 1851) with a little water, for a dose. In some few instances, one dose was sufficient; but generally a second has been required four hours after the first. Very seldom a third dose of two drachms was called for, owing to the absence of sleep. The effect was to produce a warm skin, a fuller and more regular pulse, and six or eight hours' good sleep.* My own experience with this drug is not very large, but as far it has gone, it confirms Mr. Jones' statements. At the same time I should never think of administering digitalis to all cases without distinction—a practice as injudicious as that of giving large quantities of brandy and opium simply because the individual is delirious. It has appeared to me to answer best when the symptoms have assumed a resemblance to those of acute mania, and where there has not been much exhaustion.

Occasionally it is thought necessary to restrain the patient's movements by strapping him down to his bed, or by putting on a strait-waistcoat. This should never be done, however, if it can possibly be avoided; as it always increases the excitement and prevents sleep. It will invariably be much better to have a good attendant at the bedside to calmly control him. The apartment occupied by the patient should be darkened, kept quiet, and well ventilated; while nothing is to be done that can in any way produce mental irritation.

2. Dipsomania.—Within the last few years the word Dipsomania (*Δίψα*, thirst; *μανία*, madness) has been revived, to express that craving for intoxicating liquors which, according to some physicians, partakes of the character of insanity. Now, although a fit of intoxication is

* Medical Times and Gazette. London, 29th September, 1860.

undoubtedly an attack of temporary mania, yet it appears a highly unphilosophical view (and one, too, which is fraught with the greatest danger to society) to regard a dipsomaniac as an irresponsible being; to look upon him, in fact, as an individual affected by some recognized form of lunacy. Hard-drinking is a degrading vice, and, like many other vices, the more freely it is indulged in the more difficult becomes its discontinuance. It is a cause of insanity, and a cause of crime, though I believe its influence in these respects has been much overrated.* The drunkard is artful and untruthful; he breaks every promise he makes; and he is perfectly regardless of the feelings and happiness of others. But nevertheless it seems to me absurd to say that the desire for alcoholic stimulants is a disease—that it is symptomatic of some abnormal cerebral condition, unless indeed we say the same of every act of wickedness or folly. Not only is the experience of the dead-house against such a view; but if this evidence be set aside, as of little value, we yet know that there is no difficulty in curing the most inveterate sot, provided we are but able to deprive him of his poison. The fact is indisputable, that many who drink to excess can be persuaded to abstain temporarily, if only a limit to their abstinence be fixed, so that they may enjoy the anticipation of a debauch; while a few can be so influenced that they renounce this habit entirely.

The drunkard is a nuisance to himself and to all who are brought into contact with him; and it is to be regretted that there are no legal means of controlling him until he is cured of his folly. The man who attempts suicide by some summary process is liable to imprisonment; while he who slowly poisons himself may proceed to certain destruction with impunity. He may ruin himself and his family, but so that he breaks only moral laws and obligations he cannot be stopped in his downward career. The welfare of society demands some place of detention for such men; and even if an act of Parliament cannot be obtained to sanction the necessary interference with the liberty of these misguided people, yet I believe that there are many who would voluntarily enter and submit to the rules of an institution for the cure of drunkenness. Mr. Dickens, in his "American Notes," mentions the case of a man who got himself locked up in the Philadelphia prison, so that he might rid himself of his propensity to drink; where he remained, in solitary confinement, for two years, though he had the power of obtain-

* Lord Shaftesbury says, "From my own experience as a Commissioner of Lunacy for the last twenty years, and as Chairman of the Commission during sixteen years, fortified by inquiries in America, I find that fully six-tenths of all the cases of insanity to be found in these realms, and in America, arise from no other cause than habits of intemperance."—Quoted from Dr. Belcher's pamphlet on "Reformatories for Drunkards," p. 9. Dublin, 1862. Also, from "How to Stop Drunkenness." By Charles Buxton, M.P. London, 1864. Reprinted from the North British Review, 1855.

This statement is just one of those which tell with great force at temperance meetings. But after all is it correct? I can only say that none of the Asylum Reports with which I am acquainted afford any evidence in confirmation of it; and surely the physicians to these institutions ought to be able to arrive at the truth on this point as readily as Lord Shaftesbury. If we take Dr. Hood's Statistics of Insanity, we shall find "the apparent or assigned causes" given as regards 3668 cases (male and female), admitted into Bethlem Hospital, from 1846 to 1860, inclusive. Out of this total the disease is said to have been produced by intemperance in 177; but according to Lord Shaftesbury, the number ought to have been 2200. May not his "experience" be like that of other men—fallacious?

ing his liberty at any moment that he chose to ask for it. Patients have more than once told me that they would gladly submit to any treatment or surveillance; but they have also said that without restraint all else would be useless, for they could not trust themselves.*

Our knowledge of the precise effect of alcohol upon the living body is becoming more and more perfect, though many points still remain for elucidation. An admirable series of experiments by MM. Ludger Lallemand, Maurice Perrin, and J. L. P. Duroy,† seems to show that alcohol is not only separated from the blood by the tissues of the body —especially the substance of the brain and of the liver—but that the excretory organs freely help to eliminate it; the length of time required for its entire removal from the circulating current depending of course upon the quantity introduced into the system. The experimenters believe themselves justified in deducing the conclusion, that alcohol is neither transformed nor destroyed in the living body, but that the whole of what is ingested is excreted unchanged; so that this substance has no claim to be regarded as a producer of heat—as a true food, but must be placed in the category of those medicinal or toxic agents whose presence in the living body exerts a most important influence on its functions, though they do not themselves enter into combination with any of its components. These opinions are directly contradictory to those which have been accepted from Liebig; who ranked alcohol among the heat-forming aliments, capable of replacing the fatty, starchy, and saccharine elements of food. Hence they have not been allowed to pass unchallenged; and M. Edmond Baudot‡ has especially, by his experiments, thrown doubt upon their correctness. According to this gentleman's conclusions it is allowable to believe that alcohol is destroyed in the organism, and that it fills the office of respiratory food, as asserted by Liebig. To this M. Perrin§ has replied, reiterating his assertion that alcohol is neither transformed nor destroyed in the organism; that it is eliminated by the various excretory organs; and that it offers none of the characters of food.

* Institutions for this purpose have been formed in the Isle of Skye. Dr. Christison, in relating an account of a visit to one of these establishments, where whiskey could only be obtained by a walk of twelve miles, remarks, "Here we found ten gentlemen—cases originally of the worst forms of ungovernable drink-craving—who lived in a state of sobriety, happiness, and real freedom. One, who is now well, had not yet recovered from a prostrate condition of both mind and body. The others wandered over the island, scene-hunting, angling, fowling, botanizing, and geologizing; and one of these accompanied my companion and myself on a long day's walk to Loch Corruisk and the Cuchullin Mountains. No untoward accident had ever happened among them. I may add, that it was impossible not to feel that, with one or two exceptions, we were among a set of men of originally a low order of intellect. Radical cures are rare among them; for such men, under the present order of things, are generally too far gone in the habit of intemperance before they can be persuaded to submit to treatment. Nevertheless, one of those I met there, a very bad case indeed, has since stood the world's temptations bravely for twelve months subsequently to his discharge."—A Lecture delivered before the Royal College of Surgeons of Edinburgh, 19th March, 1858. Since the delivery of this lecture this establishment has been given up. But there are others in various parts of Scotland; and among them an excellent one, on a limited scale, at Ostaig in Skye, under the care of Dr. Macleod.

† Du Rôle de l'Alcool et des Anesthésiques dans l'Organisme; Recherches expérimentales. Paris, 1860.

‡ L'Union Médicale, pp. 272, 357, 374, 390. November 10, 21, 24, 26, 1863.

§ Idem, p. 582. 23d December, 1863.

The pernicious effects of the excessive use of alcoholic stimuli, as revealed after death, are found to be induration of portions of the nervous centres, congestion of the respiratory organs, amyloid and fatty degeneration of the liver, chronic inflammation and thickening of the walls of the stomach, with disease of the substance of the heart and kidneys. Cirrhosis, or gin-drinker's liver, with all its painful train of symptoms, is a common result. Dipsomania may also lead to tuberculosis, though it probably does so indirectly, by taking away all desire for food and so lowering the powers of life. But it must be remembered that these morbid changes are the consequences—not the cause—of the abuse of stimulants; for in no instance is it pretended that the condition of brain has been demonstrated, which according to some writers gives rise to the propensity to drink.

The evils which afflict the drunkard are so great that it is unnecessary to resort to fables to point any moral. For example, spontaneous combustion from the excessive use of alcoholic stimuli is only a myth; its gross absurdity, however, being a powerful recommendation to the lovers of the marvellous. It would not be difficult to collect fifty recorded examples of it, just as fifty sane people could be brought together to testify to the truth of spirit-rapping, table-turning, clairvoyance, and so forth. But the physician credits none of these idle tales. His character, like that of the true philosopher as described by Herschel, "is to hope all things not impossible, and to believe all things not unreasonable."

A few words must suffice on the medical treatment of *chronic alcoholism;* which differs from delirium tremens inasmuch as it is not an acute disturbance of the functions of the nervous system, but a protracted state of general depression with restlessness. The chief points that demand attention are these: To enforce total abstinence, since I believe it to be more easy for the habitual drinker to renounce all stimulants, than to practise moderation; to guard against sleepless nights, by the exhibition, when needful, of the extract of henbane or hop, or even of opium; to afford mental occupation and amusement, and especially out-door recreation in cheerful society; to administer tonics and such remedies as will give gastric tone; and to regulate the diet.—In almost hopeless cases an attempt may be made to substitute opium for alcohol. The opium-eater is at all events not an annoyance to others; he is much less likely to commit criminal acts than the drunkard; while he injures his health in a smaller degree than the sot. Of two evils, we may well choose the least.—Dr. Marcet states that the nervous symptoms present in these cases may be best relieved by the oxide of zinc; which is to be given in two-grain doses, twice a day, gradually increasing the quantity until twelve or sixteen grains are taken in the twenty-four hours (F. 415). The reputed effects of this powder are to induce sleep, to remove the tremor of the limbs, to relieve the headache and giddiness, and to destroy all hallucination. In my hands, however, it has not answered these expectations. More reliable remedies are, I believe, to be found in the hypophosphite of soda, or in ammonia and bark, the mineral acids and gentian, quinine and citrate of iron, pepsine or ipecacuanha, and rhubarb with magnesia. It is often a question as to what shall be substituted for beer or wine at meal-times, and I generally recommend milk or some agreeable fruit-syrup in soda-water.

VII. INSANITY.

1. General Observations.—Few subjects more deserve the careful study of the medical practitioner than the diseases which affect the intellectual functions, and few have been more neglected. "The care of the human mind," says Gaubius, "belongs to the physician,—it is the most noble branch of our office."

Many *definitions* have been attempted of insanity, but though unsoundness of mind is for the most part easily recognized, it cannot be defined. The only rough description which will embrace all forms is,—That it is a general term used to express the mental condition opposed to sanity; sanity being that state of mind which enables a man to discharge his duties to his God, his neighbor, and himself. This definition is open to many objections; and let doctors and lawyers vex themselves as they may, every endeavor to form one will be so. For, as nothing can be more slightly defined than the line of demarcation between sanity and insanity; so if we make the definition too narrow it becomes meaningless, and if too wide the whole human race may be involved in it.*

The *indications* of impending cerebral mischief may generally be detected by the careful physician some months before they attract the serious attention of the patient or his friends. The chief premonitory symptoms or prodromata have been especially pointed out by Dr. Forbes Winslow; who forcibly insists upon the fact that cerebral affections are not suddenly developed, while they are often rendered incurable by neglect of treatment in the early stages. The threatenings of incipient insanity which should excite alarm, are—headache, attacks of giddiness and mental confusion, paroxysms of irritability and loss of temper, inaptitude for usual occupations, a weariness of life, a state of sleeplessness or of lethargy, loss of memory, some deviation from the usual line of conduct, defective articulation, dimness of sight, and flightiness of manner. The patient feels too that he is not quite right, but does not like to consult a physician. He also shuns his old friends,

* The Report from the Select Committee on Lunatics, ordered by the House of Commons to be printed, 27th July, 1860, shows that the number of lunatics in England and Wales in 1844, 1858, and 1859, was as follows:

1st January,	1844.	1858.	1859.
In Private Establishments, ...	3,790	4,612	4,762
In Pauper Asylums, Workhouses, &c., . .	16,821	30,735	31,230
Total, ...	20,611	35,347	35,991

Thus, it seems, that the increase of lunatics is much in excess of the extension of the population between the above periods; but allowance must be made for improved registration, as well as for the diminished mortality among the insane. The figures, however, show that at least one person out of every 600 in England and Wales is incapable of managing himself and his affairs. Doubtless a vast proportion of these are cases of idiocy, or of mental imbecility from age, fits, &c. These are incurable; but of the rest, some 50, 60, or perhaps 70 per cent., are curable, if taken in time and carefully treated.

The total number of Pauper Lunatics and Idiots belonging to the several Unions in England and Wales, on 1st January, 1864, was 37,592. Certain patients, however, chargeable to Counties and Boroughs, are not included in this number.

is tortured with blasphemous or obscene thoughts, has frightful dreams, and generally suffers from dyspepsia.

Mental diseases are most frequently accompanied with symptoms of a variety of bodily disorders. Even the Greek and Roman physicians were aware of this fact; yet in the present day it is often forgotten, and the physical disorder is allowed to pass on unnoticed, simply because it is not at first apparent. There are two morbid affections especially, however, which demand our consideration. Of all the forms of insanity those which are complicated with general paralysis, or with epilepsy, are the most terrible.

Insanity with general paralysis is a disease which has attracted much attention on the part of those having the medical charge of lunatics. Physicians generally, however, know but little of this disorder; a circumstance which may partly be due to its inappropriate designation. For the term *general paralysis*, as thus employed, does not mean complete loss of sensation and motion; nor in fact does the disease at all resemble ordinary paralysis—the result of compression or disorganization of some part of the cerebro-spinal system. But it is an affection sui generis, which it has recently been proposed to call the *progressive paralysis of the insane;* and I cannot but think that the sooner this term is adopted, the better.*

Esquirol first drew attention to the incurable nature of this malady; and we now know that paralytic lunatics seldom live more than from one to three years. At whatever period the paralysis supervenes its commencement is generally unmarked by any striking symptoms; while it may come on in any variety of mental disease, increasing as the power of the mind diminishes. The first indication is commonly an impediment in the movement of the lips and tongue; the articulation becoming muffled and imperfect. This impediment increases, and is followed by tottering, uncertain, and vacillating movements in walking; or the impairment of locomotion may even be the earliest symptom. The handwriting is changed. The affected muscles always contract under the influence of galvanism. Then also, there is want of expression in the countenance—a heavy vacant look; the intelligence and judgment are greatly lessened; while fits of irritability, hallucinations, and illusions are common. There is loss of memory; a marked falling-off, as regards energy and decision: with debasement of the moral character. The pulse gets feeble and frequent; the tongue on being protruded moves tremulously from side to side; usually the mobility of the pupils is lessened, and often they are of unequal size, or one pupil may be dilated and sluggish while the other is permanently contracted; the excretions escape involuntarily, either from want of attention, or from paralysis of the sphincters; and there is exaltation of the mind, with the formation of childish hopes and schemes. Hemiplegic seizures, attended with convulsions or coma, are not uncommon; but they generally pass off after the use of stimulating enemata, and the removal of any collection of hardened fæces. As the disease progresses, the patients become unable to articulate a single word; they continually grind their teeth, often producing a most discordant noise during the stillness

* The synonyms of this disease are numerous. The principal are,—General paresis (Πάρεσις, want of strength, from παρίημι, to relax); Paresifying mental disease; Dementia paralytica; Paralysie générale incomplète; and Geisteskrankheit mit Paralyse.

of the night; their weakness is such that they cannot walk or even stand; all traces of intelligence become abolished; they get motionless and insensible; and their torpid existence is reduced to a kind of slow death. With regard to the nature of progressive paralysis, Dr. Conolly says: "It appears to originate in a general affection of the brain, scarcely indicated after death by more than greater softness or greater firmness, general or partial, of the cerebral substance, and by ventricles full of serum, combined merely with other appearances common to all chronic cases of mental malady; and it leaves the practitioner, after the longest reflection, ignorant of its primary nature, and helpless as to its cure."* Since this was written Wedl has demonstrated that in every instance there is hypertrophy of the connective tissue of the small arteries and veins in the pia mater and cortical portion of the brain. In consequence, there follows degeneration of the vascular walls; and hence derangement of the circulation, with disturbed nutrition. The increasing and destructive formation of connective tissue in the cortical substance, leads to the destruction of nerve-cells and nerve-tubes.†

With regard to treatment, all that can be done is to relieve any painful symptoms, to give sleep by large doses of henbane, and to support the strength by a nourishing diet, warmth and cleanliness. Mr. Austin states‡ that when the patient is not very feeble, twenty grains of the extract of henbane is not too large a dose to begin with; and that this quantity may be gradually increased to thirty grains, twice or thrice day.

Insanity with epilepsy is also said by Esquirol to be incurable. The conduct of insane epileptics is often characterized by the most ferocious, murderous, or suicidal aberrations; it is frequently also most filthy and disgusting. Notwithstanding these unfavorable symptoms, however, residence in a well-ordered asylum will do much to induce a certain amount of mental tranquillity; whilst a good diet and daily exercise will contribute to the physical improvement. If early death do not result, the disease usually subsides into incurable dementia.

Dr. Bucknill states that in epileptic cases where no considerable amount of dementia has resulted, the brain is not found atrophied or presenting any appearances of disease. In the examination of thirty-three brains of epileptics, this gentleman only once found a spicula of bone projecting from the cranium, and once only a tumor.

2. Varieties of Insanity.—Much diversity of opinion exists as to the best *classification* of mental diseases. As the most intelligible and simple, I shall adopt that proposed by Pinel and Esquirol; who divided insanity into *mania*, *monomania*, *dementia*, and *idiocy*. It must be remembered, however, that the differences between these varieties are almost always imperfectly marked; that the descriptions laid down in books are extraordinarily distinct compared with the medley of symp-

* On the Treatment of the Insane without Mechanical Restraint, p. 72. London, 1856.

† Beiträge zur Pathologie der Blutgefässe. Wien, 1859. Quoted from Dr. Ernst Salomon's essay on the Pathological Elements of General Paresis. Translated from the Swedish by Dr. W. D. Moore. London, 1862.

‡ General Paralysis: its Symptoms, Causes, Seat, &c., p. 208. London, 1859.

toms presented by real cases; and that the various forms frequently run into each other.

a. Mania.—Mania (*Μαίνομαι*, to rage), or raving madness, may be said to be characterized by *general* delirium. The reasoning faculty, if not lost, is disturbed and confused; the ideas are abundant, erroneous, absurd, wandering—not under control. The manners are violent, excited, and exceedingly mischievous.

Although mania rarely makes its incursion suddenly, still it is that form of insanity which most frequently does so. Repeatedly there are premonitory symptoms, such as,—neglect of family and business, distrust of relatives, causeless attacks of anger and despondency, insomnia, &c. When the disease sets in the delirium becomes general, and the fury extreme. Then it is that maniacs often destroy themselves, either from not knowing what they do, or from despair—being conscious of their condition, or from accidentally injuring themselves. The difficulty of describing the symptoms of mania is extreme. "Where is the man," says Esquirol, "who would dare to flatter himself that he had observed and could describe all the symptoms of mania, even in a single case? The maniac is a Proteus, who, assuming all forms, escapes the observation of the most practised and watchful eye."

In general, maniacs soon become weak and emaciated. The mere physical exertion which they go through—sometimes shouting, howling, laughing, reciting, &c., for hours together; often furious, destructive, and rapidly moving about—would quickly exhaust a strong man. In addition to this fatigue there is a want of refreshing sleep, and not unfrequently an aversion to all food. Ofttimes the patient has incontinence of urine; while this secretion contains an excess of phosphates. Where recovery takes place it is invariably preceded by sleep, a desire for food, and a gradual cessation of the agitation and delirium.

Puerperal Mania is a peculiar affection occurring to women almost immediately—or about the fourth or fifth day—after delivery. It commences usually with restlessness, insomnia, severe pain in the head, and a diminution of the secretion of milk. Sometimes there is no fever, sometimes the skin is hot and dry; while the pulse is full and quick, and the tongue thickly furred. In the cases which I have seen there has been great debility; the patients having been prostrated, either by floodings during their labors, or by the presence of a morbid poison—as that of erysipelas—in the system, or by some other cause which has lowered their vital powers. The delirium is often violent, there may be a tendency to suicide or child-murder, and there is great general irritability. In their *treatment* these puerperal cases require particular care. The indications are to rouse and support the powers of the patient; and to allay the irritability of the brain and the nervous system. The first is to be accomplished by a cordial, stimulant, and nutritious diet. The brandy and egg mixture (F. 17) will often be very useful in oft-repeated doses. Ammonia and bark (F. 371), quinine and phosphoric acid (F. 379), and cod-liver oil (F. 389), are all efficacious remedies. Good beef-tea and wine also prove beneficial. The cerebral excitement is to be calmed, and sleep procured, by sedatives: especially by full doses of the extract of stramonium (F. 323), or of the extract of opium (F. 343), or of morphia and Indian hemp (F. 317). The patient must be controlled effectually, but mildly, by a humane nurse accustomed to the manage-

ment of these cases; and when the disease threatens to be of considerable duration, the sufferer should certainly be separated from her family and friends.

β. Monomania.—Monomania (*Μόνος*, alone; *μαίνομαι*, to be furious,—irrationality on one subject only), or partial insanity, is that form in which the understanding is deranged to a certain degree, or is under the influence of some one particular delusion. The mind is vigorous; the ideas are few, erroneous, fixed, not under control. The manners are in accordance with the predominant idea or train of ideas. At one time the intellectual disorder is confined to a single object, or to a limited number of objects. The patients seize upon a false principle, which they pursue logically, and from which they deduce legitimate consequences that modify their acts and affections. Thus, a monomaniac will insist that his body is made of glass, and being thoroughly impressed with this idea, will reason correctly that slight causes may injure it; he consequently walks with care, and avoids any rough handling. Aside from this partial delirium, he often thinks, reasons, and acts like other men. Another, in the belief that he is a bad half-crown, will go round to the neighbors warning them not to take him in payment or to give change for him when his wife offers him at the counter. Again, a third will fancy himself suspected of some horrid crime, or may think he is possessed of a demon or evil spirit, or will believe himself to be a god—imagining that he is in communication with Heaven. Occasionally, under the idea that he is a divine instrument of vengeance, the monomaniac commits murder. He will often be happy, full of joy, and communicative; unless attempts are made to control him, when he becomes wild and furious. Such individuals ask the most extraordinary favors, and make the most absurd demands.*

Another remarkable and not uncommon effect produced in the mind by insanity, is the hypochondriacal supposition of the existence of venereal disease. In one instance related by Sir W. C. Ellis, although there was no possibility of the disease having existed, the patient fancied she had been infected, and could not rest satisfied until put under a course of what were believed to be mercurial medicines. After having taken pills made of bread-crumbs for several days, the patient, from the expectation that they were to produce salivation, spat such a quantity of saliva as to require a vessel constantly by her side for that purpose. When this had persisted for some time, she imagined that the medicine had produced its effect; the bread-pills were discontinued, and the excessive action of the salivary glands ceased.—See the section on Syphiliphobia, p. 219.

Almost every insane patient labors under hallucinations of one or more of the senses,—he sees or converses with imaginary beings.

* The following copy of a letter, presented by a monomaniac to Dr. Conolly, is a good example: "In the name of the Most High, Eternal, Almighty God of Heaven, Earth, and Space, I command you to procure me the following articles immediately: A Holy Bible, with engravings, &c.; a Concordance; a Martyrology, with plates; some other religious books; a late Geographical Grammar, a modern Gazetteer, newspapers, magazines, almanacs, &c., of any kind or date; musical instruments and music; large plans, guides, maps, directories,"—and many other works, concluding with—"wines, fruit, lozenges, tobacco, snuff, oysters, money—everything fitting to Almighty God. Answer this in three days, or you go to hell. P.S.—A portable desk and stationery, and a dressing-case."

When he is satisfied by the evidence of his other senses that what he sees or hears is only an *illusion*, he is said to labor under an *hallucination;* whereas when he believes in his false perceptions, the hallucination becomes a *delusion*. Some authors use the terms hallucination and illusion in a somewhat different sense. Thus if a man hears voices speaking to him which no one else can hear, or sees objects no one else can discover, they say he labors under an hallucination; but to lay the foundation for an illusion there must be present some material object,—thus the clouds are formed into angels sounding trumpets, the windmill is regarded as a giant, and so on. Hallucinations may exist where the senses of sight and hearing are absent, but illusions of course cannot do so. Illusions are frequently observed in a state of mental health, being then corrected by the reason.

Sometimes the symptoms are so far obscure, that although the conduct of the patient, the expression of his countenance, and his demeanor suggest mental delusions, yet he manifests nothing of the sort in his conversation. The insanity may then frequently be detected by the written letters. Such a case occurred in my own practice: I was sent for one morning to see a young gentleman whose manners were peculiar, but who spoke rationally. A few hours afterwards he wrote to me: "I find that after a physician has received his fee he must do whatsoever the patient wishes, unless he (the physician) can and does certificate that to be peculiarly hurtful and detrimental. I require you to come prepared to lave my bowels completely, and apply the anti-costive oil; prepare the perineum for a blister; and put three ounces of castor oil in the bladder. I have got a preparation made to keep the blister open." Again, Dr. Noble mentions the instance of a youth, twenty-one years old, the son of a publican, who had become reserved, disdainful, and totally changed in disposition shortly before being seen. No perversion of ideas was apparent, excepting from his demeanor. Attempts to gain an explanation were quite vain; still the intuitive good sense of those about him suggested that he was not in his right mind. An accident at length revealed the fact. The draft of a letter to the Queen Dowager was found, showing that he believed himself to be her son, and was indignant at being temporarily deprived of his birthright.*

That form of monomania which is characterized by fear, moroseness, and prolonged sadness, has been separately described by some authors as *lypemania* (*Λύπη*, sadness; *μανία*,) or *melancholia* (*Μέλας*, black; *χολή*, bile). Such cases are most painful to have charge of, the despondency is often so great. A lypemaniac is unwilling to move, or talk, or to take food; he will often remain a whole day without change of posture, or without uttering a word. He dreads solitude; sleeps but little; sometimes tortures himself by the anticipation of future punishment; while at other times he is bent on maiming or destroying himself.

The attempt to commit suicide (*autophomania*, *Αὐτοφόνος*, a self-murderer) is not, as a general rule, made from any sudden impulse, but rather from a long premeditated determination; and often when patients find that they are so watched that it is impossible for them to carry out their designs, they will assume a cheerful manner for days or weeks so as to lull suspicion, and then avail themselves of the first opportunity

* Elements of Psychological Medicine, p. 125. Second Edition. London, 1855.

which offers. Hanging seems to be a favorite mode of self-destruction among the insane in this country. When a suicide has determined —usually after much consideration—upon the manner in which he shall destroy himself, it may be practically useful to remember, that he will very often wait and neglect all other means which may present themselves until he can accomplish his death after his own fashion. Sir W. C. Ellis mentions the case of an old gardener who one day consulted him as to the best mode of destroying himself, since he said that he had made up his mind not to live any longer. The heinousness of the crime contemplated, and the fact that hanging was a most painful death, were pointed out; his wife was directed never to leave him alone; and he got better by the use of medicines which restored the healthy character of the secretions. Some time afterwards, however, he was discovered dead in a little shed in his garden, where he used to keep his tools. It appeared that so determined was he to die by hanging, that though the place was so low he could not stand upright in it, and he had not a rope or even a string with which he could suspend himself, yet he contrived it by getting a willow twig and making it into a noose, which he fastened to one of the rafters. He stooped to put his head through it, and then pushing his feet from under him, suspended himself until he died. Had he not made up his mind to destroy life in this particular manner, he might have done so much more easily by drowning himself in the pond which was in his garden, or by cutting his throat with the knife which he always had about him. In some instances, melancholics having a tendency to suicide will resort to modes of destruction such as baffle all ordinary precautions. For example, they will set fire to their clothing, and while parts of the body are burning appear neither to suffer pain nor fear, but rather to triumph in their martyrdom; so also they will tear their night-dresses, and by stuffing the shreds into their mouths endeavor to produce suffocation; and lastly, when taking pills containing narcotics, they have been known to hoard successive doses, until they have accumulated a poisonous quantity.

Another variety of monomania has also been described as *moral insanity;* in which there is perversion of the natural feelings, affections, temper, habits, and moral dispositions, without at first any remarkable disorder of the intellect. Eccentricity of conduct, an impulse to commit crime, a propensity to every species of mischief, are often the leading features. These cases sometimes assume an uncontrollable destructive tendency (*androphomania*, Ἀνήρ, a man; φονεύω, to kill), and the lunatic commits murder; or there may be a propensity to set houses on fire (*pyromania*, Πῦρ, fire); or the disease may give rise to an irresistible desire to steal (*kleptomania*, Κλέπτω, to steal).

In *erotomania* (Ἔρως, love; μανία), according to Esquirol, amatory delusions rule, just as religious delusions predominate in *theomania* (Θεὸς, God) or religious melancholy. Erotomania may be only an excessive degree of chaste and honorable affection; or it may be combined with *nymphomania* (Νύμφη, the nympha) in women, or with *satyriasis* (Σάτυρος, a satyr) in men. In all these forms there is usually great mental and bodily depression; women suffer the most frequently, especially those who are single; and the phenomena are often connected with some disease of the sexual organs.

γ. *Dementia.*—Dementia (*De*, priv.; *mens*, the mind) or incoherence, is that condition in which weakness of the intellect, induced by accident or age, is the prominent feature. The mind is altogether feeble; the ideas are confused, vague, and wandering; and the memory is impaired. There are paroxysms of restlessness and excitement. The patients are ignorant of time, place, quantity, property, &c. They forget in a moment what they have just seen or heard. Their manners are undecided, childish, and silly; their conversation is incoherent, and they repeat words and entire sentences without attaching any precise meaning to them. They have neither partialities nor aversions; neither hatred nor tenderness. They see their best friends and relatives without pleasure, and they leave them without regret. Sometimes they are constantly but slowly moving about, as if seeking for something; on other occasions, they will pass days in the same place and almost in the same attitude. They have little or no control over the bladder or rectum; while the phosphates of the urine are diminished in quantity. The ultimate tendency of mania and monomania is to pass into dementia. It is very rarely, if ever, cured; and in its last stage there is complete paralysis. Cerebral atrophy is a constant concomitant of dementia, its extent varying with the loss of mental power.

δ. *Idiocy.*—This condition is characterized by partial or complete absence of the intellect, owing to imperfect organization of the brain. It is congenital. The mind is not developed; there are no ideas, or they are few. The manners are childish, with occasional transient gusts of passion. The countenance is vacant, and void of aught approaching to intelligence. The articulation and the gait are often imperfect. And occasionally the idiot (Ἰδιώτης, a private individual,—one unfit for society) is a blind deaf-mute.

Curious examples are recorded of the recovery of idiots after some injury to the head; which though inexplicable are not therefore to be discredited. Dr. Prichard says,—"I have been informed on good authority that there was, some time since, a family consisting of three boys, who were all considered as idiots. One of them received a severe injury of the head: from that time his faculties begun to brighten, and he is now a man of good talents, and practises as a barrister. His brothers are still idiotic or imbecile. Van Swieten mentions the case of a girl who was imbecile till she received an injury of the head, and underwent the application of a trephine for the removal of a depressed portion of skull: she recovered and became intelligent. Haller has reported the case of an idiot whom a wound in the head restored to understanding."* Dr. Forbes Winslow notices the history of Father Mabillon, who was said to have been in his younger days an idiot, and to have continued in this condition until the age of 26. He then fell with his head against a stone staircase, and fractured his skull. He was trepanned. After recovering from the effects of the operation and injury, his intellect fully developed itself. He is said subsequently to have exhibited "a mind endowed with a lively imagination, an amazing memory, and a zeal for study rarely equalled."†

* A Treatise on Insanity, and other Disorders affecting the Mind, p. 23. London, 1835.

† On Obscure Diseases of the Brain, and Disorders of the Mind. Second Edition, p. 433. London, 1861.

The weight of the brain of an adult man may be estimated at about 48 ounces, or 3 lbs. avoirdupois (see p. 221). Cuvier's brain was very nearly 60 oz. avoirdupois. Dr. Peacock found the brain of an idiot boy, who died of scarlet fever when nearly eleven years old, to balance only 21 oz. 3½ dr. avoirdupois; its proportion to the whole body being as 1 to 16·2. Dr. Todd also dissected the brain of an adult idiot, which was 20¼ oz. avoirdupois; while Dr. Tuke mentions the case of an idiotic female, who died in the Retreat at York, at the age of 70, in whom the brain weighed 23¾ oz.

3. Principal Causes.—These are often very difficult to detect. Insanity is no doubt frequently hereditary; or it may sometimes be traced to marriages among near relatives, "breeding in and in," as the farmers say; or it may perhaps be due to syphilis in the system of the parents, or to drunkenness on their part. The more immediate causes are injuries of the head; the abuse of alcohol, or of narcotics—as tobacco and opium; sexual excesses, and particularly masturbation; somewhat rarely, perhaps, continence; fevers; and the retrocession of erysipelas or gout in persons predisposed to insanity. Then there are certain moral causes, as blighted ambition, disappointment in love, distorted views on religion, immoderate grief, long-continued anxiety and distress, prolonged intellectual exertion, and pecuniary reverses. I think it is Dr. Noble who remarks, that the more advanced the civilization of any community, the more abundant are the diseases of the mind. Humboldt states that he looked in vain for cases of insanity among the native Indians of America.

A disregard of everything but self—a forgetfulness of his due relation to all other creatures—is a characteristic of the lowest order of man. "All the diseases of the mind leading to fatalest ruin consist primarily in this isolation. They are the concentration of man upon himself, whether his heavenly interests or his worldly interests, matters not; it is the being *his own* interests which makes the regard of them so mortal. Every form of asceticism on one side, of sensualism on the other, is an isolation of his soul or of his body; the fixing his thoughts upon them alone: while every healthy state of nations and of individual minds consists in the unselfish presence of the human spirit everywhere, energizing over all things; speaking and living through all things."*

One undoubted cause of insanity seems to be defective nutrition of the brain, whether this originates from a morbid condition of the blood, or in some obstruction to the capillary circulation. Want of refreshing sleep interrupts the restoration of nervous force most seriously; and many patients, after recovery, have attributed their disease either to complete insomnia, or to their repose having been long disturbed by frightful dreams. Those slumbers which are "but a continuation of enduring thought" are quite opposed to the nutritive regeneration of that part of the cerebral organism on the action of which the emotions depend.

In individuals predisposed to insanity, local irritation may give rise to an attack. In a case which I saw lately, a large abscess in the loins

* Modern Painters. By John Ruskin, M.A., &c., vol. v, part ix, chap. ii, p. 206. London, 1860.

had this effect. I have also observed severe hysterical mania result from acute ovaritis, the mental disease ceasing as the ovarian pain was relieved.

The age at which insanity appears to be most common is between twenty and forty; in women, perhaps between twenty and thirty, and in men between thirty and forty.

4. Diagnosis and Prognosis.—The *diagnosis* of insanity is on many occasions attended with great difficulty. In examining a lunatic we shall perhaps find that several of his actions are not more extravagant than those of many peculiar though sane men; but we shall probably learn from those about him that his conduct is totally at variance with that which he manifested prior to his attack. In short, the individual is not what he was; there has been a gradual change of demeanor, perceptible to all acquainted with him; while no good reason can be given for the alteration.—Frequently, there is some difficulty in finding out the patient's delusions, and on this point again we have to make inquiries of the friends. But with regard to all hearsay evidence the physician must be cautious; inasmuch as, without any wish to deceive, it often happens that the friends have a bias, towards which they may unconsciously lean.

It has long been known that the insane are prone to suffer from changes in the form of the external ear, and particularly from sanguineous tumors (*Hæmatoma auris*) about the outer surface of the auricle. By some these have been attributed to mechanical violence, but this opinion seems untenable. The peculiar condition is often symmetrical. Dr. Laycock from a careful study of the symptomatology of the ear has come to these conclusions: "1. That the states of the circulation, nutrition, and development of the tissues which make up the earlobule, and cover the helix, very commonly coincide with similar conditions of the encephalic tissues. And 2. That the development of the cartilages of the external ear, and of their several parts, is in relation with the encephalic and cranial development of the individual."*

This is hardly the place perhaps to enter upon the consideration of the treatment of lunatics in our courts of law. But it is impossible not to see that in this matter there is a decided leaning to undue severity. A scientific witness may entertain no doubt as to the insanity of a particular criminal; and yet if he cannot assert that the prisoner at the time of his committing the act was ignorant of the wrong he was doing, the law will not heed the evidence. In many instances the life or death of a man rests upon the answer given by the physician to this question,—Did the prisoner know the difference between right and wrong when he committed the crime? If this principle were acted up to generally, half of the asylums might be closed for want of inmates. Why the whole management of lunatics in the present day depends upon moral control,—upon teaching them that they must behave properly. But daily experience proves that a man may be quiet and harmless in an asylum, who would be very dangerous if he were his own master. A madman bent on committing suicide knows that it is a wrong act, and will regret his tendency to it, and beg to be restrained. Yet the next hour he may

* Medical Times and Gazette, p, 289. 22d March, 1862.

attempt self-destruction. A wise and benevolent dispenser of justice should endeavor to learn if the general tenor of the man's life was that of a sane or insane man; whether there had been any gradual alteration of character; if any cause had been in action likely to induce imperfect nutrition or actual disease of the brain; and he should be bent upon simply discovering the truth, in a possibly obscure case, rather than of confounding "the mad doctor," and exposing him as an enemy to society. Science and humanity alike demand that if the judges are to define in set terms what is meant by insanity, they should first visit the asylums and watch the behavior of their inmates. They might then learn that it is no more absurd to believe that some diseases of the brain lead to "uncontrollable impulses," than that certain other affections of the nervous system interfere with the power to govern choreic and similar muscular movements.

With regard to the *prognosis*, it may be said that it is more favorable when an acute disorder of the whole system, or some cerebral malady attended with fever, has constituted the beginning of the mental aberration, than in those cases where the alienation of mind has slowly exhibited itself, perhaps almost imperceptibly at the onset, and advanced progressively to confirmed insanity.

When physical violence sustained by the head is the cause, the prognosis is uncertain, inasmuch as very severe lesions of the encephalon may thus arise. Moreover, if the mind has been overthrown by sudden and severe calamity, the prospects of recovery are great. Again, if the mind breaks down after protracted cares, the case is bad; especially if the physical energies also become depressed. When insanity is complicated with general paralysis or with epilepsy, it is generally quite hopeless.—Probably more cases of mania are cured than of any other form of insanity; the probability of restoration being very much greater in the early than in the advanced periods. According to Esquirol the most favorable age for recovery is between twenty and thirty, few being cured after fifty: most authors assert that insanity in women is more curable than in men: and lastly, when the mental disease is connected with some bodily disorder which admits of removal by the progress of age, or by medical treatment, the grounds for hope are much increased. To form a correct prognosis, no link in the chain of circumstances must be overlooked. Dr. Noble well observes: "The causes, moral and physical, predisposing and exciting; the history of the invasion and progress; the actual state, and the reactions taking place under influences of every kind,—must all be known and rightly appreciated if an opinion is to be formed of the slightest value."

In advanced insanity, when the patient is happy in his delusions, he often gets stout, for his appetite is good and his morbid ideas give him no trouble. It is an unfavorable symptom when the bodily health improves, without the mental disease becoming at all alleviated.

A very common cause of death in the insane is some disease of the thoracic viscera, especially of the organs of respiration.

5. Pathology and Morbid Anatomy.—The two chief postulates as to the nature of insanity which are entertained in the present day are,—the *metaphysical* or *spiritual* theory, and the *cerebral* hypothesis. The first conjecture, that insanity is a disorder of the imma-

terial principle, and not of the material instrument by which the mind manifests itself, seems quite untenable. The second theory is the only plausible one—viz., that the brain, or instrument through which the mental phenomena are expressed, is the part affected.

The cerebral disease may be such as is visible on examination after death, or it may consist of some change which we cannot discover. If the brain be imperfectly nourished, through any morbid condition of the blood, we may have diseased action without any structural change being left which our microscopes can detect.—The most distinct theory of the pathology of insanity with which I am acquainted is that put forward by Dr. Henry Monro,* which I shall give in nearly the author's own words: 1. That it is an affection consequent on depressed vitality; which depression is wont to manifest itself with peculiar and specific force in the cerebral masses, owing to a congenital and frequently hereditary tendency in the brain thus to succumb when oppressed by an exciting cause. 2. That when the cerebral masses are suffering from this condition of depressed vitality, they lose that static equilibrium of the nervous energies which we call tone (and which is peculiarly indicative of healthy vigor), and they exhibit in their functions the two different degrees of deficient nervous action (coincidently), namely, irritable excess of action, and partial paralysis: that in consequence, the brain becomes an imperfect instrument for the manifestation of mind; and that (as the manifestations of the spiritual being are subject to the infirmities of its instrument) its operations are distorted either into irritable and diseased excess, or are more or less suspended altogether. 3. That these two degrees of deficient nervous energy do not fall alike upon all the seats of mental operations, but that the seats of the more elementary faculties (such as the conception of ideas, &c.), maintain generally only the first condition—namely, that of irritable excess, which is exhibited either by excessive rapidity of succession of ideas, or undue impression of single ideas; while the seats of the less elementary but higher faculties, such as reason and will, &c., generally succumb to this second degree—namely, partial suspension of action. 4. Corroborative of this we find want of vitality and nervous tone in those parts of the system of the insane connected with physical life, as the skin, mucous linings and appendages. 5. And lastly, these facts are supported by the results of treatment; for that which will at the same time raise depressed vitality, and equalize disturbed nervous energy, is found to be most useful in the treatment of insanity, and this is exercise in the open air, as well as the due employment of other vital stimuli.—Hence it is deduced that insanity is caused by loss of nervous tone, and loss of nervous tone by depressed vitality. Violent symptoms may be regarded as attempts on the part of nature to throw off a morbid excess of nervous energy; consequently the violence is not to be looked on wholly with fear, but rather with hope, as we know the more acute the symptoms are, the more promise there is of cure.

The observations of Drs. Bucknill and Sankey on the brains of the insane and the sane give us the following results: (1.) The absolute weight of the brain is increased in insanity, though the absolute size relatively to the capacity of the cranium is diminished. (2.) The greater

* Remarks on Insanity, its Nature and Treatment, p. 12—15. London, 1851.

heaviness depends upon increased weight of the cerebellum, compared with the cerebrum, pons, and medulla oblongata; so that the cerebellum is heavier in relation to the cerebrum in the insane than in the sane. (3.) The increased weight of the cerebellum is found to be greatest in general paralysis, and least in acute mania; the first being a disease of very much longer duration than the second. (4.) The specific gravity of both the gray and white portions of the brain is increased in the insane. (5.) Dr. Bucknill seems to think that the most essential change consists in the existence of two kinds of cerebral atrophy,—namely, that which is positive, and that which is interstitial or relative. By positive atrophy he indicates an actual shrinking of the brain; while by relative atrophy, which may or may not be coexistent, he means an interstitial change, wherein the active cerebral molecules suffer diminution, inert materials being deposited.

It must not be thought because structural disease of the brain exists, even to a considerable extent, that amelioration of symptoms may not take place for a time. Sir Henry Holland* alludes to a case of mental derangement (and says that he has met with similar instances) where the post-mortem examination showed great organic changes in the brain; many of them, from their nature, obviously of long standing, and upon which it was next to certain that the symptoms depended. Yet in this instance there occurred not long before death a lucid interval, so far complete and prolonged as to afford hopes of recovery where none before had existed; and where the event proved that none could be reasonably entertained.

6. General Treatment.—Supposing that the physician is fortunately consulted when the symptoms are merely threatening, he may often effect a cure. This is to be attempted by resting the nervous system, by taking care that there is a due amount of sound sleep, and by attending to the functions of the skin, liver, kidneys, and alimentary canal. Where there is no symptom of active disease in the head, morphia or extract of opium often proves invaluable; or Indian hemp, henbane, stramonium, or chloroform, may be useful. Some forms of excitement are best treated by thirty-minim doses of tincture of digitalis, repeated every eight or twelve hours. If the vital powers be depressed, tonics—such as quinine and iron, phosphate of zinc, bark, cod-liver oil, &c.,—must be given. The diet is to be nourishing, and the amount of stimulants to be regulated. Change of air and scene may also be recommended; especially if the patient can be accompanied by an affectionate and judicious relative.

In examining a person supposed to be insane, the duty of a medical man, as Dr. Conolly has pointed out, is twofold, viz.: 1st, to determine whether the individual in question be of sound mind; and, 2d, to give an opinion regarding the treatment required, and especially concerning the necessity of restraint, its degree, and nature. The practitioner will have learned from the preceding observations how to answer the first question. With respect to the second—the medical treatment—it must of course depend upon the state of the patient; but it may be positively asserted that under no circumstances can an antiphlogistic course of

* Chapters on Mental Physiology. Second Edition, p. 68. London, 1858.

remedies be borne.* Even when exacerbations occur at the menstrual periods, and the flow is scanty, we must not do more than apply a few leeches to the neck of the uterus, while nourishing food is freely allowed to prevent the loss of blood from causing general depression. Indeed our general object clearly must be to restore and maintain the bodily functions, and to remove any disorders in other parts of the system—as skin diseases, uterine disturbances, gastric and intestinal irritations, &c., which may be connected or coexistent with the cerebral affection. We may persevere the more, when we remember that many lunatics have been cured by improving their general health, even after suffering for some years. In an ordinary case of insanity, I should especially take care that the patient had a nutritious diet, warm clothing, out-door occupations and amusements, healthy evacuations from the bowels, and sound sleep at night. I would try and prevent all bad habits, as onanism, &c.; I should also endeavor to give repose to the nervous system; I would impart power to the body, if necessary, by tonics; and then at length would gently try to revive the affections, and strengthen the bewildered intellect. While following this plan no mechanical restraint ought on any account to be resorted to; and such cheerful occupation and recreation should be afforded as the lunatic could beneficially enjoy.

From this it will seem that stimulants, tonics, mild warm purgatives, and narcotics—especially opiates—must usually prove invaluable remedies.—The douche, shower, or simple warm-bath may perhaps be used, but only according to the ordinary principles of medicine. The regular employment of the Turkish bath is often of service; partly by improving the function of nutrition, as is evidenced by a gradual increase of weight.—The diet of the insane should undoubtedly, as a rule, be generous and of the most nourishing kind. It not unfrequently happens that all food is refused, especially perhaps by those who have morbid ideas on religious subjects. Such patients will fancy that they are commanded to fast, and will perish from inanition, rather than disobey the imaginary precept. In other cases the functions of the stomach and bowels are deranged, and the refusal is merely due to complete loss of appetite; the food being eagerly taken when the intestinal evacuations have become free and healthy. If we can, therefore, find any physical cause for the abstinence, it must of course be removed; but otherwise we may try and persuade the patient to eat by tempting him with dainties, or by putting food where he can help himself when unseen, or by feeding him with a spoon like a child, or we must resort to *forced alimentation* to sustain life. This latter process may be effected by injecting nutritious fluids through the nasal passages or by

* This opinion is in its main features acquiesced in by all physicians. One of the most careful recent writers on this subject draws the following conclusions from his experience: Insanity, in any form, is not of itself an indication for bloodletting; on the contrary, its existence is of itself a contra-indication; hence the person who is insane should, other things being equal, be bled less than one not insane; insanity may coexist with plethora, a tendency to apoplexy or paralysis, and sometimes sthenic congestion or inflammation, which call for the abstraction of blood; therefore venesection in mental disorders should not be absolutely abandoned, although the cases requiring it are very rare. As a general rule *topical* is preferable to *general* bleeding. Insanity following parturition, other things being equal, is to be treated by bleeding less frequently than that which has its origin in other causes.—An Examination of the Practice of Bloodletting in Mental Disorders. By Pliny Earle, M.D. New York, 1854.

the mouth. If we adopt the first mode, it is only necessary to have a funnel with a long flexible tube attached to it; which tube, on being passed through the posterior nares and œsophagus, will convey any liquid by simple gravitation. In the second case, while the patient is firmly held by two or three attendants, we employ the gag and stomach-pump; by means of which I have often injected mixtures of strong beef-tea, milk, cod-liver oil, brandy, and flour.—The use of nutrient enemata in these cases is not advisable.

As regards the moral treatment of insanity, no rules can be of universal application. I will only say, therefore, that it ought to be regulated by kindness and a feeling of sympathy with misfortune; and that no harshness or means which induce fear should be tolerated. The physician must endeavor to obtain the confidence of his unfortunate patients, by showing an interest in their well-doing, by quietly listening to the recital of their ailments, by never making a promise without keeping it, and by allowing as much indulgence as is compatible with the proper treatment of their disease. He should remember that lunatics are frequently shy and nervous; often prompt and acute to see through any mystification; that they highly appreciate truth and fair dealing; and that any attempt to deceive them is sure to weaken his power over them. Then, if he have a pleasing and friendly address, with kind but firm manners, he may be sure of maintaining a greater degree of influence than can ever be acquired by any amount of severity or violence. It can very rarely, if ever, be at all advantageous to reason with a lunatic; though, at the same time, it is better to do so than to treat his observations and complaints with perfect contempt. Dr. Noble mentions the histories of three inmates of an asylum, each of whom fancied himself the Holy Ghost. On their being brought together, one was cured of his delusion; as he reasoned that there could not be three Holy Ghosts. But I cannot suppose that Dr. Noble regards the discussion as the agent that effected the cure; if indeed a cure was effected, for it is not stated whether there were other delusions, or what was the ultimate result of the case.

In order to render restraint imperative, I believe a lunatic should be dangerous either to himself or to others; or seclusion must be deemed necessary as part of the curative treatment. Although the quiet and regular mode of life led by patients in well-ordered asylums is often most efficacious as a remedial agent, yet I am thoroughly convinced that many institutions contain harmless though incurable lunatics, who would be much happier and in no degree injured by residence elsewhere; but who, unfortunately, have relations and friends who will not be troubled with them. It is much to be regretted that we have no colonies for the insane like that of Gheel in Belgium, where patients are able to enjoy a certain amount of liberty, and to mix with the families in the farmhouses where they board. For although very much has been done within the last few years to improve the appearance and character of our asylums, nevertheless much remains to be accomplished. They are not yet properly converted into *Hospitals for the Cure of Insanity*, but still retain to an injurious degree the look and nature of prisons; while the parsimonious way in which some are furnished, and the especially wretched appearance of many of the night-cells, are circumstances positively disgraceful. The days of rotatory chairs, manacles,

stripes, head-shaving, baths of surprise, prolonged and violent shower-baths, dark rooms,—in short, of punishments of all kinds—have, it is to be hoped, gone forever; but if any one doubts that we have yet much to do, let him read the Reports of the Commissioners in Lunacy.

VIII. CEPHALALGIA.—VERTIGO.

1. Cephalalgia.—Headache, or cephalalgia (*Κεφαλή*, the head; *ἄλγος*, pain) is of common occurrence; since it is present as a prominent symptom during some part of the progress of most acute, and of many chronic diseases. The pain or uneasiness is in the head; and it is to be distinguished from the suffering connected with rheumatism, or neuralgia, or inflammation of the scalp, or with syphilitic affections of the pericranium and bone.

Four principal varieties of headache may be noticed. The first, or *organic headache*, is due to disease of the brain or its membranes, and especially of such in an early stage. It is generally accompanied by attacks of vertigo, occasionally by fits of vomiting, sometimes by confusion of the mind, and frequently by noises in the ears. The pain may be sharp or dull, lancinating or throbbing. Diseases of the meninges are attended with more severe headache than those of the nervous substance itself. In abscess and in cancerous tumors of the brain paroxysmal attacks are common. Dr. Forbes Winslow appears to confirm the opinion of Hasse that pain in the head always exists in central softening of the cerebrum involving the corpus callosum, septum lucidum, fornix, and the ventricular parietes. When due to inflammation the pain is often most intense, is confined to one portion of the cranium, is increased by warmth or movement or noise, and is lessened by elevating the head. At times it remits in severity. There are no symptoms of gastric disturbance, or of sluggish action of the liver.—In valvular disease of the heart headache is a common symptom; being due to the interference with the regular and perfect supply of blood to the brain.

The second, or *plethoric headache*, is dependent upon fulness of blood: the cerebral vessels become congested. There is a sense of pulsation in the ears; together with giddiness on stooping. Persons who live too freely, who take but little exercise, who rise late in the morning, &c., are liable to it; also robust middle-aged men who "make blood too fast;" as well as plethoric young women with irregularity of the catamenia.

The third, or *bilious headache*, may be temporary or constant. When temporary, it generally arises from some error of diet—any excess either in food or wine; while it is most severe in the morning on awaking from an unrefreshing sleep, and passes away as the cause ceases. The constant sick headache occurs in persons of weak stomach, who are almost always suffering from indigestion, or who have a tendency to gout. The stomach and duodenum are out of order, as is evinced by the coated tongue, the offensive breath, the flatulence, the low spirits, and the nausea which exist. The hepatic functions are also ill-performed, and the stools are clay-colored; while the urine is scanty and of a brown tint. There is seldom any disposition to vomiting.

The fourth, or *nervous headache*, is often due to debility and exhaus-

tion. Poverty of blood from renal disease, hemorrhage, &c., may induce it. The irritation of decayed teeth is I believe a frequent cause. In one variety of this disorder—known as *hemicrania*, or *brow-ague*—the symptoms assume an intermittent character; the pain recurring every day or each second day, with the same degree of regularity as an ague-fit. Although this form prevails in damp and marshy districts, yet it may arise in healthy parts of the country from other causes than malaria, and especially from constitutional debility. Weakly women, who exhaust themselves by over-lactation, &c., are frequently the victims of a variety of nervous headache known as *megrims;* which may assume an intermittent character like hemicrania. And, lastly, hysterical girls are very liable to a kind of nervous headache; which, when confined to a single spot, is known as *clavus hystericus*, because the pain is said to resemble that which, it is supposed, would arise from driving a nail into the head.

Headaches, of whatever kind, occur more frequently in persons of adult life than in extreme youth or advanced age; dwellers in towns suffer more than residents in the country; females more than males; the nervous and delicate more than the robust; the middle and higher classes of society more than the lower; and lastly, says Dr. Wright, they "especially affect persons who neglect the many little attentions and cares that our civilized, and therefore in some measure artificial mode of life requires. I may especially instance regularity in diet, carefulness in adapting the clothing to the requirements of our variable climate, attention to the action of the bowels, and a sufficient amount of exercise, as essential objects of our care."*

The indications for *treatment* are, to relieve the congestion of the head and the dyspeptic symptoms, while at the same time attempts are made to give tone and strength to the system. The diet ought to be regulated, only such food being allowed as can be usefully assimilated. Many individuals afflicted with headache, tremors, and restless nights derive great benefit from leaving off tea and coffee. Mild purgatives, such as taraxacum, the compound rhubarb and blue pill, or the alkaline decoction of aloes (F. 146, 147, 171, or 175) will frequently be useful. When the pain is connected with the gouty diathesis, colchicum is the proper remedy. We may also often effect a cure in bilious headaches by pepsine, ipecacuanha, or rhubarb (F. 384, 385, 420), to aid digestion; in which cases also the patients must take daily exercise in the open air, and avoid too much sleep. In many nervous headaches, stimulants and tonics, particularly the nitro-muriatic acid (F. 378), are to be tried: in hemicrania, quinine or arsenic (F. 52, 379, 381, 399) will be needed: while in hysterical women we must resort to zinc or steel (F. 394, 403, 410, 413, or 414).—Holding the arms high above the head produces a marked effect upon the cerebral circulation. Hence this proceeding will sometimes check troublesome bleeding from the nose; and I have frequently seen it relieve the severity of that peculiar morning headache, with which some persons constantly awake.—Compression of the temporal arteries with a couple of pads and a bandage, may sometimes be of service.—In addition to the foregoing we shall occasionally have to try cold lotions, eau de Cologne, &c., to the head; dry cupping, or blisters, or

* Headaches, their Causes and their Cure, p. 12. London, 1856.

setons to the nape of the neck; the removal of decayed teeth or stumps from the mouth and change of air.—It need hardly be added that in *organic* headaches arising from some cerebral mischief, the disease and not the symptom must claim the greatest share of the practitioner's attention.

2. Vertigo—Giddiness, or vertigo (*Verto*, to turn round) consists of a transitory sense of whirling round, or of falling. Surrounding objects appear to be in motion; the sufferer loses his balance for a second or two, but often recovers himself without falling, provided he can grasp some support; and then he asks to sit down immediately. The attack is followed by headache.

Vertigo is perhaps a more important symptom of incipient disease of the brain, than headache. When frequent seizures are complained of, they assume a serious bearing; being generally the precursors of impairment of the mental powers, as well as of actual disease.

The practitioner should always endeavor to trace the attack to its origin. In some instances it betokens general weakness; as is seen in the vertigo which arises on assuming the erect posture, in the early stages of convalescence from acute disease. It may be due to some poison in the blood; examples of which are common from intoxication, a dose of opium, and the use of tobacco by one unaccustomed to it. It may also be merely symptomatic of some gastric or intestinal irritation: of some disturbance of the liver: of some kidney affection, particularly of such as is accompanied with albuminuria: or of disease, functional or organic, of the heart. Venereal excesses induce it; and so does prolonged lactation, especially if the catamenia are regular.

Vertigo very frequently arises from some evident disturbance of the cerebral circulation. Indeed, any circumstance which suddenly modifies the circulation of the blood through the brain will induce it; whether the occurrence act so as to accelerate the flow or to retard it. In the mild form of epilepsy (epileptic vertigo), the two chief, or indeed, only symptoms, are giddiness and faintness. "Swimming in the head" is also often a forerunner of apoplexy and paralysis. Paroxysmal attacks are not uncommon in the aged, unattended by other symptoms. A diseased condition of the arteries of the brain, in advanced life, is a frequent cause of very troublesome giddiness.

In the majority of cases there are indications of depressed vital power. And this is is the case even when the vertigo is connected with a fulness of the cerebral vessels; the congestion consisting of passive venous hyperæmia much more frequently than of active arterial determination of blood. Hence, as a rule, tonic and antispasmodic remedies are more frequently called for, than those which have a tendency to lower the system. The latter, however, will be needed in persons of a full habit of body, whose heads are hot, and whose arteries are pulsating with undue force. In such, spare diet, active exercise, purgatives, blisters behind the ears, or setons in the nape of the neck, will be useful. When there is evidence of anæmia, chalybeates, a nourishing diet, and change of air must be prescribed. For the attacks of temporary dizziness to which the aged are liable, small doses of corrosive sublimate and bark are often valuable.

IX. DISEASES OF THE SPINAL CORD.

Experiment and clinical observation have taught us that the spinal cord in connection with the brain is the instrument of sensation and voluntary motion to the trunk and extremities. The continuity of the cord with the encephalon is absolutely essential; for let it be destroyed, and then sensation and voluntary motion will be abolished in all those parts of the body supplied by spinal nerves below the seat of injury. The nearer the seat of interruption to the encephalon, the greater will be the paralysis, and the more rapidly will life be extinguished; so that if the cord be severed at its junction with the medulla oblongata (as when an animal is "pithed"), death will result immediately. To Dr. Marshall Hall, however, we are mainly indebted for proving that the spinal cord may be the instrument for the excitation of movements, *independently* of volition or sensation; either by direct irritation of its substance, or through the influence of some stimulus carried to it from a portion of the trunk or extremities by nerves there distributed.

The nerves which issue from the cord have each two roots,—an anterior purely motor, and a posterior purely sensitive; these roots by their union forming a compound nerve. On making a transverse section of the cord, we find it to consist of gray and white matter. The gray matter, made up of nerve filaments and corpuscular or multipolar cells, is placed in the interior of the cord, in the shape of two crescentic masses; each mass being in a lateral half of the cord, each having an anterior and posterior horn, and each being joined to the other by a band of matter called the gray commissure. From the labors of Schroeder Van der Kolk, it seems certain that the anterior roots of the spinal nerves have their origin from the gray ganglionic cluster of cells of the anterior horn; the anterior medullary fibres of the cord being the channels through which the influence of the will is conveyed from the brain to these ganglionic clusters or plexuses. The posterior roots have two rootlets, one of which seems to ascend in the white substance to the brain, thus forming the channel of sensation; while the other penetrates the white substance, and seems to be lost in the ganglionic cells of the posterior horn and centre of the gray matter. These latter rootlets of the great posterior or sensitive roots are thought to constitute the reflex nerves. Thus the two horns of gray matter appear to stand in the closest relation to motion; the anterior being the direct sources of motion, while the posterior serve for reflex action and co-ordination. (The cause of the co-ordination of movements is therefore situated in the spinal cord, and not in the cerebellum.) The medulla oblongata appears to be the common central point, where reflex action crosses to either side; and on the irritated state of which general spasms—as convulsions and epiplesy—are thought by Van der Kolk to depend. The white or medullary matter consists of gelatinous nerve-substance and extremely minute nerve-filaments.

In the hope that these remarks will facilitate the comprehension of much that follows, I proceed to a consideration of the diseases of the cord.

1. Spinal Meningitis.—Acute inflammation of the membranes of

the cord (sometimes termed *Acute Paralysis from inflammation of the membranes of the spinal cord*) terminates either in resolution, or in the effusion of serum, or in softening or suppuration. The morbid action when acute may be associated with disease of the cerebellum or of the cerebral membranes; while when chronic it is mostly found associated with caries of the vertebræ.

The *symptoms* which have been described as indicating inflammation of the meninges of the cord, are—high fever, and sleeplessness; acute pains, often of a burning character, extending along the spine and stretching into the limbs, aggravated by motion and pressure, and often simulating rheumatism; rigidity or tetanic contraction of the muscles of the neck and back, varying in degree, but amounting sometimes to opisthotonos; feebleness of the limbs, often going on to paralysis of the lower extremities, the loss of power gradually extending upwards as the effused serum increases in quantity; a feeling of constriction in the neck, back, and abdomen; suffocating sensations; retention of urine; priapism; and obstinate constipation, sometimes succeeded by diarrhœa. Great prostration sets in towards the close; while there may be feverish delirium and coma.

Males appear to suffer more often from spinal meningitis than females: it is most common between the second and seventh year, and then between the twentieth and twenty-fifth year; and exposure to wet and cold in rheumatic subjects seems to be its most frequent cause, while mechanical injuries must rank second. The changes found after death are great congestion, effusion of serum or pus, and perhaps softening of the cord. And, lastly, the treatment must be that recommended when speaking of inflammation generally; since it is allowed by some who have resorted to bleeding and mercury, that success has not followed the use of these remedies, though they account for the failure on the ground of the practice not having been adopted with sufficient energy.*

Cerebro-spinal meningitis arises from the same causes as inflammation of the membranes of the cord alone. Sometimes the morbid action is set up in both situations at the same time; while in other instances the membranes of the brain are first attacked, and the disease spreads downwards, or *vice versâ*. But it is remarkable that cerebro-spinal meningitis occasionally occurs as an epidemic; the inmates of workhouses being liable to it.† So also soldiers have suffered from it, when quartered in ill-ventilated, overcrowded barracks; or when overworked, and supplied with too little good food and too much intoxicating drink.—To prevent its spreading, removal from the unhealthy locality is absolutely necessary; while proper regulations as to exercise, ventilation, diet, clothing, &c., must be enforced.

2. Myelitis.—Myelitis (*Μυελός*, marrow; terminal *-itis*), or inflammation of the substance of the spinal cord, is not marked by any very uniform set of symptoms; since they will be found to vary with the severity of the attack, its duration, and the portion of the cord affected.

Tracking the inflammation from above downwards, the following are

* Diseases of the Spinal Cord and its Membranes. By Charles Evans Reeves, M.D., &c., p. 45. London, 1858.

† See an account by Dr. Mayne of an epidemic which prevailed in the Irish workhouses, published in the Dublin Quarterly Journal of Medical Science, August, 1846.

the chief *symptoms*. When the *cranial* portion is affected, we find deep-seated headache, convulsive movements of the head and face, inarticulate speech, trismus, difficult deglutition, impeded spasmodic breathing, irregularity in the heart's action and in the pulse, with hemiplegia or other form of paralysis. As the fatal stage advances, there is great prostration, feeble circulation, increased dyspnœa, and involuntary escape of the excretions. Where the inflammation affects the whole thickness of the cord above the origin of the phrenic nerves, life is at once extinguished by the cessation of the action of respiration.—Supposing the inflammation is in the *cervical* portion, difficulty of deglutition, impossibility of raising or supporting the head, acute pain in the back of the neck, great dyspnœa, a sense of pricking and formication in the arms and hands, and paralysis of the upper extremities, form the prominent signs.—In inflammation of the *dorsal* region, there is pain in this district, numbness or pricking sensations in the fingers and toes, convulsive movements of the trunk, paralysis of the arms and lower extremities, short and laborious respiration, great palpitation, &c. —When, as is most commonly the case, the *lumbar* portion is affected, the paralysis of the lower extremities becomes more marked; there is great pain in the abdomen, with a sensation as of a cord tied tightly round it; there are convulsions or paralysis; while paralysis of the bladder and sphincter ani ensues, leading to retention, followed by incontinence of urine and involuntary stools.

The pain in the affected part of the cord is always less severe than in meningitis; but it is increased by the application of heat (as of a sponge dipped in hot water), or by firm pressure. Care must be taken not to attribute the pain to lumbago. According to M. Ollivier myelitis often coexists with pneumonia and gastro-enteritis.

The disease seems usually to be *excited* by cold and damp, or by wounds and contusions; while sometimes it occurs during the progress of fever. The *prognosis* is always grave; but there is no reason to doubt that many cases recover, where the inflammation has only been of short duration, and especially where only the lower half of the cord has been affected. It may, however, terminate fatally in the acute stage, or afterwards from the occurrence of ramollissement or of suppuration. Ramollissement is the most frequent result; which cannot be distinguished from non-inflammatory softening by the naked eye. Sometimes one part of the cord is found softened, and another portion indurated. Occasionally an abscess has been discovered in the substance of the cord.

The *treatment* proper in inflammation of the cord and its membranes is the same as that previously recommended for inflammation of the brain and its membranes. The value of iodide of potassium is especially to be remembered. Great care must be taken to keep the patient dry and clean, as well as to empty the bladder frequently with the catheter; remembering that incontinence of urine generally arises from the bladder being overdistended—literally, from the urine overflowing. Bed-sores will be best prevented by placing the patient on a water-bed; or, in the absence of this by the use of the soft amadou plaster.

3. Spinal Hemorrhage.—Apoplexy of the cord, or paralysis from the effusion of blood into the spinal canal or into the substance of the cord, is more rare than cerebral hemorrhage.

The *causes* are chiefly from blows and falls, over-exertion, acute inflammation of the cord or membranes, fatty degeneration of the coats of the bloodvessels, and caries or other disease of the vertebræ. The blood may be poured out external to the dura mater, or between the membranes, or into the gray portion of the cord. Where the effusion is abundant, death may ensue at once; but when this does not happen, a fatal result may take place after the lapse of some time owing to chronic softening of the cord.

The *symptoms* will depend upon the seat of the ruptured vessel. When the blood is effused between the membranes, it will necessarily gravitate to the lowest part of the spinal canal; and hence will arise paralysis, which gradually ascends. There will also be acute and sudden pain in the back, and sometimes in the head; severe convulsions often set in; the breathing will be difficult, when there is pressure on the upper part of the cord; the heart's action is usually much depressed; the skin is pale and cold; but there is no loss of consciousness. Effusion into the substance of the cord produces sudden paralysis in all parts supplied with nerves below its seat; unless the hemorrhage be very slight, when the loss of power may occur slowly after the lapse of several hours.

The object of our *treatment* must be to check the effusion of blood by quiet, and the application of ice along the spine.

4. Tumors.—Paralysis may arise from the long-continued pressure of tumors upon the cord, producing partial atrophy. The morbid growths consist either of tubercle, or cancer, or bone, or hydatid cysts. Exostosis of the odontoid process of the second cervical vertebra has occasionally been found. Sometimes the tumor has had its origin in syphilitic disease of the vertebræ.

The *symptoms* come on very slowly, paralysis occasionally not being manifested until great pressure is exerted. The paralysis of motion always precedes that of sensation. There is usually pain over the seat of the growth; cramps, with convulsive movements of the extremities, are not uncommon; and in the event of the disease being due to scrofula, syphilis, or cancer, there will be manifestations in the system of the particular affection.

The *treatment* must be chiefly constitutional; though occasionally counter-irritants to the painful part of the spine do good. Iodide of potassium, cod-liver oil, and a nourishing diet, are the remedies from which most good may be expected.

5. Hydrorachis.—This is a term applied to abnormal collections of fluid within the spinal column. When the fluid has been present for some time it produces, by its pressure, atrophy of the cord.

Hydrorachis is generally congenital, and associated with *spina bifida*. In such cases, one or more semi-transparent tumors containing fluid are found over the cervical, dorsal, or lumbar vertebræ—generally the latter—which communicate with the medulla spinalis. The arches and spinous processes of the vertebræ are wanting in the situation of the tumors; the walls of the latter being formed of skin and the spinal membranes. With care, life may often be prolonged for some years. The *treatment* must consist in improving the general health. In a few instances, removal of the fluid by puncture, followed by pressure judi-

ciously applied, may be serviceable ; but—as a rule—the less these cases are actively interfered with the better.

6. Concussion.—It is rather remarkable, that while considerable attention has been paid to the subject of concussion of the brain, very little notice has been bestowed upon the same condition as it affects the spinal marrow. The little knowledge which I possess on this matter will perhaps be best conveyed to the reader, by a concise reference to two well-marked cases of concussion of the cord which came under my notice during the year 1860. In one case, the lady fell while walking upon some rocks on the Devonshire coast ; in the other, a jump from a high phaeton was the cause of the accident. Neither lady lost consciousness in the slightest degree, both felt the peculiar tingling in the hands and feet called pins and needles, and both were able to walk some little distance after the shock. The first patient did not apply to me till six weeks after the fall, when she complained of weakness, some difficulty in passing urine, a sense of cold and deadness in the legs, startings at night, with an increased difficulty in walking. Perfect rest in bed for one month, with the daily application of the extract of belladonna down the course of the spine, effected a cure.

The second patient consulted me on the day following the mischief, inasmuch as she was frightened because she felt so sore and bruised that she could scarcely move. There was, however, no real paralysis. The pain was correctly attributed to the jump, though surprise was expressed at the severe result, inasmuch as she alighted safely upon her feet. She was kept in bed for many days until every symptom had vanished ; and no ill consequence ensued on her afterwards walking about.

Where cases like the foregoing are neglected, and when the sufferers continue to take exercise, there is a fear of chronic inflammation or softening of the marrow setting in ; which conditions are very likely to end in incurable paralysis, or even in death. Mr. Hilton, in his lectures at the Royal College of Surgeons during 1860, mentioned the case of a gentleman who had a fall upon his back, a few years previously, owing to the giving way of some scaffolding. Directly he fell he experienced the sensation of pins and needles in his legs. Having been told, when a boy, that in the event of an accident of this description, the best plan was to "run it off," he immediately started away and quickly walked six miles. Within a very short time he began to experience spinal-marrow symptoms, which have resulted in complete and irremediable paraplegia. Mr. Hilton stated his belief, that if the man had gone home directly after receiving the injury, and kept himself quiet for a considerable period, he would have been quite well in a few weeks.

One more example will complete all that need be said on this subject. The particulars of the case are as follows: A stout, feeble man, between sixty and seventy years of age, trod on a piece of orange-peel, and fell ; the lower part of his sacrum striking the pavement with great force. He was taken, in an insensible condition, to Charing-Cross Hospital, where he soon recovered his mental faculties, but both his upper and lower extremities were motionless. On the fourth day he was conveyed home, and was seen by Dr. C. E. Reeves, when it was noted that his voice was weak and interrupted, his breathing slow, the

heart's action weak, the urine scanty, and the extremities motionless and insensible. Galvanism and stimulating embrocations were tried, but the patient was found dead in his bed on the twelfth morning. At the necropsy, the cord was discovered of a bluish tinge and pulpy to the touch; while the brain presented a similar but less marked appearance. The heart and large bloodvessels, moreover, contained fibrinous clots.

7. Spinal Irritation.—The existence of spinal irritation as a distinct and idiopathic disease has been denied by some writers; and it is my duty to confess that the greater the attention which I have bestowed upon this subject, the more inclined I am to believe that there is no affection deserving the name.

In the second and third editions of this volume the symptoms of spinal irritation were said to consist of pain about the thorax, mammæ, abdomen, or uterus; this pain having some remarkable connection with the spine, since, wherever it might be, it was increased on pressing certain of the spinous processes of the vertebræ, which were also themselves exceedingly tender. Moreover this tenderness was sometimes confined to one spot, sometimes diffused over a large portion of the spinal column; while it was most common in the lumbar and sacral regions. The disease would seem to depend (it was observed) upon congestion of the spinal venous plexus, causing pressure upon—and consequent irritation of—the origins of the nerves.

Owing to doubts which I have for some time entertained, I have scrupulously availed myself of every opportunity, during the last six years, to carefully examine examples of so-called "Spinal Irritation," or "Spinal Disorder;" and the result has been this—that in every instance the suffering has appeared to be due to a combination of myalgia and hysteria with constitutional debility. The history has always shown that the patients, almost without exception, were delicate women; and that prior to the illness for which relief was sought, they had undergone great fatigue, or had been living badly, or had indulged in excessive sexual excitement, or had long suffered from a copious leucorrhœal or menstrual discharge. Moreover, the seat of the pains has always corresponded with the insertions of important muscles; there has been a marked freedom from suffering so long as the recumbent posture has been maintained; and more or less well-marked symptoms of hysteria have coexisted.

The *treatment* of these cases has served to confirm the statements just made; for under the influence of rest, belladonna plasters, nourishing food, cod-liver oil, and bark or steel, cures were effected with comparative ease. To prevent any misunderstanding, it must be mentioned that, with regard to *rest*, I merely mean that for a few weeks the patient shall retire to bed at nine or ten o'clock at night, and remain there until about the same hour the following morning; and not that she shall be confined to the recumbent posture for months together. A short time since, I saw a delicate young lady, who, under the advice of an irregular practitioner, had actually kept her bed for five years; but who, I believe, might have been cured of her pseudo-spinal disorder in as many weeks by confidence in a physician who knew his business, sea-air, moderate exercise, and a nourishing diet.

X. PARALYSIS.

By paralysis (*Παραλύω*, to relax—to affect with paralysis), or palsy, is meant a total or partial loss of sensibility or motion, or of both, in one or more parts of the body. All paralytic affections may be divided into two classes: the first including those in which both motion and sensibility are affected; the second, those in which the one or the other only is lost or diminished. The former is called *perfect*, the latter *imperfect* paralysis. Imperfect paralysis is divided into *acinesia* (*Ἀ*, priv.; *κίνησις*, motion), paralysis of motion; and *anæsthesia* (*Ἀ*, priv.; *αἰσθάνομαι*, to perceive by the senses, to feel), paralysis of sensibility. Again, the paralysis may be *general* or *partial*, as it affects the whole body or only a portion of it. Partial paralysis is divided into *hemiplegia* (*Ἥμισυς*, half; *πλήσσω*, to strike), when it is limited to one side; and *paraplegia* (*Παραπληξία*, partial paralysis; from *Παραπλήσσω*, to strike badly), when it is confined to the inferior half of the body. The term *local paralysis* is used when only a small portion of the body is affected, as the face, a limb, a foot, &c. In *reflex paralysis* (*Reflecto*, to turn back) the irritation extends from the periphery to the centre. Diseases of the urinary organs, uterus, and intestines are the most common causes of this form. And then there is that peculiar disease known as *wasting palsy*, the prominent symptom of which is a remarkable degeneration and wasting of the disabled muscles.

Paralysis of the eye, or loss of sensibility of the retina to the rays of light, is called *amaurosis* (*Ἀμαυρόω*, to obscure); paralysis of the levator palpebræ superioris muscle, allowing the upper eyelid to fall over the eye, *ptosis palpebræ* (*Πτόω*, to fall); insensibility to the impression of sounds, or deafness, *cophosis* (*Κωφὸς*, deaf); insensibility to odors, or loss of smell, *anosmia* (*Ἀ*, priv.; *ὄζω*, to smell); and loss of taste, *ageustia* (*Ἀ*, priv.; *γεῦσις*, the act of tasting).

Paralysis from Tabes Dorsalis is seen most frequently in youth as the result of exhaustion from masturbation. In extreme cases, this pernicious habit leads to a wasting of the spinal cord. Tabes dorsalis produces functional disturbance of the brain, heart, lungs, stomach, &c.; while if the irritation reflected from the spinal cord be permanent, structural lesions may result.—It may be remembered that a frequent cause of masturbation in boys is the irritation produced by sebaceous matter lodging between the glans penis and prepuce; in which cases circumcision is a valuable operation.—Women suffer less frequently from tabes dorsalis than young men. Many instances of so-called "spinal irritation" are, however, due to it. Excision of the clitoris has been recommended, where all other remedies fail.

In *hysterical paralysis* there is neither disease of the nervous centres nor of the motor nerves. It occurs in hysterical women; and is produced by fright, over-excitement, ovarian irritation, &c. The paralysis may affect the muscles of the lower extremities (hysterical paraplegia); or the muscles of the arm and leg on the same side (hysterical hemiplegia); or only one or two particular muscles may be affected. There are generally, but not always, other symptoms of hysteria. Many cases get well by recourse to remedies which improve the general health: but frequently electricity will effect a more speedy cure.

In *rheumatic paralysis* the lower extremities are more often affected, or the extensor muscles of the forearm, or the deltoid and trapezius, rendering it difficult to raise the arm. It may come on suddenly or gradually, with pain or numbness, and it is cured by electricity.

Then there are, likewise, certain forms of paralysis induced by the use of metallic poisons, as *mercurial palsy*, and *saturnine* or *lead palsy;* and, lastly, there is that very peculiar affection known as *paralysis agitans*.

The palsy may be due to disease of the brain arising from apoplexy, abscess, softening, induration, tubercular or cancerous tumors, renal disease, epilepsy, chorea, or the poison of syphilis; to disease of the spinal cord, such as inflammation, atrophy, solution of continuity, &c.; to diseases of the investing parts of the brain or cord, acting by the pressure they produce; to lesion or compression of a nerve, by which its conducting power is impaired; to some affection of the muscle itself, as is probably seen in wasting palsy; to hysteria, or to rheumatism; and to the influence of such poisons as lead, mercury, &c.

1. General Paralysis.—General paralysis, or complete loss of sensation and motion of the whole system, cannot take place without death immediately resulting: but this term is usually applied to palsy affecting the four extremities, whether any of the other parts of the body are implicated or not. It must not be confounded with the general paralysis of the insane.

Dr. Defermon* has related a case in which the power of motion in every part of the body was lost, with the exception of the muscular apparatus of the tongue, and that of the organs of deglutition and respiration. The sensibility was also wholly destroyed, except in a small patch on the right cheek, by tracing letters on which the patient's friends were enabled to communicate with him; while the intellect was perfect.—In most cases the loss of motion is more marked than that of sensibility; the intelligence also soon becomes affected.

2. Hemiplegia.—This term is used to denote paralysis of one side, extending almost invariably to both the upper and lower extremities.

Hemiplegia is the most common form of palsy. It is usually spoken of as "a paralytic stroke;" and the left is affected more frequently than the right side. When only one extremity suffers, it is generally the arm. Very rarely, the upper limb of one side and the lower of the opposite are paralyzed, forming what is termed *transverse* or *crossed palsy*. Generally the facial nerve or portio dura of the seventh pair is not involved in the paralyzing lesion; but the fifth nerve is affected, so that the palsied cheek drops loosely, while the angle of the mouth is drawn slightly upwards and to the sound side,—clearly because the muscles on that side are no longer counteracted and balanced by the corresponding muscles of the paralyzed side. The tongue also is often implicated, so that when protruded, its point is turned towards the palsied side. This is owing to the muscles which protrude this organ being powerless on the diseased side and in full vigor on the other; so that the sound half of the tongue is pushed out further than the other

* Bulletin des Sciences Médicales, tome xiii, p. 6. Paris, 1828.

half, and consequently it bends towards the affected side. The articulation is imperfect, in consequence of the palsy of the ninth and fifth nerves; while if the third nerve be involved, the upper eyelid will drop, there will be a dilated pupil, and a divergent squint.

The paralysis in hemiplegia is always limited to one-half of the body, the median line being the boundary. In most cases there is anæsthesia. The mental faculties are sometimes uninjured, but more frequently are irreparably damaged. The memory especially becomes weakened; at the same time there is a peculiar tendency to shed tears, and to be much distressed by slight causes.

The effect of paralytic disorders upon the memory is often very remarkable. There may be a curious forgetfulness and misplacement of language, so that the sufferer cannot find words to express his ideas, or he substitutes expressions having no relation with the sense intended. Sir Henry Holland refers to a case of slight paralytic affection, in which the perceptions from the senses were unimpaired, the memory of persons and events seemingly correct, the intelligence only slightly affected, the bodily functions feeble but not disordered, and yet the memory of words for speech so nearly gone that the single monosyllable "yes" alone remained as the sole utterance of all the patient desired to express. Even when a simple negative was intended, no other word was used.

In paralysis from red softening of the brain, the muscles of one of the affected limbs are sometimes rigid and contracted; owing to irritation of that part of the cord from which the nerves of the paralyzed member arise, by the propagation to it of excitement from the diseased portion of the brain.

If recovery take place, the symptoms of amendment are first noticed in the leg. In hopeless cases, the limbs waste; their nutrition gets diminished; and they become atrophied. It is of practical importance to recollect that they are colder, and unable to resist the influence of cold or heat equally with the sound parts.

Hemiplegia is generally the result of organic lesions of the brain; while most frequently perhaps the lesion is in the corpus striatum and the optic thalamus. When the intelligence and memory are affected, we may be sure that the cerebral hemispheres are involved, either directly in the lesion, or indirectly by pressure upon them. It must be remembered that the disease is not, as a rule, found on the side of the brain corresponding to the affected half of the body, but on the opposite; the cerebral portion of the centre of volition for the left side of the body being situated on the right side, and *vice versâ*. The decussation of the fibres of the anterior pyramids at the junction of the medulla oblongata and medulla spinalis, accounts for this phenomenon. This form of paralysis may also be due to some lesion of one-half of the spinal cord, just below the decussation of the pyramids; and then the palsy will be on the same side as the disease. Hence the term hemiplegia may signify *cerebral* paralysis or *spinal* paralysis. So also the hemiplegia may be transient and caused by a fit of epilepsy; or it may follow chorea, and pass away; or it may be due to some distant irritation—reflex hemiplegia—such as a colon loaded with unhealthy fæces, or persistent dyspepsia, in which the disease creeps from the periphery to the centre; or, lastly, an imperfect form may temporarily occur in nervous women—hysterical hemiplegia—

which may be diagnosed by the way in which they drag the limb while walking without attempting to lift it; whereas in true hemiplegia the patient drags the leg at the same time that he lifts it from the ground. In all forms the paralysis of motion is the prominent symptom; but sensation is sometimes more or less impaired.

In hemiplegia from disease of the brain, although the sufferer cannot by his own will move the palsied arm, yet irritation of the sole of the foot—as with a feather—will excite active movements; these reflex actions often causing no little astonishment to the patient. To distinguish between cerebral and spinal paralysis is not easy. According to Marshall Hall the condition of the irritability or contractility of the muscular fibre in the paralytic limbs must be our guide in diagnosis: since,—1. In pure cerebral paralysis—that in which the influence of the cerebrum *alone* is removed—there is augmented irritability and reflex action. 2. In spinal paralysis—that in which the influence of the spinal marrow is *also* removed—there is diminished irritability and reflex action. The galvanic current is the test of the amount of irritability.* Dr. Todd, however, denied the correctness of these views, and asserted that the contractility or irritability of the muscles of paralyzed limbs bears a direct relation to their nutrition; that the excitability of the paralyzed muscles to galvanism varies with the condition of their nerves, more than with that of the muscles themselves; that, in the majority of cases of cerebral palsy, the contractility or irritability of the paralyzed muscles is less than those of the sound side, simply because their nutrition is impaired by want of exercise; and, lastly, that no diagnostic mark to distinguish between cerebral and spinal palsy can be based on any difference in the irritability of the paralyzed muscles, for the muscles in spinal paralysis exhibit the same states as those in cerebral paralysis.†

Dr. Althaus has tested the muscular irritability in nineteen cases of cerebral paralysis, and has arrived at the same conclusions as Dr. Todd. The former gentleman found that in a certain number of cases the contractility was diminished, the muscles were flaccid, and the polarity of the nerves depressed. In another class the contractility was increased, there was early rigidity of the muscles, and an irritative lesion of the brain. While in a third set of cases there was no difference between the contractility of the healthy and the paralytic limb. Dr. Althaus employed both modes of experimentation, viz., sending the current through the limb, and localizing the current in the tissue of the muscles. The two methods yielded nearly the same results; but by localizing the electric current in the muscles, the difference of muscular contractility appeared more striking. This gentleman's conclusions, which seem to have been carefully deduced and therefore to be trustworthy, are these: The muscles of paralyzed limbs may present three different conditions when subjected to the action of the electric current, and this may enable us in certain cases to diagnose the paralyzing lesion. "1. If the excitability of the muscles—or rather the polarity of the motor nerves—be *increased* in the paralyzed limbs, the case is one of *cerebral paralysis*, connected with an irritative lesion within the cranium. 2. If

* Medico-Chirurgical Transactions, vol. xxii, p. 191. London, 1839.
† Idem, vol. xxx, p. 227. London, 1847.

the excitability of the muscles be nearly or totally *lost*, we have in all probability either *lead palsy* or *traumatic paralysis;* but it must be kept in mind that certain hysterical and rheumatic palsies of long standing present the same peculiarity; and that it also may be found in cases of disease of the brain and the cord. 3. If *paralyzed muscles respond readily to the electric current*, there is no lead in the system, nor is the connection between the motor nerves of the paralyzed muscles and the cord interrupted; but if such cases are of *long standing*, they are due to *brain disease;* and if they are of *recent standing*, they are generally instances of *hysterical*, *rheumatic*, or *spontaneous* paralysis."*

In the *treatment* of hemiplegia, even when seen early, it must not be forgotten that the mischief is done; and we cannot remedy it by taking away blood. Indeed, the patient will require all the power which he possesses to enable him to recover from the shock to his system; and hence depletion will only do harm.—Benefit may, however, be very frequently and reasonably expected from cathartics; particularly such as jalap and scammony, or calomel, or croton oil, or stimulating purgative enemata. Some authors recommend blisters to the scalp, or to the nape of the neck, or the use of a seton.—In all cases the practitioner should flex the forearm upon the arm, and the leg upon the thigh; taking care to observe if any of the muscles offer resistance to these movements. Where the muscles of the palsied limb are perfectly flaccid, we may be sure that the cerebral lesion is of an atrophic nature—probably white softening due to defective supply of blood; and consequently that wine and nourishment, ammonia and bark, are needed. On the contrary when there is resistance, the brain lesion is of an irritative kind—such as may be produced by an apoplectic clot which has lacerated the nervous substance in its vicinity; and then purgatives, blisters, and iodide of potassium will be called for. In reflex hemiplegia, the cause must be removed.

When the paralysis becomes chronic, stimulants, especially such as act on the paralyzed parts, are to be had recourse to. Strychnia in small doses (the twentieth or thirtieth part of a grain thrice daily) may be cautiously tried, if we can reasonably hope that there is no disease of the brain. Or local stimulants may be employed: thus frictions with the hand or flesh-brush, and stimulating liniments of turpentine, ammonia, tincture of cantharides, croton oil, &c., have been used with occasional benefit.

Electricity and galvanism have long been extensively employed; but when there is any structural disorganization they do harm. Thus, they aggravate the mischief in cases of cerebral hemorrhage, in softening and atrophy of the cerebral substance, in pressure from tumors, and in paralysis due to disease of the spinal cord. But after reparation of the mischief (as by absorption of the clot, the nervous substance being left uninjured), when paralysis remains without any muscular rigidity, galvanism will do good. It is also useful in hysterical, rheumatic, and lead palsy; as well as in reflex paralysis from disease of the urinary organs, diphtheria, fever, &c. And in cases of mal-nutrition and atrophy of muscular tissue it acts well by augmenting chemical changes in the muscles and increasing therefore the supply of blood to them. Induction cur-

* A Treatise on Medical Electricity, pp. 230 and 246. London, 1859.

rents are to be used, so as to excite the vitality of the motor nerves; the continuous current is useless in the cases under consideration. Opinions differ widely as to the *direction* in which the induced current should be sent through the paralyzed limb. Naturally the course is from the trunk towards the extremities, and hence it has been argued that the induced current should be made to travel through the nerves in the same direction,—in other words the *direct* current is to be used, and not the *inverse*. But this view is not borne out in practice; and the inverse current is generally employed, because it excites stronger contractions in the muscles than the direct. At first a gentle current is to be applied, the intensity being gradually increased; and as a rule the administration should not last for more than fifteen minutes at a time.

3. Paraplegia.—Paraplegia, or paralysis of the inferior half of the body, most frequently commences slowly and insidiously, with weakness and numbness of the feet and legs, or with tingling—*formication*—of these parts, unattended by pain. By degrees the weakness increases, until there is complete loss of sensibility and motion in the lower extremities, with paralysis of the bladder and sphincter ani; the patient is obliged to remain in the horizontal posture; while sloughs form on the hips and sacrum, which by their irritation and exhausting discharges accelerate death. If the urine be allowed to collect in the bladder in any quantity, it will soon get ropy, fetid, and alkaline; owing probably to the coats of the bladder becoming diseased and pouring forth unhealthy mucus, in consequence of the paralysis. Dr. Bence Jones has proved that the urine when secreted is healthy; but admixture with the diseased mucus contaminates it, decomposes its urea, and gives rise to the formation of carbonate of ammonia, rendering it alkaline.

Although voluntary motion is completely abolished in the lower limbs, involuntary movements and spasms of the muscles are not uncommon. Patients are thus often tormented and rendered sleepless at night by involuntary startings of the lower extremities. The cause of this is to be found in some exacerbation of the primary disease in the marrow; the excitement being propagated upwards to that portion of the cord in contact with the brain, as well as downwards below the lesion. Reflex movements can be excited much more frequently in paraplegia than in hemiplegia.

Paraplegia may arise from injury of the spinal cord or its membranes; from inflammation, congestion, or hemorrhage; from non-inflammatory softening; from the pressure of tumors; and also from affections of the bones and cartilages of the vertebral column. Most authorities now clearly distinguish two classes or kinds of paraplegia; viz., that which is due to disease of the spinal cord or its membranes, and *reflex* paraplegia—*i. e.*, that produced by an excitation which has reached the spinal cord from a sensitive nerve. In these latter cases Dr. Brown-Séquard believes that the palsy is accompanied and perhaps produced by an insufficient amount of blood in the spinal cord. In them the irritation may have its starting-point in the viscera, in the skin, the mucous membranes, or the trunks of nerves; while no direct treatment of the paralysis is of use, so long as the cause of irritation remains. Moreover, in reflex paraplegia there is an absence of the special symptoms of organic disease of the spine or its contents; while the paralysis of the lower

limbs is incomplete, and comes on gradually after the existence of disease in the urinary or genital organs, or in the thoracic or abdominal viscera, &c.

In the *treatment* of paraplegia we have to decide whether there is any congestion or inflammation of the spinal cord or its membranes, or whether there is the very opposite condition. Dr. Brown-Séquard shows that when the amount of blood is increased (as in chronic local myelitis) we find symptoms of irritation of motor nerve-fibres—as convulsions, cramps, twitchings, erection of penis; indications of irritation of sensitive nerve-fibres—as itching, pricking pains, abnormal sensations of cold or heat, &c.; and signals of irritation of vaso-motor or nutritive nerve-fibres—such as wasting of muscles, bed-sores, alkaline urine, and so on. There is pain corresponding with the upper limit of the inflammation; tenderness on pressure at the same part: the application of a sponge, dipped in warm water, along the spine, causes a natural sense of heat in all parts above the seat of inflammation, but a burning sensation at its upper limit; while the passage of a piece of ice over the vertebral column produces a sense of cold everywhere except at the level of the inflammation, at which part a feeling of heat is experienced. In attempting to cure these cases our object must be to diminish the quantity of blood sent to the spinal cord; and for this purpose it seems no agents are so efficacious as the ergot of rye and belladonna, since they both produce contraction of the vessels of the cord and its membranes. The ergot should therefore be given in five or six-grain doses twice a day, while a large belladonna plaster is applied over the spine. If no benefit ensue in the course of a few weeks, the iodide of potassium must be given in conjunction with the other medicines. Cod-liver oil may also be often beneficially added to the treatment. If there be much restlessness, henbane, or conium, or Indian hemp can be exhibited; but opium is to be avoided, as it produces congestion of the cord. The diet should be generous; beer or wine often being needed. The nutrition of the limbs is to be maintained by the use of stimulating liniments, or by shampooing; and subsequently by having recourse to a gentle galvanic current.

In paraplegia due to diminished nutrition of the cord (as that caused by white or non-inflammatory softening, and reflex paraplegia) a directly opposite course is to be pursued. Consequently where we find no sign of irritation or congestion, or of increase in the vital properties of the cord, we endeavor to give such food and remedies as will improve the quality of the blood, will cause an increased quantity of it to be sent to the cord, and will augment the vital properties of this nervous centre. Strychnine is here the remedy, one-twentieth of a grain being given daily, or one-thirtieth of a grain if combined with opium. Sulphur baths may also be used; quinine and iron will occasionally do good; and the patient when in bed should lie on his back, with his head and shoulders and lower extremities elevated, so that the blood may gravitate to the vessels of the cord.

Dr. John Chapman claims to have discovered that a controlling power over the circulation of the blood in the brain, in the spinal cord, in the ganglia of the sympathetic, and through the agency of these nervous centres, in every other organ of the body, can be exercised by means of cold and heat applied to different parts of the back. In this manner

the reflex excitability, or excito-motor power of the spinal cord, and the contractile force of the arteries in all parts of the body can be immediately modified. In order to lessen the excito-motor power of the cord only, he applies ice, in an india-rubber bag about two inches wide, along that part of the spinal column on which he wishes to act. On the same principle, the vitality of the cord may be increased by employing hot water and ice alternately, each in an india-rubber bag, if very energetic action be required; but if less vigorous effects be necessary, he uses ice or iced water only, resorting to it several times a day, for a short time on each occasion, with a long interval between each application. For example, intending to direct a fuller and more equable flow of blood to the brain, he applies ice to the back of the neck and between the scapulæ; increased circulation in, and warmth of, the upper extremities will be induced in the same way; the thoracic and abdominal viscera can be influenced in like manner by applications to the dorsal and lumbar regions; while the legs and coldest feet can have their circulation so increased that they become thoroughly warm by the ice-bag applied over the lower part of the back.*

It need only be further added, that while in reflex paralysis we endeavor by the foregoing plans to relieve the palsy, we must also try to remove its external cause; as by the expulsion of intestinal worms, relieving irritability of the urinary or sexual system, and curing all skin diseases, &c. In reflex paraplegia from onanism, the penis should be painted every night with the tincture of iodine, so as make it too sore to allow it to be handled. If this prove insufficient, blistering fluid may be used so as to produce a raw surface. If there be irritation from the retention of sebaceous matter between the glans penis and the prepuce, the latter should be cut off. The cold douche will also be useful in these cases.

4. Local Paralysis.—Of the different varieties of local palsy, I shall only mention *paralysis of the face*, the effect of pressure on, or injury to, the portio dura or facial portion of the seventh pair of nerves; a nerve which is very rarely affected by disease of the brain. As one-half only of the face is usually palsied, the appearance is remarkably striking; the features on the paralyzed side being blank, unmeaning, and void of all expression. The orbicularis palpebrarum muscle is powerless, and therefore the patient is unable to close the eyelids. Moreover he cannot frown on the affected side, the nostril does not dilate, the cheek hangs loose, and the angle of the mouth droops. The fifth pair of nerves is unaffected; for the muscles of mastication act properly, while there is no loss of sensibility. The paralysis is generally free from danger, being but rarely connected with intracranial disease.

Paralysis of the portio dura on both sides is a rare affection. Owing to the symmetrical nature of the disease in such cases there is no distortion of the features, as happens when one nerve only is affected. But, on close examination, the nostrils will be found motionless; the cheeks flat and relaxed; there is inability to close the eyes completely;

* Medical Times and Gazette, p. 60. 18th July, 1863.

and there is defective articulation with regard to the sounds formed by the lips, while the lingual articulation is unimpaired.

Exposure to cold is a frequent source of paralysis of the portio dura; and so is debility from any exhausting influence. In cases where no appreciable cause can be detected, the mouth should be examined; so that if there be any decayed teeth they may be extracted. In children, otitis leading to caries of the petrous portion of the temporal bone not unfrequently produces the loss of power. This form of palsy may have a duration of from ten days to many weeks; if it does not get well, there is no fear of its shortening life, unless there be disease of the temporal bone; while aperients, tonics, iodide of potassium, friction with shampooing, and galvanism, are the remedies to be resorted to.

5. Wasting Palsy.—This curious disease is sometimes described as *Creeping palsy*, or *Peripheric paralysis*, or *Lead palsy without lead*, or *Paralysie musculaire atrophique* (Cruveilhier), or *Atrophie musculaire avec transformation graisseuse* (Duchenne). Dr. W. Roberts, in an excellent essay on the subject, says that he is inclined to call it *Idiopathic degeneration of the voluntary muscles;* but as this name is too cumbrous, and may not prove correct in the end, he seems to me wisely to prefer the more homely name of *Wasting palsy*.

Symptoms.—The pathognomonic feature of this disease is a degeneration, and consequent loss of volume and power, of the voluntary muscles; there being no diminution of the intelligence, or of the sensibility of any part of the body. The atrophy may affect the upper limbs, or the lower limbs, or more rarely the voluntary muscles of the entire body—of both the trunk and the extremities. Fibrillary tremors or convulsive quiverings of some of the fasciculi which form the muscle can often be noticed by the attendant, though the patient may be quite unconscious of their occurrence. Anything which irritates the skin will produce these muscular vibrations. There is weakness that increases daily, though slowly, and which patients at first describe as unwonted lassitude of the limbs. The wasting of the muscles gives rise to a peculiar withered look in the part affected; while as the muscular atrophy is often unequal on the two sides of the body, distortions arise —the muscles least diseased overcoming the resistance of those most affected. Tactile and common sensibility are usually unimpaired; there is no tremulous agitation as in paralysis agitans; occasionally neuralgic or rheumatic pains are complained of; there is great sensitiveness to cold; the intellectual powers are undisturbed, and the judgment remains sound; while the general health continues moderately good. In one distressing example which I have seen there was no diminution of sensibility, but simply a complete inability to move either the upper or lower extremities, so that the patient was obliged to be fed and carried about like a child. Death, I believe, occurred from an attack of bronchitis. Fatal asphyxia is a very common termination of these cases. For when the diaphragm and intercostals become involved, the thoracic movements get reduced to a slight motion of the lower ribs; so that if any mucus be poured out, it must accumulate and produce suffocation, since no sufficient efforts can be made to dislodge it.*

* Few of the reported examples of wasting palsy are more interesting than the one published by Cruveilhier (Archives Générales de Médecine, cinquième série, tome

Prognosis.—The duration of wasting palsy may be said to vary from nine months to five years; although in one instance death did not occur till after the lapse of more than twenty years. In some few instances complete recovery seems to have taken place: whilst in a larger number the progress of the disorder has been permanently suspended. When the disease has invaded the trunk, the prognosis is most unfavorable; but as long as it is confined to the extremities, there is hope of arresting it. Most frequently, however, death results from it sooner or later.

i, p. 571, Paris, 1853), and I shall therefore give a condensed account of it. This case is the more deserving of attention since from it Cruveilhier first determined the existence of a new form of paralysis, due neither to cerebro-spinal disease, nor to metallic poisoning. The chief points are these: A mountebank, thirty-two years of age, came under observation in July, 1850, suffering from atrophic muscular paralysis, which had already become almost general.—In September, 1848, he passed the night in the open air, on the muddy pavement; and awaking, found his right side, on which he had slept, quite benumbed. The warmth of a tavern soon restored both sensation and motion; but three weeks afterwards he noticed a weakness of the right hand, he could not take hold of objects, and was henceforth unable to play the cornet-à-piston. For a year the weakness was confined to the muscles of the hand; but he then passed another cold wet night in the open air, and afterwards felt a great weakness in the lower limbs. From this time the muscular paralysis progressed rapidly, so that when he entered Cruveilhier's wards, in July, 1850, not only were the extremities affected, but also the facial muscles and those concerned in articulation, deglutition, and respiration. Still the patient could dress himself and walk, though with trouble; while he was able to feed himself and to articulate intelligibly. The muscles were agitated with a fibrillary quivering or tremor—a kind of twitch, such as would be produced by an uninterrupted succession of mild electric shocks. The tactile sensibility was developed to its highest degree; the organs of special sense were remarkably delicate, the intelligence was perfect, and he used thus to describe his condition: "I am not ill, but my strength is gone, and my weakness increases daily. There is a feeling of great lassitude in my limbs, which torments me every hour, but especially at the time of awaking from sleep."

At the end of 1851, this man could not walk at all, neither had he the power to change his position without help. His food was given to him, and he was put to bed like a little child. The saliva could not be swallowed, but ran from his mouth: the buccal portion of the act of deglutition could not be effected, owing to almost complete paralysis of the tongue: twice he was nearly choked by pieces of vegetable lodging in the pharynx: and his appetite was voracious. To feed him, the nurse was in the habit of thrusting down the food in a spoon low into the pharynx: considerable efforts at swallowing on the spoon and its contents were then made, and the former being withdrawn, repeated attempts at deglutition followed. In trying to swallow liquids, the greater part was always returned. The power of articulation being lost, the wants were made known by nods, by the eyes, and by a guttural nasal sound. The respiration was very incomplete; so that it was certain that the unhappy man, whose intelligence was unimpaired, was menaced every moment with asphyxia. On the 15th January, 1853, he was seized with the prevailing influenza, and being unable to expectorate the mucus, was one morning found quite dead.

At the autopsy it was shown that the *brain* was perfectly healthy, and weighed 36 ounces 163 grains avoirdupois. The *spinal cord* was sound, and of the usual bulk, consistence, and color. The *anterior roots of the spinal nerves* were remarkably small compared with the posterior: for whereas in health the posterior or sensitive roots are to the anterior or motor as 3 to 1 in the cervical region, 1½ to 1 in the dorsal, and 2 to 1 in the lumbar; here the proportion was as 10 to 1 in the cervical, and 5 to 1 in the dorsal and lumbar regions. Moreover, many of the anterior cervical roots were reduced to mere neurilemma, and presented no trace of nervous tissue when examined with a lens. The *muscles* of the pelvis and thigh had escaped the atrophy; while the elevators of the lower jaw, the muscles of the pharynx, those of the supra- and infra-hyoidean regions, the platysma on both sides, and the zygomatics had undergone simple atrophy or emaciation. Other muscles were wasted and pale; while most had undergone atrophy with fatty degeneration. Several seemed at first sight to have disappeared, so thin and slender were their remains. There was not a single muscle of the upper extremities unaffected; the intrinsic muscles of the hand being the most atrophied, then those of the shoulder, then those of the forearm, and next of the upper arm. The tongue was changed into a fatty mass, in the midst of which appeared a number of vertical muscular bundles.

General muscular atrophy—that of the trunk and extremities—spares neither children, adults, nor aged people; whereas the partial form would appear to be most common between thirty and fifty years of age. —Males are much more liable to the disease than females, perhaps owing to their occupations; it is certainly hereditary; exposure to wet and cold, or very hard work, are often the assigned causes; while Dr. Roberts shows that when it arises from cold the atrophy is much more likely to extend to the muscles of the trunk, than when it has its origin in overwork.

Pathology and Morbid Anatomy.—We are not in a position as yet to decide upon the nature of this disease. According to some authorities it has its starting-point in the nervous system, the affection of the muscles being secondary. But most observers seem to agree that this position is untenable; and it is generally believed that the disorder consists of a granular and fatty degeneration of the muscular fibre, similar to that which is observed in fatty heart. Although there is no general depression of the nutritive functions, yet there is an error of nutrition affecting the muscular fibre, owing to some unknown constitutional peculiarity.

The post-mortem appearances confirm these remarks. The heart, liver, kidneys, and spleen have been always found healthy; as have also the brain and medulla oblongata. In two-thirds of the reported cases the spinal cord was in a normal condition, while in three instances there was inflammatory softening, and in one amyloid degeneration of the posterior columns. The anterior roots of the spinal nerves were diminished in size in some instances, but by no means in all; although such a change has been carefully looked for, since Cruveilhier imagined that he had discovered the essential nature of the disease in this alteration.

The affected muscles were always wasted, and sometimes quite annihilated; they were of a pale red or buff color; while often to the naked eye they presented evidence of fatty degeneration. From the results of the microscopic examinations it may be said, that the muscular fibrillæ had degenerated into a granular amorphous substance, or into fat globules; the empty sarcolemma or tunic of the elementary fibre having been broken up, so that only a little connective tissue was left. The degeneration sometimes appeared to be entirely granular and not fatty; while in other instances the fat was abundant.

Treatment.—It may be instructive to mention that amongst the remedies which have certainly failed to do good, we must place strychnia and nux vomica; setons, issues, or blisters over the vertebræ; and cold baths during the active stage. With one exception, mercury and iodide of potassium have proved useless; and it is very doubtful if there has been any greater success with tonics and cod-liver oil.

Galvanism applied locally to the wasting muscles is said by Dr. Roberts to be the most effective remedy. Duchenne seems to have been particularly successful in the treatment by localized Faradization (the electricity of the induced or secondary current in the helix round the magnet, discovered by Faraday); but he advises the careful use of this agent, not giving more than one minute to each affected muscle lest it become fatigued and exhausted, and not prolonging each sitting for more than ten or fifteen minutes.—With galvanism there may be combined

gentle frictions, occasional warm sulphur baths, the use of such remedies as will improve the quality of the blood, and methodical exercise.—When the disease has become stationary, galvanism may be more freely resorted to, together with cold bathing.

6. Mercurial Palsy.—Mercurial palsy, or mercurial tremor, as it is sometimes termed, consists of a kind of convulsive agitation of the voluntary muscles, which is increased when volition is brought to bear upon them. In advanced stages of the disease, articulation, mastication, and locomotion are performed with difficulty; while the use of the hands is almost entirely lost. The skin acquires a brown hue, and the teeth turn black. Workmen exposed to the fumes of mercury,—such as gilders of buttons, glass-platers, barometer-makers, &c., are very liable to it.

In the *treatment* of mercurial palsy the patient must be withdrawn from the injurious atmosphere. Warm baths, good diet, sea air, and iodide of potassium—for reasons to be presently mentioned—will generally effect a cure.

7. Lead Palsy.—An affection which usually follows or accompanies *colica pictonum*, though it may exist independently. The poison of lead appears to exert some peculiar noxious influence over the nerves of the forearm and hand; in consequence of which the extensor muscles of the hands and fingers become paralyzed, so that when the arms are stretched out the hands hang down by their own weight, or, as the patients say, the *wrists drop*. The inferior extremities are very rarely affected. The sufferers frequently experience attacks of lead colic. The odor of the breath is peculiar (saturnine), and there is a similar kind of taste. A characteristic symptom of the presence of lead in the system is the existence of a blue or purplish line—the sulphuret of lead—round the edges of the gums, just where they join the teeth; a very important aid to diagnosis, for the notice of which we are indebted to Dr. Burton.* Plumbers, painters, color-grinders, type-founders, &c., are the usual sufferers from this affection. But cases of lead poisoning are sometimes met with among the public generally; the source of the mischief being in most instances traceable to the employment of water which has either been kept in, or transmitted through, leaden vessels.

The question naturally arises,—What is the particular organ affected in the cases where the mischief arises from the handling of lead compounds? Dr. Todd answers this question by stating his belief that the muscles and nerves are early affected, and that subsequently the nervous centres become implicated. The muscles being contaminated by the lead, their nerves participate in this contamination. The nervous system is therefore first vitiated at the periphery, in the nerves: and the poisonous influence continuing, the deterioration gradually advances to the centres. This is proved by the occurrence first of local paralysis in these cases, and subsequently of epileptic convulsions or other symptoms of centric disease.

* The formation of the blue sulphuret of lead is probably due, as was suggested by Dr. Pereira, to the action of sulphuretted hydrogen (evolved by the decomposing particles of food lodged between the teeth) on lead contained in the saliva and buccal mucus.

The operatives in lead-works and in mines suffer much from the saturnine emanations. The work-rooms where the manufacture of white lead is completed, have the atmosphere loaded with minute particles of lead-compounds, so that the men and women employed in them get their systems contaminated chiefly through the respiratory organs. They become "leaded;" and hence are rendered the victims of paralysis, colic, gout, spasms of the respiratory muscles, and sleeplessness. They get wan, pallid, feeble, and suffer much from neuralgia.

Death may occur when the system has been long exposed to the influence of lead; this termination being most common in those addicted to intemperance.

The *treatment* of lead palsy has been very much facilitated by the hypothesis promulgated by M. Melsens, that the baneful effects of lead and mercury are caused by the chemical combination of these metals with the tissues of the body, or by their being present in intimate union with these tissues in some analogous manner. The therapeutical application of the theory necessarily was, as pointed out by Dr. J. R. Nicholson, that the action of the curative agent must be directed to the conversion of the poisonous metal into a compound having less affinity for those tissues, and therefore readily eliminated from the body; and it has been shown that iodide of potassium possesses the requisite conditions for becoming a curative agent in lead diseases, according to this theory.

Dr. Nicholson has published a very interesting case in which the lead, after the administration of the iodide of potassium, could be distinctly detected in the urine, notwithstanding it was not to be found before the commencement of the treatment. In this instance the colic entirely ceased, but the palsy persisted. Galvanism was then used in conjunction with the iodide of potassium, and the patient went to his work, about fifty days after the commencement of the treatment, without any trace of paralysis. From this result it is concluded: First, that the iodide of potassium acts as a curative agent in lead-poisoning, by converting the lead into a form which can again be readily taken up by the blood, and evacuated by one of the natural outlets. Secondly, that the iodide acts more speedily in conjunction with galvanism, when employed for the relief of lead paralysis.*

In addition to the iodide of potassium—gr. v, thrice daily—the patient may use warm or sulphur baths (F. 125), galvanism and friction to the paralyzed limb, a nourishing diet, and exercise in the fresh air. To prevent any injurious influence, Liebig recommends all workers in lead to drink sulphuric acid lemonade daily. This acts probably by converting the salt of lead, as it enters the system, into an insoluble sulphate.

8. Paralysis Agitans.—This disease is characterized by a tremulous agitation—a continued shaking—usually commencing in the hands and arms, or in the head, and gradually extending over the whole body. Mr. Parkinson has well defined the disorder thus: "Involuntary tremulous motion, with lessened muscular power, in parts not in action, and even when supported, with a propensity to bend the trunk forward,

* Lancet, 14th October, 1854.

and to pass from a walking to a running pace; the senses and intellects being uninjured." The disease progresses slowly. When it is far advanced the agitation is often so violent as to prevent sleep; the patient cannot carry food to his mouth; deglutition and mastication are performed with difficulty; the body is inclined forwards, and the chin bent on the sternum; the urine and fæces pass involuntarily; and coma with slight delirium closes the scene.

As regards the remedies for paralysis agitans I can say but little, since I know of no measures likely to do much good. I should, however, try the effects of pure air, nourishing diet, baths, ferruginous tonics, cod-liver oil, and occasional opiates. A cure has been effected by the employment of the continuous galvanic current, such as may be derived from a Pulvermacher's chain-battery of 120 links.

XI. EPILEPSY.

Epilepsy (*Επιλαμβάνω*, to attack unexpectedly) is a disease the leading symptoms of which are—sudden loss of consciousness and sensibility, with clonic spasms of the voluntary muscles, usually followed by exhaustion and coma; the attack recurring at intervals.

Warnings.—There are sometimes, though not in the majority of cases, premonitory symptoms sufficient to warn the patient of an approaching seizure. These warnings differ both in duration and character; in some cases being too short to allow the sufferer to dismount from horseback, or to get away from the fire, or even to lie down; while in other instances, many minutes, or even hours, elapse between their occurrence and the attack. Dr. Gregory, of Edinburgh, was assured by an epileptic that when a fit was approaching, he fancied he saw a little old woman in a red cloak advance towards him, and strike him a blow on the head; on which he at once lost all recollection and fell down. Spectral illusions, headache, sickness, giddiness, dimness of vision, confusion of thought, a sense of fear and terror, and especially that peculiar sensation known as the *aura epileptica*, constitute the most frequent premonitory symptoms. The epileptic aura is differently compared by patients to a stream of cold water, or a current of cold or warm air, or the creeping of an insect; the sensation commencing at the extremity of a limb, and gradually ascending along the skin towards the head. Directly the aura stops the paroxysm takes place.

Symptoms.—The commencement of the seizure is generally characterized by a cadaverous pallor of the countenance, and the utterance of a loud piercing shriek or scream; immediately after which the individual falls to the ground senseless and violently convulsed. Hence the disease has been called by the vulgar the *falling sickness*, or, more vaguely, fits. During the attack the convulsive movements continue violent. There is gnashing of the teeth, foaming at the mouth, and the tongue is thrust forward and often severely bitten; the eyes are partly open and suffused, the eyeballs rolling, and the pupils insensible to light; the skin is generally cold and clammy; there may be involuntary defecation and micturition, with vomiting; the breathing is laborious or almost suspended; and the face gets flushed and turgid. In fact, death

seems about to take place from suffocation, when—gradually—these alarming phenomena subside, the extremities of one side are jerked about, and shortly afterwards all convulsive movements cease; leaving the epileptic insensible and apparently in a sound sleep, from which he recovers exhausted and with a headache, but without any knowledge of what he has just gone through.

The average duration of the fit is about five or eight minutes; it may, however, last for half an hour or more. It may also be very slight or very severe, constituting the *petit mal* and the *grand mal* of the French. The periods at which the seizures recur are variable. At first there is often a respite for three or four months, but as the disease progresses, the intervals become shorter, until hardly a day passes without one or more paroxysms. In recent cases especially, the fits often take place in the night, either on just going to sleep or on awaking. The repetition of the seizures has a tendency to impair the memory, to produce temporary or permanent paralysis, or even to induce complete mental derangement. As may be imagined, various accidents are likely to occur from the epileptic falling into the fire, or into the water, or upon the sharp angles of furniture, &c.

The face of the epileptic often wears a peculiar expression which it is difficult to describe. But in many cases there may be observed an immobility of the countenance—a sort of fixed state of the muscles, with a strange staring appearance about the eyes. The patient looks as if he were going to have a fit, though nothing of the kind happens. There is frequently also a dilated and sluggish condition of the pupil, with a want of brightness in the eye. And there appears to be a general torpid state of the system, with a disposition to suffer from frequent attacks of headache.

Epilepsy is often *feigned;* but the imposition may be detected by observing that the eyes are closed, the pupils contract to the stimulus of light, the skin is hot from the necessary exertion, the tongue is not bitten, and neither the urine nor fæces are voided. The impostor also selects a time and situation for his manœuvres, when attention will be attracted to them. Proposing to apply the actual cautery, or to cut off the hair, will often effect a speedy cure; or we may blow some dry snuff up the nostril with a quill, and change the fit into one of sneezing.

Causes.—The tendency to epilepsy is often hereditary. Malformations of the head are frequent predisposing causes. It is more common at the date of puberty than at any other period; while in women at this time it is often accompanied by some derangement of the catamenia. Debauchery of all kinds, indulgence in alcoholic drinks, the practice of masturbation, &c., may give rise to it. Amongst other causes must be also mentioned fright, blows upon the head, insanity, intestinal worms, and the irritation of teething. The poisoning of the blood in rheumatism, or its impoverishment in renal disease, &c., may induce it.

Associated with epilepsy we often find dyspepsia, constipation, sleeplessness, great nervousness and depression, leucorrhœa in women, involuntary seminal discharges in men, &c. &c.

Morbid Anatomy and Pathology.—Uncomplicated epilepsy is so rarely fatal, that it is difficult to give precise information as to the appearances most commonly found, or to determine the value of the variety of lesions which have been discovered. When an epileptic dies who has only

labored under the disease for a short time, no appreciable alteration of any part of the nervous system can, as a rule, be detected. If death occur during a paroxysm, the brain is often found more or less congested. In cases of long standing, disease of the cerebral bloodvessels, with softening or induration of the brain, may be present; while in such the weight of the brain is usually above the average. Occasionally the bones of the skull are thickened or otherwise diseased.

Dr. Todd held that the peculiar features of an epileptic seizure were due to the gradual collection of some morbid material in the blood; the accumulation going on until it reached such an amount as to act upon the brain in, so to speak, an explosive manner.

Schroeder Van der Kolk concludes from his researches that the first cause of epilepsy consists in an exalted sensibility and excitability of the medulla oblongata, rendering this part liable to discharge its force in involuntary reflex movements, on the application of irritants which excite it. This irritation may be external (of the fifth pair of nerves), or it may be in the brain, or in the intestines. In children, intestinal worms, or torpidity of bowels, are common causes; in adults, it may be due to irritation of the intestines, but especially to onanism. Amenorrhœa, chlorosis, congestion of the uterus, hysteria, &c., must also be remembered as causes. In the commencement there is only exalted sensibility, which may be removed and a cure effected; but when the disease is of long continuance, organic vascular dilatation takes place in the medulla, too much blood is supplied, and the ganglionic groups are too strongly irritated. Every attack increases the mischief by promoting the vascular dilatation. Moreover, increased exudation of albumen ensues from the constantly distended vessels; and the coats of these organs get thickened, the medulla becomes hardened, and we have fatty degeneration, softening, &c.

The deaths registered as due to epilepsy, in England, for ten years 1852-61), average annually 2202.

Treatment.—This must have reference to the measures to be adopted during a fit, and those to be employed in the interval.

During the fit—the patient ought to be laid on a large bed, air freely admitted around him, his head raised, and his neckcloth—together with any tight parts of his dress—loosened. A piece of cork or soft wood should, if possible, be introduced between his teeth, to prevent injury to the tongue. Cold affusion to the head will sometimes be useful, especially where the countenance is turgid and congested. In cases preceded by the epileptic aura, the application of a ligature just above the region from which the sensation starts, has been said to prevent the attack. On this principle the testicles have been removed, or a limb amputated, when the aura has appeared to proceed from these parts; and although success seems sometimes to have followed, yet this practice would hardly be adopted in the present day.

In the interval—we must endeavor to improve the patient's general health, and especially to give tone and firmness to the nervous system. Dr. Sieveking, Dr. Radcliffe, and, in fact, almost all who have recently paid much attention to this disease, agree in believing that everything tending to depress the vital powers does harm. Mineral tonics, especially quinine (F. 379, 386); or the salts of iron (F. 380, 390, 394, 405), or zinc (F. 410, 413, 414), are consequently to be employed.

Phosphorus is beneficial in some cases; the best preparation being the hypophosphite of soda (F. 419). The cold shower-bath may be especially recommended, if it can be well borne; otherwise the tepid sponging-bath should be substituted. Sleeplessness is particularly to be combated. The diet must be simple but nutritious; with milk, raw eggs, and a moderate quantity of wine or bitter ale. Cod-liver oil (F. 389) is often useful. The patient's habits must also be regulated by such rules as common sense will dictate—daily exercise, early hours, and attention to the alvine and urinary secretions being necessary; while mental excitement or exertion is, on the other hand, especially contra-indicated.

In some cases, those more particularly which are dependent upon a thickening of the cranial bones or membranes, iodide of potassium, or a gentle long-continued course of mercury, does good. Foville had great faith in the oil of turpentine in half-drachm doses, repeated every six hours; and Dr. Watson seems to think it more useful than any other single drug. Camphor, valerian, assafœtida, naphtha, cajuput oil, and the various preparations of ether, are often very valuable agents. The bromide of potassium in ten-grain doses, thrice daily, continued for a long time, has cured some cases; especially where there has been any erotic dispositions, or any ovarian irritation. The nitrate of silver long enjoyed great but undeserved reputation; its tendency to blacken the skin, moreover, is sufficient to interdict its employment. Again, the juice of the cotyledon umbilicus has been much vaunted; but my own experience coincides with that of many practitioners who have tried it and found it valueless. The expressed juice of the galium album, or "ladies bedstraw," has been said to act "with almost uniform success;" an assertion which all physicians who have had much to do with epileptic patients can rightly interpret. Dr. Marshall Hall recommended strychnia in *tonic* not *stimulant* doses (F. 407, 408); while, following a suggestion of Dr. Todd's, I have used the vapor of chloroform, and believe that the fits have diminished both in severity and number from its employment. The truth probably is, however, as Esquirol shrewdly remarked, that epileptics improve for a time under every new plan of treatment. Undoubtedly, hope and confidence are important elements in the treatment of this disease, and the physician should therefore never appear to despond nor allow his patient to do so.

Dr. John Chapman, whose views have been already referred to (p. 281), gives the following rules for the cure of epilepsy. The object to be kept in view is to lessen the excito-motor power of the cord, by diminishing the amount of blood circulating in it, and to prevent those spasmodic contractions of the cerebral arteries which induce the sudden loss of consciousness constituting the first phase of an epileptic fit. The rules are, (1) Apply ice, in an india-rubber bag, to some one part, or to the whole length of the back, for from two to eighteen hours a day, according to the special character of the case under treatment. (2.) If the extremities be cold, their wonted warmth is to be restored by frequently immersing them in hot water and by friction, during the first day or two of treatment. Also, in winter, by clothing the arms and legs in flannel. (3) As auxiliaries, abundant physical exercise, use of dumb-bells when practicable; to arrange the dress and hair so as not to impart warmth to upper and back part of neck; promote mental activity by healthy study, or some interesting employment; and to have the dress

along the centre of the back light and cool. I am only personally acquainted with one patient who I believe was thoroughly treated on these principles; and in this case no benefit was derived. The experience of some other physicians is also very unfavorable to the practice. Dr. Chapman, however, has recorded instances in which he has been successful.

Mr. Tomes has published an instructive case that occurred in the Middlesex Hospital, where the derangement of the nervous system was due to diseased and exostosed teeth. "A lad, a farm-laborer from Windsor, was admitted into the hospital for epilepsy. The usual remedies were tried for six weeks without effect. His mouth was then examined, and the molar teeth of the lower jaw were found to be much decayed, and of some of these the fangs only remained. He did not complain of pain in the diseased teeth or in the jaw. The decayed teeth were, however, removed, and the fangs of each were found to be enlarged and bulbous from exostosis. During the eighteen months that succeeded the removal of the diseased teeth, he had not suffered from a single fit, though for many weeks previous to the operation he had two or three per day. This is a case of singular interest, inasmuch as there was no complication of maladies, and hence there could be no doubt as to the cause of the disease, seeing that it immediately subsided when the teeth were removed."*

These remarks will hardly be complete without a brief notice of one or two other points. For example, Dr. Marshall Hall entertained strong opinions as to the efficacy of tracheotomy in some forms of epilepsy, not so much as a curative proceeding, but to avert the dangers of the paroxysm, to convert the disease into a milder variety, and to give time for a trial of remedies.† Two or three cases have been recorded where this practice has been adopted; but probably no practitioner would now resort to it.—Again, caustics to the larynx have been applied, but without benefit.—Dr. Brown-Séquard cauterizes the nape of the neck, or the part where the aura originates, using the moxa or the red-hot iron; but I know not what amount of success has justified this treatment.—And lastly, on the principle of attempting to relieve the congestion of the medulla oblongata, Schroeder Van der Kolk employs setons or issues placed high up in the neck; and there can be no doubt that counter-irritants over the upper cervical vertebræ, with tonics, and the removal of all external sources of irritation, will often prove most useful.

XII. HYSTERIA.

Dr. Copland defines hysteria as—"Nervous disorder often assuming the most varied forms, but commonly presenting a paroxysmal charac-

* A System of Dental Surgery, p. 443. London, 1859.

† Dr. Marshall Hall says—"There are two cases of epilepsy in its direst forms, in which the propriety and efficacy of tracheotomy admit of no doubt: these are—first, Epilepsia laryngea, with spasmodic laryngismus, threatening the extinction of Mind; second, Epilepsia laryngea, with paralytic laryngismus, threatening the extinction of Life. . . . . The diagnosis must be established by observing the state of the larynx, of the neck, of the face, and of the cerebrum. In the absence of laryngismus, the deep purple lividity and tumefaction, and the subsequent deep coma, &c., are equally absent, and tracheotomy of course *hors de propos.*"—Lancet, pp. 308, 309, 14th October, 1854.

ter; the attacks usually commencing with a flow of limpid urine, with uneasiness or irregular motions and rumbling noises in the left iliac region, or the sensation of a ball (*globus hystericus*) rising upwards to the throat, frequently attended by a feeling of suffocation, and sometimes with convulsions; chiefly affecting females from the period of puberty to the decline of life, and principally those possessing great susceptibility of the nervous system, and of mental emotion."*

I shall consider this disease as it occurs in paroxysms, as it affects sensibility, and as it mimics other affections. The name hysteria (Ὑστέρα, the womb) has been applied to it, owing to its supposed origin in the uterus. The term is inappropriate, since the disease is ocasionally, though rarely, seen in the male sex.

Symptoms.—The symptoms which characterize the *hysteric paroxysm* or fit are—convulsive movements of the trunk and limbs; violent beating of the breasts with the hands clenched, or tearing of the hair or of the garments; shrieks and screams, violent agitation, and the globus hystericus; the attack ending with tears, convulsive outbreaks of crying or laughter, and sometimes with obstinate hiccup. Occasionally the patient sinks to the ground insensible and exhausted; remains so for a short time; and then recovers, tired and crying. The fit is often followed by the expulsion of a quantity of limpid urine; while occasionally this secretion is passed involuntarily during the tumult.

The paroxysm differs from epilepsy, inasmuch as the hysteric fit is almost peculiar to women, it continues longer, and there is seldom loss of consciousness—the patient being aware of all that is passing around her. The convulsive movements are also of a different character, much less severe, and not more marked on one side of the body than the other; the respirations are never suspended; the tongue is not bitten; and the attack is not followed by coma, as epilepsy is.

It has been well pointed out by M. Briquet that hysterical patients often suffer from *hyperæsthesia*, or increased sensibility of various tissues. The fleshy portions of the muscles are very liable to become so affected; particularly the muscles of the frontal and temporal regions of the cranium; those of the epigastric region, often in association with dyspepsia; those of the back, especially on the lower part and left side of the vertebral column, sometimes leading to the erroneous opinion that there is spinal disease: those of the side of the thorax, especially the left, giving rise to symptoms likely to be confounded with the suffering of pleurisy, and with intercostal neuralgia; also those of the walls of the abdomen, the pain of which can hardly be mistaken for that of metritis or ovaritis if its superficial character be observed; and, lastly, the superficial and perhaps the deep-seated muscles of the upper and lower extremities. The pain is generally aggravated by pressure, by movement, by moral emotion, and by even a mild electric current: it is relieved by resting the affected muscles: it varies in intensity from mere uneasiness causing slight inconveniences, to the most acute suffering destroying all repose and inducing fever with general disturbance: and it is generally accompanied by weakness and mental depression. There is none of the heat, redness, tension, or pulsation of inflammation; and

* Dictionary of Practical Medicine; art. "Hysteria," vol. ii, p. 272. London, 1858.

the pain may disappear only soon to return in an aggravated form, and to prove very rebellious to all kinds of treatment.

The opposite condition, *anæsthesia* or loss of sensibility, is a prominent phenomenon in some instances; and it is probable that nervous women and magnetic somnambulists, whose insensibility is supposed to be a trick, are often merely hysterical women thus affected. The anæsthesia may be only temporary, or it may last for years; the skin being most commonly affected. The left side of the body also suffers more often than the right; while the conjunctiva is often insensible, especially of the left eye. The muscles of the extremities may be rendered so insensible, that pins can be thrust into their substance without causing the least pain.

In some chlorotic and hysterical subjects the appetite for food becomes diseased, and the most improper and indigestible substances will be eaten. Occasionally the appetite is preternaturally diminished; and weak girls, wishing to make themselves objects of pity and wonder, will pretend to subsist without any food at all. Allied to these cases are those where young women thrust needles into various parts of their bodies, or produce ulcers by pressure, or pass various substances into the vagina, or resort to other means to excite the compassion of their relatives.

Hysteria simulates almost all diseases; perhaps the favorite maladies imitated being—suppression of urine, calculus of the bladder, inflammation of the peritoneum, pleurisy, consumption, laryngitis, stricture of the œsophagus, aphonia or loss of voice, paralysis, and disease of the spine or of one or more of the joints. Hysterical cough, sneezing, yawning, panting, sighing, sobbing, or hiccough may be continuous for hours, or even days; until, indeed, considerable exhaustion sets in. In all forms, the individual deceives herself and tries by strong expressions of suffering to mislead others. A practised eye is seldom, however, long imposed upon by such patients; although undoubtedly cases are met with, and especially among the upper classes of society, where the diagnosis is surrounded with difficulty. There is a peculiar expression about hysterical women, impossible almost to define, yet readily recognized when once it has been studied. Moreover, there is a fulness of the upper lip, and a tendency to drooping of the upper eyelids; the self-tormentors answer questions in an unpleasant manner, often only in monosyllables; and their pains are always said to be most acute, and to be increased by pressure, or almost even by pretended pressure. The catamenia are generally irregular, and there is frequently profuse leucorrhœa.

And here the important question may be asked,—Are these pains and sufferings, described as being so acute, merely feigned? Undoubtedly not. There are, of course, exceptions to this rule; but, speaking generally, the patient believes herself to be grievously afflicted. Sir Henry Holland has well observed that the hypochondriac, by fixing his consciousness with morbid intentness on different organs, not merely creates disordered sensations in them, but even disordered actions. There may be palpitation of the heart, hurried or choked respiration, flatulence and other diseases of the stomach, irritation of the bladder, and vague neuralgic pains, all arising from this morbid direction of attention to the organs in question. It is also certain that many of the secretions are

immediately affected by mental emotions; and the same results ensue from simple sustained attention to the parts concerned in these functions.

Under the name of "The Bed Case," Dr. Walter Channing has described a peculiar affection which I cannot but regard as a not uncommon form of hysteria.* The subjects of it live in bed; they are tranquil, cheerful, have good digestions, and like the kind attentions showered upon them by sympathizing friends. They are often impressed with the belief that there is serious disease in the spine, or in the womb; and there are generally certain movements which they think cannot be made without "horrible" pain. Menstruation is frequently attended with suffering, and there is leucorrhœa. Amongst the six or seven examples of this psuedo-disease which have come under my observation, the most marked was that of a single lady, thirty-four years of age, who first consulted me in 1861. This patient had then been confined to her room, and almost to her bed, for ten years. She had been treated for spinal disease, and had taken large quantities of medicine; while leeches, blisters, setons, &c., had been freely used. On examination I found that every part of her body was healthy with the exception of the uterus, which was retroflexed. By replacing this organ, and by the use of galvanism to the long inactive muscles, a cure was effected; but the greatest patience was needed to get her from the bed to the sofa, from the sofa to the chair, from the chair to the crutches, and so on until at the end of three months she could walk out in the open air. Some of these cases can be cured in a much shorter time; but each example varies in regard to important mental peculiarities, and caution is needed lest the patient should determine not to get well.†

* Bed Case: its History and Treatment. Boston, 1860.

† The reader will find a good example of Bed Case in Mrs. Oliphant's Life of Edward Irving, vol. ii, Appendix A. London, 1862. The patient describes her cure in a letter to a friend, the principal points in which are the following. She says,—"My dear Christian Friend: I received yours of the 22d on Friday last, and take up my pen with pleasure to inform you of the particulars of the Lord's gracious dealings with me. . . . . I transcribe you a copy of facts, which by the wish of my dearest Father I have written out for the perusal of our Christian friends: it is a plain detail of facts from the commencement of my illness. In the month of November, 1822, having for some months been in a bad state of health, it pleased God to visit me with a hip disease. Perfect rest was recommended by the late Mr. Pearson, of Golden Square. . . . . This was the last application; and in September, 1828, I returned home as unable to walk as when leaving: once or twice the attempt was made, but produced much pain. From this time no means have been used excepting constant confinement to the couch. Within these few weeks, even on the very day in which Jesus so manifested His Almighty power, I had attempted to walk; scarcely could I put one foot before the other; the limbs trembled very much. Thus it continued till the 20th October, 1830, when a kind friend, who had seen me about two months before, had been led by God to pray earnestly for my recovery. . . . . Sitting near me, we talked of his relatives and of the death of his brother. . . . . After asking some questions respecting the disease, he added, 'It is melancholy to see a person so constantly confined.' I answered, 'It is sent in mercy.' 'Do you think so? Do you think the same mercy could restore you?' God gave me faith, and I answered, 'Yes.' 'Do you believe Jesus could heal, as in old times?' 'Yes.' 'Do you believe that it is only unbelief that prevents it?' 'Yes.' 'Do you believe that Jesus could heal you at this very time?' 'Yes.' (Between these questions he was evidently engaged in prayer.) '*Then*,' he added, 'get up and walk to your family.' He then had hold of my hand. He prayed to God to glorify the name of Jesus. I rose from my couch quite strong. God took away all my pains, and we walked down stairs. Dear Mr. G. prayed most fervently, 'Lord have mercy upon us! Christ have mercy upon us!' Having been down a short time, finding my handkerchief left on the couch, taking the candle I fetched it. The next day I walked more than a quarter of a mile, and on Sunday from the Episcopal

Treatment.—During a paroxysm the patient's dress is to be loosened; she must be prevented from injuring herself; should be surrounded by cool air; smelling-salts may be applied to the nostrils; and if she can swallow, a draught containing a drachm of the compound tincture of valerian, or of the fetid spirit of ammonia, ought to be administered. When the apparent insensibility continues, the sudden and free application of cold water to the head and face will probably cut it short. Many a "fit case," carried into the hospital on a stretcher, may have the use of her limbs (and the tongue also) immediately restored by holding her head under the water-tap for a few seconds.

In the other forms of hysteria the general health must be attended to, the bowels kept freely open, the shower-bath daily used, and ferruginous tonics administered.—In hysterical epilepsy with disordered uterine functions, Sir Charles Locock recommends the prolonged use of the bromide of potassium, in five- or ten-grain doses, thrice daily. Where the catamenia are unnatural, the treatment must have reference to the nature of the particular disorder. Thus, if too abundant, astringents and the cold hip-bath, to which alum or bay-salt should be added, ought to be employed; if scanty, the flow should be encouraged by aloetic purgatives, different preparations of iron, and the warm bath. The compound decoction of aloes and the compound iron mixture—half an ounce of each—taken thrice daily, will form an excellent medicine in such cases. For hysterical aphonia, galvanism is often very useful. A mild induced current of galvanic electricity should be applied by means of moistened conductors; the poles being directed partially to the inferior laryngeal nerve, and partially over the crico-thyroid muscle, since it plays an important part in the formation of the voice. In hyperæsthesia of the muscles, hot cataplasms, iodine paint, warm baths, and a mild electric current, are the means to be tried; while in anæsthesia a cure may often be effected, by making a stronger current of electricity traverse the insensible muscles daily for about fifteen minutes at a time. As in other cases of hysteria, so in these varieties, one or more of the preparations of assafœtida (F. 86, 89), of valerian (F. 87, 94), of zinc (F. 410), of quinine (F. 94, 379), of steel (F. 380, 394, 401), or of phosphorus (F. 405, 418, 419), &c., will be often found very valuable.

The patient's diet should be regulated, nourishing food being necessary, and often a moderate quantity of wine or beer. Hot rooms and evening parties are to be proscribed; stays ought not to be worn; and, lastly, it is of the greatest importance that while the value of self-control is inculcated, healthy mental occupation should be afforded. In-

Jews' Chapel, a distance of one mile and a quarter. . . . . It is material to add that my legs, the flesh of which was loose and flabby, feeling them in a short time after I walked down, were firm as those of a person in full health. The back, which was curved, is now perfectly straight. My collar-bones have been pronounced by a surgeon to be in quite a natural state, whereas one of them was before much enlarged. I must tell you that my mind had not been at all occupied with those events which had taken place in Scotland; indeed, all I had heard concerning them was that a young person had been restored in answer to prayer; this was, perhaps, five or six months back. I had heard of nothing since, and can with truth say my mind had never been led to the contemplation of such subjects. I had not the least idea that my dear friend was offering up prayer in my behalf, for he did not say so till after the mighty work was wrought. . . . . Elizabeth Fancourt."

deed, without this latter, a permanent cure is not to be expected; for amongst the most frequent causes of hysterical affections we must count the want of proper employment of the mind and energies.

XIII. CATALEPSY.—ECSTACY.

These wonderful diseases are very rare, but they undoubtedly do happen occasionally. Nervous and hysterical women are most likely to suffer from them. They are not dangerous.

By a fit of *catalepsy* (*Καταλαμβάνω*, to restrain, or hold firmly) is implied a sudden suppression of consciousness and volition; the patient remaining during the attack in the same position in which she happens to be at the commencement, or in which she may be placed during its continuance. The seizure may last only a few minutes, or several hours, or even one or two days. On recovery, which is generally instantaneous and as if from a deep sleep, there is no recollection of what has occurred. Very rarely these cases terminate in apoplexy or insanity; or they may be connected with chronic softening, or with tumor of the brain.

"Absence of mind" is a slight form of catalepsy. Dr. Laycock well remarks, that "in *brown study* or reverie the eye is fixed by a muscular action analogous to the cataleptic; and not the eye only, for a limb, or the whole body, will remain in the same position for many minutes; the senses themselves being in deep abstraction from surrounding objects."* In some individuals a cataleptic state may be induced by strongly fixing the attention on one object for a short time. The mental faculties get tired; there is diminished nervous influence or force; and persons so affected then believe that they are unable to move, cannot see, &c., until the so-called *mesmeriser* grants them permission. Examples of this state are also seen in animals,—as in birds and rabbits *fascinated* by the glaring eyes of the serpent.

An account of an endemic cataleptic disorder prevailing at Billingshausen near Würzburg has been published by Dr. Vogt.† The population consists of 356 individuals, who are Protestants, although living among Catholic neighbors. They are small, feeble, and plain-featured. "There is no poverty—the poorest man in the place is the minister." About half the inhabitants, males as well as females, are affected; being known as the *starren* (stiffened ones.) Without any premonitory symptoms, the patient suddenly falls down. The aspect is death-like, the face pale, the eyes fixedly directed to one point with their axes converging, the lips closed and protruded, and the fingers semiflexed. Attempts to speak result in short, unintelligible sounds. The muscular system is alone affected: the senses and intellect remain uninterfered with. The attack lasts from one to five minutes; and its occurrence appears to be favored by cold. The system of intermarriages may be the cause.

* A Treatise on the Nervous Diseases of Women, p. 316. London, 1840.

† Würzburger Medicinische Zeitschrift, Band iv, p. 183. 1863.—Half-yearly Abstract of the Medical Sciences, vol. xxxix, p. 81. London, 1864.

An interesting report of a well-marked case of catalepsy, which was admitted into St. George's Hospital, has been published by Mr. Thomas Jones.* The patient was a male, aged 60, who for a fortnight had experienced much mental suffering, owing to the sudden death of his wife. He was always very excitable, but his previous health had been good. Two or three days before the attack there were hallucinations of vision and hearing. Then, while engaged in plastering, he became suddenly seized with tetanic rigidity of all the muscles, which caused him to be fixed in the position he was in at the moment. Subsequently the limbs retained any position in which they were placed: there was partial loss of consciousness: and the duration of the fit was twenty-two hours. The recovery was good.

In what is termed *ecstacy* (*Ἔκστασις*, from *Ἐξίστημι*, to put a person out of his natural state) the condition is of an analogous kind. The patient is insensible to all external impressions, but is absorbed in the contemplation of some imaginary object. The eyes are immovably fixed; but impassioned sentences, fervent prayers, psalms and hymns are uttered or sung with great expression. The religious fanatic, by encouraging some predominant idea, falls into a state resembling the incipient stage of monomania. The "gift of unknown tongues" was mostly manifested by nervous women; who were not impostors, but simply diseased. Faith, imagination, enthusiasm, and an irresistible propensity to imitation, will explain the case of the convulsionaries of St. Medard, over the grave of the Abbé Pâris. And so also with the victims of tarantism, the dancing mania, &c.

A similar plan of *treatment* to that recommended in hysteria must be relied upon for these disorders; especially remembering to avoid all lowering remedies.

XIV. CHOREA.

Chorea (*Χορεία*, a dancing or jumping; from *Χορὸς*, a dance accompanied with singing) or St. Vitus's dance, is characterized by irregular, tremulous, and often ludicrous actions of the voluntary muscles, especially of those of the face and limbs; there being incomplete subserviency of the muscles of this class to the will. The disease has been quaintly designated "insanity of the muscles."

Symptoms.—This disorder occurs most frequently in young girls between the age of six and fifteen; while it may be either of a mild or severe type. It begins generally with slight clonic spasms of the muscles of the face. By degrees, all or almost all the voluntary muscles become affected. The child finds it almost impossible to keep quiet, though the movements are to some extent under the control of the will; while there is a constant restlessness of the hands and arms, and even of the legs. One half of the body is generally more affected than the other; while in a few cases the movements are entirely confined to one side—*hemichorea*. Moreover, the features are very curiously twisted and contorted; the articulation is impeded; and all the shifting motions are

* British Medical Journal, p. 585. 6th June, 1863.

most severe when the child is conscious of being watched. If the patient be asked to put out her tongue, she is unable to do so for some moments; but at last suddenly thrusts it out, and as suddenly withdraws it. If she be told to walk, she advances in a jumping manner, by fits and starts, dragging her leg rather than lifting it, and alternately halting and hopping. She cannot even sit still; her shoulders writhe about, she picks her dress, and shuffles or scrapes the floor with her feet. During sleep these irregular actions almost invariably cease.

As this disorder runs its course, endocarditis or pericarditis may supervene. Sometimes there is merely functional disturbance of the heart, with an anæmic murmur audible at the base. In other instances a murmur is detected at the apex; the origin of which has by several observers been thought to be due to choretic contractions of the musculi papillares, causing valvular imperfection and regurgitation. This explanation, if correct, which it probably is not, can only apply to some cases; since the murmur not unfrequently remains permanent.

When an attack of chorea is of long continuance, the memory gets impaired, and the temper irritable; while often the countenance assumes a vacant appearance bordering on fatuity, and some imbecility of mind becomes manifest. The functions of the stomach and bowels are also frequently deranged; the appetite is irregular; the abdomen swollen and hard; and there is often constipation. The urine is of high specific gravity, especially when the choreic movements are very active; a condition due, according to Dr. Todd, to the increased waste of tissue consequent on the disturbed state of the muscles and nerves. As the case gradually improves, the specific gravity of the urine diminishes. Moreover, all the symptoms cease on the termination of the disease; which is scarcely ever fatal, or even dangerous, unless it merges into organic disease of the nervous centres, or of the heart, or into epilepsy.

Causes, &c.—Chorea may last from one week to several months; the average duration in uncomplicated cases, under the use of tonics and good food, being about four weeks. It is often complicated with hysteria; and the general health is usually below the normal standard. —Fright appears to be the most frequent cause; blows or falls seem sometimes to have induced it; and the occurrence of the disease from irregular dentition, or from the irritation of intestinal worms, has long been noticed. It has by some, moreover, been attributed to onanism; while deranged uterine function is occasionally the apparent cause. Some of the worst cases that have been recorded have occurred during gestation, especially in women pregnant for the first time. I believe, too, that the children of nervous and hysterical women are more likely to be afflicted by it than others. Although most common in girls, yet boys from eight to sixteen years old not unfrequently suffer from it.

Pathology.—As the appearances found after death are usually slight and by no means uniform, physicians have not agreed as to the pathology of chorea. Some observers regard it as a disease the essence of which is perverted nervous function. Others believe that the blood is primarily affected. There seems to be some connection between chorea and rheumatism; the latter disorder occasionally preceding the former, now and then accompanying it, and sometimes following it. Numerous cases have been recorded in which morbid conditions of the heart and pericardium, of a rheumatic as well as of a non-rheumatic

character, have given rise to choreic symptoms. In some instances of fatal chorea, a softened state of a portion of the brain, or of the spinal cord, or of both, has been detected. Moreover, occasionally the disorder would seem to have been connected with symptoms of mental imbecility.

Treatment.—Where medical treatment is called for, the only plan to be recommended consists in regulating the bowels, subduing irritation, and strengthening the system. For this purpose, the employment of cathartics of a stimulating nature is usually necessary, such as calomel and jalap; or, where worms are suspected, the oil of turpentine. A combination of tonics or anti-spasmodic medicines with purgatives, is often found to be serviceable.—The two great remedies, however, are the cold shower or douche bath, and steel. As regards the former, it should be employed every morning on the patient's rising; with respect to the latter, different preparations have been recommended. Perhaps the best is the saccharated carbonate of iron, given in doses varying from five to twenty grains, mixed with treacle. The sulphate, or the ammonio-citrate, or the tincture of the perchloride of iron may, however, be used almost as advantageously. The combination of steel and arsenic (F. 399), or of steel and zinc (F. 414), or of steel and phosphate of lime, &c. (Chemical Food, F. 405) is to be preferred in some cases; especially in such as are of a severe and obstinate character. Cod-liver oil is generally useful, administered simultaneously with tonics. I have likewise found much benefit in certain well-marked cases from the hypophosphite of soda with bark. The diet must be nutritious, with plenty of milk; exercise in fresh air is to be freely allowed; and mental excitement ought to be guarded against.

A choreic child should hardly be allowed to mix very freely with other children. For, in the first place, it is cruel to expose the infirmity; and secondly, the effects of the principle of imitation are so remarkable in the young, that the disease may spread to the healthy. Falstaff's words have a wider application than he intended. "It is certain," says Sir John, "that either wise bearing, or ignorant carriage, is caught, as men take diseases, one of another; therefore, let men take heed of their company."

The employment of gymnastic exercises has been strongly recommended. In a memoir submitted to the French Academy of Sciences, M. Blache states, that he has treated by these exercises alone, or by these in combination with other measures, such as sulphur baths, 108 patients—84 girls and 24 boys. In 102 the cure was completed, on an average, in 39 days; in the remaining six, in 122 days. These figures prove very little; inasmuch as numerous cases can be cured in five or six weeks by moral control and nourishing food, without any other treatment. Nevertheless, a system of gymnastics may often be made supplementary to tonic remedies with advantage.

XV. TETANUS.

The term Tetanus (*Τείνω*, to bend, or strain) is used to denote a disease the principal feature of which is, long-continued, painful contrac-

tion or spasm of a certain number of the voluntary muscles. The rigidity of the muscles being continuous, we say that there is *tonic spasm* or *spastic contraction;* these terms being employed in contra-distinction to the *clonic spasms* of convulsions, in which there is a state of alternate contraction and relaxation.

The *symptoms* usually set in suddenly, the muscles of the jaws and throat being commonly the first affected. The patient complains that he has taken cold, and says that he feels as if he had got a sore throat and stiff neck; but the stiffness and uneasiness soon increase, and extend to the root of the tongue, causing difficulty in swallowing. The temporal and masseter muscles gradually get involved, and *lock-jaw or trismus* (*Τρίζω*, to gnash with the teeth) occurs. When the disease proceeds, the remaining muscles of the face, those of the trunk, and, lastly, those of the extremities, become implicated. The spasm never entirely ceases, except in some cases during sleep; but it is aggravated every quarter of an hour or so, the increased cramp lasting for a few minutes, and then partially subsiding. Where the strong muscles of the back are most affected, they bend the body into the shape of an arch, so that the patient rests upon his head and heels, a condition known as *opisthotonos* (*Ὄπισθε*, backwards; *τείνω*, to bend). When, on the contrary, the body is bent forwards by the strong contraction of the muscles of the neck and abdomen, the affection is termed *emprosthotonos* (*Ἔμπροσθεν*, forwards, and *τείνω*); while if the muscles are affected laterally, so that the body is curved sideways, it has been designated *pleurosthotonos* (*Πλευρόθεν*, from the side, and *τείνω*), or *tetanus lateralis*.

The suffering caused by the tetanic spasms is absolutely frightful to contemplate. The face is pale, the brows contracted, the skin covering the forehead corrugated, the eyes fixed and prominent—sometimes suffused with tears, the nostrils dilated, the corners of the mouth drawn back, the teeth exposed, and the features fixed in a sort of grin—the *risus sardonicus*. The respirations are performed with difficulty and anguish; severe pain is felt at the sternum; there is great thirst, but the agony is increased by attempts at deglutition; the pulse is feeble and frequent; the skin is covered with perspiration; and the patient cannot sleep, or if he dozes it is only for a few minutes at a time. Yet with all this suffering, the intellect remains clear and unaffected. Death at length ends the agony, the release being due partly to suffocation and partly to exhaustion.

There is a peculiar form of this affection called *Trismus nascentium*, that occurs in young infants about the second week after birth, and which is very fatal. It is very rare in this country; though some eighty years since, when the Dublin Lying-in Hospital was badly ventilated, it proved one of the most prominent causes of the infantile mortality in that institution. Tetanus infantum is still common in the West Indies, where it sometimes seems to rage as an epidemic.—When prevalent, great care ought to be taken to guard the new-born child from cold or foul air, improper feeding, imperfect cleansing, or from retention of the meconium; while attention should also be paid to prevent improper management of the remains of the umbilical cord by the nurse. In dividing the funis at birth, not more than two inches should be left attached to the umbilicus.

The *causes* of tetanus are chiefly exposure to cold and damp, and

bodily injuries—particularly lacerated wounds. When due to cold, or when arising spontaneously, it is termed *idiopathic;* when the result of wounds, *traumatic* tetanus. In idiopathic tetanus recovery may be hoped for; while in the traumatic form almost every case proves fatal. Taking both varieties into the calculation, it may be said that death is most likely to occur between the third and fifth days of the disease. The symptoms produced by a poisonous dose of strychnia are very similar to those of this disease. Tetanus is occasionally connected with, or dependent upon, some alteration—especially congestion—in the spinal cord or its membranes; but it is generally allowed that it is often merely a functional affection, and by no means necessarily connected with inflammation of any portion of the nervous system. Hence in many instances no post-mortem appearances of any note have been discovered. It has indeed been suggested that it results from some poison formed in the blood, or from the absorption of morbid matter secreted by the wound; but little evidence in favor of this toxic origin can be adduced. The strongest point is that there appears to be a resemblance between hydrophobia and tetanus.

The *treatment* is commonly empirical, and generally—it must be confessed—useless. There are four remedies on which, it seems to me, reliance is chiefly to be placed,—viz., belladonna, chloroform, quinine, and wine. Opium has never been found to do any good; and it is now rendered probable that the use of it is objectionable, since this drug produces a state of congestion and polar excitement of the spinal cord somewhat similar to that caused by strychnine. Belladonna may be applied to the spine locally, smearing the extract well over this part; while it can also be administered internally, in doses of half a grain or one grain with two grains of quinine every four hours.—The patient might also be kept under the influence of chloroform for very many hours: indeed I would not mind trying its use for one or more entire days, provided no symptoms—such as a failing pulse—to forbid it, arose during its operation. Under the influence of this anæsthetic the pulse falls to its natural standard, the respiration becomes easy, and all indication of suffering subsides; but as soon as the remedy is suspended, the fatal symptoms again begin to show themselves.—With regard to quinine, from three to five grains may be given every four or six hours, either by the mouth or rectum.—Considering that the action of woorara is antagonistic to the effects of the artificial tetanus of strychnia, it was hoped that this agent might prove useful in traumatic and idiopathic tetanus. It has now been used by inoculation in several cases; but the result, on the whole, has been unfavorable. Mr. Spencer Wells has suggested that, as the specimens of the extract brought to this country vary in strength, in future trials it would be as well to use a solution of the active principle of woorara—the alkaloid curarina. Further experiments are undoubtedly desirable before giving up this medicine.—A severe example of traumatic tetanus was successfully treated with nicotine, by Mr. Tufnell, in March, 1862. Fifty-six drops (one or two for each dose) were administered in six days; each drop being equivalent to 23.3 grains of Virginia Cavendish tobacco. The Rev. Professor Haughton had previously met with successful cases from the employment of this agent.

There are a few other points worthy of recollection. Thus, if de-

glutition be difficult, enemata must be used. I should also be inclined to try the prolonged application of ice to the spine. Some practitioners recommend the frequent use of the warm bath, while others prefer the cold douche: but neither appears to have been of much utility. A few authorities have faith in conium when applied locally and taken internally; while cures have followed the exhibition of aconite. Remembering the supposed toxic origin of the disease, it might be worth while to see the effect of the sulphite of soda or magnesia (F. 48). Purgatives will generally be necessary; full doses of calomel and jalap, repeated until the bowels have been thoroughly evacuated, being as efficient as any other medicine of the class of aperients. Bloodletting, blisters, mercury, antimony, colchicum, large doses of assafœtida, turpentine, digitalis, musk, iron, hydrocyanic acid, and the extract of Indian hemp, have been repeatedly employed, and as often caused disappointment.

XVI. SLEEP AND SLEEPLESSNESS.

The necessity for *sleep* is apparent in all animals. In the young, while the functions of nutrition are most active and the waste of the system small, the whole time is passed in eating and sleeping. During adult life, about one-third of the twenty-four hours is passed in repose. In old age, when the nutritive operations are carried on with less vigor, more sleep is needed, so that the system may be spared as much as possible.

Sleep may be said to be especially the rest of the nervous system. Repose is necessary for repair and nutrition. Not that these processes occur only during sleep, but for their perfection sleep is required. Sleep, in short, aids all those processes by which the nutrition of organs is effected. Even in the heart's action there is a period of repose. It is true that the rest after each pulsation is short; but the total amount in the twenty-four hours becomes considerable.

Sleep is preceded by drowsiness. The eyelids become heavy and droop; and then the sense of sight, hearing, and touch fail in succession. The limbs are semiflexed, and voluntary movements cease. The eyes are turned upwards, the pupils are contracted, the respiration and circulation get slow, and there is deep unconscious sleep. From the time of this occurring until complete awakening, there is seldom one continuous state of repose. There are doubtless periods of more or less imperfect slumber, when movements are performed under the influence of external impressions. Thus we seldom awake in the same position in which sleep came on, though there may be no consciousness of having made any change. According to Sir Henry Holland, sleep, "in the most general and correct sense of the term, must be regarded not as one single state, but a succession of states in constant variation:—this variation consisting, not only in the different degrees in which the same sense or faculty is submitted to it, but also in the different proportions in which these several powers are under its influence at the same time."* Man requires about eight hours of sleep: and should not, as a rule, have less, if he would duly repair the waste which has arisen from ac-

* Chapters on Mental Physiology. Second Edition, p. 15. London, 1858.

tive occupation. Numerous individuals do with five or six hours, even for a considerable term; but I am inclined to think that many such enjoy snatches of slumber, which they fail to reckon. Students working for an examination will often restrict themselves to five hours nightly for a few weeks; but they subsequently make up for the deficiency by passing nine and ten hours in bed for some time afterwards. Doubtless, however, habit and temperament control us much in this respect.

Many physiologists have thought that venous pressure was the cause of sleep. But the evidence in favor of this hypothesis is very imperfect. The general inactivity of the brain during slumber is better accounted for on the supposition that there is a withdrawal of blood from this organ, rather than an increased quantity. Dr. Pierquin observed in 1821, in one of the hospitals of Montpeleier, a female patient, part of whose skull and dura mater had been destroyed by disease. The brain was perfectly motionless when she was in a dreamless sleep. When slightly agitated by dreams, there was an elevation of the brain; when the dreams were vivid, the brain protruded through the opening in the skull, forming cerebral hernia. . The same phenomena were seen when she was perfectly awake, if engaged in active thought or sprightly conversation. Blumenbach has also mentioned cases in which, portions of the skull having been lost, he witnessed a sinking of the brain during sleep, and a swelling with blood when the patient awoke. In order positively to determine the condition of the cerebral circulation during sleep, Mr. Durham resorted to an ingenious experiment.* A dog having been chloroformed, a portion of bone the size of a shilling was removed from the parietal region of the skull, and the subjacent dura mater partially cut away. The part of the brain thus exposed appeared inclined to protrude. The large veins over its surface were distended, and the smaller vessels of the pia mater seemed full of dark-colored blood; while there was no appreciable difference in color between the arteries and veins. The longer the exhibition of the chloroform was continued, the more distended did the veins become. But as the deep anæsthesia passed off, the animal fell into a comparatively natural sleep. As he did so, the surface of the brain became pale, and sank rather below the level of the bone; the veins were no longer distended; a few small vessels containing arterial blood could be seen; and many previously congested vessels were now hardly distinguishable. After a time the dog was roused; and then the brain again rose, the pia mater became more injected, the central surface assumed a bright red color, and the veins and arteries appeared full of blood. After feeding, the animal again was allowed to sleep; the bloodvessels resumed their former dimensions and appearance, and the surface of the brain became pale as before.

Dr. Parkes points out the difficulty of ascertaining the effect of sleep on the urine, owing to the impossibility of eliminating the effect of other influences. According to some observers sleep diminishes this excretion. But the result of experiments performed by Dr. Böcker on his own person has been to show that all the urinary ingredients are increased during slumber, with the exception of the uric acid, phosphoric acid,

* The Physiology of Sleep. "Guy's Hospital Reports." Third Series, vol. vi, p. 153. London, 1860.

and the fireproof salts. The increase in the sulphuric acid was slight, that in the urea very great. The decrease in the uric acid was considerable, in the phosphoric acid very great. "This would seem to show," says Dr. Parkes, "that the disintegration of nervous tissue is lessened during sleep."*

Heat creates drowsiness, and severe cold does the same. A hearty meal generally predisposes to it. A morbid disposition to sleep is often the precursor of apoplexy; or it may be due to renal disease, with imperfect elimination of urea; or it may arise from alcoholic intoxication; or it may be caused by anæmia generally. A remarkable example of prolonged sleep, probably owing to anæmia and faulty nutrition of brain, has been reported by Dr. J. Ward Cousins.† The chief points in the case are these: J. C., a farmer, ætat. 43, has been subject at intervals during the last twenty years to attacks of deep and prolonged sleep. The disorder began, without any assignable cause in 1842, and continued nearly a year. It returned in 1848, persisting for nearly eighteen months. He was then free until the commencement of the present attack on May 19, 1860; since which time he has not slept naturally. He retires to bed at night soon after 10 o'clock and almost immediately falls into a profound sleep, from which all attempts at rousing him have failed. His appearance remains natural while asleep; but his face and ears are pale, feet often cold and livid, respiration scarcely perceptible, pulse slow and feeble, &c. He awakes suddenly, and always seems refreshed. The longest period he has ever passed in profound sleep is five days and five nights. Recently he has frequently slept three and four days, but the average is nearly two days. He is awake about four or five hours out of the forty-eight. During these sleeps he does not dream; the contents of the bowel and bladder are always retained; and on awaking his first question is, "How long have I slept?" Lately he has looked pale and lost flesh. In 1848, he suffered frequently from spasmodic trismus, but has not done so since.

Insomnia or *sleeplessness* often forms one of the premonitory symptoms of insanity. It is commonly present in mania, greatly aggravating the disease. Sometimes the insane are afraid to sleep because of the frightful dreams and visions which they experience; but often the desire for repose seems banished. All exciting passions have a tendency to prevent sleep; and many acute diseases, in their early stages especially, act in the same way. In some cases of jaundice there is sleeplessness; while others are characterized by excessive drowsiness. Probably, the greater the amount of blood-poisoning, the greater the disposition to somnolence. Dyspepsia is a fertile source of restlessness; and so is the use of strong tea and coffee. Mental anxiety causes wakefulness, as well as bodily suffering; while the ill effects of disease of the heart or large vessels are often aggravated by imperfect and disturbed sleep. And, lastly, women of a nervous excitable temperament are often annoyed by an inability to obtain sound repose during pregnancy;

* The Composition of the Urine in Health and Disease, and under the Action of Remedies, p. 91. London, 1860.

† Medical Times and Gazette, p. 396. 18th April, 1863. The reader will also find the notes of some half-dozen cases of this nature in The Philosophy of Sleep, by Robert Macnish, p. 215. Glasgow, 1830.

or they may suffer from complete insomnia after delivery. In the latter case, the practitioner must be on his guard, lest puerperal mania supervene.

It is difficult to say for what length of time a person might exist without sleep. Dr. Forbes Winslow quotes the following case, which seems to have occurred in 1859:* A Chinese merchant, convicted of murdering his wife, was sentenced to die by being deprived of sleep. The condemned was placed in prison under the care of three of the police guard. The latter relieved each other every alternate hour, and they prevented the prisoner from falling asleep night or day. He thus lived nineteen days without having any repose. At the commencement of the eighth day his sufferings were so intense, that he implored the authorities to grant him the blessing of being strangulated, guillotined, burned to death, drowned, garotted, shot, quartered, blown up with gunpowder, or put to death in any conceivable way which their humanity or ferocity could suggest.

To secure repose which may be refreshing and renovating to both mind and body in cases where there is unnatural wakefulness, a proper amount of exercise should be taken; the diet ought to be digestible, and especially such as will not favor the production of flatulence or acidity; and no tea or coffee must be allowed in the after-part of the day. In many cases I have seen benefit from the dinner being taken at half-past one or two o'clock in the afternoon, as was the old-fashioned custom; while a light supper has been enjoyed about an hour before bedtime. The reading of exciting works of fiction late in the evening is to be prohibited; and everything that is possible should be done to remove anxiety. The patient had better retire to rest at an early and regular period; the apartment should be quiet, and proper means taken to have it well ventilated; and if the weather be at all chilly, a fire may often be kept up during the night with great advantage. Although a very low temperature predisposes to somnolence, yet I am sure that the moderate degree of cold which we have for six or eight months in this country has quite the reverse effect with many delicate individuals. The bed should generally consist of a mattress, without too many heavy blankets; the pillows must not be high; and no curtains or hangings ought to be permitted.

If attention to these simple rules fails to produce the desired effect, one or other of the following different plans may be practised perhaps somewhat empirically. For example, it has happened to me to see a good result, particularly when there is any debility, from a tumblerful of port-wine negus, or of mulled claret, or of white-wine whey, being taken the last thing at night. In other instances, where the skin has been hot and dry, a glass of cold water has appeared to be useful. So, again, the employment of a bath for about three or five minutes, at a temperature varying from 90° to 96° F., just before going to bed often affords relief: as does also a rapid sponging of the body with tepid water. Sometimes the use of a warm foot-bath—or of a hot water bottle—acts favorably, by drawing the blood from the brain to the extremities. It has been said, that it is a frequent practice in Kashmir

* On Obscure Diseases of the Brain, and Disorders of the Mind. Second Edition. Note, p. 580. London, 1861.

for mothers to put their children to sleep by exposing their heads to a small stream of cold water for a couple of hours; a practice which can only act by inducing cerebral anæmia.

When any physical cause for the wakefulness can be discovered, it must of necessity be removed. Thus, if the bowels are constipated, or if the excretions are unhealthy, laxatives and alteratives will be required. Patients afflicted with heartburn should take three or four bismuth lozenges on retiring to rest. If there be headache, a rag dipped in cold water will be useful; while in some acute diseases the application of a bladder containing ice to the scalp may be advised. These measures failing, recourse must be had to sedatives; henbane, hop, Indian hemp, or conium, being first tried, since they neither affect the head nor confine the bowels. But not unfrequently stronger drugs will be needed; and then one-sixth or a quarter of a grain of morphia with some spirit of chloroform, or half a grain of extract of opium with four grains of hyoscyamus, or twenty drops of the liquid extract of opium with the spirit of ether, may be prescribed. Frequently I have found the exhibition of opiate enemata or suppositories preferable to the use of this drug by the mouth. In insomnia due to nervous irritability, large doses of bromide of potassium (twenty grains thrice daily) have been recommended.

There can be no doubt that the manœuvres employed by mesmerists will induce sleep, when practised on certain susceptible persons. In properly selected cases, there is no objection to the physician resorting therefore to this remedy. "For my own part," remarks Dugald Stewart, "it appears to me, that the general conclusions established by Mesmer's practice, with respect to the physical effects of the principle of Imitation and of the faculty of Imagination (more particularly in cases where they co-operate together), are incomparably more curious than if he had actually succeeded in ascertaining the existence of his boasted fluid. Nor can I see any good reason why a physician, who admits the efficacy of the *moral* agents employed by Mesmer, should, in the exercise of his profession, scruple to copy whatever processes are necessary for subjecting them to his command, any more than he would hesitate about employing a new *physical* agent, such as electricity or galvanism."* Similar in its results to mesmerism, is hypnotism (Ὕπνος, sleep; terminal ισμὸς), which Mr. Braid believes is capable of effecting more good than can be accomplished by the ordinary mesmerizing processes. This gentleman says,—"My usual mode of inducing the sleep is to hold any small bright object about ten or twelve inches above the middle of the forehead, so as to require a slight exertion of the attention to enable the patient to maintain a steady, fixed gaze on the object; the subject being either comfortably seated or standing, stillness being enjoined, and the patient requested to engage his attention, as much as possible, on the single act of looking at the object, and yield to the tendency to sleep which will steal over him during this apparently simple process. I generally use my lancet case, held between the thumb and first two fingers of the left hand; but any other small bright object will answer the purpose. In the course of about three or

* The Collected Works of Dugald Stewart, F.R.S., &c. Edited by Sir W. Hamilton, vol. iv, p. 167. Edinburgh, 1854.

four minutes, if the eyelids do not close of themselves, the first two fingers of the right hand, extended and a little separated, may be quickly, or with a tremulous motion, carried towards the eyes, so as to cause the patient involuntarily to close the eyelids, which, if he is highly susceptible, will either remain rigidly closed, or assume a vibratory motion—the eyes being turned up, with, in the latter case, a little of the white of the eye visible through the partially closed eyelids. If the patient is not highly susceptible, he will open his eyes, in which case request him to gaze at the object, &c., as at first; and, if they do not remain closed after a second trial, desire him to allow them to remain shut after you have closed them, and then endeavor to fix his attention on muscular effort, by elevating the arms if standing, or both arms and legs if seated, which must be done quietly, as if you wished to suggest the idea of muscular action without breaking the abstraction, or concentrative state of mind, the induction of which is the real origin and essence of all which follows."*

Before concluding these remarks a few words must be said on *dreams*, *somnambulism*, and *nightmare*. It is most probable that dreams only occur during imperfect sleep, when there is partial activity of the nervous centres. They are most common towards the morning, as consciousness is gradually returning. The nature of the dream may be suggested by external circumstances; and although it may often consist of contradictory and grotesque or horrible elements, yet occasionally it presents a logical sequence of events free from exaggeration. Most dreams are forgotten, especially those which are followed by sound sleep; just as the rambling talk of a patient slightly under the influence of chloroform is not remembered, if the inhalation be continued until complete anæsthesia ensues. Disturbed and frightful dreams are sometimes the precursors of apoplexy, insanity, tubercular meningitis, and epilepsy. Children are commonly alarmed by their dreams; the goblins and scarecrows having their origin in uneasiness from teething, a loaded bladder, irritation of the bowels, &c.

The somnambulist dreams and carries out his conceit. His movements appear to have the precision of one awake, because he is familiar with the objects and actions which he pictures to himself. The phenomena of somnambulism vary from simple talking or crying, to the performance of various actions as if the senses were in full activity and under the control of the understanding.

In nightmare (or *incubus*, from *Incubo*, to lie upon) there are generally apparitions, horrible or ludicrous, with always a distressing consciousness of inability to move. It may arise from the presence of indigestible food in the stomach, or from pressure upon this organ, or from flatulence with acid secretions. The suffering usually commences with a disagreeable vision, and the sleeper attempts to escape from some imaginary danger. Then he experiences a sense of suffocation, which increases until there is an imperfect consciousness that he is in bed. But he is still oppressed with a weight on the chest, which keeps him lying on his back; and he feels unable to inflate his lungs. The oppressed breathing becomes most painful; palpitations of the heart set

* Magic, Witchcraft, Animal Magnetism, Hypnotism, and Electro-Biology. Third Edition, p. 57. London, 1852.

in; attempts are made to move the arms, but it is found impossible to do so; and the countenance assumes a ghastly expression, with the eyes half open. In a minute or two the power of volition returns; and the patient accustomed to these attacks thoroughly rouses himself, lest the paroxysm should recur. Spasmodic contraction of the diaphragm and intercostal muscles has been assigned as the proximate cause of nightmare. Dr. Hodgkin, himself a sufferer, has attempted to analyze the symptoms. The chief point he succeeded in making out, was that the involuntary movements of respiration appeared to be suspended, whilst the chest seemed to be passively collapsing. Following up the indications derived from this, he obtained most speedy relief from so moving the arms that the pectoral muscles might elevate the ribs; and he now begs that whenever he appears to be under the influence of an attack, one of his arms may be worked like the handle of a pump.* In cases where the seizure is apt to return on the same night, it may be warded off by an antacid draught (a little soda and ammonia in water). Of course, heavy suppers, and food likely to induce dyspepsia (especially malt liquors), should be rigidly avoided in these cases.

XVII. HYPOCHONDRIASIS.

Hypochondriasis (*Ὑποχονδριακὸς*, affected in the viscera under the false ribs,—because such affection was regarded as the cause of melancholy), may be said to consist prominently of an exaggerated egoism. There is frequently functional derangement, occasionally structural disease, of certain organs, especially of those connected with the nutritive processes; these derangements occurring either primarily or secondarily to the erroneous action of the mind. The hypochondriac is ever writhing under the petty despotism of an imaginary evil. He fulfils all his duties naturally, and generally with amiability for a season; but he is morbidly sensitive of the opinions and actions of other men, while he is also constantly tormenting himself by dwelling upon his own miserable condition. There is an unceasing dread of the existence of internal disease; with the fear either of impending insanity or of death. To the same extent that hysteria is peculiar to the female, so hypochondriasis is the special affliction of the male sex.

This disorder may vary in degree, just as individuals of different constitutions and temperaments possess a variable amount of control over the feelings and faculties of the mind. Doubtless education has also a certain influence in this respect. And it is not an extravagant assertion to say, that he who is commonly called a strong-minded man may shake off a real disposition, to which another person, less happily constituted, will succumb; so remarkable is the power of the mind over the body. To believe firmly is almost tantamount in the end to accomplishment. Extraordinary instances are related showing the influence of the will over even the involuntary muscles. Thus, Celsus speaks of a priest who could separate himself from his senses when he chose, and lie like a

* British Medical Journal, p. 501. 16th May, 1863.

man void of life and sense. Cardan used to boast of being able to do the same. But the most surprising example of this kind is the well-known case related by Dr. George Cheyne.* The very essence of hy-

* The quaint description given by this author of his patient's unnatural skill runs thus: "*Colonel Townshend*, a Gentleman of excellent Natural Parts, and of great *Honor* and *Integrity*, had for many years been afflicted with a *Nephritic* Complaint, attended with constant *Vomitings*, which had made his Life painful and miserable. Dureing the whole time of his *Illness*, he had observed the strictest *Regimen*, living on the softest vegetables and lightest *Animal Foods*, drinking *Asses' Milk* daily, even in the Camp: and for common drink *Bristol* Water, which, the Summer before his death, he had drunk on the *Spot*. But his Illness increasing and his Strength decaying, he came from *Bristol* to *Bath* in a Litter, in Autumn, and lay at the *Bell-Inn*. Dr. *Baynard* (who is since dead) and *I* were called to him, and attended him twice a Day for about the Space of a Week, but his *Vomitings* continuing still incessant, and obstinate against all Remedies, we despaired of his *Recovery*. While he was in this Condition he sent for us early one Morning: we waited on him, with Mr. *Skrine* his Apothecary (since dead also); we found his *Senses* clear, and his *Mind* calm, his Nurse and several Servants were about him. He had made his *Will* and settled his Affairs. He told us, he had sent for us to give him some Account of an *odd Sensation* he had for some Time observed and felt in himself: which was, that composing himself, he could *die* or expire when he pleased, and yet by an *Effort*, or some how, he could come to Life again, which it seems he had sometimes tried before he had sent for *us*. We heard this with *Surprize*, but as it was not to be accounted for from now *common Principles*, we could hardly believe the *Fact* as he related it, much less give any Account of it: unless he should please to make the *Experiment* before us, which we were unwilling he should do, lest, in his weak Condition, he might carry it too far. He continued to talk very distinctly and sensibly above a Quarter of an Hour about this (to Him) surprising *Sensation*, and insisted so much on our seeing the *Trial* made, that we were at last forced to comply. We all *three* felt his pulse first: it was distinct, tho' small and *thready:* and his *Heart* had its usual Beating. He composed himself on his Back, and lay in a still posture some time: while *I* held his right Hand, Dr. *Baynard* laid his Hand on his Heart, and Mr. *Skrine* held a clean Looking-glass to his Mouth. I found his *Pulse* sink gradually, till at last I could not feel any, by the most exact and nice Touch. Dr. *Baynard* could not feel the least Motion in his *Heart*, nor Mr. *Skrine* the least Soil of Breath on the bright *Mirror* he held to his Mouth; then each of us by *Turns* examin'd his *Arm*, *Heart*, and *Breath*, but could not by the nicest *Scrutiny* discover the least *Symptom* of *Life* in him. We reasoned a long Time about this odd *Appearance* as well as we could, and all of us judging it inexplicable and unaccountable, and finding he still continued in that Condition, we began to conclude that he had indeed carried the *Experiment* too far, and at last were satisfied he was actually dead, and were just ready to leave him. This continued about half an Hour. By Nine o'Clock in the Morning in autumn, as we were going away, we observ'd some Motion about the Body, and upon Examination found his *Pulse* and the *Motion* of his *Heart* gradually returning; he began to *breathe* gently and speak softly: we were all astonish'd to the last Degree at this unexpected Change, and after some further Conversation with him, and among ourselves, went away fully satisfy'd as to all the Particulars of this Fact, but confounded and puzzled, and not able to form any rational *Scheme* that might account for it. He afterwards called for his *Attorney*, added a *Codicil* to his *Will*, settled Legacies on his Servants, received the *Sacrament*, and calmly and composedly expir'd about five or six o'Clock that Evening. Next Day he was opened (as he had ordered): his Body was the soundest and best made I had ever seen; his *Lungs* were fair, large, and sound; his *Heart* big and strong, and his *Intestines* sweet and clean; his *Stomach* was of a due Proportion, the *Coats* sound and thick, and the villous *Membrane* quite entire. But when we came to examine the Kidneys, tho' the *left* was perfectly sound and of a just *Size*, the *right* was about four Times as big, distended like a blown *Bladder*, and yielding as if full of Pap; he having often pass'd a *Wheyish* Liquor after his Urine, during his Illness. Upon opening this *Kidney*, we found it quite full of a white *Chalky* Matter, like *Plaster of Paris*, and all the fleshy substance dissolved and worn away, by what I called a *Nephritick Cancer*. This had been the Source of all his Misery; and the *symptomatick* Vomitings from the Irritation on the consentient *Nerves* had quite starved and worn him down. I have narrated the *Facts*, as I saw and observed them deliberately and distinctly, and shall leave to the *Philosophick Reader* to make what Inferences he thinks fit; the Truth of the material Circumstances I will warrant."—The English Malady: or a Treatise of Nervous Diseases of all Kinds, as Spleen, Vapors, Lowness of Spirits, Hypochondriacal and Hysterical Distempers, &c., p. 307. London, 1733.

pochondriasis, however, is a want of resolution,—an inability to resist "thick-coming fancies." It is a gigantic evil, often the offspring of selfishness and indolence. At the same time there is sometimes associated with it bodily disease, although the symptoms are greatly exaggerated. The most frequent of these are affections of the stomach, liver, heart, large vessels, and urinary organs. While therefore, on the one hand, care must be taken not to overlook the existence of organic disease, when present; so, on the other, it must be remembered that there is generally only a simulation of some serious malady, with functional disturbance of the viscus to which the attention is morbidly directed. Moreover, occasionally the organic affection is slight. Thus, some remarkable cases of long-standing hypochondriasis have fallen under my observation, where the only disease discoverable after careful and repeated examination has been in the teeth. And in such, no benefit has arisen from treatment until the foul stumps or carious organs have been all extracted. In most instances the circulation is languid, and cold feet are particularly complained of.

No station in life gives immunity to attacks of hypochondriasis. But perhaps the most frequently affected are such as have been accustomed to an active life, yet who, having retired to enjoy the fruits of their industry, get oppressed with ennui. So also those who, from their social position, have not been brought up to any occupation, suffer; those accustomed to sedentary pursuits; and those again who overwork the mind, or who have any prolonged mental anxiety. The dejection, slight at first, gradually becomes extreme. Poor Cowper, writing to congratulate a friend on his recovery from severe disease, says,—"Your illness has indeed been a sad one, causing, no doubt, great distress to yourself, and considerable anxiety to your relatives and friends. But, oh! what are your *bodily* sufferings, acute as they undoubtedly were, to the unceasing *mental* torture I suffer from *a fever of the mind?*" Under such suffering it is hardly surprising that men have attempted suicide, as indeed Cowper did;* believing with the Son of Sirach that—"Death is better than a bitter life or continual sickness."

Reading men at the Universities are not uncommonly tormented with great depression of spirits. Sometimes this is connected with spermatorrhœa, of which more will be said in a future page; often the conscience is over-sensitive, and the importance of becoming distinguished is exaggerated; but frequently over-mental work, with the fear of ungratified ambition, is the only cause. In these cases, as in others of a similar kind, great benefit is often derived from going through a modified system of physical training. By this practice the invalid not only relieves his weary mind at the time; but, while bringing the various muscles and tissues into play, he obtains general vigor, energy of body, buoyancy of spirits, a power of self-command, and, in short, that happy, desirable feeling which constitutes perfect health. The first rule in following such a course of treatment is to obtain natural, quiet sleep; to procure which the bed should be free from drapery, while it ought to be placed in a well-ventilated room. There must be sufficient, but not

* The description of this attempt, as given by the poet himself, is of special interest to the psychological student. It is too long for quotation, and will not bear curtailment.—See The Poetical Works of William Cowper. Edited by Robert Bell, vol. i, p. 25. London, 1854.

too much clothing; while a hair mattress is serviceable, a feather-bed being only fit for an effeminate milksop. The feet are to be kept warm, and the head cool. If there be restlessness, it may be relieved by a tepid sitz-bath a few minutes before retiring for the night; or in any case, the skin ought to be rubbed with a coarse towel. From seven to eight hours of sleep will be needed. Then, on rising, a cold or tepid sponge-bath ought to be employed, unless sea-bathing or a plunge in the river can be enjoyed. The hair is to be kept short, and the teeth are to be well cleaned night and morning; and while flannel is to be worn next the skin during the day, only a cotton shirt must be slept in.—In having recourse to dumb-bell exercise, the best authorities recommend that the weight of the dumb-bells should be in proportion to that of the individual using them as pounds to stones. Thus, a man of ten stone will select instruments each weighing five pounds. Their use gives flexibility and tone to the muscles, and promotes general activity.—For club-exercise, wooden bats are to be selected about two feet in length, and each having a weight of from three to nine pounds, according to the strength of the individual.—For walking, woollen socks of a proper size are to be worn; the shoes being made of thin upperleather, while the soles are moderately thick and broad, without high heels, and fitting closely but not tightly. In commencing a pedestrian tour, a short journey is to be taken the first day; the novice gradually increasing the distance until he can accomplish his twenty or five-and-twenty miles a day. The rate should be about three miles an hour; allowing regular intervals for rest and meals. A good bracing air is to be selected, remembering that the athletes of ancient Rome were trained in localities reputed to be the most healthy in the country. A party of three congenial friends will be all that is desirable; for desultory practice soon ends in disgust, and who can find more than two companions with whom he is likely to happily end a tour of some weeks' duration? And, lastly, the diet ought to consist of stale bread and fresh butter; tea, with half milk; white fish, mutton chops, steaks, roast beef and mutton, poultry, game, potatoes, &c. Light bitter beer, without wine or spirits, will be necessary. Breakfast had better be taken at eight o'clock, dinner at two, and supper at half-past seven. There should be complete rest on the Sundays. And let each one remember the motto of training,—"Soberness, temperance, and chastity."

In concluding these remarks, the reader may look for some information as to the drugs which are useful in conquering hypochondriasis. But on this head I would rather give a word or two of caution, than a long list of useless remedies. In the first place, all purgative medicines are injurious. The action of the bowels must be maintained by exercise and diet. Secondly, narcotics and sedatives only increase the mischief, and check the secretions. Thirdly, tonics are seldom of more than temporary benefit. If there be anæmia, however, some preparation of steel may be given; or if there be great depression of the nervous system, the hypophosphite of soda and bark (F. 419) may be tried, or the nitro-hydrochloric acid with small doses of strychnia (F. 378). Cod-liver oil will prove serviceable, when the hypochondriac is below his normal weight. Yet the chief point is for the practitioner to inspire his patient with confidence; failing to accomplish this, all else will be unprofitable. Though the sufferer neglect to attend to the necessary rules, neverthe-

less—as old Burton says, "It behooves a good physician not to leave him helpless. But most part they offend in that other extreme, they prescribe too much physic, and tire out their bodies with continual potions, to no purpose."* The physician of the present day, however, ought not to render himself amenable to this censure.

XVIII. NEUROMA.

By the term Neuroma (*Νεῦρον*, a nerve) is designated a tumor connected with a nerve. The growth may be solid or cystic; the former being the most frequent. The solid growths are of a fibrous nature, consisting of dense plastic matter, implicating the neurilemma and nerve-fibres. Occasionally the nerve-fibres are merely spread over the tumor, without being involved in its texture.

Neuromatous tumors may form spontaneously, in which case they are generally single and very painful; it being remarkable that the suffering is much less when there are several tumors on the same or on an adjoining nerve, than when there is only one. They may also result from a wound or other injury; and thus they are sometimes produced on the extremities of nerves after amputation.

Occasionally cancerous masses are deposited in the course of a nerve, and simulate the disease under consideration. But true neuroma is of a benign nature. So again the presence of a painful subcutaneous tubercle may lead to an incorrect diagnosis. These little bodies, however, are situated immediately beneath the skin, are seldom larger than a pea, are formed of dense fibro-cartilage, and though sometimes very sensitive to the touch, are rarely as painful as the tumors developed in the nerves.

Idiopathic neuromatous growths vary in size from a barleycorn to a melon. They occur most frequently on the spinal nerves, the branches of the ganglionic system being very rarely affected. Their growth is steady but slow. They are of an oval or oblong form, the long axis corresponding with the direction of the nerve to which they are connected. They may be due occasionally to neuritis, but often no appreciable cause can be detected. A single growth is frequently the origin of agonizing darting pain; which is increased by any attempt to move the tumor in the direction of the nerve. Neuroma has been the antecedent of epilepsy in several recorded cases. In the only instance of nerve-tumor which has fallen under my own observation it produced severe hypochondriasis.

In traumatic neuroma the growth is generally single, and is the source of paroxysmal pains of great severity, often comparable to a galvanic shock. Complete division of a nerve seems especially to produce it; in which case the tumor is solid, not invested by the neurilemma, and is destitute of any distinct capsule.

No mode of treatment proves effectual but excision. The only question for consideration is whether the growth should be carefully dissected

* The Anatomy of Melancholy. Tegg's Edition, p. 301. London, 1845.

out, or the neuroma and its corresponding portion of nerve be excised. Dr. Robert W. Smith, in his excellent monograph on this disease, remarks that "the annals of surgery furnish numerous instances in which the excision of the neuroma, along with the corresponding portion of the nerve, has been followed by complete and permanent success. . . . . Experience has further established that neither sensibility nor the power of voluntary motion are, of necessity, ultimately lost in consequence of the excision of even several inches of some of the largest nerves in the body."* This latter observation can hardly be strictly correct; but allowing that there is an element of truth in it, and that a small portion of a nerve may be removed without ultimate detriment, yet many months will elapse before sensibility and motion are restored to the parts supplied by it. Consequently, when possible, the tumor should be dissected out; or, if complete excision be resorted to, the two ends of the divided nerve ought to be brought into apposition by a suture. After the removal of a neuroma from the median nerve at the middle part of the arm, and the excision of the nerve itself to the extent of about two-thirds of an inch, M. Nelaton united the two cut ends by a suture. No ill-result followed, and at the end of forty-three hours there was a return of sensibility and motion.—When there are several neuromatous tumors, it would be very unwise to interfere with them.

XIX. NEURITIS.

Inflammation of a Nerve, or Neuritis (*Νεῦρον*, a nerve; terminal *-itis*), is an affection which seldom comes under the notice of the physician. For although it may perhaps arise spontaneously in gouty or rheumatic subjects, yet it is much more frequently due to a bruise or wound, or to inclusion of some branch by a ligature in taking up an artery.

The special symptom of this disorder is severe and continuous pain extending along the trunk of the nerve and its ramifications. The constitutional disturbance varies according to the size of the inflamed nerve; but there is generally fever, with great restlessness at night. In chronic cases, the symptoms are those of neuralgia.

The chief remedies in gouty or rheumatic neuritis, are iodide of potassium and colchicum. In all cases, the affected part must be kept very quiet; while it ought to be freely covered with belladonna and water-dressing, or with linseed-meal poultices containing the extract of poppies.

XX. NEURALGIA.

1. Introduction.—The pains which occur in the course of disease may be divided into two varieties: *i. e.*, into those occurring at the seat of mischief—as pain in the breast from cancer of the mamma, pain in a joint from inflammation of the synovial membrane, pain in the sciatic nerve from disease of the neurilemma; and those referred to parts not actually the seat of morbid action—as pain in the shoulder from disease

* On the Pathology, Diagnosis, and Treatment of Neuroma, p. 7. Dublin, 1849.

of the liver, pain in the little finger from striking the ulnar nerve at the elbow, pain in the knee from disease of the hip, and pain in the foot from piles or from stricture of the urethra, &c.

Neuralgia (*Νεῦρον*, a nerve; *ἄλγος*, suffering) consists of violent pain in the trunk or branch of a nerve, occurring in paroxysms at regular or irregular intervals: frequently there are nocturnal exacerbations. It may attack the nerves of the head, trunk, or extremities; the subcutaneous nerves of these parts suffering the most frequently.

2. Varieties.—When the branches of the fifth pair of nerves are the seat of the pain, we call the disease *neuralgia faciei* or *tic douloureux;* when certain nerves about the head—*hemicrania;* when the sciatic nerve—*sciatica.* Certain authorities consider that *angina pectoris* is a neuralgic affection of some of the cardiac nerves; and *gastrodynia* a similar disease of the nerves of the stomach.

a. Tic Douloureux—or facial neuralgia—may affect either of the three chief branches of the fifth pair of nerves. Where the pain depends upon a morbid condition of the first or ophthalmic branch, the frontal ramification of it—the supra-orbital nerve—is the most frequently attacked; the suffering being referred chiefly to the forehead. Supposing the second or superior maxillary branch is the seat of the complaint, the infra-orbital nerve will be one of the most commonly affected; the symptoms consisting of excruciating pain shooting over the cheek, lower eyelid, alæ of the nose, and upper lip. Tic douloureux of the third or inferior maxillary branch is generally confined to the inferior dental nerve, especially to that portion of it which emerges from the mental foramen and extends to the lower lip. The pain is referable to the lower lip, the alveolar process, the teeth, chin, and side of the tongue.

Whichever nerve may suffer, the torture is usually confined to one-half of the face. The right infra-orbital nerve is the most frequent seat of this disease. The pain comes on usually very gradually—perhaps as a momentary twinge; but soon it increases in severity, gets lancinating and burning, and often becomes excessive and intolerable. I have seen the most horrible sufferings induced; and until I became aware of the value of chloroform, have often been unable to afford any relief. Not unfrequently the attack is preceded by nausea and derangement of the digestive organs, sometimes by dyspnœa, and occasionally by slight rigors followed by heat.

Facial neuralgia may be caused by many different conditions. Thus, it may arise from general debility, owing to simple anæmia or renal disease; from disease of the bones of the face; or from some tumor or other organic disease of the brain. Frequently the affection can only be regarded as a product of hysteria in an irritable constitution; sometimes it is intermittent and periodical, appearing to be due to the poison of malaria; in many cases it seems to be dependent on disordered digestive organs; while in not a few it cannot be traced to its real source.

But of all the causes of tic douloureux I believe none to be so frequent as some morbid condition of the teeth. The disease affecting these organs may be of the nature of caries, or necrosis, or exostosis of the roots; or of inflammation or exposure of the dentinal pulp; or of disease of the periosteum with suppuration. Even the presence of super-

numerary teeth, with overcrowding of the jaw, will induce headache or tic douloureux in sensitive subjects.* In all cases of neuralgia, therefore, the mouth should be carefully examined, so that any decayed teeth or stumps may be extracted. And it is important to remember that the pain may have its origin in the teeth, without there being any toothache. Moreover it does not follow that there is no organic disease, because the neuralgia assumes a periodical form. Many cases have been recorded where some nerve in one of the extremities has been irritated by a tumor or an aneurism, and yet the paroxysms of pain have occurred with all the regularity of an ague, and have entirely disappeared when the cause has been removed. Where exostosis takes place in apparently sound teeth, it will be difficult to fix upon the source of the suffering; though frequently there is sufficient tenderness about the gum to remove all doubt. An extraordinary example of dental exostosis has been related by Mr. Fox:† A young lady, scarcely twenty years of age, had suffered for more than a year from deepseated pains in the face, teeth, and gums. The pain had gradually extended to all the teeth; and one by one those of the lower jaw, with the exception of the four incisors, had been removed. During this time every kind of treatment had been resorted to, without any alleviation. When Mr. Fox saw her, she was only able to take fluid nourishment, the teeth of the upper jaw being so tender that the slightest touch caused extreme pain. There was a constant flow of saliva from the mouth; while the sight of one eye was affected, and the lids had been closed for two months. The first molar of the upper jaw, on the side of the affected eye, was extracted. The fangs of this tooth were much enlarged and the periosteum thickened: its removal gave relief, and in two days the eye could be naturally opened. The relief, however, was partial; and a perfect cure was only ultimately effected by removing all the teeth.—Mr. Tomes‡ mentions the case of a lady who had suffered from tic douloureux for some years. The crowns of the teeth were sound; but when extracted, the fangs were found to be enlarged from exostosis. The disease was not cured until the whole of the teeth in the upper jaw had been removed.—And lastly, Mr. Catlin§ has recorded the very singular instance of a lady who consulted him concerning a diseased right molar. For three months she had suffered acute pains in the tooth, ear,

* The importance of investigating the state of the mouth in all cases of facial neuralgia, headache, deafness, and hypochondriasis cannot be too strongly insisted upon. —The teeth are divided into incisors, canines, bicuspids or premolars, and molars. A representation of the number of the different kinds of teeth in both jaws by means of symbols, constitutes what is called a "dental formula." The number and nature of the permanent teeth of men are thus expressed in the convenient signs put forward by Professor Owen:

$$i.\ \frac{2—2}{2—2};\ c.\ \frac{1—1}{1—1};\ p.\ \frac{2—2}{2—2};\ m.\ \frac{3—3}{3—3}=32.$$

The formula for the deciduous, temporary, or milk teeth is

$$d\ i.\ \frac{2—2}{2—2};\ d\ c.\ \frac{1—1}{1—1};\ d\ m.\ \frac{2—2}{2—2}=20.$$

† The Natural History and Diseases of the Human Teeth. Second Edition, part ii, p. 45. London, 1814.

‡ A System of Dental Surgery, p. 441. London, 1859.

§ The Teeth in Health and Disease. By Robert Thomas Hulme, F.L.S. &c., p. 211. London, 1864.

and side of the neck. When he saw her she had been deaf for four days. The inflamed tooth was extracted, and hearing returned within an hour after the operation.

In a person liable to neuralgia, the paroxysms of suffering are induced by very trifling causes; a slight current of air, a sudden jar or shake, or anything which reminds the patient of his malady, frequently sufficing to bring them on. The pains often prevent all attempts even at repose. When the sufferer is once asleep, however, the rest is sound and undisturbed; since the pains—as pointed out by Sir B. Brodie—are suspended by sleep.

β. *Hemicrania* (Ἥμισυς, half; κρανίον, the skull) is merely headache affecting one side of the brow and forehead. It is often attended with sickness, and frequently results from debility. Occasionally its attacks are periodical, coming on at a certain hour every day. It has been called *Sun-pain*, from the circumstance that at times it continues only so long as the sun is above the horizon.

γ. *Sciatica* (Ἰσχίον, the hip) consists of acute pain following the course of the great sciatic nerve; extending therefore from the sciatic notch down the posterior surface of the thigh to the popliteal space, and frequently along the nerves of the leg to the foot. It very often results from pressure upon some part of the nerve, such as may arise from intestinal accumulations, or from simple or malignant uterine tumors; now and then from inflammation; sometimes from over-fatigue, and exposure to cold and wet; and occasionally from rheumatism. Puerperal women—especially those of a rheumatic or gouty diathesis—not uncommonly suffer from sciatica; the nocturnal exacerbations of pain quite preventing sleep, and exhausting the patient.

Usually one limb only is affected, examples of bilateral suffering being rare. The muscles feel stiff, and as if their action were impeded; so that the patient limps along with the aid of a stick. The duration of sciatica varies from a few weeks to several months; the middle period of life, from forty to sixty, is most obnoxious to it; and occasionally attacks of it alternate with other rheumatic or neuralgic affections.

3. Treatment.—In the treatment of neuralgia, it is obvious that our first efforts must be directed to the removal of the cause. The state of the health will have to be looked to. General plethora—which very rarely, if ever, exists in these cases—is to be relieved by purging and other lowering means; while constitutional debility ought to be corrected by a nourishing diet. I generally forbid the use of tea and coffee; but allow plenty of milk, with a regulated amount of some alcoholic stimulant. Warm clothing should be recommended, and especially the use of flannel next the skin. In sciatica, chamois-leather drawers often prove very comfortable. The employment of a salt tepid or cold bath every morning, followed by friction, will be beneficial.

Ferruginous tonics frequently prove of great value. Dr. Elliotson says, that "in all cases of neuralgia, whether exquisite or not, unaccompanied by inflammation, or evident existing cause, iron is the best remedy;" and the peroxide may therefore be given in thirty or sixty-grain doses two or three times a day, with an occasional aperient. When there are symptoms of disorder of the digestive organs, purgatives—especially F. 148, 149, 156, 162, 180, 181,—and antacids (F. 63, 65)

often give great relief. Cases associated with rheumatism will derive benefit from iodide of potassium, guaiacum, colchicum, and occasionally from turpentine, &c.; while those in which the attacks are periodic can generally be cured by full doses of quinine (F. 379, 383), or by minute doses of arsenic with bark, zinc, &c. (F. 52, 381, 399.)

The efficiency of the valerianate of ammonia as a remedy for neuralgia, has been urged by many practitioners, though I must confess it has greatly disappointed my expectations. From one to three or more grains of this salt may be given, in an ounce of infusion of calumba, thrice daily. I have greater faith in the hydrochlorate of ammonia; thirty grains of which should be administered every hour in water, while the paroxysm is on. If after the fourth dose there be no diminution of the suffering, it will be useless to persevere. As soon as the pain is relieved, the dose may be reduced to fifteen grains three times a day.

In the treatment of sciatica, mercury or iodide of potassium will be needed if there be any symptoms of a syphilitic taint; active purgatives, especially croton oil (F. 168, 191), if we fear the existence of fæcal accumulations; and steel, with cod-liver oil (F. 389) if there be general debility. In two or three cases where I could detect no cause for the disease, a cure has been effected by the sulphate of soda and steel (F. 181), with the use twice a week of the hot-air bath.

Certain topical expedients have been proposed. Division of the affected nerve is an unscientific operation, which can rarely, if ever, be of lasting service.—Any tumor or foreign body pressing upon the nerve ought to be removed, or any portion of necrosed bone that may be the cause of the suffering must be taken away.—In facial neuralgia, the extraction of carious teeth, &c., as already dwelt upon, may effect a cure. Belladonna, veratria, aconite, or opium (F. 297, 304), applied to the affected part, will often at least palliate the suffering; while, in some instances, the cuticle may be removed by a blister, and the part dusted over with one or two grains of morphia mixed with the same quantity of white sugar.—Narcotic injections into the areolar tissue find favor with many. Morphia is, perhaps, the best agent to employ (F. 314); while as much relief is given by using this hypodermic method at a distance from the seat of pain, as by practising it at the neuralgic part. To inject the solution, a graduated syringe having a sharp perforated nozzle ought to be used.—A small portion of an ointment, made by mixing one or even two grains of aconitine with sixty grains of lard (F. 296), may be cautiously smeared over the track of the painful nerve once or twice a day.—So also warm baths, or hot douches of medicated water, will often be useful.—Where there is no disease of the nervous centres, and where the affected nerve is not irritated by inflammation or by the pressure of some morbid growth, the use of a continuous current of galvanic electricity (such as can be obtained from one of Pulvermacher's chains) may diminish the morbid exaltation of sensibility, and so lead to a cure.

In the majority of cases it will be necessary to resort to the employment of narcotics and sedatives. When the pain is on, and when the patient is racked with torture, no agent produces such instantaneous relief as ether or chloroform (F. 313);) the inhalation of one of which remedies should be permitted until complete insensibility is produced. The ease induced often continues long after the patient recovers from the immediate effects of the anæsthetic.

PART V.

DISEASES OF THE ORGANS OF RESPIRATION AND CIRCULATION.

I. CATARRH.

CATARRH (*Καταῤῥέω*, to flow down little by little) consists of acute inflammation of the mucous membrane of some part of the air-passages. It is called *coryza* (*Κάρα*, the head; *ζέω*, to boil), if it affect the Schneiderian membrane of the nose; *gravedo* (*gravis*, heavy), if the frontal sinuses suffer; and *bronchitis* (*Βρόγχια*, the branches of the windpipe; terminal *-itis*), when the stress of the disease falls upon the trachea and bronchial tubes.

Catarrh is the commonest of diseases. It arises not from mere cold, but from too sudden a change of atmosphere, or from exposure to wet, &c., when the strength is exhausted. Sudden vicissitudes of temperature are not dangerous; for in the use of the Turkish bath a cold douche is commonly employed after leaving the sudatorium, while Dr. Currie and others have related many cases of fever, scarlatina, &c., which have been beneficially treated by cold affusion during the hot stage. The application of cold is only dangerous when the heated body, exhausted by exercise, is rapidly parting with its heat. Under other circumstances, the glowing body can react upon the cold, and convert it into a strengthening rather than a depressing agent; but the frame which is quickly cooling after having been over-warmed is not in a condition to react, and hence the application of cold increases the depression.

The *symptoms* chiefly consist of lassitude, pains in the limbs, aching of the back, a sense of tightness across the forehead, excessive discharge from the nostrils, profuse lachrymation, hoarseness, sore throat, furred tongue, more or less feverishness, thirst, loss of appetite, and a quick pulse. An eruption of herpes also appears upon the lips, and perhaps most frequently about the angles or the middle of the lower lip.—At the end of some forty-eight hours these symptoms begin to subside; or the disease passes into a more severe affection, such as acute tonsillitis, bronchitis, pneumonia, &c.

Attacks of catarrh are apt to recur, on slight causes, in many susceptible subjects. Occasionally the disease appears to get chronic, but this seldom happens when the system is strong. As the disease leaves the mucous membrane of the nostrils, the trachea or bronchi may

become affected, a troublesome cough resulting. Moreover in catarrhal inflammation of the trachea there is often dysphagia, sometimes so severe for a day or two as to give rise to suspicions of grave disease. But independently of the fact that the pain soon ceases under simple treatment, there is an absence of all symptoms of stricture of the œsophagus, aneurism, cancer, &c. The uneasiness is only felt during coughing or at the moment of deglutition, whether the substance passing consist of food or merely of saliva; and it is often referred by the patient to the top of the sternum. It is probably due to the stretching of the inflamed windpipe which takes place at the time of swallowing. There is sometimes complete aphonia in these cases.

Dr. Hyde Salter has suggested that the symptoms of catarrh depend upon a specific animal poison; and that they are attributable either to the material presence of this poison circulating in the blood, or to the irritation which it produces in those organs which are its constituted eliminants. The arrest of the function of the skin from exposure to cold throws back into the circulation that which ought to have been eliminated as the cutaneous excretion; and this, either by itself, or by ulterior changes which it gives rise to in the blood, induces a condition of toxæmia. The vicarious emunctory for the correction of this state of blood-poisoning, by the elimination of the material for whose excretion the skin has been temporarily rendered unequal through cold, is the respiratory mucous membrane; and the principal local symptoms—coryza, tonsillitis, bronchitis—depend upon the vascular changes in this membrane induced by such exceptional excretory function, and possibly by the irritation of the poison materially present thereat. So long as the blood is thus contaminated, the fever symptoms persist; while its depuration is immediately attended by their abatement.

No one applies to a doctor to cure a simple cold. Every man acts as his own physician, and judiciously amuses himself with slops, putting his feet in hot water, and perhaps by taking a few doses of James's powder, while the disease runs its course, and in three or four days exhausts itself. Doubtless the cure can sometimes be expedited by a mild aperient, by one or two ten-grain doses of Dover's powder at bedtime, or by the use of a saline draught (F. 348). A hot-air or vapor bath may often do good. In some persons, an opiate at bedtime (fifteen or twenty minims of the liquid extract of opium) will cut short a catarrh; and in others, a good dinner, with two or three extra glasses of wine, will have the same effect. Dr. C. J. B. Williams assures us that any cold may be cured in forty-eight hours or less, by almost total abstinence from liquids; but it is a practice which in all probability very few have adopted, though it was originally recommended about one hundred and forty years ago by Dr. Richard Lower.

II. CHRONIC INFLAMMATION OF THE NOSTRILS.

Chronic inflammation of the nostrils, or ozæna (ὄζη, a stench), or rhinorrhœa (ῥίν, the nose; ῥέω, to flow), is attended with heat and stiffness of the nose, tumefaction of the Schneiderian membrane, and an offensive sanious or muco-purulent discharge.

Causes.—This disease may result from repeated or long-continued attacks of acute inflammation, or of common catarrh; being especially apt to do so in such as are of a delicate constitution. It may also be a consequence of the strumous or gouty diathesis, when it is generally associated with disordered digestive organs. And again it not uncommonly depends upon a syphilitic taint.

Diagnosis.—In every case of ozæna the nostrils should be examined with a probe and a nasal speculum, to be certain that the symptoms are not dependent on any impediment—as a foreign body, piece of necrosed bone, or a polypus—to the free discharge of the nasal mucus; since if this secretion be allowed to accumulate, it soon putrefies and excites troublesome inflammation.

It is astonishing what extraordinary substances children sometimes push into the nasal fossæ. Shells, cherry-stones, pieces of slate pencil, &c., have been removed by me, after they had been causing an offensive discharge for months.

Rhinolithes (Ῥίν, the nose; λίθος, a stone) sometimes form in the nasal cavities; these concretions consisting of the phosphate and carbonate of lime, magnesia, and mucus. In one which I extracted in 1862, the nucleus consisted of a shell; and the patient assured me that this must have been introduced at least thirty years previously.

Abscess of the septum may also give rise to an offensive purulent discharge, which may continue for some time in strumous subjects. When there is a polypus, the necessity for its complete removal is to be remembered; and even then, a gelatinous growth of this kind often forms again and again.

Where the cause of the symptoms is obscure, the recesses of the nostrils ought to be examined by the rhinoscope; so that the condition of the turbinated bones, or the seat of any tumefaction or ulceration, may be reflected in the little glass or steel mirror.

Symptoms.—The symptoms of ozæna vary somewhat according to the cause. Usually they come on insidiously with the indications of an ordinary cold; there being especially great uneasiness or "stuffiness" in the nose, owing to the thickened mucous membrane impeding the passage of the air. A portion of the Schneiderian or pituitary membrane may even swell, so as to look like a polypus on a superficial examination. There is also frontal headache, cough, general weakness, and much mental depression; but the most troublesome symptom is a profuse, fetid, muco-purulent discharge. Sometimes this discharge is quite purulent; while it is generally tinged with blood if there be any ulcer on the mucous membrane. Large solid flakes of fibrin or of hardened mucus occasionally come away. The smell from these crusts, owing to the rapidity with which they decompose, is so very offensive and taints the breath to such an extent, that the patient is unable to go into any society. He becomes even an object of disgust to himself; and if medicine fails to give a relief, he gets miserable and desponding, has no appetite, loses flesh and strength, and passes wretched restless nights. When the disease has continued some time the septum of the nose often gets eaten through; or the spongy bones become implicated, and there is caries or necrosis. This is especially likely to happen when the system is tainted with the poison of syphilis.

Occasionally the symptoms in ozæna are very slight. The patient—

probably a strumous subject—is merely annoyed by an uneasy feeling in the nose, and especially by finding that whenever he uses his handkerchief he brings away thin mucus stained with blood. Advice is seldom sought until this has continued some time; and it is then perceived on examination that there is a circular hole, perhaps large enough to admit a goose-quill, in the septum nasi, with ulcerated edges. These cases are in no way connected with any venereal taint.

Treatment.—This must be local and constitutional. Remembering that the fetor of the discharge results, in part at least, from the decomposition of the retained mucus, we shall take care to have the nostril frequently and effectually syringed with warm water; to which some alum or zinc, or a little of the solution of permanganate of potash (one or two fluidrachms to water fl. oz. viij), or a small portion of chloride of zinc (gr. 12 to water fl. oz. viij) may often be very advantageously added. I have seen cases where a large syringe has had to be used for half an hour at a time, in order completely to dislodge the inspissated matter; for unless the whole is removed no relief will be given. To moderate its secretion subsequently, the nitrate of mercury ointment (one part to four or six of lard) should be applied up the nostril by means of a camel's-hair pencil every night. Powders of white bismuth, of chlorate of potash and sugar (thirty grains and half an ounce), or of red oxide of mercury and sugar (five grains and half an ounce), inhaled in the same way as snuff twice or thrice daily, have been recommended by M. Trousseau and others; but they are less efficacious than injections, and more difficult to get thoroughly applied. In catarrhal ozæna attention is to be paid to the digestive organs; and then such tonics as quinine and iron, the nitro-hydrochloric acid and bark, steel with arsenic, cod-liver oil, and a nourishing diet, will prove the most appropriate constitutional remedies.

In strumous cases I have found most benefit from the iodide of iron and cod-liver oil, or from iodine and arsenic, together with the injection of warm water. The inhalation of steam, medicated either with iodine (F. 259), or creasote (F. 261), or turpentine (F. 260), is very useful. Change of air, especially to a bracing part of the coast, often does great good.

The treatment of syphilitic ozæna is locally the same as for the other forms; while the constitutional remedies are those of secondary syphilis generally.

III. APHONIA.

Aphonia (*Ἀ*, priv.; *φωνή*, the voice) may vary in degree from a slight impairment to complete dumbness. The loss may be temporary or permanent; and it may be due to functional disorder or structural change.

Of the *functional* variety, hysterical aphonia may be selected as the type. Its diagnosis is for the most part easy enough, since it is generally allied with other symptoms indicative of its nature. In women, the uterine functions are usually disturbed, irritation of one or both ovaries being often present. Sometimes there is amenorrhœa, sometimes menorrhagia; but the former is more frequent than the latter. Leucorrhœa is commonly complained of.

The patient usually speaks in a whisper for days together. Then the power of the voice returns, but there are generally many relapses. In a fashionable school, where the studies were principally devoted to the so-called accomplishments, three out of eight of the pupils suffered from occasional attacks of aphonia. In two of the cases the disease was hysterical, the mind exercising some influence upon the laryngeal nerves, such as is seen in loss of voice from any sudden or violent emotion. But in the third instance the affection was simply feigned; the young lady being capricious and wayward though in good health. Galvanism, moral influence, and ferruginous tonics cured all the patients; enabling the victims to become the masters of their nerves.

Aphonia from fright or shock may occur in men as well as in women. Deputy Inspector-General Longmore has related an interesting example of complete loss of speech from nervous shock.* The chief points in the case are as follow: A stout healthy soldier of the Dragoon Guards was struck just below the centre of the lower lip by a small match-lock ball weighing nearly one ounce, during a charge of his regiment at the action of Pal-i-chou near Pekin, on the 21st September, 1860. The bullet penetrated the tissues, carried away part of the alveolar process, and four teeth on the left side; travelled downwards behind the symphysis, clearing away the origins of the genio-hyo-glossi muscles in its passage; and became lodged in the soft textures of the floor of the mouth, behind the frænum linguæ. The power of articulation was immediately lost. The ball was extracted from within the mouth on the twenty-third day. On examination at Fort Pitt, soon after his return home, the inferior maxillary bone was found a little thickened at the seat of injury. The tongue was somewhat wasted, and its movements rather limited; but there was no evidence of muscular paralysis, and no impairment of taste or sensation. Subsequently to his discharge from the service he was watched, but the dumbness continued. At the end of July, 1862, thirteen months after becoming a pensioner, he suddenly recovered his speech while in a state of excitement, during an altercation in a public-house. Dr. Aitken attributed the loss of speech in this case to the injury of the insertions of the genio-hyo-glossi muscles, and to the probable disturbance of the ninth pair of nerves by the inflammation excited. Mr. Longmore objects to this view, on the ground that if it were correct the power of articulation should have been recovered gradually, as the injured parts were restored to health. He attributes the dumbness to the nervous shock; classing it with those cases of temporary aphonia that occur from hysteria, fright, &c., and in which the recovery is often sudden.

When hysterical or any form of functional aphonia is of long continuance, the vocal cords may become flaccid or powerless, just as happens after severe loss of blood, an acute attack of fever, diphtheria, &c. Dr. Althaus has related the case of a woman, aged thirty, who had lost her voice two months before he saw her in May, 1862. An examination by the laryngoscope showed a paralytic condition of both vocal cords, which were perfectly motionless, while between them a considerable cleft was visible. After two trials of Faradization, the patient could speak

* Statistical, Sanitary, and Medical Reports, for the year 1861. Army Medical Department, p. 461. London, 1863.

again, though only in a hoarse whisper. The laryngoscope then showed that the right vocal cord had to a great extent recovered, and that it approached the middle line when an endeavor was made to pronounce a long "ah." By further treatment, the left vocal cord was also restored to its normal condition, and the voice entirely recovered.*

The chief causes of *organic* aphonia are inflammation, serous infiltration, or ulceration of the mucous membrane about the vocal cords; the pressure of morbid growths in or near the larynx; and disease of the brain. The diagnosis of the first two sets of causes is readily made by the laryngoscope; the best method of employing this instrument being well detailed by Dr. Gibb,† from whose practical and interesting volume I have derived much information. The laryngoscope consists of a little mirror attached to a flexible metallic stem, which is fixed into a handle of wood or ivory. It varies in size from three or four lines to an inch and a half in diameter, and is of a circular, oval, elliptical, or quadrangular form. Glass are better than steel mirrors, according to Dr. Gibb. Before introducing the laryngeal mirror into the mouth it should be gently warmed over a spirit-lamp, and the temperature estimated by applying the back of it to the cheek. The throat is to be illuminated by means of a light thrown into it from a reflecting surface, which is accomplished by wearing a large ophthalmoscopic mirror before the right eye, between the two eyes, or on the forehead. I have always used the latter, and been well satisfied with it; though it is not a matter of much moment which form is selected. The attachment of the mirror to a large spectacle-frame, the forehead band, or the mouth-piece of Czermak, permits of its movement in any necessary direction. The light to be employed for reflection may be natural or artificial; the former comprising day and sunlight, and the latter a good moderator lamp or an argand gas-lamp, with a plated mirror at the back of the cylindrical glass chimney. In sunlight the patient has his back to the window, and the rays being received in the reflector are thence conveyed to the laryngeal mirror. But, as a rule, artificial light is the best; and the mode of proceeding as follows: The patient is to sit erect, with the lamp near his left elbow. His mouth ought to be on a level with the nose or eyes of the operator, the flame of the lamp being on a line with the operator's eyes. The position being rendered comfortable, the patient is to protrude his tongue, and with his handkerchief to firmly hold it outwards and downwards; at the same time opening his mouth as wide as possible, and reclining the head a little upwards. The proper focal distance being ascertained by movements of the head forwards, the operator introduces the warmed laryngeal mirror with the right hand, or with his left if he would keep the right free for applying remedies or instruments: gently placing the mirror against the middle of the soft palate and uvula, without touching the tongue or back of the pharynx. The handle of the mirror is to be well kept to the left side of the patient's mouth out of the light, the patient breathing quietly as usual. The back of the tongue with its large follicles first comes into view; then the hollow space between it and the anterior or glossal sur-

* On Paralysis, Neuralgia, and other Affections of the Nervous System, &c Third Edition, p. 154. London, 1864.

† On Diseases of the Throat and Windpipe, as reflected by the Laryngoscope, &c Second Edition, p. 445 to 456. London, 1864.

face of the epiglottis; next the apex and laryngeal surface of the epiglottis; and then the interior of the larynx, in which is seen an extremely movable antero-posterior fissure, bounded by two brilliant pearly borders, that palpitate with surprising rapidity. This last is the glottis; being formed by the inferior thyro-arytenoid ligaments or true vocal cords, in contradistinction to the false cords, which are above the glottis and are formed by the superior thyro-arytenoid ligaments or muscles. Beyond the glottis the trachea is seen, the rings of which are distinctly visible far down, even to the bifurcation, during deep inspiration. In cases where the throat is irritable an astringent or soothing gargle must be used for a day or two before making the laryngoscopic investigation; while in very sensitive subjects, about eight grains of the bromide of ammonium may also be administered thrice daily, since this agent seems to deaden the sensibility of the mucous membrane. My own throat is so sensitive that I have only once been able to practise autolaryngoscopy, and this was after taking the iodide of potassium for some days. But usually the first-named salt is preferable to the latter.

In connection with this subject it only remains to notice that for the cure of inflammation and ulceration about the cords the best application (by means of a curved brush) is that recommended by Dr. Gibb; viz., from forty to eighty grains of the crystals of nitrate of silver to the ounce of distilled water. Scarificators are employed for œdema of the glottis, curved forceps for the extraction of foreign bodies, and the wire écraseur for the removal of polypi or other growths.

Disease of the brain is by no means an uncommon cause of aphonia. Thus apoplexy, softening, morbid growths, or serous effusion may produce paralysis of the muscles of the larynx; on the normal action of which muscles, the tension and position of the vocal cords depend. There is also, as Dr. Todd taught, a peculiar class of cases of epileptic hemiplegia in which the exciting cause of the epileptic seizure at the same time greatly injures voluntary power and speech. Two or three years ago, I saw, at Millbank a prisoner who was completely dumb, and had been so for some months, in consequence (as he believed) of a blow on the back part of the head from a policeman's truncheon. By some practitioners, this man had been deemed a malingerer; though I felt convinced from his general appearance and symptoms that the suspicion was unjust. To remove all doubt, however, he was put carefully but fully under the influence of chloroform; in the conviction that as the anæsthetic effect passed off he would betray himself, if the aphonia were feigned, before perfect consciousness returned. But though he evidently strived to talk, he merely uttered a few guttural sounds, something like those produced by a deaf mute when excited. The laryngoscope was not then in daily use as it is now, or doubtless paralysis of the vocal cords might have been detected.

IV. DIPHTHERIA.

Diphtheria (*Διφθέρα*, a skin or membrane) may be defined as an epidemic sore-throat of great severity, due to toxæmia; being attended with much prostration, and characterized by the exudation of false

membranes on the tonsils and adjacent parts. When it does not end fatally, it is often followed by an alteration in the voice, partial paralysis of the muscles of deglutition, weakness of the upper extremities, anæmia, and impaired vision.

From the writings of old physicians it appears certain that this disease prevailed extensively at different times in the sixteenth, seventeenth, and eighteenth centuries. In France an epidemic broke out in 1818, which was described by Bretonneau, under the name of Diphthérite, in Mémoires communicated to the Académie Royale de Médecine in 1821. About the same time also, some cases seem to have occurred in Scotland, and a few in England; but English physicians paid only slight attention to the subject until the outbreak of the epidemic at Boulogne, in January, 1855. In this country the first cases of the last epidemic were observed in the middle of the year 1856; and it has continued more or less prevalent in different parts of England up to the present time.

Prior to the outbreak of diphtheria in any locality, throat affections have often been noticed to be unusually prevalent.

Pathology.—Diphtheria is a specific blood-disease, which runs a rapid course. Its anatomical character is a spreading inflammation of the fauces, œsophagus, and respiratory tract, with the exudation of lymph. In some instances—nasal diphtheria—the mucous membrane of the nasal fossæ is alone affected; recovery or death occurring before the morbid action has extended through the posterior nares to the pharynx. The lymphatic glands of the neck often become swollen and tender, especially in strumous subjects. Where the cases recover, some remarkable nervous affections are apt to supervene; consisting of impaired or perverted sensibility, with progressive paralysis of the muscles of the tongue, fauces, pharynx, neck, trunk and extremities. These secondary nerve-affections occur after mild as well as after severe attacks; while generally a few days of convalescence intervene between the two series of phenomena. During the year 1860 there occurred 210 cases of diphtheria at the Paris Hôpital des Enfans, and paralytic symptoms followed in 31 of them. The proportion was really greater; inasmuch as several of the children were removed from the hospital prior to the time at which consecutive paralysis is usually developed, while others died before this period arrived. M. Roger believes that the ratio generally may be considered as one in three or four. These secondary paralyses are as rare in the other acute diseases of children as they are common in diphtheria. Thus, in the same year and place, among 61 cases of angina simplex, 12 of typhoid fever, 33 of rubeola, 12 of scarlatina, 4 of variola, and 24 of pneumonia, not an instance of secondary paralysis occurred; and the like negative results were observed in M. Blache's wards.

Diphtheria and scarlatina sometimes occur as epidemics in the same district, while occasionally they coexist in one individual. Hence some have thought that diphtheria was only scarlatina without any eruption; and they have pointed to the facts that in modified scarlet fever there is now and then an exudation slightly resembling the diphtheritic membrane, while albuminuria sometimes is present in both diseases. Further investigation shows, however, that these affections are distinct from each other, though there may be some analogy between

them. Thus, an attack of the exanthematous fever, while it confers immunity to a second assault, does not afford any protection against diphtheria; a person may suffer from the latter more than once, the last seizure being as violent as the first, while moreover relapses are not very uncommon; and the larynx is often affected in diphtheria, never in scarlet fever. Furthermore, albuminuria occurs only during convalescence from scarlet fever, while when it takes place in the epidermic sore throat, it may be found on the first or second day of the disease; and then, lastly, there is a marked difference in the sequelæ of the two affections.

Diphtheritic affections sometimes appear sporadically; they often seem to be endemic, while they are also epidemic and contagious. Bretonneau asserts, from the consideration of innumerable facts, that those who attend patients with diphtheria cannot contract it, unless the diphtheritic secretion, in the liquid or pulverulent state, is placed in contact with a mucous membrane, or a part of the skin denuded of epidermis. Diphtheria attacks both sexes, at all ages, though children seem to be especially obnoxious to it; it is probably most fatal to the poor, or such as reside in damp situations and in badly drained houses; while spring and autumn appear to be the seasons when its ravages are greatest.

Symptoms.—Diphtheria sets in very gradually, with feelings of depression and muscular debility, headache, nausea, slight diarrhœa, chilliness, and drowsiness; while before the throat is actually sore a sense of stiffness in the neck is complained of. Then the tonsils become inflamed and swollen, and the glands about the angles of the lower jaw get tender; while, as the inflammatory action proceeds, it involves the velum, uvula, posterior part of the pharynx, &c., and perhaps causes painful or difficult deglutition. With regard to the small word "perhaps" just employed, it is meant that the amount of pain in the throat affords no criterion as to the extent of the disease; for in most instances there is less general discomfort and suffering than in simple acute tonsillitis, while in many of the fatal cases there has been little more than a feeling of uneasiness.

It is probable that at this stage resolution of the inflammation may in some instances take place, and the patient be soon restored to health; but more commonly the characteristic feature of the disease now becomes manifested, and a plastic fibrinous material is effused. This exudation commences in the nasal fossæ, or on the soft palate, or on one tonsil, or on the back of the pharynx, in the form of small ash-colored specks; these spots by their enlargement and coalescence forming patches of considerable size. As the disease spreads, the false membrane increases in thickness and in extent; it usually becomes firmly attached to the mucous tissue beneath; and if it be forcibly removed a new patch will be found at the end of a few hours. But if the exudation be cast off naturally, then either no new false membrane is formed, or only one which is much more filmy than the first. The exudation has been compared to wet parchment, or to damp dirty wash-leather. It may spread forwards to the cheek and gums, upwards into the nares, downwards into the œsophagus, and even through the glottis into the larynx and trachea; and when it begins to separate and decompose, the patient's breath is rendered most offensive. Probably, the browner or blacker the color of the pellicle and the more dense its texture, the

greater is the danger. As the lymphy deposit is cast off, we may have ulceration, sloughing, or gangrene of the mucous coat; or this tissue may gradually assume a healthy appearance. And, lastly, true diphtheritic membranes may form on abraded cutaneous surfaces, on the conjunctiva, on the vaginal mucous coat, or on the lining membrane of the rectum; giving rise to a general morbid state very likely to be misinterpreted, unless the possibility of this occurrence be remembered.

The general symptoms may be rather slight, especially at first, in comparison with the severe local effects. But in most instances the prostration is extreme, and often there is considerable restlessness. Pain may be almost wanting. There is only moderate pyrexia, though the skin may be dry and harsh; the pulse is neither sharp nor hard, but increases in rapidity as the depression becomes greater; while the tongue is clean or only slightly furred, the tonsils are much swollen, the saliva perhaps dribbles from the mouth, the breath is fetid, and there is a disinclination to move even to take drink or food. Then there may be great dysphagia, or the throat will even be much affected without any difficulty in swallowing; there are frequently attacks of hemorrhage from the nose, fauces, or bronchi; sometimes there is purpura, now and then an erythematous rash, once in a way typhoid-looking rose spots, and occasionally sudamina; while in a few instances there is found, from an early stage, albuminuria with fibrinous casts of the tubes.—Death may happen from hemorrhage, gangrene, slow exhaustion, or from asphyxia—when the larynx and trachea are affected; the mental powers generally retaining their full vigor till the last. There have been many instances where a fatal termination has taken place very suddenly; and, as I believe, from the deposition of fibrin within the heart or in one of the large vessels, and not from syncope, as has commonly been stated.

In cases of recovery, the convalescence is often very slow. There may be anæmia for many weeks; the voice is left impaired, owing to paralysis of the soft palate; sometimes the power of deglutition is not thoroughly regained for several months, the difficulty of swallowing liquids especially remaining; while the muscles of the neck are not unfrequently paralyzed, so that the head cannot be properly supported, or the muscles of the arm may be powerless, or there may be paraplegia, or very rarely there is hemiplegia. Defective vision is occasionally complained of owing to loss of adjusting power, a condition which is to be remedied by the use of a low convex glass; and I have seen more than once intense neuralgia as a sequela of diphtheria.

If the diphtheritic exudation be examined microscopically, it will be found to consist of molecular particles, epithelium, pus-cells, and blood-corpuscles. Fibrillæ are but very rarely seen. The oïdium albicans may occasionally be detected; but the occurrence of this fungus is only exceptional, and when the membrane has begun to undergo an acid putrefaction. So also the leptothrix buccalis may be discovered, but it is also often found in the buccal mucus of healthy persons.

Prognosis.—In all cases this is a very grave disease. Death may occur, even within thirty-six hours, from the intensity of the general disorder; or at a later period, from the severity of its local effects, or from the occurrence of some complication. A patient will apparently be doing well at the end of five or six days from the onset, the pulse

will be moderately good, yet in a few hours the exudative inflammation may extend to the larynx, and rapidly cause asphyxia. If this danger be escaped, there is the fear of thrombosis, of uræmia, or of fatal exhaustion. Ichorhæmia has also occurred, from the absorption of sanious matter produced by the putrid sloughs. Generally speaking, the following symptoms are especially alarming:—albuminuria, suppression of urine, epistaxis, a very rapid pulse, a very slow pulse, delirium, somnolence, and dyspnœa.

The duration of diphtheria may be stated as commonly from three to twelve or fourteen days. For the number of deaths registered as due to this disease in the five years 1858–62, see p. 174.

Treatment.—Every one who has witnessed much of diphtheria must feel that remedies of a supporting kind are those which alone seem likely to be useful. There is no specific for this disease; and all that we can attempt is to guide the patient safely through it.

With regard to *local treatment*, it must be said that external applications to the throat are injurious or useless; leeches and blisters being only powerful for mischief, while fomentations or poultices fail to give any relief. If the case be seen within a few hours of the commencement of the symptoms, relief may be afforded by allowing the inhalation of acid vapor (two or three ounces of vinegar to the pint of boiling water). Then as the peculiar pellicle begins to show itself, we shall perhaps do good by painting the fauces gently with the tincture of the perichloride of iron, or with turpentine; or we can employ a gargle of one or two drachms of the tincture of perchloride of iron with seven of sweetened water, or one of the permanganate of potash (from one to two drachms of the officinal solution to eight ounces of water). Dr. Greenhow has very properly remonstrated against the severe topical applications which have been resorted to. "I am sure much mischief has been produced by its indiscriminate use, especially by the frequent tearing away of the exudation by probangs, or similar contrivances for the application of nitrate of silver, or of strong caustic solutions. Observing that removal of the exudation, and the application of remedies to the subjacent surface, neither shortened the duration nor sensibly modified the progress of the complaint, but that the false membrane rarely failed to be renewed in a few hours, I very soon discontinued this rough local medication to the tender and already enfeebled mucous membrane."*

As to the *general remedies*, I believe that when the patient is seen early it may be advantageous to give an emetic of ipecacuan and ammonia (F. 233); following up its action by a free allowance of some alkaline drink (F. 356, 360). But if the patient be depressed, if there be the least symptom of hemorrhage, or if the urine contain any albumen, I at once order the tincture of the perchloride of iron, as was first recommended by Dr. Heslop, of Birmingham; and very frequently it has seemed advantageous to combine it with quinine (F. 380). Where the formation of fibrinous clots is feared, ammonia and bark (F. 371), with or without opium, ought to be prescribed in the place of the steel. Dr. Wade, of Birmingham, strongly recommends iodide of potassium, believing that it eliminates the poison from the system; with which object he gives two, three, or four grains, with five or ten grains of chlorate of

* On Diphtheria. By Edward H. Greenhow, M.D., &c., p. 263. London, 1860.

potash, every two or three hours. Whatever medicine be selected, however, only limited confidence is to be placed on its effects. Simultaneously, strong beef-tea is to be systematically given, port wine should be administered, and a raw egg in milk or brandy-and-water is to be ordered twice or thrice in the twenty-four hours. Sometimes iced champagne proves very grateful to the patient's feelings, frequently a good draught of bitter ale, ofttimes simple spring water, or not rarely a tumblerful of milk; either of these drinks being beneficial, if wished for. Considerable benefit often arises from constantly sucking small pieces of ice; in the same way that pure water is valuable as a diluent, especially by greatly increasing the action of the kidneys. Moreover, the use of ice is valuable in allaying vomiting, when the stomach is irritable; its power in this respect being aided by the application of sinapisms to the epigastrium. When great depression sets in, brandy in often-repeated doses must be trusted to; and in such instances I think it better not to give any other stimulant.

In all cases the patient is to be kept in bed, and it frequently seems advantageous to have him clothed in flannel. The air of the apartment should be warm (70° F.) and moist; the latter being effected by keeping a pot of boiling water on the fire, through the lid of which a long curved tube has been fixed so as to project a few inches above the mantelpiece.

Many physicians begin the treatment of every case with an aperient, but I have seen no advantage from this practice. Of course the bowels may be acted upon, if necessary; but I always prefer a mild cathartic like castor oil, to an active dose of calomel and jalap.—If the secretion of urine be scanty, large linseed-meal poultices ought to be applied over the loins, changing them every two hours.—Where the exudation is obstructing the larynx, tracheotomy may prevent suffocation and save life.* Or, if the attacks of dyspnœa are only paroxysmal, with somewhat long intervals between them, the repeated inhalation of chloroform will prove most serviceable to the weary sufferer, and may render an operation unnecessary.—When there is great difficulty in swallowing, we must trust to enemata containing essence of beef, cream, port wine, quinine, and the tincture of the perchloride of iron; repeating the clyster every four or six hours, according to the rapidity with which absorption takes place.

As soon as convalescence is safely established, nothing does so much good as change of air; while any paralytic symptoms will be best treated by a generous diet and cod-liver oil, a good deal of rest, quinine and ferruginous tonics, small doses of strychnia or nux vomica, and local Faradization.

* A most unequivocal example of the value of this operation is related by Dr. Jenner: "There is not a shadow of a doubt on my mind that he (Dr. C.) would have been dead in two minutes, had his larynx not been opened at the moment it was by Mr. Quain. I never saw any one so manifestly brought back from the threshold of death. His complexion had that bluish pallor that precedes immediate dissolution. My hand was on his wrist. I felt his pulse failing under my finger, until at last it was imperceptible. His eyes closed, and his diaphragm was making those convulsive contractions which indicate that respiration is about to cease, when the knife entered the larynx, and the air was drawn by what really seemed the last effort of the diaphragm into the lungs. The natural hue of his face returned; his pulse was again perceptible; his eyes opened; consciousness was restored; and the patient was alive again. He finally recovered."—Diphtheria: its Symptoms and Treatment, p. 75. London, 1861.

V. CROUP.

Croup (*trachealia*, *tracheitis*, or *cynanche* trachealis*) may be defined as an inflammatory disease of the trachea, or often of the glottis, larynx, and trachea; the fever and inflammation being accompanied by the exudation of false membranes upon the affected surface.

Croup is a disease of early life; most cases of it occurring during the second year of childhood. Some families seem more predisposed to it than others. It is often complicated with bronchitis or pneumonia. It may end fatally from exhaustion, suffocation, convulsions, or the formation of a clot in the heart.

Symptoms.—In the incipient stage they are those of a cold—slight fever, cough, hoarseness, drowsiness, suffusion of the eyes, and running at the nose. In about twelve or eighteen hours the respiration becomes of a wheezing character, the fits of hoarse coughing are more numerous, and there is occasional spasmodic action of the laryngeal muscles. Then the peculiar signs of croup begin to show themselves, commencing with an alteration in the character of the cough, which becomes attended with a peculiar ringing sound, rendering it "brassy;" this cough being also followed in a few hours by a still greater change in the respiration. The act of inspiration becomes prolonged, and attended with a characteristic crowing or piping noise, readily recognized when once it has been heard. If now the fauces be examined, the tonsils will be found enlarged, and of a red color, but less intense than in tonsillitis; the uvula also is sometimes slightly swollen. As the disease advances, the fever increases, the breathing becomes more hurried and impeded, the cough more frequent; the pulse gets very weak and irregular, and the vital power much depressed; there is great thirst, and the child is very irritable and restless; while with features expressive of alarm and distress, he grasps at his neck, or thrusts his fingers into his mouth, as if to remove the cause of his sufferings. Exacerbations always take place at night, with remissions towards the morning. Should there now be a tendency towards a restoration to health, the cough will lose its peculiar clang, and become moist, whilst the crowing inspirations will almost cease. On the other hand, when the disease is about to end fatally, the drowsiness soon becomes extreme, though the sleep is uneasy; the child starts and wakes in terror; the breathing gets gasping and interrupted, and suffocation seems more imminent; the skin turns cold and is covered with clammy sweats; while the child often dies directly after an inspiration, or coma and convulsions ensue, and close the scene.

Sometimes this disease runs a very rapid course; though usually its duration ranges from four to ten days. Professor Gölis, of Vienna, relates the case of a healthy little boy, aged four years, who going into the open air on an extremely cold day was attacked with croup, which proved fatal in fourteen hours.

Diagnosis.—The history of the attack, the hoarseness or loss of voice, the dry ringing cough, the croupal inspirations, and the fever, distinguish this disease from every other. It can indeed only be confounded with true laryngitis: but this latter affection occurs in adults, very

* From Κύων, a dog; ἄγχω, to strangle; because dogs were supposed to be especially liable to sore-throat.

rarely in children except as associated with croup; it causes a fixed burning pain in the larynx, increased by any examination; it does not give rise to the exudation of false membranes; and—if prolonged—it ends in suppuration or ulceration. The diagnosis between croup and laryngismus stridulus is not at all difficult; for in the latter there is an absence of fever and of the peculiar cough, while during the intermissions the patient is apparently well.

Pathology.—Supposing death to have occurred about the fourth day of the disease, we shall find the mucous lining of the windpipe covered with a layer of false membrane. This layer will be thin, or some lines in thickness; so diffluent that it may be wiped off, or so consistent that it can only be removed as a cylindrical cast of the air-tube; either firmly or loosely adherent; and limited to the walls of the larynx, or extending from the glottis down to the minute bronchi.

The inflammation has its seat in the mucous membrane; the vessels of this tissue exuding the albuminous or fibrinous material which by concretion forms a false membrane. The breathing is obstructed not only by this croupal production, but also by spasmodic contractions of the muscles of the larynx, diminishing the calibre of the air-tube; while the irritation produced by partially detached fragments may produce even fatal spasm.

The mortality from croup is very great, for probably at least half of the children attacked die. If we take twelve cases of death from various diseases during childhood, we shall find that about one is owing to croup. In a large number of the fatal cases death seems to take place from asphyxia; while in some instances it certainly appears due to a deposit of fibrin in the heart. After death from acute croup, Dr. Richardson has more than once found the cavity of the right auricle filled with a fibrinous concretion; which must have been formed during life, as the masses of fibrin were grooved by the currents of blood passing over them from the inferior and superior venæ cava. In such cases death begins at the heart; the dyspnœa being caused by the want of blood in the pulmonic capillaries. The lips are slightly blue, the body pale, and the pulse irregular; while the heart-beats are feeble and quick and irregular, the sounds muffled, and sometimes there will be a bruit. The respiratory murmur is everywhere audible; and frequently there are signs of emphysema.

When death in croup is going to happen from suffocation, auscultation and percussion give evidence of the existence of congestion of the lungs, but never of emphysema; while the body is of a dark hue, there are convulsive muscular movements, the heart-sounds are clear, and the pulse is feeble.

Treatment.—In no disease, perhaps, is it more necessary to be prompt and cautious. Bleeding, tartar emetic, and mercury are the measures on which we are usually taught to rely; but I cannot help thinking that the treatment is unsound, since we find that however early and perseveringly applied, yet the disorder proves fatal in half the cases. Would it not be better, then, to try the effects of a different and perhaps milder plan? For the reasons already stated, I should not advise the abstraction of blood, nor would I recommend large doses of tartar emetic or mercury. Blisters never have any other than an injurious effect.

In all cases the patient must be confined to bed, and should be clothed in flannel. The air of the room is to be kept warm and moist, as recommended in the remarks on Diphtheria. When the disease is seen early, the continuous application of very hot fomentations to the throat will do great good. But if much benefit be not quickly apparent, emetics (F. 231 or 232) must also be administered; while when the heat of the body is above the normal standard—as ascertained by the thermometer—a warm bath will lessen it (F. 137). Thus it is clear that a patient having a temperature of 104° or 105° Fahr. must part rapidly with some of this heat if placed in water warmed only to 96° Fahr.; unless indeed, as fast as the heat is given off it be regenerated.

Supposing that the disease advances notwithstanding these measures, I resort to the use of the iodide of potassium combined with assafœtida and senega (F. 31); from which it is believed that great benefit has resulted.

In order to prevent the formation of false membranes, it is said that mercurial inunction should be had recourse to from the commencement of the severe symptoms; thirty, or even sixty grains, of the unguentum hydrargyri being gently rubbed in every four or six hours. The practitioner must use his own judgment as to the employment of this agent. No harm can arise from calomel given at the onset as a purgative, in doses of two, three, or four grains; but I have no faith whatever in its power to control inflammation, and believe that its frequent administration is very injurious.—In the latter stages of the disease, it will be necessary to support the powers of life by beef-tea; and wine, or a few drops of aromatic spirits of ammonia, or of brandy, with water, should be frequently repeated. Ammonia and ether (F. 364) will often give strength, and act as a useful stimulant.—The inhalation of oxygen, from a gasometer charged with equal parts of common air and oxygen gas, has been recommended when asphyxia threatens; and certainly this remedy appears deserving of a trial, though no opportunity of testing its value has fallen in my way.

Can we do any good by tracheotomy? This is a question the consideration of which must force itself upon every one treating a case of croup. Looking at the pathology of the disease, remembering that the inflammation frequently extends into the bronchial tubes, that the serious dyspnœa for the most part arises from the albuminous exudation obstructing the trachea and bronchi, and that tracheotomy when performed in croup has a tendency to induce bronchitis or pneumonia,—remembering these points, there seems to be much less chance of a favorable issue than may be expected from the same proceeding in laryngitis. Granting this, it must still be remembered that making an opening into the trachea is sometimes the only proceeding that can be of any avail; while not only does it directly prolong life by the admission of air, but it affords time for the disease to run through its several stages. My former colleague Dr. Conway Evans says—"The operation of tracheotomy for the relief of croup has been many times performed in this country, and in at least *ten* cases with the most signal success; life having been saved when the patient had been literally almost at the last gasp."* Mr. Henry Smith is also a strong advocate for this opera-

* Edinburgh Medical Journal, vol. v, p. 416. November, 1859.

tion; and he tells me that when it fails to save life, it still affords great temporary relief. The truth of this observation will be apparent to every practitioner who may have had the opportunity of comparing the very painful death which results from gradual suffocation, with the easy sinking of fatal exhaustion.

To sum up these remarks, I would say, that if the predominant symptoms are those of asphyxia—if the air does not freely enter the lungs at each inspiration—tracheotomy is the remedy; this proceeding being resorted to as soon as the false membranes appear to be causing obstruction, instead of deferring it as a last resource. The operation should be performed slowly and deliberately; chloroform ought to be used; the external incision is to be large; and, as Dr. Evans suggests, before thrusting the scalpel into the trachea, this tube should be fixed and drawn forwards by means of a sharp hook inserted into it. In adults it is best to open the larynx by dividing the crico-thyroid membrane; but in children the larynx is too small to admit the tube, and therefore tracheotomy will have to be performed through the upper rings of the trachea. After the operation I am convinced that all medicines had better be abandoned; due nourishment and stimulants must be given; the air of the apartment is to be kept warm and moist; and the patient's neck should be lightly enveloped in a large piece of muslin, or in a thin fomentation flannel.

On the other hand, if the sufferer appears to be dying from syncope—from some obstruction about the heart—then tracheotomy will be useless; for there has probably been a deposition of fibrin in the right auricle or ventricle, and we can only trust to the administration of ammonia with other restoratives.

VI. LARYNGITIS.

Cynanche laryngea, or laryngitis, is not happily a very common disease: in the greater proportion of cases in which it has occurred, it has proved fatal. Cold and wet are commonly the exciting causes of the inflammation; and speaking generally, it may be said to be peculiar to adults.

The *symptoms* of acute inflammation of the larynx are often at first obscure, as the disease may make its approach in an insidious manner. At the end of some hours, however, they are these: Fever, redness of the fauces, pain referred to the pomum Adami, difficulty of breathing and of swallowing, considerable anxiety, with hoarseness or even complete loss of voice. There are frequent spasmodic exacerbations of these symptoms, causing distressing paroxysms of threatened suffocation. The inspirations are long, and attended with a peculiar wheezing sound, as if the air were drawn through a narrow reed. If there be any cough it is hoarse and brassy. The face becomes flushed, the eyes protruded, the lips swollen, the pulse hard; and unless relief be afforded, the distress gets greater and greater. The larynx and trachea move with excessive rapidity upwards and downwards, and all the muscles of respiration are brought into action, so that the chest heaves violently. The patient gasps for breath, and tries to get to the open window to obtain

more air. He soon sinks into a drowsy and delirious state; and then speedily dies suffocated, the chink of the rima glottidis becoming closed from the swelling of the mucous membrane lining it, or from the effusion of serum into the adjacent areolar tissue.

In many instances the act of swallowing is attended with so much suffering that nutrient enemata have to be employed, instead of giving food by the mouth. As in dysphagia from some other causes, liquids are swallowed with greater difficulty than solids.

The inflammation is often of very limited extent; the danger being entirely owing to its situation. To avert the peril our *treatment* must be promptly carried out. The patient is to be closely watched, kept very quiet, and not allowed to talk; while the air of his room is to be made warm and moist. He should frequently inhale the steam of simple boiling water, or of that which is medicated by hydrocyanic acid with a little spirit of chloroform (F. 262); and in the intervals of doing so, it will prove advantageous for him to wear a respirator. But directly it is evident that the remedies are not acting favorably, that the general distress is increasing, and that the blood is not being thoroughly oxygenated, the trachea must be opened. Mr. Porter* well remarks that tracheotomy allows the organ in which the diseased action is situated perfect repose; it removes the danger of the lungs becoming congested and engorged; it frees the patient from those terrible paroxysms of spasmodic suffocation; and in short it takes the place of all other treatment, which, besides being injurious from loss of time, *is often in itself positively detrimental.* He quotes, also, the opinion of Mr. Lawrence, that "bleeding, blistering, and the usual means for subduing inflammation, are here found totally inefficacious." Is it not then matter for regret that many still recommend the adoption of this antiphlogistic practice, and bid us persevere with it: the usual argument amounting to this, that because all the cases have not died under such a plan, therefore there is every ground for encouragement. Moreover, the administration of mercury proves equally unavailing in checking the inflammation or the effusion; unless indeed, the disease be dependent upon the poison of syphilis, in which case calomel with opium should be given, and mercurial vapor baths employed, so as rapidly to influence the system.—After opening the air-tube, the patient's strength will have to be supported by milk, beef-tea, and wine or brandy, if there be—as there usually is—much depression.

Œdema of the glottis will sometimes arise from other causes besides inflammation, and produce the same effects as laryngitis. It is often due to boiling water, or a strong mineral acid, or one of the alkalies, taken accidentally into the mouth; either of these corrosives producing sudden contraction of the muscles of the pharynx and larynx, whereby it is expelled through the nostrils and mouth to the great injury of all the tissues over which it passes. The case is different when a caustic poison is voluntarily swallowed, for the fluid then passes into the stomach without injuring the larynx. The poison of erysipelas may likewise give rise to œdema glottidis, the inflammation either having its onset in the fauces and larynx, or extending to these parts from the face. To

* Observations on the Surgical Pathology of the Larynx and Trachea, &c. &c. pp. 86, 143. London, 1837.

favor the subsidence of the tumefaction, we may (if the symptoms be not urgent) sponge the epiglottis and cavity of the larynx with a solution of the crystals of nitrate of silver, sixty grains to the ounce, as recommended by Dr. Horace Green. Scarifying the œdematous swelling, with the object of permitting the escape of the effused fluid, has been adopted with success. But these plans failing or appearing inapplicable, laryngotomy or tracheotomy becomes our only resource. Yet it is necessary before proposing the operation to be positive as to the diagnosis. For example, a patient in King's College Hospital, with renal disease and general anasarca, had considerable dyspnœa. Œdema of the glottis was thought to be the cause, and the necessity for tracheotomy was discussed. An examination with the laryngoscope demonstrated, however, that no such condition as was suspected, existed; while it proved that there was no disease in the larynx to account for the dyspnœa.

The larynx may also suffer from *chronic* disease. Thus chronic inflammation and ulceration are not uncommon in cases of pulmonary consumption; a species of tuberculosis being consequently known as *phthisis laryngea*. So, again, the membrane lining the laryngeal cartilages often becomes thickened and ulcerated in secondary syphilis. Polypi and water tumors (readily seen by the laryngoscope) may also arise from different parts of this tube, and cause great impediment to the entrance and exit of air.* They can generally be removed by the écraseur. Even in epithelial cancer seated about the vocal cords, the growth may be excised; for though it is almost certain to return, yet life will probably be prolonged for some months by the operation. And lastly, foreign bodies—as coins, beans, stones, &c.—are occasionally accidentally introduced into the windpipe. When sufficiently heavy they fall into one of the bronchi—usually the right—and give rise to all the symptoms of obstructed respiration; or they may become lodged at any part of the tube. Opening the larynx or trachea is generally the only remedy, so as to allow of the removal of the substance through the wound; or else to permit of the inversion of the body, without producing spasm, and thus facilitate the escape of the coin, bean, or whatever the article may be, through the glottis.

VII. LARYNGISMUS STRIDULUS.

Laryngismus stridulus (*Λαρυγγίζω*, to vociferate with all his might; *Strideo*, to make a hissing noise), infantile laryngismus, spurious croup, or child-crowing, is a spasmodic disease occurring in infants chiefly during the period of dentition. It consists of a temporary, partial, or complete closure of the rima glottidis, by which the entrance of air into the lungs is impeded or stopped.

Symptoms.—Infantile laryngismus is unattended by fever, almost its only symptom being the interruption of the breathing. The child is suddenly seized with dyspnœa, it struggles and kicks, is unable to inspire, and seems about to perish from suffocation. Presently the spasm

* Histoire des Polypes du Larynx. Par C. H. Ehrmann. Strasbourg, 1850.

gives way; air is drawn through the chink of the glottis with a shrill whistling or crowing sound, and the paroxysm is over; sometimes to return shortly, or in a few hours, or not perhaps for several days.

Pathology.—This affection was carefully investigated by Dr. Ley, who attributed it to pressure made by enlarged glands in the neck or chest upon the recurrent nerve, or upon some part of the eighth pair of nerves. The pressure subverts the exact antagonism by which the glottis is automatically and involuntarily kept open, and allows its margins to come together; thus occasioning the dyspnœa and peculiar kind of inspiration so much resembling that of croup. It was reserved for Dr. Marshall Hall, however, to give the immediate explanation of the phenomena of this disease, by showing that it is to be attributed to some source of irritation producing reflex spasm—to an excitation of the true spinal or excitomotory system. It *originates*, says Dr. Marshall Hall, in—

1. *a.* The *trifacial nerve* in teething.
   b. The *pneumogastric*, in over or improperly fed infants.
   c. The *spinal nerves*, in constipation, intestinal disorder or catharsis.

These *act* through the medium of—

2. The *spinal marrow*, and—
3. *a.* The *inferior* or *recurrent laryngeal*, the constrictor of the larynx.
   b. The *intercostals* and *diaphragmatic*, the motors of respiration.

Treatment.—During the paroxysm the treatment should be the same as that employed in resuscitating still-born children. Hot water to the lower parts of the body; cold affusion to the head and face; slapping the chest and nates; exposure to a current of cold air; the gentle inhalation of chloroform; and artificial respiration, if necessary, taking care to draw the tongue well forwards. The vapor of ether or ammonia can also be applied to the nostrils; while, as a last resource, tracheotomy may be performed.

The subsequent remedies must consist of mild purgatives, antispasmodic tonics, and, above all, change of air. Belladonna, commencing with one-sixth of a grain thrice daily, is sometimes useful; while its efficacy may be increased by combining the iodide of potassium or ammonium with it. The diet ought to be very simple; a child at the breast should not be otherwise fed. Many of the diseases of infants are caused by the silly obstinacy of some mothers, who are only happy when overloading the stomachs of their children.

VIII. DYSPHONIA CLERICORUM.

Dysphonia (Δυς, difficulty or pain; Φωνή, the voice) clericorum, or clergyman's sore throat, is frequently a nervous complaint; being unattended, at least in its early stages, by any organic lesion, but consisting rather of hyperæsthesia or irritability of the investing membrane of the fauces. Subsequently, however, a series of important morbid changes takes place. These are chiefly congestion, inflammation, or re-

laxation of the mucous membrane; enlargement of the tonsils; elongation of the uvula; with irritation, inflammation, morbid deposit, and ulceration of the mucous follicles about the isthmus faucium. Dr. Horace Green, of New York, has described this affection, when far advanced, as consisting of a diseased condition of the glandular follicles of the mucous membrane of the throat and wind-pipe; commencing usually in the mucous follicles of the isthmus of the fauces and of the upper portion of the pharyngeal membrane; and extending by continuity until the glandulæ of the epiglottis, larynx, and trachea are extensively involved in the morbid action. He calls it *follicular disease of the pharyngo-laryngeal membrane.*

Symptoms.—These consist of an uneasy sensation in the upper part of the throat, with continued inclination to swallow, as if there were some obstacle in the œsophagus which could be removed by deglutition. The patient also makes frequent attempts to clear the throat of phlegm by coughing, hawking, and spitting; he will point to the larynx, too, as being the seat of pain. At the same time the voice undergoes an alteration; there is loss of power, and hoarseness—sometimes complete aphonia—especially towards the evening. On examining the throat and fauces, we shall find these parts presenting an unhealthy, slightly raw, or granular appearance; the mucous follicles may be visible, sometimes filled with a yellowish substance; and a viscid muco-purulent secretion will be seen adhering to the palate as well as to the edge of the velum pendulum palati.

This sore throat either exists alone, or it may accompany or follow laryngitis, bronchitis, or phthisis. Clergymen, barristers, public speakers, actors, singers, &c., are most liable to it.

Treatment.—In its early stages, when merely a nervous affection, the treatment is resolved into the use of tonics, especially iron and quinine; cold shower-baths or sea-bathing; and temporary change of scene and occupation. When the disease is further advanced, a combination of internal with local remedies will be necessary. Iodide of potassium (F. 31), iodide of iron (F. 32), iodide or bromide of ammonium (F. 37, 38), small doses of corrosive sublimate (F. 27), phosphate of zinc (F. 414), strychnia and steel (F. 408), steel and chlorate of potash (F. 402), quinine with iron and arsenic (F. 381), phosphoric acid with nux vomica and bark (F. 376), and cod-liver oil (F. 389), will prove the most efficacious remedies.

The local treatment consists in the application of a solution of nitrate of silver (from forty to sixty grains of the crystals to the ounce of distilled water) to the diseased parts, and even to the interior of the larynx. This is effected by means of an angular brush, or of a whalebone probang about ten inches long, having a piece of fine sponge, the size of a pistol-bullet, attached to its extremity. The difficulty of introducing the sponge or probang between the lips of the glottis is greatly lessened by employing the laryngeal mirror; with which the instrument can be seen to enter the larynx. One of the methods of using the sponge is described somewhat thus by Dr. Hughes Bennett: The patient being seated in a chair and exposed to a good light, the practitioner stands on the right side and depresses the tongue with a spatula held in the left hand. Holding the probang with the sponge saturated with the solution in the right hand, this instrument ought to

be passed carefully over the upper surface of the spatula exactly in the median plane, until it is above, or immediately behind the epiglottis. The patient should now be told to inspire; and as he does so, the tongue must be dragged slightly forwards with the spatula, and the probang thrust downwards and forwards by a movement which causes the right arm to be elevated, and the hand to be brought almost in contact with the patient's face. The operation of course requires dexterity, since the rima glottidis is narrow, and unless the sponge comes fairly down upon it, the aperture is readily missed. The passage of the sponge into the proper channel may be determined by the sensation of overcoming a constriction, which is experienced when it is momentarily embraced by the rima, as well as by the spasm and harsh expiration that it occasions.* When recourse is had to the laryngoscope, the patient draws his tongue forwards and holds it tightly. Then, the operator taking the mirror fixed in its handle with his left hand, introduces the sponge with his right, guiding it by the aid of the reflected image. (See p. 356.)—The application, however made, will be required about every other day for two or three weeks.

If it be thought preferable to disperse a minutely-divided and misty spray of some medicated solution over the diseased surfaces, recourse may be had to Mr. Tompson's very ingenious Hydro-Pneumatic Inhaler. This instrument consists of a bellows, a glass cylinder or flask traversed by sixteen capillary tubes, an adjusting apparatus, and a nozzle furnished with a screw-cap for the inclosure of a plate of fine silver-wire gauze. Charging the instrument is effected by unscrewing the union-joint of the nozzle, and pouring into the flask from half a drachm to a drachm of the required fluid; which usually consists of forty grains of nitrate of silver, in an ounce of distilled water. The patient may take from one to six inhalations, according to circumstances, two or three times a week.

To prevent a recurrence of this disease the throat should be properly covered; no protection being more efficient than that which nature has provided. Hence the beard ought to be allowed to grow. Moreover, every working man requires one day's rest in seven. The conscientious clergyman, whose duties are as toilsome as those of the mechanic or day-laborer, should make a rule of taking a thorough holiday on every Monday. In obstinate cases, a winter at the Undercliff (F. 434), or at Torquay (F. 436), at Pau (F. 443), at Malaga (F. 445), or at Algiers (F. 451), may be strongly recommended.

When the tonsils remain enlarged and indurated—as they often do after this form of sore throat, as well as after tonsillitis—various astringent gargles and inhalations, preparations of iodine, and the solid nitrate of silver have been long employed. Nevertheless, not unfrequently permanent and effectual relief will only be obtained by the excision of one or both of these glands. Mr. Harvey has condemned this

* The mistake of trusting to these sensations is well illustrated in the Report of the Commission of the New York Academy of Medicine, appointed to inquire into this subject: "We witnessed in cases 11 and 21 the fallacy of Dr. Horace Green's opinion as to the success of his experiment, though based on so large an experience. In both instances, whilst positive that he had successfully passed the instrument (an elastic tube) into the trachea, *the patient vomited through the tube*, and thus demonstrated his error." This of course happened before the laryngoscope had come into vogue.

practice, and has stated that removal of the tonsils interferes with the development of the genital organs. I have seen, however, so much benefit from the operation, without any bad results, that I cannot but doubt the correctness of Mr. Harvey's views.

IX. BRONCHITIS.

Inflammation of the mucous membrane of the bronchial tubes is one of the most common of the pulmonary diseases which come under the notice of the practitioner. Bronchitis (*Βρόγχος*, the windpipe; terminal *-itis*) may be acute or chronic; and one or both lungs may be affected throughout, or only a portion of these organs—usually the upper lobes.

Hay-asthma will also be included in this section, as its prominent symptoms are often of a bronchial character.

The fatality of bronchitis in England is very great. The deaths registered from it, as compared with those due to phthisis and pneumonia, are as follows:

	1858.	1859.	1860.	1861.	1862.
Bronchitis, . . .	29,093	25,998	32,347	30,986	32,526
Pneumonia, . . .	26,486	24,514	25,264	22,914	23,713
Phthisis, ...	50,442	50,149	51,024	51,931	50,962

For the estimated population in these years, as well as for the total number of deaths from all causes, reference should be made to p. 174.

1. Acute Bronchitis.—This is a dangerous disorder, more especially on account of the frequency with which the inflammatory action spreads to the vesicular texture of the lungs.

Symptoms.—The chief symptoms consist of fever, a sense of tightness or constriction about the chest, hurried respiration with wheezing, severe cough, and expectoration—at first of a viscid glairy mucus—which subsequently becomes purulent. The pulse is frequent and often weak; the tongue foul; and there is headache, lassitude, sickness, and great anxiety.

Inflammation of the larger and medium-sized tubes is attended by less severe symptoms, and is much less destructive to life than *general and capillary bronchitis*, in which all the ramifications of the bronchi are affected. This latter form of the disease is chiefly seen in the very young and old, being rare in adults: while it is readily recognized by its tendency to produce asphyxia; by the paroxysmal attacks of dyspnœa (*Δυς*, difficulty; *πνέω*, to breathe), or of orthopnœa (*Ὀρθὸς*, erect; *πνέω*); as well as by the congestion of the surface of the body, the perpetual cough, and the extreme general restlessness. The patient is obliged to sit up in bed; the urine is scanty, deep-colored, of high specific gravity, and sometimes contains a little albumen; the pulse is regular but feeble, and from 120 to 150; the prostration rapidly increases, and we may have anasarca of the feet and legs; while in fatal cases there will soon be somnolence, muttering delirium, coma, and death.

It sometimes happens, during the progress of a case of bronchitis,

that one or more of the tubes becomes choked up with the viscid phlegm; and we have, as the result, *pulmonary collapse*, a portion of the lung being emptied of air. Thus, supposing a plug to form in one of the bronchi, the lung beyond it in expiration soon forces out the air by the side of the foreign body; but each inspiration draws the obnoxious substance towards a narrower part of the tube, which it seems effectually to cork up. The consequence is, that the collapsed portion of the pulmonary tissue becomes condensed; this condensation having been formerly considered as due to inflammation, whence it was termed *lobular pneumonia*. One frequent result of the collapse is the production of vesicular emphysema; so that the loss of function in the airless part of the lung is compensated for by an increase of volume in the non-obstructed portion.

On practising *auscultation* in the early stage of acute bronchitis, two *dry* sounds will generally be heard—viz., *rhonchus* and *sibilus;* both of which indicate that the air-tubes are partially narrowed—that the mucous membrane lining them is indeed dry and tumid. Rhonchus in itself need give us no anxiety, as it belongs entirely to the larger divisions of the bronchial tubes; sibilus, on the contrary, bespeaks more danger, since it denotes that the smaller air-tubes and vesicles are affected. After a time, the inflamed mucous membrane begins to pour out fluid—a viscid, transparent, tenacious mucus is inhaled; this constituting the second stage of the inflammation. Two very different sounds to those just noticed are then to be detected—viz., *large crepitation* and *small crepitation*—often called the *moist* sounds. As the air passes through the bronchial tubes it gets mixed, as it were, with the mucous secretion, so that numerous air-bubbles keep forming and bursting. When this occurs in the larger branches, it gives rise to large crepitation; when in the smaller, to small crepitation. We have, therefore, rhonchus and large crepitation as, respectively, the dry and moist sounds of the larger air-passages; sibilus and small crepitation as those of the smaller branches. On practising *percussion*, no appreciable alteration in the resonance of the chest will usually be discoverable; bronchitis in this respect offering a marked difference to the dulness which is present in pneumonia. If the lungs, however, are acutely emphysematous, there will be increased resonance; while if there be collapse of a large portion of the pulmonary tissue from the obstruction produced by pressure of an enlarged bronchial gland upon a tube, or from the choking-up of the latter with inspissated mucus, the percussion-note will be dull.

Prognosis.—Where relief is not afforded by the copious expectoration, or by remedies, the disease assumes a very dangerous character. The strength becomes much reduced, signs of great pulmonary congestion ensue, and symptoms of partial asphyxia often follow, soon ending in death. In favorable cases, however, the affection begins to decline between the fourth and eighth day, and shortly either entirely subsides, or passes into the chronic form. From one-half to three-fourths of those attacked with capillary bronchitis die between the sixth and tenth days of the disease.

Treatment.—The patient is to be confined to his bed. The temperature of the room may vary from 65° F. to 70°; and it is usually beneficial to have the air moist, as recommended when speaking of diphtheria. Beef-tea, milk, arrowroot or gruel, tea with milk, and a mucilaginous

drink (F. 19) ought to be allowed; while if there be indications of debility, white-wine whey (F. 10) will prove a good restorative. An agreeable demulcent drink may also be made with sarsaparilla, squills, and barley-water (F. 238).

Then, after a brisk purgative, a saline mixture containing ipecacuan or squills (F. 348); or, if there be any depression, a stimulating expectorant (F. 235) must be ordered. Gentle counter-irritation to the front of the chest, by dry-cupping, turpentine stupes, or sinapisms, will also prove valuable. Should the phlegm appear to accumulate in the bronchial tubes, an emetic (F. 231) will readily remove it. When Physician to the Farringdon Dispensary, where the patients were very poor, I was in the constant habit of successfully treating acute bronchitis from the commencement with stimulating expectorants (ammonia, squills, and senega being the chief ingredients in the prescription), good beef-tea, the inhalation of the steam of hot water, and counter-irritation by means of rubefacient liniments or turpentine stupes. Opium, cautiously given, often does much good; though it is not to be employed if there be any indications that the blood is insufficiently aerated—if the complexion be dusky or bluish.

2. Chronic Bronchitis.—Chronic inflammation of the bronchial tubes is very common in advanced life. The slighter forms are indicated only by habitual cough, some shortness of breath, and copious expectoration; these symptoms being always aggravated by exposure to cold and wet, or by bad living. The physical signs of chronic bronchitis are, chiefly, slightly impaired resonance on percussion, especially low down posteriorly; while the vesicular murmur is feebly heard, and is mingled with rhonchus and sibilus and moist crepitation. The majority of cases of "winter cough" in old people are examples of bronchial inflammation of a low lingering kind. It may arise idiopathically, or it may follow an acute attack. Dilatation of the bronchi, with condensation of the surrounding lung-tissue, occasionally results from it; and may keep up excessive and fetid muco-purulent secretion—bronchorrhœa. Chronic bronchitis is seldom fatal in itself; but it is often the indirect cause of death by leading to other diseases.

There is a peculiar and severe form of this disorder, occurring in aged people, which deserves notice. It has been described as *peripneumonia notha* (bastard peripneumony), or *catarrhus senilis*, or *subacute bronchitis;* and it really consists of a subacute attack of general or capillary inflammation of the tubes. In these cases there is often only the appearance of a violent catarrh, with more or less severe dyspnœa, and an excessive secretion of opaque frothy mucus loaded with pus-cells and columnar epithelium (visible with a $\frac{1}{4}$-inch object-glass). The symptoms are frequently much relieved by remedies which cause a free and copious expectoration. In other instances, however, the feverish and catarrhal phenomena are at first very moderate, and apparently unimportant. But after a few days these symptoms suddenly become considerable: there is the orthopnœa and tendency to asphyxia already noticed; we find a rapid pulse with hurried respiration; great prostration soon sets in; and a fatal event occurs so quickly, that it is probably unexpected. Capillary bronchitis sometimes proves fatal by the accumulated mucus, which the patient has not the power to expel, causing

suffocation; while in other instances deficient oxygenation of the blood leads to coma.

Plastic bronchitis is a rare form of bronchial disease, characterized by the formation of solid or tubular concretions of exudation-matter within the bronchial tubes. It is a disorder which runs its course very slowly. The chief symptom is the occasional expectoration of casts of the tubes; very little suffering being caused by the bringing up of small fragments, while the expectoration of moulds of notable size is usually preceded by dyspnœa, dry cough, and not unfrequently by hæmoptysis. Sometimes the hæmoptysis is the first symptom, the concretions being detached, but not expelled, from the bronchi. While, again, in other instances there may be slight aneurismal or some other form of hemorrhage into the tubes, the casts consisting of decolorized coagulated blood. Cases of plastic bronchitis not uncommonly last for years; the patient having acute seizures, attended with the peculiar expectoration, every few weeks. Medical treatment seems to have no permanent effect upon this disease; but I believe that the prolonged use of the carbonate of ammonia will prove more useful than most other drugs. Where there is hemorrhage, however, we must trust to gallic acid or turpentine or iron-alum, with perfect quiet. Over-active remedies, especially of an alterative or depressing nature, will only be productive of great mischief.

There are various forms of *mechanical bronchitis*, caused by the inhalation of different particles of matter which irritate the tubes. We have thus the grinder's rot, or knife-grinder's disease; carbonaceous bronchitis, or black phthisis, occurring in miners, from the inhalation of the lamp-smoke, and the inspiration of the carbonic acid gas formed in the pits; and cotton pneumonia, or cotton phthisis, met with amongst the operators in cotton-mills.

Bronchitis occurring secondarily in blood-diseases is not uncommon, though often very troublesome. Thus, *typhoid bronchitis* not very unfrequently occurs during typhoid fever; in severe cases greatly aggravating the danger of this disease. We may also have *gouty* or *rheumatic bronchitis*, only to be cured by the relief of the constitutional disorder. So again, persons poisoned to the second, or to the tertiary degree, by syphilis, are apt to suffer from *syphilitic bronchitis;* giving rise to excessive muco-purulent expectoration, night sweats, great debility, and wasting. Iodine inhalations are useful in these cases, in conjunction with anti-syphilitic remedies. It should be remembered, moreover, that occasionally this last variety of bronchitis assumes the acute form.

Severe examples of chronic bronchitis, with abundant offensive expectoration, are apt to be mistaken for cases of gangrene of the lung, or for phthisis; especially if there be also dilatation of the bronchi. Professed consumption-curers often commit the latter error in diagnosis, and then vaunt their very ordinary as extraordinary cures.

The *treatment* of chronic bronchitis must depend very much upon the age and constitution of the patient. The cases which have fallen under my own observation have been most benefited by various stimulating expectorants, such as combinations of ammonia, senega, ipecacuan, conium,

spirit of chloroform, squills, &c. (F. 235, 236, 237, 239, 243, 245); by tonics (F. 371, 375, 386); by cod-liver oil; good nourishing food; and wine, or some other stimulant. When the disease is due to the poison of syphilis, it will be most readily cured by iodide of potassium and the compound calomel pill. If the patient be gouty or rheumatic, colchicum and iodide of potassium often work wonders. In mechanical bronchitis, from fifteen to twenty grains of larch or Venice turpentine (Terebinthina laricea) made into pills with liquorice-powder, and administered thrice daily, frequently prove of great service. Supposing there to be any difficulty in throwing off the muco-purulent secretion, we shall do most good with ammonia, squills, spirit of chloroform, and spirit of ether or of nitrous ether. Sometimes an emetic of sulphate of zinc acts favorably in these cases, but we must take care that it does not cause much depression.

The inhalation of simple vapor is generally useful. Where the secretion is excessive, turpentine (F. 260) or creasote (F. 261) inhalation may deserve trial. Counter-irritation by sinapisms, turpentine stupes, or rubefacient liniments, will give great relief; while blisters frequently do good. Patients often subsequently derive advantage from covering the chest with a large warm or chalybeate plaster. And, sometimes, susceptible subjects may ward off bronchial attacks by wearing the pneumoclime of Mr. Jeffreys, when in the open air at night or during unfavorable weather.

3. Hay-Asthma.—This peculiar disease (*hay-asthma*, *hay-fever*, or *summer catarrh*) might perhaps be best described as a severe catarrh, frequently having asthmatic symptoms superadded. The conjunctival, nasal, faucial, and bronchial mucous membranes are each affected; so that the patient has all the suffering often experienced from an aggravated common cold. There is headache, suffusion of the eyes, sneezing, irritation of the nose and fauces, with a dry harassing cough. Then at intervals there may be paroxysmal attacks of asthma; the dyspnœa being sometimes so urgent that the patient has the most distressing sensations of impending suffocation.

Hay-asthma is not a common disorder. It probably arises from the inhalation of the aroma of spring grass and hay (*Anthoxanthum odoratum*); or from the perfume of the *Nardus stricta* when in flower, a grass which is abundant in many grazing fields, for cattle will not eat it. Exposure to the emanations of *ipecacuanha powder* will produce it in impressible individuals.

If the disease be allowed to run its course without medical treatment, it will probably have a duration of three or four weeks. It may, however, usually be cut short by removal from the cause; sometimes residence at the sea-side being effectual. In two or three instances the susceptibility to the disease has been destroyed by the use of quinine and iron, or of arsenic, or of nux vomica. During the attack such antispasmodics as tincture of lobelia (F. 88), ammonia and assafœtida (F. 86), valerian and assafœtida (F. 94), or ether and camphorated tincture of opium (F. 85), give most relief; while a trial of creasote inhalations (F. 261) once or twice daily, as recommended by Dr. Walshe, may be resorted to. For moderating the asthmatic paroxysm, no agent

is more valuable than tobacco; inasmuch as directly the nausea and collapse caused by smoking set in, the sense of suffocation will pass off, and the patient be enabled to forget his sufferings in sleep.

X. INFLUENZA.

Influenza (from the Italian, *Influénza;* because the phenomena were thought to be due to the influence of the stars), or epidemic catarrhal fever, or in France "la grippe," is an epidemic disorder attended with great depression, chilliness, running from the eyes and nose, frontal headache, cough, restlessness and fever.

Influenza arises at various periods from some peculiar condition or contamination of the atmosphere. The first visitation of it in this country, of which we have a trustworthy description, was that of 1510. The poisonous influence, whatever its nature may be, wings its way with greater celerity than the speed of human intercourse; while its progress seems uninfluenced by the season of the year, it is said to travel from east to west, and it seldom stays in one district more than six or seven weeks. Some visitations have proved more severe than others: one in 1782, which extended over the whole of Europe, was very fatal. Dr. Southwood Smith says that when the influenza broke out in London in 1847, it spread in a single day over every part of the metropolis, and affected upwards of 500,000 persons.

Symptoms.—The chief symptoms of this mysterious affection are heat and dryness of the skin, urgent frontal headache, coryza, sneezing, tenderness of the fauces, hoarseness, harassing cough, shortness of breath, pains in the back and limbs, perverted taste, and disorders of the stomach. There are, in addition, all the signs of nervous and muscular prostration, such as an uncommon degree of languor and debility and dejection of spirits. Occasionally the danger is much increased by the setting-in of acute bronchitis, capillary inflammation, or even of pneumonia.—The suddenness and rapidity with which the fever occurs is very remarkable. This disease is more fatal to elderly than to other persons. In favorable cases it runs its course in rather less than a week, often terminating in an attack of diarrhœa, or in profuse sweating or diuresis, and merely leaving great feebleness.

Diagnosis.—Influenza differs from a common cold in its greater severity, and especially in the amount of prostration to which it gives rise. Between the reception of the poison and the commencement of the symptoms, there is a period of incubation; but as to the duration of this we know nothing, since in some well-observed cases it has appeared to be only ten or twelve hours, while in other instances it has been as many days.—The deaths amongst persons under forty years of age were very small indeed, in all the epidemics; but frequently, amongst the aged, the mortality has been large.

Treatment.—About the treatment there can be no mistake. The patient must be kept in bed, and barley-water with nourishing broths administered. In mild cases no drugs are needed. If the catarrhal symptoms become urgent, ten grains of Dover's powder may be given

at night; or a mixture should be ordered containing Indian sarsaparilla with infusion of linseed (F. 243), or of spirit of nitrous ether and camphorated tincture of opium (F. 348). A sinapism applied to the chest, together with the inhalation of the steam of hot water, may be necessary. A vapor or hot-air bath would in many instances give great relief. When prostration is the predominant symptom, stimulants are to be freely resorted to; such as wine, ammonia, or even brandy. The subsequent debility will be most quickly removed by tonics—especially by bark and phosphoric acid (F. 376), or quinine and iron (F. 380). Great good always accrues from a few days' holiday in the country.

XI. HOOPING-COUGH.

Pertussis (*Per*, very; *tussis*, a cough), or hooping-cough, is an infectious disease; rarely occurring more than once in the same individual; attended with slight fever, and vomiting; and accompanied at first by catarrh, and subsequently by a peculiar cough, which occurs in paroxysms at uncertain intervals. Its duration varies from two or three weeks to as many months. It is especially a disease of childhood.

Pathology.—Hooping-cough appears to depend upon some peculiar poison, communicated through the atmosphere, which affects and irritates the pneumogastric or vagus nerve. The disease is now and then epidemic.—The bronchial glands are occasionally found enlarged, after death. In many cases also, structural changes have been detected in the air-passages, or in some portion of the alimentary canal. Collapse of one or more of the lobes of the lungs seems to be a frequent cause of death.

Symptoms.—In the commencement (after a latent period of perhaps six days) it produces a simple febrile stage of eight, ten, or twenty days' duration; which is sometimes accompanied, but generally followed, by violent paroxysms of coughing. The little patient is never confined to his bed; but he is restless from the coryza, oppression of the chest, and heat of the skin. As the fever begins to remit, at about the end of ten days, the cough assumes its peculiar shrill sound or hoop. Prior to the commencement of each paroxysm the child has a kind of warning, and he runs to his nurse for protection. The series of coughs or expiratory efforts are so powerful, and expel the air so largely from the lungs, that the patient seems on the point of being suffocated; until a long-protracted inspiratory act follows, the rush of air through the contracted glottis causing the characteristic crowing or hooping noise. As Dr. Todd remarked, it is the signal of the child's safety. Directly the fit, which bears some analogy to laryngismus stridulus, is over, the child regains his courage, soon appears well, and returns to his amusements; while even if it end in an attack of vomiting, the patient has a craving for food immediately afterwards, and asks for something to eat. The frequency with which the paroxysms of cough recur varies: there may be only two or three in the day, or as many in an hour.

The duration of hooping-cough is very variable, some cases being susceptible of cure in a fortnight or three weeks, while others continue

troublesome for several months. When the disease comes on in the autumnal or winter quarters, I believe it to be more obstinate than when it sets in during the spring or summer.

Complications, &c.—The poison of hooping-cough may coexist with other poisons, as with those of small-pox, measles, &c.—Dr. Gibb has pointed out that in many cases, the urine is saccharine—*pertussal glucosuria*—the quantity of sugar being usually small, and often consisting of a mere trace.—Hooping-cough may also be complicated with bronchitis, pneumonia, disordered bowels, or some head affection. When the paroxysms are severe, they are sometimes followed by hemorrhage from the nose, mouth, or ears. In the latter case there is rupture of the membrane of the tympanum, deafness resulting in the affected ear unless the laceration completely heals. Ecchymosis of the conjunctivæ, from the giving way of one or more small subconjunctival vessels, is not very rare.—Dr. Graily Hewitt states that this disease, when it destroys life, generally does so, not by causing pneumonia as has been thought, but by inducing catarrhal inflammation of the bronchial tubes, attended with collapse of a portion of the lungs. This airless state of a part of the lung has been found to arise in young children from other causes besides hooping-cough; as well as in adults, as has been already mentioned in the section on bronchitis. Pulmonary collapse, however, is not by any means necessarily fatal unless it prove extensive, or is badly treated by lowering measures: it being a condition which especially calls for the free employment of stimulants and as strong liquid nourishment as can be digested. (See Section XIV.)

Treatment.—In the treatment of this disease our object must be to keep it simple—to prevent other affections from complicating it. In mild cases very little management is required. The patient should be warmly clothed, kept in-doors, fed with light nourishing food, and allowed to drink freely of some mucilaginous fluid. No medicine need be administered internally; but the spine may be rubbed every night with aconite and soap liniment in the proportion of two drachms to twelve, or with a mixture of equal parts of tincture of belladonna, glycerine, and camphor liniment.

With regard to the more severe forms of the disease, emetics (F. 231) are often very beneficial, especially if their use be followed by mild sedative expectorants, such as the tincture of squills and camphorated tincture of opium; or by a mixture of ammonia, ipecacuan, and senega (F. 235).—As in all diseases, bloodletting has been recommended by some physicians. But I think it is impossible not to see that this affection, instead of being an inflammatory, is rather a spasmodic complaint; and consequently, on this ground alone, it may be positively asserted that antiphlogistic measures are to be discarded.—The patient must be kept from cold air, in an apartment having a temperature of about 65° or 68° Fahr.; he ought to be clothed in flannel; the general nutrition should be maintained by food easily to be assimilated, such as fish, milk, and lightly-cooked eggs; the chest can be sponged, back and front, once or twice a day with cold water; and embrocations containing sedatives may be afterwards used to the same part. The best drugs are those known as tonics and antispasmodics—such as some salt of zinc, bark, quinine, morphia, aconite, belladonna, conium, hydrocyanic acid, assafœtida, camphor, spirit of ether, and chloroform. It need

hardly be mentioned that the greatest caution will be necessary in the use of most of these remedies, that they should be given in minute doses, and that their effects ought to be narrowly watched. A favorite practice with me is to order the sulphate of zinc, in gradually increasing doses, thrice daily; to give a mixture of ammonia, ether (or spirit of chloroform), morphia, and hydrocyanic acid, which shall be administered occasionally, as the frequency of the paroxysms may demand; and to have the spine well rubbed, night and morning, with an embrocation made of equal parts of the belladonna, aconite, camphor, and soap liniments.

Dr. Fuller speaks very highly of the use of sulphate of zinc and belladonna (F. 92); under the influence of which remedies, given in increasing and large doses, he says the hoop rarely lasts more than twenty-one days, while it sometimes subsides in ten. In out-patient hospital practice I have been disappointed with this treatment; but there are many reasons why too much reliance should not be placed upon results thus obtained.

Dr. Gibb states that nitric acid (F. 91) is a specific, although in my hands it has not proved to be so.—This gentleman also, in common with Dr. Harley, has found the bromide of ammonium useful, possibly owing to its peculiar anæsthetic effect upon the nerves of the larynx and pharynx. The dose is from two grains thrice daily for an infant, up to twelve grains for older children.—In many instances great benefit will be produced by sponging the fauces and glottis with a solution of nitrate of silver (twenty grains to the ounce of distilled water).—Where the secretion from the bronchial tubes is excessive, it should be checked by astringents; as, for example, by alum, sulphate of zinc, small doses of sulphuric acid and infusion of bark, or gallic acid. When the case becomes chronic, a cure may be effected by ferruginous tonics, cod-liver oil, and change of air—by removal to the sea-side.

XII. ASTHMA.

Asthma (*Ἀσθμάζω*, to gasp for breath) may be defined as essentially a nervous disease; the phenomena which it presents being dependent upon tonic contraction of the circular muscular fibres of the bronchial tubes. The paroxysms may be induced by direct or reflex mechanism,—or in other words, the stimulus to contraction may be central, in the medulla oblongata; or it may be in the pulmonary or gastric portion of the pneumogastric, or in some other portion of the nervous system besides the vagus, and being transmitted to the medulla oblongata by incident, may be thence reflected by motor filaments.

Symptoms.—A fit of asthma is either preceded by headache and sleepiness, or by various digestive or other disturbances, or it occurs suddenly without any warning. The patient awakes two or three hours after midnight with a sensation of suffocation or constriction about the chest; the dyspnœa gradually increasing until a fearful and most painful struggle for breath sets in. Various postures are assumed to facilitate the attempt at emptying and filling the lungs: the patient stands

erect, or leans his head forwards on his hands on some piece of furniture, or rushes to the open window, at which he will remain almost for hours gasping for air. The chest is distended to its utmost limit, inspiration and expiration are performed with the greatest difficulty, and there is evidently some serious obstruction to the entrance and exit of air. If we auscult the thorax no respiratory murmur is audible; but we hear sibilant rhonchi, loud wheezing, or shrill whistlings. For inasmuch as the varying calibre of the tubes, due to the muscular contraction, causes the air in them to be thrown into vibrations, so we of course have musical sounds of greater or less intensity according to the size of the constricted bronchi. The pulse is small and feeble; the eyes staring; and the countenance anxious. The skin gets cold (the temperature often falling to 82° F.) and clammy from deficient oxygenation, while it may subsequently become bathed in a hot sweat owing to the fatigue produced by the respiratory efforts. The patient's whole appearance is most distressing, so much so that he seems sometimes to be dying; while he is either irritable at his prolonged suffering, or he looks beseechingly at the attendant for relief from his intense misery. Then, after a certain lapse of time, comes a remission. Cough ensues, and with the cough expectoration of little pellets of mucus: and soon the paroxysm ceases, to allow the sufferer to fall into the long-desired sleep.

Dr. Sidney Ringer has examined the urine in one case of spasmodic asthma. He found a remarkable diminution of the urea and the chloride of sodium, in the hours immediately succeeding the attack. There was, therefore, either a considerable arrest of formation or of elimination; most probably of the former. After four hours the urea rose to its former amount; while the chloride of sodium was increased beyond it.*

During the interval which elapses between one asthmatic paroxysm and the next, the patient very often enjoys moderately good health, and has his breathing quiet and free. Most asthmatics are thin and round-shouldered, they have an anxious appearance of countenance, the cheeks are hollow, the voice is rather hoarse, and there is a slight cough. The length of the interval varies greatly in different cases; but not unfrequently the attacks are periodic, whether the time of recurrence be once in twenty-four hours, or once a week, or once a month, or once in twelve months. In one of the most troublesome cases (though there was no organic disease) which have come under my notice, the paroxysm always came on every morning at 1 o'clock, A.M.; the dyspnœa continuing just as regularly for two hours. Thinking that this periodicity might be due to some particular stage in the function of digestion, the patient was advised to discontinue taking supper, but no alteration was induced in the disease.—With another asthmatic, habit has something to do with the attacks. Thus, he is generally well in London, yet being fond of Brighton tries to stay there some weeks in each year. But if, on the first night of sleeping away from town he experience an attack, a paroxysm is sure to recur nightly, until he is compelled to return; whereas if this night be safely passed over, he may continue his sea-side residence for weeks without any fear. Dr. Salter† mentions several similar

* The Composition of the Urine, in Health and Disease, and under the Action of Remedies. By Edmund A. Parkes, M.D., &c., p. 319. London, 1860.

† On Asthma: its Pathology and Treatment, p. 230—261. London, 1860.

cases; while this gentleman also points out the capriciousness of asthma, one patient being better in a crowded city than in the country, another being benefited by a bracing air and injured by a relaxing climate, a third preferring the winter months to the autumnal, while again there are other instances where it is just the reverse of all this.

Asthma is more common in men than in women; it is often hereditary; and it sets in at any time of life, though most frequently about the middle period. It may be uncomplicated,—that is to say, in all other respects the sufferer is perfectly healthy, there being no lesion of the brain, lungs, heart, stomach, or other organs; or it may be complicated with, or indeed symptomatic of, some disorder, such as chronic bronchitis, heart disease, a morbid state of the nervous system, &c.—The first form is sometimes known as *idiopathic* or *spasmodic*, the second as *symptomatic* or *organic* asthma.

Causes.—The fact that the tendency to asthma may be hereditary has just been mentioned; but it must be remembered that often no influence of this kind can be discovered. Again, this affection will sometimes be owing to some organic disease within the chest, while frequently no such cause can be detected.

The paroxysm may be directly due to an irritant inspired into the air-passages, such as dust, cold air, certain vapors, and emanations from hay or ipecacuanha or mustard. The influence of particular atmospheric or climatic conditions is well known; though we are unable to explain why one asthmatic should be unable to sleep in a smoky and dirty city, while another can live nowhere else. Improper food, or an excessive quantity, or meals taken at certain particular times—*e. g.*, late suppers—may originate a fit. So, again, the cause may be some irritation applied to parts of the body remote from the chest; as was observed in a patient of Dr. Chowne's, where the application of cold to the instep at once induced the fit. And, lastly, mental emotion—fear, anger, &c.—may originate it.

Prognosis.—Spasmodic asthma very rarely, if ever, directly destroys life; and even many who are subject to it live to a good old age, perhaps for the reason that they are obliged to take great care of themselves. Moreover, a complete cure occasionally takes place; though, as a rule, when an attack has once occurred, there are sure to be repetitions of it.

But the disease is nevertheless a very serious one, because of the morbid pulmonary and cardiac conditions which it sometimes induces. The chief of these are congestion of the lungs, emphysema, and hypertrophy with dilatation of the right side of the heart; which mostly arise in consequence of the repeated obstruction to the circulation of the blood through the pulmonary capillaries, impeding the action of the right side of the heart. When either of these complications has become thoroughly established, the asthmatic passes but a poor time with it. Indeed, his life is gradually rendered more and more miserable by cough, abundant expectoration, orthopnœa, venous regurgitation, œdema, and cyanosis; until at length the circulation of venous blood produces somnolence and coma, which are soon followed by a welcome death.

Treatment.—Under this head must be considered the measures necessary to relieve the paroxysm, and those which may be employed in the hope of preventing or delaying its recurrence.

During the paroxysm we first have to try and remove the cause; as

by giving an emetic when the stomach contains an undigested meal, or administering an enema if a loaded rectum seems to be the source of the irritation. Then our efforts must be directed towards relaxing the bronchial spasm, and for this purpose we resort to the use of sedatives. —Frequently I have found that the latter object has been admirably fulfilled by a large dose of *iodide of potassium* (ten grains), combined with some aromatic spirit of ammonia or spirit of ether, and tincture of belladonna.—*Tobacco* may be employed as a depressant or as a sedative, and in either way it often effects good. To those who are unaccustomed to smoking, a pipe of Latakia (which is quite strong enough for the purpose) soon produces exhaustion: while directly the feeling of nausea and collapse comes on, the attack of asthma ceases. As a sedative, tobacco is more uncertain, though it will perhaps prove useful if taken when a fit seems impending.—*Chloroform* is invaluable in many instances, while in others it does harm; and such is also the case with the vapor of *ether* (F. 313). The latter possesses this advantage, that with proper directions it may be intrusted to the patient's wife or nurse for administration, after it has been found to have a favorable effect. Moreover, it rarely nauseates patients so much as the prolonged use of chloroform frequently does; while to many it is, from the first, more agreeable. It will seldom be necessary to produce complete insensibility, and when there is any blueness of the surface it can never be advisable to do so. —*Stramonium* acts like a charm with certain asthmatics, a few whiffs of a pipe filled with it, or of a cigar, giving relief; but, in other cases it is often worthless. Care must be taken to get the drug good, while it may be remembered that the seeds are much more powerful than the leaves and stalk cut up.—*Nitre-paper fumes*—the fumes of burning filtering or blotting-paper which has been soaked in a saturated solution of nitrate of potash and dried—affords much alleviation in many cases of uncomplicated asthma.—And, lastly, there are instances where palliation is soonest obtained from a *stimulant*, as a glass of whiskey or brandy-toddy, or a cup of very strong coffee. I am told that the poor of Perth often stop an attack with whiskey; but a paroxysm thus starts off the propensity to drink, which is sometimes only checked when the sufferer has pawned all that he possesses.

Our *treatment in the interval* must be directed to improving the general health by prescribing tonics, a regular mode of life, and the use of the cold shower or sponge-bath; to laying down rules as to diet, so as to obviate attacks of dyspepsia; to so ordering the times of the various meals that the process of digestion may be finished before bedtime; and to choosing a climate, the opposite to that in which the fits come on—as London air for those who are worst in the country, and the reverse.

Where there is a relaxed condition of the mucous membrane about the fauces, and the expectoration is copious, tannin or catechu lozenges prove useful. When the digestion is weak benefit will often be derived from the nitro-hydrochloric acid (F. 378), with pepsine (F. 420) at the meals. While in many instances, where the cause is obscure, the iodide of potassium (F. 31) certainly works wonders. When the last edition of this work was in the press I was trying this remedy, but had not then had sufficient experience to justify my recommending it. Since then it has seemed to effect a complete cure in some four or five well-

marked cases, while it has proved beneficial in many others; so that I am inclined to think there is no single remedy which can compete with it. This drug requires to be persevered with for some weeks; the patient being watched, lest it impoverish the blood, and produce purpura or boils or even a carbuncle. Directly any hemorrhagic spots appear, however, all may be made to go well by temporarily substituting quinine or nitric acid and bark. And then, if there be constipation during any plan of treatment, a mild aperient should be given at bedtime, such as five grains of compound rhubarb pill with the same quantity of extract of conium.

In conclusion, the inhalation of oxygen gas might (as suggested by Dr. Salter) do good in some instances; and, perhaps, the respiration of compressed air (long since recommended by Sir John Sinclair and others) would give relief in similar cases, by affording the system an excess of oxygen. As regards blisters to the spine or nucha, strychnia, and galvanism, it need only be said that the great theoretical objections to these agents have not been overcome, so far as I know, by any practical experience of their utility, although they are not unfrequently recommended.

XIII. EMPHYSEMA.

The diseases of the lung thus denominated are of two kinds. One consists essentially of enlargement of the air-cells, atrophy of their walls, and obliteration of their vessels; this is called *vesicular* or *pulmonary* emphysema (*Ἐμφυσάω*, to inflate). When, on the other hand, there is infiltration of the air into the interlobular areolar tissue, or into the sub-pleural areolar tissues, the disease is known as *interlobular* emphysema. Both forms give rise to habitual shortness of breath, with occasional severe paroxysms of asthma; in many instances they lead to disease of the right cavities of the heart, with venous congestion and dropsy; while they are at all times very distressing complaints, and quite unfit the sufferer for any active occupation.

Vesicular emphysema may affect one lung, or both, or a part of each —especially the anterior edges and the apices. The increase in the size of the air-cells necessarily diminishes the contractility of the yellow elastic fibrous tissue of their walls; which, on being long overstretched, is unable to recover its tone. Then the walls become perforated with small oval openings; the perforations gradually increasing in size. As the disease progresses there is a complete wasting of the partitions between the cells; so that two or three or more form one cavity, which may project from the surface of the lung like a bladder. The dilated air-vesicles, in partial emphysema, are not found in those parts of the lung where there is evidence of pre-existing bronchitis, but in the opposite portions.

According to Dr. Gairdner,* vesicular emphysema is of mechanical origin, is produced by the inspiration force, and is essentially a compensatory dilatation of the air-cells, implying that a portion of the lung is

* British and Foreign Medico-Chirurgical Review, vol. xi, p. 469. London, 1853.

non-expansible; hence the foundation of the disease may be bronchitis, pulmonary collapse, asthma, &c. Some discussion has arisen as to whether the extra strain upon the cells really occurs from the pressure of the air during inspiration or expiration; and it seems probable that although a certain amount of dilatation may be determined by inspiration, yet—as Dr. Jenner* has shown—the most efficient cause is the pressure of the air contained in the lung brought to bear upon the inner surface of the air-cells by the expiratory efforts.

Dr. Waters recognizes and defines two forms of vesicular emphysema.† One is the *partial* or *lobular* form, and it supervenes on those disorders of the respiratory organs which are accompanied by violent cough. The other is the *general* or *lobar* emphysema, in which an entire lobe or the whole of one or both lungs may be attacked. This latter variety comes on insidiously; and Dr. Waters believes that it is constitutional—the result of some degenerative process, the exact nature of which is uncertain. He founds this view on the fact that it may reach a high degree of development without any previous history of long-standing cough; while the disease is not only sometimes hereditary, but the uniform manner in which the whole of both lungs is occasionally attacked, form corroborative circumstances. He further considers that the distension is not brought about by expiratory efforts, but by inspiration; the abnormally weak lung-tissue giving way under the influence of a pressure, which in a state of health it would be able to resist. Hence, the primary step in the disease is a degeneration of lung-tissue, and the mechanical distension a secondary consequence.

The prominent symptom of emphysema is dyspnœa, which is much increased upon any exertion. There is also a feeble cough, difficult expectoration of frothy sputa, a dusky appearance of the countenance, weakness of the voice, a stooping gait, loss of flesh and strength, a lowered temperature of the body, constipation, a weak and slow pulse, and a diminished frequency of the respirations. Asthma is a repeated accompaniment.—The physical signs of this disease consist of unnatural clearness and resonance on percussion; while only a very indistinct vesicular murmur is heard on auscultation. Occasionally a moist râle will be detected, like the sub-crepitant rattle of bronchitis. The heart's sounds are merely feebly audible, and this organ is often displaced; while if only one lung be affected there will be cardiac displacement to the opposite side, or if both be involved we shall have displacement downwards and to the right. The diseased side of the thorax is also more prominent and rounder than the healthy one. Thus, as regards percussion and auscultation, emphysema affords results the reverse of other affections: the disease consisting, as it were, of a superabundance of air which does not pass away, there is more resonance, but less sound in the air-passage—less respiratory murmur. It can only be confounded with pneumothorax; but it may be distinguished by remembering that this latter disease merely affects one side of the chest, that the percussion note is much more tympanitic, and that the site over which the resonance is obtained is much more extensive than in emphysema.

* Medico-Chirurgical Transactions, vol. xl, p. 25. London, 1857.

† Researches on the Nature, Pathology, and Treatment of Emphysema of the Lungs, and its Relation with the Diseases of the Chest. London & Liverpool, 1862.

As regards treatment, we can, for the most part, only attempt to give relief by an invigorating diet, rest, warm clothing, attention to the digestive organs, and by the occasional use of tonics and antispasmodics. Amongst the former, quinine and iron are the most useful (F. 380); or if the digestion be weak, steel and pepsine (F. 394) at the meals, may be preferable. Strychnia has failed to be of any service. Cod-liver oil ought also to be administered. Amongst the latter remedies, ammonia, ether, hydrocyanic acid, sumbul &c., (F. 85, 86, 95), are the most promising. The ethereal tincture of lobelia has been recommended, and so has the Indian hemp. Stramonium may also be smoked; or the camphor cigarettes of M. Raspail might be tried. Occasionally the vapor of chloroform is of great temporary service.—A warm climate is often very beneficial to sufferers from this affection; the dyspnœa being always most urgent in cold weather. Mr. Jeffrey's pneumoclime (respirator) may generally be worn with advantage, in unfavorable states of the atmosphere. If Dr. Jenner's theory be correct, we must—as he shows—moderate the violence of the expiratory actions in persons disposed to emphysema; and not allow them to follow occupations—such as carrying or pushing heavy weights—which necessitate expiratory efforts with a closed glottis.

Interlobular emphysema, or the collection of air in the areolar tissue between the lobules and in the interspaces of the air-cells, is generally produced by the sudden rupture of the latter from some violent strain or effort. Hence it may be caused by forcing or bearing-down at stool, by the expulsive pains of parturition, by repeated fits of coughing, and so on. On examining some fatal cases of hooping-cough, M. Guillot found extensive sub-pleural emphysema; in a few instances emphysema of the areolar tissue of the mediastinum, and even of the neck, being also present.

This affection is not to be diagnosed by any certain signs during life; it is very rarely associated with vesicular emphysema; and when very extensive, it may at once give rise to fatal asphyxia.

XIV. CONDENSATION OF THE LUNG.

Condensation of the lung may result from pneumonia, from phthisis, or from cancerous deposit; as well as from pressure exerted on the lung by fluid poured out in pleurisy, by enlarged bronchial glands, and by aneurismal or other intra-thoracic tumors. A small tube, or even a main bronchus, may thus become so obstructed that air cannot pass; and as a consequence there results collapse of that portion of the lung to which the compressed bronchus leads.

But in the present section the foregoing cases have not to be dealt with. We have now to consider that particular variety of pulmonary condensation, which is owing to collapse of the air-cells from the plugging-up (generally by a thick tenacious secretion) of a bronchial tube. This form has been variously designated as *disseminated lobular pneumonia*, *marginal pneumonia*, *carnification*, or *pulmonary collapse*. The same condition is sometimes met with in new-born infants, from congeni-

tal non-expansion of the air-cells, being known as *atelectasis* of the lungs. Hence it will be convenient to speak of these two sets of cases separately, under the heads of *acquired* and *congenital* pulmonary condensation.

In *acquired* pulmonary collapse, the margin of the lung, or an irregular portion of one lobe, or an entire lobe, or even the whole of the organ may be involved. The obstruction may be owing to an increase in the secretion of the mucous membrane, with inability to cough it up; and hence it not unfrequently occurs in bronchitis and hooping-cough, especially in feeble subjects. Or, the secretion being natural in quantity, is expelled with such great difficulty (owing to old age or general debility) that an accumulation takes place in the central or some other part of the lung, and acts like a plug. In either case, it can be readily understood that a portion of tenacious mucus at the bifurcation of a bronchus will act like a valve; at every expiration permitting of the escape of air, but falling close on the opening at each inspiration so as to prevent ingress. Consequently the vesicles beyond the obstruction gradually become emptied of air, and then collapse; this condition causing more or less severe dyspnœa, in proportion to the extent of lung affected. The physical signs of collapse ought to consist of decided dulness on percussion, with an absence of the respiratory murmur over the affected parts. But if the morbid condition has been of some duration, the signs are apt to be masked by the occurrence of a kind of compensatory emphysematous distension of those portions of lung anterior to the obstruction.

The indications for treatment are sufficiently obvious. Instead of inflammation we have general debility with deficient inspiratory power. Hence stimulants, tonics, and restorative food are the remedies to be employed.

Congenital non-expansion of the air-cells is met with in weakly infants. Some portion of the lungs—especially the lower edge of the upper and lower lobes, and the middle lobe of the right lung—are liable to remain solid and unaerated, giving rise to the condition known as *atelectasis* (Ἀτελής, imperfect; ἔκτασις, expansion). An infant so affected looks as if it had only been born to die speedily. It is often jaundiced; it utters a weak whimper or cry; it can scarcely suck; it remains very feeble and drowsy; the surface is cold and slightly livid; and the chest is but partially dilated by the imperfect respiratory movements. After the lapse of a few days, or perhaps weeks, the child either gradually becomes stronger, the paroxysms of dyspnœa materially lessen, and good health is ultimately obtained; or, in less fortunate cases, the symptoms increase, convulsions occur, and death ends the sufferings. To avoid this latter termination we must keep the infant wrapped up in flannel or cotton-wool, in a warm room. A hot bath may be used for five minutes, once or twice a day. Stimulating oily liniments should be rubbed over the back and front of the chest, and along the spine. Ether with ammonia, or port wine with a few drops of tincture of bark, ought to be administered every few hours. If the air-tubes appear to be obstructed by mucus, an occasional mild emetic of ipecacuan may serve to remove it. And then, if the exhaustion be too great to admit of attempts at sucking, the mother's milk must be drawn off, and feeding with a spoon had recourse to.

XV. PLEURISY.

Pleuritis, or pleurisy, are terms applied to inflammation of the pleura —the serous membrane investing the lungs and lining the cavity of the thorax. The disease may run an acute or chronic course; while one side only is usually affected, though occasionally we have double or bilateral pleurisy. Uncomplicated cases very rarely end fatally.

Symptoms.—This disorder is ushered in with chilliness or slight rigors. Then follows fever, and an acute lancinating pain in the side, called a stitch; which pain is commonly seated below the nipple, over the antero-lateral attachment of the diaphragm. It is aggravated by the expansion of the lung in inspiration, by coughing, by lying on the affected side, and by pressure. There is also a short harsh cough, the skin remains hot and dry, the cheeks are flushed, the pulse is hard and quick, the respirations are slightly increased in frequency, there is anxiety and restlessness, while the urine is rather scanty and high-colored. If we listen to the painful part of the chest at this period, we shall hear the dry inflamed membranes—the pulmonary and costal pleuræ—rubbing against each other, and producing a *friction sound;* or if the hand be placed on the corresponding part of the thorax, this rubbing may be distinctly felt. But the sound soon ceases: either the inflammation terminates in resolution, and the two surfaces of the pleura regain their natural moisture and smoothness; or, the roughened and inflamed surfaces get adherent, the lymph which has been exuded forming a pseudo-areolar tissue; or they become separated by the effusion of serum, and a kind of dropsy results, known as HYDROTHORAX (Ὕδωρ, water; θώραξ, the chest). If the pleurisy has been severe, the effusion becomes excessive (it may vary from a very few ounces to several pints); and the fluid accumulating in the sac of the pleura compresses the yielding lung, suspends its functions, displaces the heart, and somewhat distends the thoracic parietes.

When the pleuritic inflammation ends in suppuration, and the pus accumulates in the cavity of the chest, we have what is called EMPYEMA (Ἐν, within; πύον, pus); a termination which is much more frequent in men than in women. Some practitioners speak of true and false empyema: the first form being that in which the pus is secreted by the pleura; while the second is that in which the pus finds its way into the cavity of the thorax from the rupture of an abscess of the lung. Now and then the pus forms a bulging tumor in one of the intercostal spaces. When the swelling is on the left side, a pulsation synchronous with the heart's beat may also be observed. A careful examination will prevent "pulsating empyema" from being mistaken for an aneurism; since the tumor diminishes and increases with each inspiration and expiration, while there is neither an aneurismal thrill nor bruit. Nevertheless, if it be determined to evacuate the matter, a grooved needle should be introduced, as a precautionary measure, before using the bistoury. Occasionally ulceration takes place in the costal pleura and gradually extends through the muscles, or a portion of the rib becomes carious, and an aperture is formed externally; through which channel (a *parietal fistula*) pus continues to be discharged for some time in cases of chronic pleurisy. On the other hand, the pulmonary pleura may be

perforated, and an opening take place into the air-tubes; which opening, when it fails to close after the evacuation of the fluid by the bronchi, is known as a *bronchial fistula*.

Whether the matter effused consist of serum, or of serum mixed with blood (as in hydrothorax occurring in a scorbutic subject), or of pus, we shall find, on listening to the chest, that the respiratory murmur is diminished in proportion to the quantity of fluid thrown out. Where this is excessive and the lung is compressed backwards—flattened almost against the spinal column—no vesicular breathing at all will be heard; but instead we shall detect the air passing into the larger bronchial tubes, the condensed lung and the layer of fluid acting as conductors of sound. We then say that *bronchial respiration*, and *bronchial voice* or *bronchophony*, exist. The bronchophony may be accompanied by a tremulous noise, resembling the bleating of a goat; it is then termed *ægophony*. If the lung be completely compressed, so that air cannot enter even the bronchial tubes, then no sounds of any kind will be heard; but on the healthy side the respiration will be more distinct than natural—will be *puerile*. There must also be dulness on percussion all over the affected side, if the pleura be full of fluid: if it be only partially filled, we can sometimes judge of the quantity by placing the patient in different attitudes; for since the liquid will gravitate to the most dependent part of the cavity, so it necessarily carries the dull sound with it. The exceptions to this rule which may be met with, consist of cases where there is solid exudation-matter as well as fluid; for if the pleura be coated with a thick pulpy substance, there will clearly be dulness on percussion in whatever posture the patient may be placed. We shall often more decidedly be able to judge of the amount of the effusion by the dyspnœa which the patient suffers from; since this will, of course, be most urgent when the lung is most compressed. At the same time, also, the sufferer is commonly unable any longer to lie on the sound side; for the simple reason that the movements of the healthy lung are then impeded by the superincumbent weight of the dropsical pleura. The pain, moreover, no longer prevents his lying on the diseased side. If we measure the two halves of the chest, the side containing the effusion will be found the largest: we must remember, however, that in many persons the right half of the chest is naturally rather larger than the left. In making an ocular examination of the affected side, it will be found enlarged; the intercostal muscles are seen inactive, and the spaces quite obliterated or even bulging if the secretion be copious; there is marked fulness of the infra-clavicular region; and the shoulder is depressed. From some inexplicable cause, pleuritic effusion occurs most frequently on the left side.

After a time the symptoms often begin to decrease, and absorption of the effused fluid fortunately commences. Supposing the lung to be bound down by adhesions, it will not be able to expand in proportion to the absorption of the fluid. The affected side consequently shrinks inwards, and instead of any longer remaining larger than the sound one, will become smaller.

In one form of the disease, known as *latent pleurisy*, there may be neither pain, cough, nor dyspnœa; and yet effusion may go on until one half of the chest becomes filled with fluid, as shown by the physical signs.

Diagnosis.—The distinction between pleurisy and pleurodynia (pain in the muscles of the thorax) is rendered so easy by attention to the foregoing description of the symptoms, that nothing more need be added. Malignant disease of the lung or pleura is more likely than any other affection to be mistaken for empyema; since in both of these instances there has generally been pleurisy, in both there may be displacement of the heart, dulness on percussion, absence of respiratory murmur, inability to lie on the sound side, and œdematous enlargement of the affected side. Again, empyema of the right pleura is not always easily diagnosed from enlargement of the liver; but the difficulty will be lessened by noticing that in the latter there is no intercostal paralysis, there is resonance on percussing the middle and upper parts of the chest, the force of the respiratory murmur in the postero-inferior portion of the chest is much greater than the dulness would lead us to anticipate, and the heart is displaced upwards instead of laterally.

Causes.—The most common causes of pleurisy, in subjects suffering from some morbid condition of the blood, are exposure to cold and wet. I do not believe, however, that any amount of cold will produce the disease in a healthy individual. It may prove the exciting, but not the essential cause of the inflammation. It has been stated that in the greater number of cases of pleurisy on the right side, the inflammation depends on the pre-existence of tubercle in the lung; while pleurisy of the left side is usually independent of this cause. In cancer of the female breast pleurisy often occurs secondarily, either from the irritation of the pleura by a deposit of cancer beneath it; or in some instances probably—as Dr. Walshe suggests—by the sub-inflammatory action on the confines of the diseased gland extending through the intervening tissues to the pleura. During the progress of continued fever, and of Bright's disease, an attack may set in. And, lastly, mechanical injuries will excite inflammation of this serous membrane. Thus the jagged ends of a fractured rib often give rise to it: while if they also wound the pulmonary pleura, air will escape from the lung into the pleural cavity.

The presence of air in the pleura may also be due to other circumstances than the injury produced by a broken rib. Thus it may arise from an external wound, as well as from ulceration owing to the extension of a tubercular cavity. When the pleura contains air alone, we say there is PNEUMOTHORAX (*Πνεῦμα*, air; *θώραξ*, the chest); when, as generally happens, there is a liquid with the air, we call the disease PNEUMOTHORAX WITH EFFUSION. The physical signs of pneumothorax are great resonance on percussion, with indistinctness of the respiratory murmur on auscultation. The patient's breathing, cough, and voice, give rise to a ringing metallic noise like that produced by blowing obliquely into an empty flask, and hence called *amphoric resonance.* When there is also liquid with the air, we obtain in addition—especially on practising succussion—a sound known as *metallic tinkling;* which some authorities believe to result from a drop of fluid falling from the upper part of the cavity and causing a little splash, but which is in all probability simply due to the bursting of an air-bubble in a confined cavity with firm walls.

Prognosis.—Simple unilateral pleurisy always terminates favorably. Even when it is bilateral, or when it occurs during the progress of some

chronic ailment—as Bright's disease, tuberculosis, cancer, &c.—it is not often the immediate cause of death.

Treatment.—The indications for the treatment of pleurisy are first to subdue the inflammation; and, secondly, to promote the removal of its products. To obtain these results, the sufferer is to be kept very quiet in bed; while in order to prevent undue friction at the inflamed part, he should be cautioned against talking or taking full inspirations. The application of a fine flannel bandage round the chest, may sometimes be serviceable by lessening the movements of the ribs. As, in all probability, the more the patient is lowered, the more severe will be the results of the inflammation, I would advise the practitioner not to resort to general bleeding; but rather to trust to the administration of diaphoretics (F. 211, 212), with opium to relieve the pain. Locally, no measures give greater relief than large and very hot and moist linseed-meal poultices, covered with the extract of poppies; or the use of poppy-head fomentations, which, however, must be sedulously applied. Some practitioners prefer the employment of sinapisms or turpentine stupes, but they have often the disadvantage of irritating the patient. When the pain is very severe, the removal of three or four ounces of blood by cupping will possibly give relief sooner than any other proceeding, by unloading the congested vessels. But even before taking away this small quantity it will be better to try the effect of the fomentations, together with the application of the extracts of belladonna and poppies (one part to eight); a proceeding which I constantly resort to with the greatest advantage. If the practitioner have faith in the powers of mercury to control inflammation, he may administer calomel and opium; though it is very doubtful if the calomel can exercise any beneficial influence. The bowels must be kept open by purgatives, if necessary; the diet should consist of gruel, arrowroot, milk, and broths; and cooling refreshing drinks are to be freely allowed.

If these means prove insufficient and effusion takes place, we must then endeavor to promote absorption. The patient ought to be kept on a moderate diet, free from stimulants; a succession of flying blisters should be applied to the diseased side, or the action of the absorbents may be increased by sinapisms, or friction with the ointment of red iodide of mercury may be tried; and purgatives as well as diuretics are to be administered. The iodide of potassium (F. 31) will often be useful; or a combination of squills, digitalis, and blue pill (F. 28) has been highly recommended. Very often, however, mercury in any shape, administered internally, does harm; and especially if the effusion be due to chronic pleurisy. In such cases the compound tincture of iodine, or the iodide of iron, or cod-liver oil, are much more likely to forward our views.

When the foregoing remedies fail, tapping the thorax so as to let the fluid out has been resorted to, and on many occasions with success. The opinions of physicians vary widely as to the propriety of performing this operation.* My own impression is, that as a general rule it

* This discrepancy can scarcely be better illustrated, or less satisfactorily accounted for, than by the following facts. Drs. Hughes and Addison were both physicians at the same time to Guy's Hospital. The former (Guy's Hospital Reports, Second Series, vol. ii, p. 48, London, 1844) speaks in high terms of the good which he has seen effected by tapping the chest in numerous cases, and the facility with which it

ought not to be performed unless the effusion is excessive; nor until proper attempts to procure absorption have been adopted. At the same time it is by no means to be tried as a last resource; for if deferred too long, irremediable mischief takes place in the lung. Thus the pulmonary tissue becomes carnified, and deprived forever of its power of expanding; while the pleura continues to secrete fluid, and bands are formed between the pulmonary and costal portions, which lead to future contractions of the chest. When it is decided to resort to paracentesis, it will be as well to commence by making an exploratory puncture with a grooved needle; if fluid tissue, a trocar and canula may then be introduced. The best position for the puncture is probably the intercostal space between the fifth and sixth true ribs, at—or somewhat anterior to—the digitations of the serratus magnus muscle; provided, of course, that the lung is not fixed to this part by adhesions, and that no good reason exists—such as the pointing of the tumor—for selecting a different spot. It will probably be better to remove all the fluid: if serum come out, the orifice should be closed and healed; if pus, the aperture may be enlarged and kept open by a piece of catheter, or an India-rubber drainage-tube. When this tube is employed, two openings have to be made, as recommended by Dr. Goodfellow and Mr. Campbell De Morgan. The operation is a simple one, as performed by the latter gentleman. A puncture with a trocar, or a simple incision, is to be made into the cavity of the chest at the usual place—between the fifth and sixth, or sixth and seventh ribs—or indeed in any convenient situation. A firm long iron probe, somewhat bent, is then passed through the opening, and directed towards the lower and back part of the cavity; the lower the better. If the end of the probe be pressed against the inside of the thoracic walls, it may be distinguished from the outside through the intercostal space—perhaps obscurely, owing to the thickness and toughness of the false membrane within. The lowest site in which the probe can be felt having been selected, an incision is made upon its end, which is then pushed out of the opening thus formed. A strong piece of silk thread is passed into the eye of the probe, and drawn through the two openings; and the drainage-tube, perforated at short intervals, being firmly tied to one end, is then pulled through by means of the silk. The ends of the tube are fastened together, and the operation is completed. The pus drains away through the perforations. The admission of air through the tube, or through the canula of the trocar, into the pleura does no harm, for it becomes spontaneously removed in a few hours. It must be remembered that the intercostal artery has been wounded in the operation of tapping, giving rise to

may be performed. The latter gentleman (Lancet, 17 November, 1855) says he believes, from the numerous cases seen every year at Guy's Hospital, that paracentesis thoracis is one of the worst and most deceiving operations in general practice. A serous cavity, he thinks, is almost invariably changed into a cavity pouring out purulent matter by the first operation; and the thick, leather-like, false membranes lining the pleura soon make the operation one of very great difficulty and danger. Nature herself, if assisted by proper remedies, will often remove serous effusions from the pleura; but if once interfered with by instrumental assistance, the amount of pus separated from the system is almost incredible, and beyond her power to get rid of. Cases are mentioned of twelve and fourteen pints of purulent matter drawn from the chest, but its production is very possibly due to the first opening made in the pleura.

serious hæmothorax (*Αἷμα*, blood; *Θώραξ*, the chest); an accident which may be best avoided by keeping free of the borders of the ribs.

In some examples of pneumothorax, where the dyspnœa has been very urgent, it has been found necessary to puncture the pleural cavity with a grooved needle, to let the air out. Such cases, however, are very rare.

XVI. PNEUMONIA.

Pneumonia (*Πνευμονία*, a disease of the lungs), or acute inflammation of the substance of the lungs, is a serious disorder, commonly ushered in by restlessness with general febrile disturbance. At the end of from one to three days there are rigors, which are soon followed by nausea, cough, pain in the side, distressed breathing, a pulse reaching to 140 or even 160 beats in the minute, burning heat of skin, thirst, loss of appetite, prostration, headache, and sometimes transient delirium.

Each case of pneumonia may be said to consist of three degrees or stages—viz., first that of engorgement or splenization; secondly, that of red hepatization; and, thirdly, that of gray hepatization, or purulent infiltration. In each stage there is, speaking summarily, fever; more or less pain in some part of the chest—most severe at the commencement; accelerated and oppressed breathing; great depression, with occasionally delirium; and cough, with expectoration of viscid and rust-colored sputa, which unite into a mass so tenacious, that even inversion of the vessel in which it lies will not detach any portion. If these sputa be minutely examined, they will be found to consist chiefly of mucus, epithelium, exudation-matter, blood-cells, and oil-globules; the presence of sugar may sometimes be detected by Trommer's test; while there is also an excess of chloride of sodium. Moreover, as the blood contains an undue amount of fibrin, coagula may form in the right side of the heart or in the pulmonary arteries, and give rise to urgent dyspnœa or even to sudden death.

In the first stage, or that of engorgement, the substance of the affected part of the lung becomes loaded with blood or bloody serum. It is of a dark-red color externally, and on cutting into it, a quantity of red, frothy serum escapes; while its appearance somewhat resembles the spleen, its elasticity and sponginess being diminished, though it will still float in water. If we listen to the chest when the lung is in this condition, we shall hear very fine crepitation; a sound which is known as *minute crepitation*, or *crepitant rhonchus*. If a lock of one's own hair be rubbed between the finger and thumb close to the ear, a sound will be produced nearly resembling it. The natural respiratory or vesicular murmur is still heard mingled with this minute crepitation, especially at the beginning; as the inflammation advances, however, the healthy sound is quite displaced by the morbid one. Percussion also, at first, affords the natural resonance, which gradually becomes obscured.

If the inflammation proceed, it passes into *the second stage, or that of hepatization;* in which the spongy character of the lung is quite lost, and it becomes hard and solid, resembling the cut surface of the liver, whence it is said to be hepatized. If we now practise auscultation,

neither the minute crepitation nor the vesicular murmur will be any longer perceptible. *Bronchophony*, however, often exists, more particularly if the inflammation be seated near the upper part or in the vicinity of the root of the lungs; it is accompanied also by *bronchial respiration*, these sounds being conducted by the solidified lung. The resonance on percussion is dull over the whole of the affected part.

Advancing still further, we now have *the third stage of pneumonia, or that of gray hepatization, or purulent infiltration;* which consists of diffused suppuration of the pulmonary tissue, parts of the lung remaining dense and impermeable. In many instances there is no true suppuration, the appearance of such a condition being simulated by liquefied exudation matter. Circumscribed abscess of the lung is very uncommon; but diffused suppuration is said to be a frequent consequence of inflammation of the pulmonary tissue. There are no physical signs by which this stage can be diagnosed, until part of the lung breaks down and the pus is expectorated; *large gurgling crepitation* will then be heard.

If the inflammation subside before the stage of purulent infiltration, as it fortunately often does, then the hepatized condition may remain permanent, or it will gradually cease. In the latter case we shall find the air slowly re-entering the lung; as will be indicated by a return of the minute crepitation, mingled with—and subsequently superseded by—the healthy vesicular murmur.

When the urine of a healthy person is treated with nitrate of silver,* after being acidulated with nitric acid, the copious precipitate of chloride of silver which is thrown down shows the presence of a considerable quantity of chlorides. In pneumonia, a normal amount of the chlorides may be found for the first day or two; but the quantity gradually diminishes as the inflammation advances, until—when hepatization is perfect—they have entirely disappeared. As the hepatization recedes, so the chlorides reappear; continuing to increase as convalescence favorably progresses. Dr. Redtenbacher further observed that the more intense the inflammation, the greater was the diminution in the chlorides; while the rapidity or slowness of their decrease or increase was in constant relation to the rapid or slow course of the disease. Dr. Beale, in confirming the important views of Redtenbacher, says: "There is reason to believe that the absence of the chloride of sodium from the urine during the stage of hepatization depends upon a determination of this salt to the inflamed lung; and that when resolution occurs, this force of attraction ceases, and whatever salt has been retained in the lung is reabsorbed, and appears in the urine in the usual way."† It must be remembered, however, that a deficiency of chloride of sodium, or its total absence from the urine, is not peculiar to cases of pneumonia, nor even to acute inflammations generally. According to Neubauer and Vogel, the diminution depends chiefly upon the loss of appetite, and the saltless nature of the diet of the patients;

* Nitrate of silver, added to healthy urine, throws down a whitish precipitate which consists of chloride and phosphate of silver. A few drops of nitric acid will dissolve the phosphate, leaving the insoluble chloride. The chloride of silver is readily soluble in a little ammonia. Nearly all the chlorine contained in the urine occurs as chloride of sodium.

† Medico-Chirurgical Transactions, vol. xxxv, p. 375. London, 1852.

in addition to which there are occasionally abstractions of chlorine from the blood, as in diarrhœa, exudations, and pneumonic sputa.

Occasionally, in depressed constitutions, acute inflammation of the lung terminates in *diffused* or in *circumscribed gangrene*. Sphacelation may also arise from other conditions than pneumonia; as, for example, from tubercle, cancer, hemorrhage, the presence of morbid poisons in the blood, and disease of the brain causing perverted innervation of the lungs. It occasionally occurs in children after the eruptive fevers, or as an accompaniment of cancrum oris. The characteristic symptoms of such an occurrence are an intolerably fetid state of the breath, resembling the odor which proceeds from external gangrenous parts; together with dyspnœa, and very great prostration. The physical signs are those of softening and excavation of the pulmonary tissue. The disease is usually more extensive and progresses more rapidly in diffused than in circumscribed gangrene. Unless the mortified portion be small, death will in all probability result.

Chronic pneumonia may occur as a sequel of the acute disease; giving rise to persistent consolidation of a portion of the pulmonary tissue, which may be mistaken for solidification resulting from tubercular deposit. This error is the more likely to be made, since the general symptoms are partly those of phthisis; such as weakness, emaciation, cough, a sense of oppression within the chest, attacks of feverishness, and loss of appetite. Iodide of potassium and bark, or iodide of iron, or ammonia and bark, cod-liver oil or glycerine, and good diet, are the remedies to be trusted to.

Pneumonia may affect one lung or both; or, technically speaking, may be double or single. The right lung suffers from inflammation nearly twice as often as the left; about once in eight cases both are affected. The lower lobes are more obnoxious to inflammation than the upper. The average duration of the disease, when uncomplicated, is about fourteen days: when complicated, not less than twenty-one days. Mild cases, unless subjected to heroic treatment, are often fairly convalescent on the ninth day. In fatal instances death occurs between the sixth and twentieth days. Pneumonia destroyed life in 26,486 cases in England, during the year 1858; the mortality being greatest in the winter quarters. In 1862, the number registered was 23,713. (See p. 340.)

Pneumonia without bronchitis is probably never seen. It may happen with or without pleurisy: when the pneumonia forms the chief disease, the double affection is termed *pleuro-pneumonia;* when the pleurisy predominates, it is sometimes called *pneumo-pleuritis*.

The *treatment* of pneumonia remains to be considered; though, after what has been said in speaking of the remedies for inflammation, only a few remarks are called for. Bleeding, tartar emetic, and mercury, are the agents on which we have been mainly taught to rely; but these remedies will, I feel convinced, do much more harm than good if applied to the treatment of pneumonia in the present day. It is the more necessary to insist upon this point, because some of our text-books still advocate depletion. In recommending the adoption of a very simple line of practice, I am only doing that which my experience has taught me is much the best, not only for the ultimate safety of the patient, but even for diminishing the duration of the disease. I am quite alive to the argument that whereas our ancestors bled too much, we may fall

into the opposite error, and bleed too little; but whatever may be said upon this head, it can only be replied, that the practitioner is advised not to have recourse to antiphlogistic remedies in the treatment of pneumonia, because it is firmly believed that their use always retards, and often prevents, restoration to health.

When the case is first seen, attention must be paid to the bowels, a dose of castor-oil being given if necessary. The most perfect quiet in bed is then to be enjoined; the air of the sick-room being kept moist by the evaporation of boiling water, while the temperature should not be allowed to fall below 65° Fahr. From thirty to sixty minims of the liquor ammoniæ acetatis, freely diluted, may be given every two, three, or four hours, according to the action of the skin, with or without a few drops of wine or colchicum; while small doses of opium are also to be administered, if there be pain or restlessness. The vapor of chloroform may occasionally be used to relieve the cough and dyspnœa; but I have had no experience in the treatment by full inhalations repeated every three or four hours. When the patient's constitution is feeble, a draught containing an excess of ammonia, according to F. 212, is to be ordered. At the same time, large linseed-meal poultices or poppy-head fomentations are directed to be properly used over the affected side; or if the pain be bad, recourse may be had to turpentine stupes night and morning. All that is necessary besides is a light diet with a free supply of cold water; together with strong beef-tea, and wine or brandy, as soon as there are any indications of greater weakness than the patient can support. When the crisis occurs by sweating or by diarrhœa, care must be taken not to check it unnecessarily; while during convalescence milk, raw eggs, animal food, and wine may be allowed. Few tonics will then be more useful than ammonia and bark (F. 371); followed subsequently by quinine and steel (F. 380), with perhaps codliver-oil.

In some very severe cases the only question is how to keep the patient alive, until the exudation-matter occupying the air-cells becomes absorbed. Under these circumstances brandy is invaluable; but it must be freely administered,—possibly even to the extent of half an ounce every thirty minutes, for one or two days. The essence of beef (F. 3) may also prove useful.

Should the inflammation end in *gangrene*, stimulants and tonics will be especially needed. When the odor of the breath is very offensive, the solution of chlorinated soda (F. 76) may be prescribed. Dr. Skoda, of Vienna, has published several cases in which the symptoms gave way on the use of terebinthinate vapors and the free exhibition of quinine. The inhalations are made by pouring oil of turpentine on boiling water; the vapor being inspired for about fifteen minutes every two or three hours. Brandy, and nourishment in as large quantities as can be borne, will be required.

XVII. PHTHISIS.

Tubercular phthisis, or pulmonary consumption, is a constitutional disease manifesting itself especially by certain very important changes in the lungs.

Phthisis (*Φθίω*, to waste away) may be acute or chronic.—The *acute* form is very rare. It commences suddenly with shivering, fever, rapid pulse, pain, cough, and dyspnœa; soon there is hectic fever, profuse sweating, and diarrhœa; there is rapid degeneration of the lung substance, so that small cavities form rapidly; the increasing emaciation becomes daily more perceptible; and death may happen from exhaustion within as few a number of weeks as from three to twelve from the commencement of the disease. Generally the tubercular deposit is spread all through the lungs; while instead of being at first deposited in the upper lobes, it often begins in the middle and lower ones. Acute pulmonary consumption now and then occurs as the sole morbid state; or it may set in during the progress of chronic phthisis; or it occasionally proves the termination of some chronic malady, as was the case in a lady long under my care with pelvic abscess.—*Chronic* phthisis is that variety which is ordinarily met with; the symptoms, diagnosis, &c., of which will presently be detailed.

Pathology.—The origin and formation of tubercle has already been considered in the section on Tuberculosis. It is only necessary to mention, therefore, that in phthisis the tubercular deposit takes place in the areolar tissue between the air-cells, in the air-cells themselves, and in the smaller bronchial tubes communicating with them; and that wherever a speck of this matter is deposited from the blood, it continues to increase by constant addition. In its hard state it is called crude tubercle. After a time, inflammation arises in the pulmonary substance surrounding the deposit, suppuration occurs, the tubercular matter softens and breaks down, and at length is gradually expelled through the bronchi, trachea, and mouth, leaving cavities or excavations behind, of various sizes. Sometimes the cavities close and heal: more frequently tubercular matter continues to be deposited on their sides, and in other parts of the lungs, until these organs become diseased to an extent incompatible with the continuance of life.

A more or less abundant deposit of tubercle is, at times, to be found in other organs as well as in the lungs. Thus, in many cases of pulmonary consumption, this material may be detected in the tissues of the intestinal canal, mesenteric glands, kidneys, peritoneum, liver, spleen, bronchial glands, heart and pericardium, or of the nervous centres. Moreover, fatty degeneration of the liver is a frequent accompaniment of phthisis; while less commonly the muscular fibres of the heart, and the middle coat of the aorta or other vessels, are found in a similar state of deterioration.

Symptoms.—The general symptoms of phthisis are gradually increasing cough, hæmoptysis, debility, expectoration, loss of appetite and a dislike to fatty food, dyspepsia in some form or other, acceleration of the pulse, pyrexia, slight dyspnœa, loss of flesh, sweating, and diarrhœa. Weakness of the voice or hoarseness is not uncommon. A mark at the reflected edge of the gums, usually deeper in color than the adjoining surface, and producing a festooned appearance by the accuracy with which it corresponds to the curve of the gingival border, has been observed to be very frequently present in these cases.* A dull aching

* Clinical Lectures on Pulmonary Consumption. By Theophilus Thompson, M.D., F.R.S., &c. London, 1854.

pain under the clavicles or scapulæ is often complained of, even when the amount of tubercle is small. Sometimes, especially in males, fistula in ano is one of the earliest symptoms; a complication which, when left alone, becomes highly injurious.

Pulmonary consumption ordinarily sets in with a short dry cough, which the patient often refers to the trachea. It is doubtless due to tubercular deposit irritating the bronchial membrane; it may continue some time without being aggravated, or without the supervention of any other symptom; and each paroxysm is followed by the expulsion of a little thick and semi-purulent expectoration. In other cases, the cough is loose, hollow, and less severe; being succeeded by a copious frothy phlegm, derived from the congested mucous membrane of the bronchi. In about 50 per cent. of the cases, there is hæmoptysis; which, recurring at variable intervals, gives the patient the first unmistakable intimation of the disease. It occurs much more frequently in the first, than in the second or third stages. The hemorrhage varies in amount from one or two drachms to the same number of pints. It may indeed be so considerable as to kill *directly* or *indirectly*. Dr. Walshe states that his analyzed series of 131 cases of phthisis furnishes but two examples of such mode of death. In one, death was direct from asphyxia, owing to the plugging of the trachea and bronchi with blood; in the other, it occurred from exhaustion at the end of five days.*

Among other symptoms, the patient complains also of languor; slight exertion—ascending a hill or going up stairs—causes fatigue, hurries the breathing, and often gives rise to palpitation; the uterine functions are more or less disturbed in women; and the liver often becomes congested and tender. The tongue gets red and irritable; and aphthæ frequently form about the mouth and fauces. The mucous membranes of the bronchi, larynx, and pharynx are also very apt to become affected with a low form of inflammation; while occasionally tubercle is deposited in the submucous tissue of these organs, leading to ulceration and even extensive destruction. The latter is, I believe, most likely to occur when the fauces are relaxed and the uvula elongated; since the constant cough and irritation then set up prevent all attempt at reparation. It is also remarkable that in some cases the nails become incurvated, while the ends of the fingers get a peculiar round or clubbed appearance. The latter is referred by M. Labalbary to the imperfectly arterialized state of the blood, and to venous stasis in parts furthest removed from the centre of the circulation; in consequence of which stagnation, tubercular matter is deposited from the blood. In cyanosis, the digital extremities sometimes assume the same character.

While the disease has been gradually progressing, the cough and expectoration† have been increasing, and at length hectic fever appears.

* On Diseases of the Lungs, Heart, and Aorta. Second Edition, p. 505. London, 1854.

† "The microscopical elements of phthisical sputa"—says Dr. Walshe—"are very numerous. First, epithelium tessellated, cylindrical, and ciliated from the bronchial tubes; salivary fluid, and epithelium from the mouth. Secondly, blood-disks (even when no reddish tint exists to the naked eye), melanic cells and molecules, molecular fat, oil-globules, and saline matter, crystalline and amorphous. Thirdly, exudation-matter in patches, exudation-cells, and pus-cells. Fourthly, fragments of pulmonary fibre, capillary vessel and nerve. Fifthly, dark molecular matter, soluble neither in ether nor in hydrochloric acid, and probably tuberculous,—and, in very rare cases,

The debility quickly gets more marked; the countenance becomes frequently flushed; chilliness is complained of in the evening, while on awaking in the night or early morning the body is found bathed in a profuse sweat; the hair falls off; and there is loss of appetite, with thirst, &c. Moreover, in women, there is a total cessation of the catamenia; a very discouraging indication of want of vital power. The patient now rapidly loses flesh; diarrhœa—either due to disordered secretions, or to ulcerations of the mucous membrane of the ileum and colon—often sets in and increases the debility; the urine is sometimes found to contain albumen, and occasionally minute quantities of sugar; the lower extremities frequently become painful and œdematous; and death soon ends the scene, the mental faculties remaining clear until the last few hours.

In some cases perforation of the lung happens towards the close, and then the resulting pneumothorax greatly adds to the patient's sufferings. As Dr. Scott Alison points out, perforation is a natural consequence of progressive excavation; and were it not for the pleural adhesions, its occurrence would be almost unavoidable. This condition is readily recognized by the urgent dyspnœa which follows the formation of the aperture; by the tympanitic percussion-note; and by the occurrence (not constantly) of amphoric respiration, and metallic tinkling.

Diagnosis.—The attempt has been made by Dr. E. Smith to show that before the deposition of tubercle in the lungs, there is an abnormal physical condition of these organs and of the body generally, which manifests itself by certain indications. The physical signs of this so-called *pretubercular state* are very slight subclavicular dulness, diminished vesicular murmur, less forcible and deep inspiration, and flattening of the apices of the lungs. If there are also symptoms of dyspepsia present, with loss of weight, it seems to me that the evidence is in favor of tubercle having been actually deposited, rather than that it is only about to invade the lungs.

Many authors have divided the course of phthisis into three stages; a plan which is convenient, to say the least. During the *first*—that in which tubercles become developed in the lungs—neither the local nor the general symptoms warrant us in positively announcing the presence of any other affection than severe catarrh. If the tubercles be deposited, however, in considerable quantity, the infra- and supra-clavicular regions will be flattened; while there can likewise be observed defective expansion of the upper and front part of the affected side of the chest. The sound on percussion will be dull; or it may be morbidly resonant if the deposit extend from the costal surface directly to the trachea or large bronchi. There will be harsh or tubular inspiration; the act of expiration will be prolonged—from impairment of the elasticity of the lungs;—and *bronchial respiration* and *bronchophony* can be heard. A distinct bruit, synchronous with the systole of the heart, may sometimes

cells possessing the characters originally assigned by M. Lebert to those of tubercle: I have—at least occasionally—seen, in the opaque buff-colored striæ of comparatively clear sputa, cells non-nucleated and more angular in outline than those of exudation-matter. Sixthly, the vibrio lineola, and mycodermatous entophytes. Now the presence of fragments of tissue indicates breakage of the lung-substance, and may furnish its earliest evidence. The existence of tubercle-cells, if certain, is, of course, distinctive of phthisical disease. Otherwise, the characters enumerated have no precise diagnostic signification."—On the Diseases of the Lungs. Third Edition, p. 447. London, 1860.

be detected under one or both clavicles. Speaking from my own experience, I should say that this *subclavian murmur* was more frequently present on the left than on the right side. It may proceed from the left subclavian, the innominata, or from the pulmonary artery; and it is due to pressure exerted on the vessel from behind. Hence it is not distinctive of tubercular deposit in a crude state; though in practice it will be found that this is by far the most frequent cause, inasmuch as solidification of the lung's apex except from tubercle is rare.—In the *second* stage, the tubercles have increased both in number and size, so as to compress and obstruct the substance of the lung, and occasion dyspnœa; while they have also begun to soften and disintegrate. There is now marked depression of the infra- and supra-clavicular regions; the affected side is often contracted, owing to the destruction of the vesicular tissue by the pressure of the morbid material; there is a deficiency of movement; and there is a stooping, rounded back. The dulness on percussion is usually decided; though the note elicited may be normal, if the amount of tubercle be small and well surrounded by slightly emphysematous lung. On practising auscultation, *large crepitation* (*liquid* or *mucous râle*) will be distinct, and in the sound lung *puerile breathing*.—In the *third* stage, the softened tubercles are eliminated; they make an opening for themselves through some of the surrounding or involved bronchi, and being thus evacuated, they give rise to the formation of cavities. On inspection we observe a well-marked depression below the clavicle; the whole side is flattened and generally contracted; the intercostal spaces are much retracted; and the heart's impulse may be distinctly seen and felt to be most intense at a higher point than the normal one. Notwithstanding the existence of one large or of numerous small cavities, percussion almost invariably affords a dull sound; dulness existing even if the cavity (unless of great size) be empty, owing to the layer of lung forming the wall being dense and solid. Auscultation now elicits a peculiar sound, called *gurgling*, caused by the bubbling of air with the pus or mucus contained in the cavity. Gurgling, it must be remembered, may also arise from that rare disease, circumscribed abscess of the lung, as well as from the mixture of air with liquid in a dilated bronchus affected with chronic inflammation. When the cavity contains little or no liquid, we hear *cavernous respiration;* if it be large, *amphoric resonance* and *pectoriloquy* will also be distinguishable.

The *spirometer* is an instrument for measuring the volume of air expired from the lungs; and as this volume is always diminished in each stage of phthisis, we have a rough kind of aid to diagnosis, for which we are indebted to Dr. Hutchinson. The quantity of air expired after the most complete inspiration is termed by this gentleman the *vital volume* or the *vital capacity*. Now the vital capacity always increases with stature; it will also be slightly affected by weight, but not sufficiently, as a rule, to interfere with the correctness of the following table, which is intended to show the capacity in health and in the three stages of phthisis:*

* When the vital capacity is to be tested, the patient should loosen his vest, stand perfectly erect, take as deep an inspiration as possible, and then place the mouth-piece of the spirometer between his lips. The observer having opened the tap, the patient empties his lungs, making the deepest possible expiration; at the termination of which

Height.					Capacity in Health.	Capacity in Phthisis Pulmonalis.		
						1st Stage.	2d Stage.	3d Stage.
Ft.	in.		Ft.	in.	Cub. in.	Cub. in.	Cub. in.	Cub. in.
5	0	to	5	1	174	117	99	82
5	1	"	5	2	182	122	102	86
5	2	"	5	3	190	127	108	89
5	3	"	5	4	198	133	113	93
5	4	"	5	5	206	138	117	97
5	5	"	5	6	214	143	122	100
5	6	"	5	7	222	149	127	104
5	7	"	5	8	230	154	131	108
5	8	"	5	9	238	159	136	112
5	9	"	5	10	246	165	140	116
5	10	"	5	11	254	170	145	119
5	11	"	6	0	262	176	149	123

This table reads thus: A man whose height is between 5 ft. 7 in. and 5 ft. 8 in. should breathe in health 230 cubic inches: in the first stage of consumption this will be reduced to 154; in the second, to 131; and in the third, to 108 cubic inches.

Another very early, and therefore highly important, sign of pulmonary consumption is *loss of weight*. A slow and gradual fall is more serious than a rapid and irregular diminution in weight: *a steady loss always precedes tuberculosis*. Dr. Hutchinson, from an examination of 2650 healthy men at the middle period of life, has deduced the following table:

Exact Stature.		Mean Weight.				Weight increased by 7 per cent.			
Ft.	in.	St.	lbs.		lbs.	St.	lbs.		lbs.
5	1	8	8	or	120	9	2	or	128
5	2	9	0	"	126	9	9	"	135
5	3	9	7	"	133	10	2	"	142
5	4	9	13	"	139	10	9	"	149
5	5	10	2	"	142	10	12	"	152
5	6	10	5	"	145	11	1	"	155
5	7	10	8	"	148	11	4	"	158
5	8	11	1	"	155	11	12	"	166
5	9	11	8	"	162	12	5	"	173
5	10	12	1	"	169	12	13	"	181
5	11	12	6	"	174	13	4	"	186
6	0	12	10	"	178	13	8	"	190

This reads: A man of 5 ft. 8 in. should weigh, in his clothes, 11 st. 1 lb. or 155 lb. (14 lb. = 1 stone); he may exceed this by 7 per cent., and so attain 11 st. 12 lb., or 166 lb., without affecting his vital capacity; beyond this amount his respiration becomes diminished. According to M. Quetelet the average weight of the clothes at different ages is one-eighteenth of the total weight of the body, and one-twenty-fourth of that of the female.

In Dr. Robert Boyd's article on "Vital Statistics and Pathological Contributions,"* it is mentioned that the mean height of 141 adult male paupers, measured by Dr. Hutchinson in the Marylebone workhouse, was a little more than 5 ft. 3 in. and their mean weight 134 lbs. The mean height of the male consumptive patients has been nearly 4 inches more, and their weight nearly one-third less. Hence it would appear

the operator turns off the tap, thus confining the air in th ereceiver. The receiver is then to be lightly depressed until the surfaces of the spirit in a bent tube on the outside of the instrument are on a level with each other, when the vital capacity may be read off from the scale.

* The Edinburgh Medical and Surgical Journal, vol. lxi, p. 290. 1844.

that tall persons are most subject to consumption. Moreover, the immense loss of weight is in the muscular structure, several tissues, and framework; since Dr. Boyd shows that the internal organs were all heavier than the healthy standard.

Causes, &c.—Phthisis may be inherited or it may be acquired; it is not contagious. Of 1000 cases collected by Dr. Cotton, at the Consumption Hospital, 367 were hereditarily predisposed; 582 were males, and 418 females. The left lung suffers more frequently than the right; in Dr. Cotton's cases the left lung was affected in 455, the right in 384, and both in 161.—The apices and posterior parts of the upper lobes of the lungs are ordinarily the situations in which the deposit first takes place. In some few instances, however, the development of tubercles begins at the base of the lung, and gradually extends upwards. As these cases sometimes manifest the physical signs of pneumonia, especially persistent minute crepitation, they have not unfrequently been erroneously treated. To avoid this mistake it is only necessary to observe that the general symptoms are not those of inflammation, but of steadily increasing depression.

No period of life is exempt from this scourge. I have already shown that in the year 1862, considerably more than one-fourth of the whole number of deaths in England were due to consumption and other diseases of the respiratory organs (see the section on *Tuberculosis*). Insufficient and bad food, impure air, confinement, deficiency of light, immoderate indulgence of the sensual passions, the poison of syphilis, and indeed whatever produces nervous exhaustion or impoverished blood, may be regarded as frequent causes. Its ordinary duration varies from about six to twenty-four months: it very rarely proves fatal in less than three months, unless indirectly from severe pneumonia or pleurisy.

Treatment.—This resolves itself into that necessary for the prevention of phthisis, and that to be adopted to stay its course when it has once developed itself. As regards prevention, I need only refer to the observations which have been made in the section on Tuberculosis.

When the disease is present—when tubercles have become developed in the lungs, we must endeavor to *improve the general nutrition*, by attention to the quantity and quality of the food, by enjoining residence in a healthy climate (not necessarily a warm one), by ordering exercise in the open air, by taking care that the patient never sits or sleeps in a vitiated atmosphere, by advising warm clothing, by recommending daily tepid sponging with friction of the skin, and by the administration of cod-liver oil. The patient's system should in no instance be lowered; and even during those temporary exacerbations of fever which occur in the progress of every case, it will only be necessary to substitute salines and diuretics in the place of tonics, for a day or two, to speedily give relief. The irritation and weakness produced by fistula in ano are much more injurious than the simple operation of laying open the sinus with division of the sphincter, while the patient is under the influence of chloroform; and consequently the old-fashioned rule of not interfering in these cases should be disregarded, especially if the lung disease be comparatively slight. On the same principle I have not hesitated to remove uterine polypi: while in one instance I even operated (23d March, 1861) on a case of vesico-vaginal fistula, where the lungs contained tu-

bercle; the cure of the opening which resulted not only having been the means of relieving the sufferer from constant distress, but in all probability also of prolonging her life, for death did not take place until the 18th of June, 1862.

As regards the *diet* in phthisis, only the most nutritious food ought to be allowed; an animal diet being absolutely necessary, so long as the powers of the stomach and alimentary canal are sufficiently strong to digest and assimilate it. When the strength of the digestive organs fails, and when there is acidity of stomach, pepsine (F. 420) with the two principal daily meals, should be ordered. Milk and cream are very nutritious, and so are raw eggs (F. 5, 15, 16). The addition of a teaspoonful of the saccharated solution of lime to a tumblerful of milk will often allow this fluid to pass uncoagulated into the duodenum, when it would not otherwise do so. A small allowance of brandy, or a moderate quantity of wine, or of good bitter ale, or of Scotch ale, or of Guinness's stout, may always be advantageously permitted. Too long an interval should not elapse between each meal; it being much better to take food rather frequently, instead of making one or two heavy meals in the day.

Change of air and scene is an important element in the treatment; though it must be remembered that this change is to be resorted to only in the early stages and in chronic cases, for it is cruel to send patients away merely for them to die. When softening of the tubercles has begun, it will generally be too late to expect much benefit; and certainly naught but mischief can ensue from depriving a sufferer of the comforts of home when extensive cavities have formed.—Phthisical subjects sometimes imagine that change of climate is *the* remedy, instead of being only *one* of the steps which favor the accomplishment of a cure. Consequently such persons on leaving home should be cautioned to act with prudence; to avoid high living and over excitement; to take open-air exercise in moderation, and not to walk up high hills exposed to the sun's glare; to attend to the skin, and the proper action of the bowels; to wear flannel next the body, and to be provided with proper clothing so as to guard against sudden changes of temperature; and to keep regular and early hours, always being indoors between sunset and sunrise. Moreover, they are not to give up the use of such drugs as steel, cod-liver oil, bark, &c., if these have been found beneficial at home.—The chief circumstances which render it advisable for a patient to return home, are—the persistence of diarrhœa or dysentery, increased debility, serious disturbance of the functions of the liver, or any symptoms of a disposition to ague. In women, change of climate often disorders the uterine functions; when it is especially necessary that any tendency to menorrhagia be checked, since it will otherwise form a serious complication. Even a leucorrhœal discharge is very weakening; and therefore attempts ought to be made to stop it by astringent injections.

Torquay (F. 436 η), the *Undercliff of the Isle of Wight* (F. 434 β), *Sandgate* (F. 431 δ), *Hastings* (432 a), and *Penzance* (F. 437 a), are places in our own country admirably adapted for the winter residence of those consumptive invalids who need a relaxing or sedative atmosphere. But if a more bracing air be suitable we may recommend *Brighton* (F. 432 γ), *Southport* (F. 439 a), *Queenstown* (F. 440 β), or

the Western coast of Scotland (F. 441). Frequently a more complete change of climate is wished for by the patient, who longs for a clear atmosphere and a cloudless sky. We may then send him to *Mentone* (F. 443 ι), *Cannes* (F. 443 ζ), *Ajaccio* (F. 444), *Malta* (F. 449), *Malaga* (F. 455 ε), or to *Algiers* (F. 451). The mild and equable temperature of *Madeira* (F. 452 β) renders it a fitting residence for patients whose pulmonary disorder is aggravated by an irritable condition of the mucous membrane of the larynx and bronchi; while it is also useful for invalids threatened with consumption. The colony of *Natal* (F. 453 β) is particularly healthy, and is certainly deserving of trial. There are many phthisical invalids who are always worse in warm than in cold weather; and for such *Canada* (F. 454 α) might offer a good residence. And, lastly, where a sea voyage is indicated I have found no change so beneficial as a trip to *Australia* or *New Zealand* (F. 574), in a well-appointed vessel. While writing these pages (August, 1864) I have received a letter from a gentleman who reached New Plymouth on the 24th of March, in tolerable health. At the end of last summer he was obliged to be brought from Hastings in an invalid carriage; so shattered, by a prolonged attack of hæmoptysis, that he could scarcely turn himself in bed. Had he remained in England during the inclement winter of 1863–64, I believe he would have died before its close. Yet he improved directly he got to sea at the end of November; and was able to be on deck for some hours every day during the voyage, suffering no inconvenience whatever until the provisions began to run short, and diarrhœa returned to a slight extent.—Even the anticipation of the change from a dreary sick-room buoys up hope, and seems to renovate the system. And though a passage of some eighty days appears long, yet I have found patients wonderfully like Mr. Micawber; who when he was going from London to Canterbury talked as if he were proceeding to the farthest limits of the earth, and when he went from England to Australia spoke as if he were taking a little trip across the Channel. As our old friend said,—"It's merely crossing. The distance is quite imaginary."

With respect to *drugs*, there are certain agents which must be especially mentioned. *Cod-liver oil* (F. 389) is a most valuable remedy: it nourishes the body; diminishes the cough, expectoration, and night-sweats; and there is every reason to believe, checks the fresh exudation of tubercular matter. In the beginning, a teaspoonful should be given twice or thrice daily, and gradually increased to a tablespoonful four or five times a day; remembering that it will be more easily digested if taken directly after the meals. If there be much acidity of stomach, the oil may be combined with liquor potassæ; or if it produce nausea, a drop of creasote can be added to each dose. When there is great rapidity of the pulse, ozonized oil, as recommended by Dr. Symes Thompson and his father, is deserving of trial; for in twenty cases, in which it was administered by the former gentleman, the pulse was reduced more than twenty beats a minute in eleven, and to a less extent in seven of the remainder. Where the stomach will not tolerate any form of cod-liver oil, enemata containing it may be resorted to; or this agent may be introduced into the system by inunction (F. 283), and by applying lint saturated with it to the chest. Inunction with the best sperm oil has also proved rather useful in my hands.—*Glycerine* is cer-

tainly very inferior in its effects to cod-liver oil, while it often has the disadvantage of relaxing the bowels; but it may at times, and in exceptional cases, be found efficacious. The dose varies from one to four teaspoonfuls two or three times a day; and it may either be given with some bitter infusion, or with the syrup of iodide of iron, or with quinine, or with the tincture of perchloride of iron, &c. (F. 392).

The various preparations of *iron* (F. 380, 394, 397, 401, 403, 405, &c.) are very useful in many cases; especially during the second and third stages of the disease, provided there be neither hæmoptysis with a full pulse, nor pulmonary congestion. Supposing the use of steel to be indicated where there is hæmoptysis, no preparation will be found more useful than iron alum (F. 116). *Iodine* and its compounds—especially the iodide of potassium—have been highly praised: the iodide of iron is the best preparation, though I have but little faith in it. *Bark* is an excellent tonic; and I have frequently seen much good from giving one or even two drachms of the compound tincture three or four times in the twenty-four hours. *Liquor potassæ* is often beneficial in the early periods, particularly combined with bark (F. 373); but it is a less favorite remedy with me than the *carbonate of ammonia* (F. 371). Dr. J. F. Churchill regards *phosphorus* in certain combinations as a specific. Without indorsing this extreme view, I am bound to say that the hypophosphite of soda (F. 419) has been of great use in some instances, particularly when the disease has been in an early stage. Whether other remedies might not have proved equally beneficial in these cases, I cannot determine; for having once put a phthisical patient on a plan under which his symptoms are becoming ameliorated and his weight decidedly increased, I am only too glad to leave well alone. When the cough is severe, small doses of *opium* or *morphia*, frequently repeated, give relief: when there is troublesome hæmoptysis, the *oil of turpentine*—℥ x every hour—often checks it; or *ammonio-sulphate of iron* (F. 116), or *gallic acid* (F. 103) may be tried: when the heart's action is irritable, it may be controlled by *hydrocyanic acid* with or without small doses of *digitalis:* if the night-sweats weaken and annoy the patient, they may often be checked by *gallic acid*, or by the *mineral acids with bark*, or especially by the *oxide of zinc* in four or five-grain doses at bedtime: while the diarrhœa, when urgent, must be stopped by *catechu*, *logwood*, the *powder of kino and opium*, the *enema of opium* of the British Pharmacopœia, or by F. 96, 97, 105, 106, 108, 113, &c.

Counter-irritation to the chest by dry-cupping, or the use of the croton-oil liniment (F. 303), or a succession of small blisters, or frequent sinapisms, or turpentine stupes, and particularly the officinal iodine liniment diluted with an equal proportion of tincture of aconite, often gives relief. In some instances blisters kept open for weeks with savine ointment or Albespeyre's plaster (F. 208) have proved useful, particularly when the tubercle is near the surface with adhesions between the pulmonary and costal pleuræ. When there is much laryngeal irritation, sponging the epiglottis, back of the pharynx, and even the interior of the larynx, with a strong solution of nitrate of silver, serves to ease the breathing and to diminish the dysphagia.

And, lastly, it only remains to say that pyro-acetic spirit or naphtha, administered by the stomach or by inhalation, has been highly but un-

deservedly praised, since it more frequently does harm than good. While naught but mischief can result from the use of arsenic, oxalic acid, phosphate of lime, oxygen gas, daily emetics, frequent small bleedings, antimony, mercury, and colchicum—although each has found an advocate.

XVIII. CANCER OF THE LUNG.

Pulmonary cancer, most commonly of the encephaloid kind, is a rare disease: it may occur either as a primary infiltration, or as a secondary nodular deposit. It is generally associated with mediastinal cancer.

When the disease occurs *primarily*, the symptoms will vary with the extent of the infiltration. There will, however, often be found—flattening of the affected side, impairment of the respiratory movements, and dulness on percussion. Moreover, pain, emaciation, night-sweats, failure of the powers of life, dyspnœa, cough, purulent expectoration—often mixed with blood, and of a dark color—and sometimes fetor of the breath, will be present: chronic bronchitis also frequently complicates the disease.

In *secondary cancer* the symptoms are very obscure; indeed dyspnœa is often the only indication afforded during life. Both lungs are usually affected. In an example of cancerous infiltration of the penis, with secondary deposits in the lungs and elsewhere, the chief indication of pulmonary mischief was that the man could not inhale chloroform without showing alarming symptoms of collapse. In the course of a month he died. On examination afterwards it was found that the whole penis was occupied by soft cancerous deposit; that there was a cancerous ulcer of the bladder; cancerous deposits in the lungs and bronchial glands; and that several of the bones were similarly affected. The heart was in a state of extreme fatty degeneration. The patient was in St. Bartholomew's Hospital under the care of Mr. Holmes Coote.

The weight of each lung in health is about 1¼ lbs., the right being rather heavier than the left. In cancer, without much apparent increase in bulk, the weight may rise to 5 or 6 lbs. Cancer and tubercle but rarely coexist. Dr. Walshe states that the mean duration of cancer of the lung may be estimated at 13.2 months; the longest 27 months, the shortest 3.5 months.

As regards the treatment, we can only attempt to relieve the symptoms as they arise; while we try to support the strength by nourishing food, cod-liver oil, and stimulants, as long as possible.

XIX. PERICARDITIS.

Pericarditis (*Περί*, about; *καρδία*, the heart; terminal *-itis*), or inflammation of the external fibro-serous covering of the heart, may be regarded as a local manifestation of constitutional disease. It occurs most frequently in connection with some special disorder of the system, such as—acute rheumatism, Bright's disease, ichorhæmia, or scurvy.

Pathology and Morbid Anatomy.—The inflammation may end in resolution. More commonly there is effusion of serum, the quantity varying from a few ounces to three or four pints. Lymph may also be extravasated with or without the serum. This lymph sometimes forms a false membrane, covering the heart and lining the pericardial sac; the thickness of the exudation being variable, but usually measuring some two or three lines, while it often presents a peculiar irregular or honeycomb appearance. And then, in cases occurring in depressed constitutions, the inflammatory action is very likely to end in the formation of pus; such instances generally end fatally.

In severe cases, the muscular walls of the heart are very often involved in the morbid action. So also endocarditis frequently arises during the course of rheumatic pericarditis. White patches of lowly-organized fibrin may be found after death, effused either into or upon the tissue of the pericardium, especially that part covering the right side of the heart. They are of no importance, and are probably due to the friction arising from the cardiac movements.

The sac of the pericardium is sometimes obliterated from adhesion of its free surfaces; a condition which generally arises from inflammation of a chronic rather than of an acute character, occurring for the most part in strumous subjects. Occasionally there are only partial adhesions, obliterating the sac in parts; in such instances, the adhesions being most common at the base. Obliterated pericardium is not unfrequently found with a healthy condition of the heart, but when there is an alteration in the muscular structure, the left side of the heart is by far the most frequently affected; the cavities being generally dilated with hypertrophy of the walls. In a less number of examples of adherent pericardium, however, the heart has been found partially or entirely atrophied: this condition probably existing when the adhesions have been so thick as to compress the organ. Lastly, together with the adhesions there may be fatty degeneration of the heart's texture.

Causes.—It frequently arises from acute rheumatism, from the contaminated state of the blood produced by renal disease, from damp and cold, and from mechanical injuries. In acute rheumatism, probably one case in nine or ten will be complicated with pericarditis: in Bright's disease the proportion will possibly be only one in fifteen or twenty. The tendency to cardiac complication in rheumatism diminishes with increase of age after fifteen.—Dr. Ormerod reduces all cases of pericarditis to two classes: 1. Rheumatic pericarditis; 2. Non-rheumatic pericarditis. In the first, the disease is always well marked, it is associated with affections of the joints, women appear rather more subject to it than men, it is most common in the young and delicate, and it is rarely directly fatal: in the second, the inflammation occurs at a later period of life, is most common in men, occurs most frequently in bad constitutions, and is very often the cause of death. Moreover, non-rheumatic pericarditis may be due to some local irritation, as cancer, tubercle, &c.; or it may arise from some constitutional cause, as disease of the kidney, scurvy, typhoid fever, pleurisy, pneumonia, pyæmia, or one of the eruptive fevers.

Symptoms.—There is a considerable difference in the nature and degree of the symptoms; for while sometimes they are so slight that the disease escapes detection during life, in other cases they are strongly

marked. When there is merely a slight exudation of fibrin, or when the serum thrown out has been rapidly absorbed and adhesions early effected, the patient may simply experience a feeling of fever and oppression; but when there is abundant effusion pressing upon the heart and embarrassing its movements, or when there is coexistent myocarditis, then both the local and general symptoms are much more decided. Thus, in these latter instances, there may be high fever; pain referred to the region of the heart, often darting through to the left scapula, upwards to the left clavicle and shoulder, and down the arm; violent palpitation, the motions of the heart being tumultuous, and perceptible at a distance from the patient; irregularity of the pulse; hurried respiration; incapacity of lying on the left side; strong pulsation of the carotids; anxiety of countenance; difficulty in swallowing; with frequently noises in the ears, giddiness, and epistaxis. As the disease advances, there is extreme debility, cough, suffocative paroxysms, occasionally a tendency to syncope, and œdema of the face and extremities; the heart's action also becomes much weaker, the impulse irregular and trembling, and the sounds weakened and altered in character. In very severe cases indications of disturbance of the nervous centres frequently show themselves; especially great restlessness, distortion of the features, tetanic spasms and furious delirium.

The uncertainty of the general symptoms of pericarditis makes it all the more necessary that in every instance where the occurrence of this disease is feared, the physical signs which indicate its commencement should be carefully watched for. On practising auscultation, we shall find—in the earliest stages—increased intensity of the natural sounds; if endocarditis coexists, as it so frequently does, a loud systolic *bellows-murmur* will also be heard. Very early, too, a distinct *alternate rubbing* or a *to-and-fro sound*, as Dr. Watson terms it, will be audible. The bellows-sound indicates fibrinous deposits in the texture as well as on the surface of the valves, from inflammation of the internal membrane of the heart—the endocardium—and it generally continues for life. The to-and-fro sound is evidence of inflammation of the pericardium, and it commonly ceases in a few days, when either adhesion between the two surfaces of the membrane takes place, or when effusion happens. The pericardial friction-sound may so closely simulate valvular murmur that it is sometimes difficult to distinguish between the two; while it is probable that a full development of the friction-sound can only take place when both divisions of the pericardium are the seat of plastic exudation.

Where serous effusion occurs, there will be a feebleness and deficiency of tone and force in the heart's sounds, probably owing to the deadening influence of the fluid surrounding the heart. There must also be increased dulness on percussion in the cardiac region; the dulness extending upwards to the level of the second rib or clavicle, though but little below the healthy limits downwards; while the dull region may also change its extent from day to day. Hypertrophy of the heart, as well as serous effusion, may produce præcordial bulging; though there may be a large quantity of fluid poured out without this bulging being present. In hypertrophy of the heart, the percussion-dulness is extended in all directions, and remains stationary. In cases of effusion, also, it has been specially insisted upon that an undulatory or vermicular move-

ment accompanies the cardiac impulse; but this motion has also been seen where no serous effusion existed—in enlargement of the heart, and in adherent pericardium. If the fluid does not become absorbed, we say that *hydro-pericardium* exists; a dropsical affection which usually proves fatal. Only when the friction-sound is loud will it be sensible to the touch; since a more powerful rubbing is needed to produce a tactile than an audible phenomenon.

If we classify the physical signs of pericarditis, they will be as follows: 1. Sensations of friction communicated to the hand. 2. Friction-sounds; the "attrition murmurs" of Hope. 3. Extension of dulness over the heart, resulting from liquid effusion. 4. Friction-signs, attended with—or preceded by—valvular murmurs. 5. Signs of eccentric pressure analogous to those of empyema. 6. Signs of excitement of the heart. 7. Signs of weakness or paralysis of the heart.

Prognosis.—Pericarditis—especially the rheumatic variety—is not so much to be feared for its immediate danger, as for the traces of permanent injury which it leaves behind. The endocarditis that so frequently accompanies it, especially produces mischief to the valves of the heart. Hence an individual, after apparent recovery, seldom finds himself as strong or hearty as he was before the attack; he suffers occasionally from cough and shortness of breath, together with palpitations of the heart on moderate exertion. Sometimes the symptoms remain latent for a few years; that is to say, they are not appreciable to the patient, who flatters himself that he is free from all traces of his attack. But after a time—much shorter in those who have to work hard for their daily bread, than in the well-to-do members of society—the health begins to fail: the weakness, difficulty of breathing, and palpitations return: dropsical symptoms set in: or perhaps an attack of inflammation takes place, and proves fatal.

Treatment.—In no disease was the lancet used with a more unsparing hand only a few years since, than in inflammation of the pericardium. More extended experience has proved to us, however, that this heroic and sure method—as it was deemed—of extinguishing the morbid action, is not only uncertain, but often very dangerous. Dr. Markham well says, "Experience has also shown us that venesection has no *directly* beneficial influence over pericarditis; and that large bleedings are prejudicial, and therefore inadmissible in this disease. Nevertheless, that small bleedings are often of very great service *in relieving the congestions of the heart and lungs*, which so often arise as consequences of and coincidently with the pericarditis, is, I think, an undoubted fact."* Then we were also taught the great importance of rapidly getting the system under the influence of mercury after bleeding; but the observations which have already been made (p. 87) upon this head, render further remarks unnecessary.

The treatment which I adopt is that practised by many for the relief of acute rheumatism,—the three principal remedies being the bicarbonate of potash in half-drachm doses every two or three hours, opium in sufficient quantities to relieve pain and restlessness, and the vapor-bath. Locally, poppy fomentations or hot linseed-meal poultices are useful. From these agents I believe that I have seen the greatest benefit; and

* Diseases of the Heart; their Pathology, Diagnosis, and Treatment. Second Edition, p. 45. London, 1860.

certainly in no instance have they been prejudicial. They give considerable relief to the patient's sufferings, without inducing debility; and they in no way complicate the symptoms. The quantity of opium which may be needed, will vary with the severity of the suffering; but usually full doses—about one grain every three or four hours—are wanted. Sometimes a single vapor-bath suffices: in other cases, it is necessary to repeat it daily, for three or four times. Alkaline drinks (F. 355, 356, 360) are also refreshing and do good. In pericarditis from a punctured wound, any treatment beyond the administration of opium and the ordering of perfect rest, can only tend greatly to diminish the chances of recovery.

In most cases it will be necessary to administer a few doses of some purgative: the neutral salts (F. 141, 148, 150, 169) generally agree well. At first the nourishment should be light, consisting of gruel, arrowroot, milk, and mutton-broth. Directly the strength begins to fail, however, the diet must be made more strengthening; and soup, strong beef-tea, and wine freely allowed. Dr. Stokes states that he is convinced patients are often lost from want of stimulants at the proper time: and he directs us to give support directly the pulse becomes feeble or intermittent, or the jugular veins appear turgid, or pallor and coldness of the surface set in, or a tendency to faint upon exertion is manifested. "It may be laid down as a general principle, that there is no local inflammation whatever, the mere existence of which should prevent the use of wine, if circumstances require it. In two cases especially—namely, cerebritis and pericarditis, we find the greatest timidity in practice with respect to the use of wine. Yet even in the first case it may be required; and in the second its employment is imperative, when, as too often happens, excessive depletion has been resorted to."* Absolute repose of body and mind, in all cases, is important.

When the effusion into the pericardium is abundant, a large blister should be applied over the præcordia; or a succession of blisters may be necessary. The iodide of potassium (F. 31) has been advantageously administered to promote absorption. It has been proposed —as a forlorn hope—in obstinate hydro-pericardium, to remove the fluid by the introduction of a trocar and canula. M. Aran, Physician to the Hôpital St. Antoine, Paris, relates a case of pericarditis with copious effusion, in a young man aged 23, which he treated by an injection of iodine. The pericardium was punctured from below upwards, with a capillary trocar, in the fifth intercostal space, a little below the spot where the dulness on percussion was well marked: about twenty-eight ounces of a transparent reddish serum were removed. A mixture formed of four drachms of tincture of iodine, fifteen grains of iodide of potassium, and an ounce and a half of water, was then injected without causing any pain: a drachm or two being allowed to escape before closing the wound. The fluid having reaccumulated, the operation was performed the second time, at the end of twelve days, giving outlet to forty-nine ounces of a greenish-albuminous fluid; a stronger injection then being employed, formed of equal parts (fl. drs. xij) of tincture of iodine and water, with sixty grains of iodide of potassium. The treatment was successful.†

* The Diseases of the Heart and the Aorta, p. 88. Dublin, 1854.

† Lancet, p. 407. 12th April, 1856.

XX. ENDOCARDITIS.

Endocarditis (*Ἔνδον*, within; *καρδία*, the heart; terminal *-itis*), or inflammation of the whole or of a part of that delicate membrane which lines the interior of the heart and its valves, is of great interest to us as pathologists and physicians, owing to the severe organic diseases that so constantly spring from it.

Inflammation of the endocardium is most commonly associated with acute rheumatism. Dr. Hope was of opinion that endocarditis more frequently occurs without pericarditis, than the latter without the former. Dr. Stokes has come to a different conclusion, and he places these diseases in the following order of frequency: 1. Acute pericarditis with endocarditis; 2. Acute pericarditis without endocarditis; and 3. Endocarditis without pericarditis. It is certain, however, that *endo-pericarditis* is more frequently met with than simple endocarditis.

Symptoms.—In very severe instances it chiefly gives rise to a sense of oppression and uneasiness at the præcordial region; the patient prefers to lie on his back, and he is restless and anxious; there is fever, with a small and feeble and intermittent pulse; while there may be also cold sweats, oppressive dyspnœa, jactitation, and syncope. Where the inflammation is only of limited extent, or when it assumes a chronic form, the symptoms are much milder and more obscure; so that it not very unfrequently occurs during the progress of rheumatic fever without being recognized. Nevertheless, its power is manifested by the structural changes which remain after apparent recovery. Endocarditis of the left is much more common than of the right side of the heart; while that part of the membrane which covers the valves and lines the orifices is most prone to become affected. The disease is seldom directly fatal; its remote effects being those so much to be dreaded.

Diagnosis.—If we apply the hand to the chest in simple endocarditis, the action of the heart may appear to be violent; while sometimes a vibratory thrill will be felt.—Percussion, it is said, often discovers an augmented extent of dulness in the præcordial region; this dulness being distinguished from that caused by pericardial effusion, by the beat of the heart appearing superficial instead of remote and distinct. But it is very doubtful if simple endocarditis ever gives rise to so much tumefaction or congestion of the walls of the heart, as to produce an increased degree or extent of dulness.—Auscultation alone gives us any reliable information. On listening to the heart's sounds we shall usually detect a soft bellows-murmur, the most constant and characteristic of the phenomena of endocarditis. Supposing that during the progress of an attack of rheumatism a murmur is found where none existed before, we can hardly be wrong in diagnosing endocarditis. If the murmur be systolic, most distinct at the base and along the course of the aorta, and accompanied with a small pulse, it is significant of *aortic obstruction;* if systolic, most distinct at the apex, and with an irregular pulse, it is due to *mitral regurgitant disease.* A diastolic murmur, most distinct from the centre of the sternum (on a level with the third intercostal space) upwards towards the base, with a jerking pulse, is indicative of *aortic regurgitation;* while a diastolic murmur, most distinct from the fourth left intercostal space downward towards the apex, with an

irregular small pulse, is the result of *mitral obstruction*.—The murmurs of purely acute endocarditis are thus arranged in order of frequency by Dr. Walshe.*—Aortic obstructive; mitral regurgitant; aortic regurgitant; aortic obstructive and mitral regurgitant together; aortic obstructive and regurgitant together. Pulmonary systolic and diastolic murmurs are infinitely rare. Dr. Walshe has never observed acute obstructive mitral murmur, nor acute regurgitant tricuspid murmur.

For the further consideration of the physical signs, see the section on *Diseases of the Valves of the Heart.*

Terminations.—The terminations of acute endocarditis are permanent valvular disease, with implication of the heart's substance, and all their combined consequences. Persistent valvular disease leads to dilatation of the cavities; the system loses tone, and the blood becomes impoverished; while after a variable interval dropsy sets in. Thenceforth the progress towards a fatal termination is rapid, life rarely being prolonged beyond fifteen months from the occurrence of dropsy.

When fibrinous deposits have taken place upon the valves, portions of the exudations may become detached and circulate with the systemic blood until they get arrested in some artery where they act as a plug, and so cut off the supply of blood to the part. Temporary paralysis is not very rare in heart disease, and may arise in this manner; the power being restored if the collateral circulation is able afterwards to afford a due supply of blood, or if the mass of fibrin should soften and break up so that the vessel once more becomes permeable. (See p. 47.)

Sometimes the fibrinous deposit sets up great irritation in the tissue of the valves; and then ulceration may take place, producing perforation or a ragged condition of the edges. The disorganizing process will even extend to the chordæ tendineæ, breaking them down and rendering them useless. Dr. Ogle has given a very interesting report of twenty-one cases of ulceration of the valves, which occurred in St. George's Hospital.†

Treatment.—This must be conducted on the same principles as should guide the practitioner in the treatment of pericarditis. Owing, however, to the power of ammonia in preventing deposition of fibrin, it is very advisable to administer full doses of the carbonate or the aromatic spirit of this salt, from the commencement of the inflammation.

XXI. MYOCARDITIS.

Myocarditis (*Μῦς*, a muscle; *καρδία*, the heart; terminal *-itis*), carditis, or inflammation of the muscular substance of the heart, seldom occurs as a distinct affection; being generally, if not always, combined with pericarditis, or endocarditis, or with both. The morbid action, it is probable, extends from the investing or the lining membrane to the muscular substance; though our present knowledge will not justify our

* The Diseases of the Heart and Great Vessels, including the Principles of Physical Diagnosis. Third Edition, p. 248. London, 1862.

† Transactions of the Pathological Society of London. Vol. ix, pp. 131–153. London, 1858.

denying that the starting-point of the inflammation may be in the muscular fibres themselves. The walls of the left ventricle seem to suffer more frequently than other parts of the heart. The results of myocarditis are induration of the muscular structure from the deposit of lymph; the formation of abscesses; aneurismal dilatation of the walls of the heart; and, perhaps, rupture.

An instructive example of inflammation of the muscular substance of the heart has been recorded by Mr. Salter,* in which the disease ran its course in seven weeks. It commenced with an acute pain in the left side of the chest; which came on when the patient was walking, lasted a short time, and recurred about a week afterwards, whilst he was using the same exercise. The pain subsequently became very frequent, and was induced by the slightest exertion. When Mr. Salter first saw him, about a week before his death, there was orthopnœa, and an uneasy sensation or dull aching referred to the stomach and middle of the sternum. Venesection, calomel and opium, with counter-irritation, were the means adopted to stay the disease; but they were unavailing, and death took place. At the post-mortem examination the pericardium was found inflamed, especially in its diaphragmatic portion; its vessels were distended, and spots of ecchymosis were discovered beneath the serous membrane. The substance of the heart was moderately firm; but the left ventricle had almost entirely lost the color of muscle, pus could be scraped from its surface, and in some parts there were cavities in the muscular substance like small abscesses.

There seems to be some reason for believing that the muscles of the heart may occasionally be affected with rheumatic inflammation, causing sudden paralysis of the organ and death. This occurrence may explain those cases of acute rheumatism, where patients have been suddenly seized with severe pain in the cardiac region, suffocative dyspnœa, insensibility, convulsions, and death; and where afterwards no appearances have been detected on a careful examination of the body to account for the abrupt invasion of the fatal symptoms. It must not be overlooked, however, that possibly in some of these cases the fatal event may have been due to the formation of a coagulum in one of the large arteries.

XXII. VALVULAR DISEASES OF THE HEART.

A few words on the normal sounds of the heart may not be out of place, before speaking of the valvular diseases of this organ. On practising auscultation over the cardiac region we can detect two sounds, very quickly following each other. They are succeeded by an appreciable period of silence. If the time occupied by the sounds and the pause be divided into fifths, we shall find the first sound occupying two-fifths, the second sound rather more than one-fifth, and the pause rather less than two-fifths. The *first sound*—sometimes called the systolic or inferior sound of the heart—should be listened to over the apex: it is dull, booming, and prolonged; and is coincident with the systole (*Συστέλλω*, to contract) of the ventricles, pulse of the arteries, diastole (*Διαστέλλω*, to dilate) of the auricles, and impulse of the apex against the

* Medico-Chirurgical Transactions. Vol. xxii, p. 72. London, 1839.

thoracic parietes. The *second sound*—often termed the diastolic or superior sound—is best heard about the middle of the sternum: it is short, abrupt, and clear; and is synchronous with the passive flow of blood from the auricles into the ventricles, the diastole of the ventricles, and the retrocession of the apex.

All physiologists agree in regarding the second sound of the heart as due to the tension of the semilunar valves of the aorta and pulmonary artery: but the cause of the first sound is still a matter of uncertainty. Dr. Halford believes that he has solved this *quæstio vexata;* for this physician states that his experiments demonstrate the fact that both sounds "depend upon the same cause, which is simply the vibration of the valves, produced by the backward pressure of the blood, first against the auriculo-ventricular, and secondly against the ventriculo-arterial valves." Now this explanation is not altogether satisfactory; and the experiment by which he supports it—viz., exposing the heart of a living animal, and arresting the flow of blood through it—is liable to mislead the student. For it is clear that if the circulation through the heart be arrested, none of the supposed causes of the first sound can act: there can then be no rush of blood through the arterial orifices, no impulse against the thoracic walls, no *bruit musculaire*. Hence it seems better, in the present state of our knowledge, to regard the heart's first sound as really a compound one. In other words, though it may be chiefly due to the tension of the auriculo-ventricular valves, yet that there are other causes which aid in its production. These are, the impulse of the heart's apex against the thoracic walls, the muscular bruit, and the sudden dilatation of the aorta and pulmonary artery.

Causes and Effects of Valvular Disease.—Most of the alterations in the internal lining membrane of the heart result from inflammation, which gives rise to a deposit of lymph upon or beneath the serous membrane. The valves thus lose their thinness and transparency; they become thick, puckered up, and adherent to each other or to the opposite walls of the channel. Independently of inflammation, the valves sometimes become covered with warty vegetations or excrescences, or they may be converted into bone, or they are found to be the seat of atheromatous or other deposits.

The *effects* are twofold: either to contract and narrow the orifice and so obstruct the passage of the blood—*valvular obstruction;* or by thickening and shortening the valves, to make the orifice more or less patent, and hence permit of regurgitation of blood—*valvular insufficiency, regurgitant disease of valves*, &c. There may be only valvular obstruction or valvular insufficiency in any given case; but often these conditions coexist.

Diagnosis.—In the diagnosis of the diseases under consideration attention must be directed, firstly, to the physical signs; and secondly, to the chief physiological or functional symptoms.

1. The Physical Signs.—The natural sounds of the heart are liable to be modified and changed by disease, causing either sound or both to be accompanied or to be supplanted by a noise which has been aptly compared to the blowing of a pair of bellows; hence it is termed by us a *bellows-murmur*, and by the French a *bruit de soufflet*. A bellows-murmur may be harsh, or rough, or cooing, or whistling, or musical, but these modifications are of little importance. For of whatever nature,

it is caused either by the presence of obstructions which impede the free flow of blood through the heart and its great vessels—producing an *organic* murmur; or by a change in the composition of the blood, or a clot in one of the heart's cavities—giving rise to an *inorganic*, or *functional*, or *hæmic* murmur. When the valves of the heart are affected so that they act ineffectively, an organic bellows-murmur must result.*

The loudness and distinctness of organic murmurs is not proportionate to the extent of disease causing them, for sometimes a very small vegetation on one of the valves will produce a very loud murmur. Dr. C. J. B. Williams had a man, thirty years old, under his care, in whom there was a very loud murmur following the second sound; which, though most distinct in the mid-sternum, was also heard in every part of the chest, in the arteries of the neck, and even slightly in the radial. The man caught typhus fever and died; and at the post-mortem examination it was found that the valves were all healthy except the aortic, and in these the only change was that one of them had the free margin neatly retroverted, so as to leave a small smooth chink for regurgitation. The ventricles were also moderately enlarged and thickened.

The lining membrane, valves, and orifices of the left side of the heart are much more frequently diseased than those of the right; so much so, that it is almost a question whether disease of the tricuspid or pulmonary valves can be accurately diagnosed. "Practically, in at least nineteen out of twenty cases," says Dr. Harvey, "the questions to be determined are, whether it be the mitral or the aortic valve that is diseased, or both; and whether the disease be of the nature of valvular obstruction, or of valvular insufficiency, or both."† Diseases of the left side chiefly affect the arterial pulse, giving rise to irregularity and inequality; those of the right side affect the venous circulation, causing regurgitation into the jugular veins—a condition known as the venous pulse. Dropsy is more often connected with disease of the right than of the left cavities.

Disease of the *semilunar valves of the aorta* is not uncommon. If the affected valves diminish the aortic orifice during systole—or contraction—so as to prevent the blood from freely flowing out of the ventricle,

* The arteries may also become the seat of murmurs. When the calibre of a vessel is much increased, so that the direction of the blood-current is altered, or when it is diminished so that there is increased friction of the blood against the coats; when the coats of the artery are diseased, with or without aneurism; and when there is some direct communication between an artery and vein,—in all these cases an *organic* murmur results. An *inorganic* murmur is due either to altered composition of the blood, or to the formation of a clot in the vessel.

In the early stage of phthisis, a murmur (which, strictly speaking, can neither be referred to the organic nor inorganic class just described) may sometimes be detected under the left clavicle, owing probably (as before mentioned) to the pressure of the tubercles upon the left subclavian artery; while not uncommonly a systolic bellows-sound is heard in the second left intercostal space over the pulmonary artery, the heart and the pulmonary artery being quite healthy. Moreover, displacement of the heart, owing to the pressure of pleuritic effusion, ascites, &c., may give rise to a loud murmur which does not disappear until the organ is restored to its natural position, by the removal of the fluid; though it must be confessed that a bruit under these circumstances is a rare event, for I have frequently looked in vain for it when the heart has been pushed considerably upwards by the presence of an ovarian tumor, or by pregnancy advanced to the full term.

† "Notes on Chronic Heart Disease."—Association Medical Journal, p. 785. 1st September, 1854.

a systolic bellows-sound will result, which can be best heard at the base of the heart, along the course of the thoracic aorta, up towards the right clavicle, and even in the carotids; the sound diminishing as the stethoscope is moved towards the apex of the heart. If the valves close imperfectly, permitting reflux of blood from the aorta, the morbid sound will be diastolic—will accompany the dilatation of the ventricle. The pulse of aortic regurgitant disease is peculiar, being generally sudden and sharp; and without any prolonged swell of the artery; Dr. Hope calls it a jerking pulse. The short, second sound of the heart will also be muffled and indistinct. Sometimes we have both these conditions of the aortic valves in the same case; a double bruit or bellows-sound being then produced.

The *mitral valve*, which guards the left auriculo-ventricular orifice, may become thickened or ossified; the effect of which is to prevent its closing the auricular orifice during systole, as well as to hinder its lying flat against the walls of the ventricle so as to allow the blood to pass freely out during the diastole. In such cases the orifice is almost rendered a permanent oval slit. A double bruit may perhaps be detected: the first, systolic, caused by the regurgitation of the blood from the ventricle into the auricle; the second, diastolic, and due to the impediment to the passage of the blood from the auricle to the ventricle. Such a double bruit is but rarely heard, however. The murmur or murmurs can be best distinguished towards the apex of the heart, on the left. The pulse will be irregular. Palpation also often discovers a purring thrill. Mitral regurgitant is the most common of all the valvular lesions; while next we must rank aortic constrictive, then aortic regurgitant, then mitral constrictive, and lastly in the same order diseases of the tricuspid and pulmonary valves. In valvular lesion due to rheumatism, the mitral and aortic valves are very often affected together.

Dr. Harvey thus briefly tabulates the signs of disease of the aortic and mitral valves:

BRUIT: If *systolic*, and loudest at
Base = AORTIC *obstruction.*
Apex = MITRAL *insufficiency.*
BRUIT: If *diastolic*, and loudest at
Base = AORTIC *insufficiency.*
Apex = MITRAL *obstruction.*
PULSE: If *regular*,
Full, or strong,
Jerking, resilient,
} = AORTIC disease.
PULSE: If *irregular*,
Intermittent, unequal,
Soft, small, weak,
} = MITRAL disease.

The *semilunar valves of the pulmonary artery* are very rarely diseased; so rarely, that any organic alteration in them is a pathological curiosity. When, however, a bellows murmur can be traced from the middle of the left edge of the sternum up towards the left clavicle, and when this murmur cannot be heard in the subclavian or carotid arteries, we may assume that it originates at the orifice of the pulmonary artery. The pulse remains unaltered.

The *tricuspid valve*, guarding the right auriculo-ventricular opening,

is also but seldom found otherwise than healthy. When diseased, the arterial pulse will be unaffected; but there will be turgescence, with pulsation of the jugular veins at every ventricular systole. A bellows-murmur may be heard over the central and lower part of the sternum, extending downwards to the epigastrium, inaudible in the aorta and its branches.

To determine the systolic or diastolic character of a murmur, the pulse at the wrist should be carefully noted during auscultation: if systolic, the bruit must of course be synchronous with the pulse, and if most audible at the apex, is indicative of mitral disease; if diastolic, not synchronous with the pulse, and most audible over the centre of the sternum and along the course of the aorta, it is indicative of aortic disease.

2. Physiological and Functional Symptoms.—The following are the chief:

a. Difficulty of breathing, varying from the slightest dyspnœa to the most severe orthopnœa; much increased on ascending a height or making any exertion. *b.* Palpitation and irregular action of the heart, with the sounds and murmurs discoverable by auscultation, &c. *c.* Irregular pulse. In mitral disease the pulse is generally soft and irregular; in aortic, it is hard, jerking, but regular. *d.* Congestion of the lungs; bronchitis; pneumonia; pulmonary hemorrhage, with or without pulmonary apoplexy; these symptoms being most urgent in mitral disease. *e.* Hemorrhages from the nose, bronchial tubes, or mucous membrane of the stomach. *f.* Œdema of the lower and sometimes of the upper extremities, and face; hydrothorax; and ascites. Dropsy is more common in disease of the right cavities of the heart than in affections of the left. *g.* Cephalalgia, tinnitus aurium, vertigo, syncope, cerebral congestion, and cerebral hemorrhage, most urgent in aortic disease. *h.* Broken rest, with startings during sleep, and frightful dreams. *i.* Enlargement of the liver and spleen, with disorder of the digestive organs generally. *j.* A peculiar and almost characteristic appearance of the countenance,—*i. e.* the face is puffed, the cheeks are flushed and of a purple hue, the lips congested, and the eyes bright.

As time advances, the heart disease commonly becomes more aggravated. In such cases the patient gets weak and very nervous; he suffers immediately from over-exertion, mental emotion, improper food, or exposure to wet and cold; and subsequently death ensues—either suddenly from syncope, or gradually from the progress of one or other of the secondary affections. The latter termination is decidedly the most common.

Prognosis.—The danger of structural cardiac disease will be in proportion to the extent to which the change impairs the power of the heart in carrying on the circulation; as well as partly in proportion to the degree to which the blood is deteriorated in quality. So long as the natural sounds are distinct, and the impulse of the apex is not felt beyond its natural limits, there is no present danger—provided there be no great amount of anæmia—however loud or harsh the accompanying murmurs happen to be; while even if the general symptoms be distressing, we may entertain very sanguine expectations of relieving them to such an extent that moderate health may be regained. Whether the improvement will persist for any length of time, must of course depend

upon the fact of the valvular lesion becoming stationary or aggravated; for it may so increase, from many causes, as to develop dangerous disorder. But if the history of the case is not that of a sudden or recent attack, and if the physical signs do not grow more marked in the course of a few weeks, a favorable prognosis may be given, and hopes encouraged of some years of comfort.

On the contrary, if the natural sounds are indistinct, or are nearly superseded by abnormal murmurs, then it must be inferred that the heart's power for action is much impaired, and that there is serious ground for alarm. In such cases, too, the general symptoms usually plainly indicate that the chief organ of the circulation is failing in its work; for there are distressing palpitations, irregular action, frequent attacks of syncope, dropsy, and congestions of internal organs and tissues. Those cases are especially dangerous where the valvular lesion is due to some violent exertion; or where the structural change has been aggravated by a second assault of endocarditis, or by the setting in of fatty degeneration and consequent softening. When to the above symptoms there is superadded a thin watery state of the blood, the cause for alarm is proportionately increased; as is also the case when the blood is poisoned by urea, bile, lithic acid, &c.

Treatment.—In the treatment of the valvular diseases of the heart three indications have generally to be followed: 1st, To abate inordinate action of the heart by sedatives—as digitalis, hydrocyanic acid, aconite, belladonna, conium, henbane, hop, and morphia; though these remedies, and especially the last, must be employed with great caution, for where there is a feeble pulse, dyspnœa, and difficult expectoration, a dose of opium may but materially hasten death. 2d, To ward off or gradually relieve the results of the cardiac disease,—such as pulmonary congestion, pneumonia, hemorrhage, congestion of the liver and kidneys, dropsy, &c. This is to be attempted by ordering a nutritious diet, and by maintaining the various secreting organs in a healthy state; saline purgatives and diuretics, repeated at proper intervals, being very valuable. When the dropsical effusion is great in these instances, much benefit may often be derived from mercury; diuretics, which had previously been useless, often causing an astonishing flow of urine directly the gums get touched. The latter effect, however, is frequently obtained with difficulty where the obstruction to the circulation is great. In anasarca of the lower extremities, small incisions along the legs give great relief, by allowing the serum to drain off; the uncomfortable feeling caused by the flow of fluid being best mitigated by wrapping the limbs in soft chamois leather. And then, 3d, We must endeavor to give strength and tone to the heart, so as to assist it to do its work, by nourishing food, perhaps cod-liver oil, a duly regulated supply of stimulants, breathing pure air, warm clothing, early hours, cold or tepid salt-water sponge-baths, avoidance of all bodily and mental excitement, and by the administration of tonics—especially the various preparations of steel.

XXIII. HYPERTROPHY OF THE HEART.

The heart is stated roughly to be about the same size as the closed fist. The average weight of this organ in the adult male may be said to be nine and a half ounces, that of the female being eight and a half.* After the age of sixty the heart is somewhat heavier, since the thickness of the walls of the left ventricle has then become decidedly increased. The muscular parietes of one or more of the cavities may become thickened without any diminution in the size of the chamber: this is called *simple hypertrophy*. Or, as most frequently happens, the walls may be thickened and the chamber become larger than natural: this is *eccentric hypertrophy*, or *hypertrophy with dilatation*. On the other hand, the increase in thickness may be accompanied with diminution in the size of the cavity; a condition known as *concentric hypertrophy*, which is now believed only to occur as a congenital malformation, and never as the consequence of disease.

The *cause* of the hypertrophy is usually some obstruction either to the flow of blood through the heart, or to the free play of this organ; hence it is frequently a provision of Nature to counterbalance the impediment. The heart is stimulated to extra exertion, and in consequence receives an extra supply of nutritive materials, by which its muscular structure is strengthened. The left ventricle is more frequently found hypertrophied than the right, and much more so than the auricles. In a heart which weighed five pounds, the walls of the left ventricle had acquired a thickness of two inches. Hypertrophy with dilatation of the right ventricle is commonly due to some chronic disease of the lungs obstructing the circulation.

The *symptoms* will depend upon the extent of the hypertrophy: frequently they consist of palpitation, dyspnœa, difficulty of walking quickly, uneasiness and pain in the cardiac region, headache, and repeated attacks of vertigo. If we listen to the heart's movements the systolic sound will be found less distinct than in health; but we shall also feel that the extent of the pulsation beyond the præcordial region, and especially the degree of impulse against the walls of the chest, are both much increased. Moreover, when there is valvular disease, the morbid sounds indicative of such will be present.

The *treatment* must consist in keeping the patient as quiet as possible, and in prescribing for his symptoms. If there be much debility, steel (F. 380, 394, 405), bark (F. 371, 376), or the mineral acids (F. 377, 378) may be given; if the heart's impulse be very great, aconite (F. 330), or digitalis (F. 334) may be occasionally, but cautiously, tried; while when the dyspnœa is urgent, stimulants, especially ammonia and spirit of ether (F. 322), may be had recourse to. Dr. Hope observes that the art of treating hypertrophy consists in keeping the

* The weight of the healthy heart in persons from twenty to fifty-five years of age averages, in males 9 oz. 8 dr., and in females 8 oz. 13 dr. Estimates of this description are of course, to a certain extent, arbitrary: for as the heart is found, in some cases, to be considerably above its ordinary weight, without the proportion of its walls and cavities being materially altered, or the organ being otherwise diseased, it is not easy to say at what point it ceases to be healthy.—Dr. Peacock: Edinburgh Monthly Journal, September, 1854.

patient rather low, and the circulation tranquil, short of producing anæmia or debility.

Simple Hypertrophy of the Left Ventricle with no Obstruction to the Flow of Blood.—This condition is rare. On auscultating the heart the systolic sound is less loud and clear than natural, but no bellows-murmur can be heard. On placing the hand over the præcordial region, the impulse of the heart will be felt increased.

In many cases of chronic Bright's disease, there is found hypertrophy of the heart—especially of the left ventricle—without any disease of the valves or large bloodvessels existing to retard the flow of blood, and thus to explain the increased bulk of the muscular walls. In these cases it is supposed that the blood is impeded in its passage through the minute systemic vessels owing to its contamination by excrementitious materials in consequence of the renal degeneration; and hence the left ventricle has to make extraordinary efforts to propel the blood, and of course acquires increased bulk and strength.

Hypertrophy of Left Ventricle with Valvular Disease.—This is the most common form of hypertrophy. The chief causes are —"Defective aortic valves, permitting regurgitation of the blood into the left ventricle during its diastole; constriction of the aortic orifice, impeding the free passage of the blood from the left ventricle during its systole; deficiency of the aortic valves, associated with constriction of the aortic orifice; defective mitral valves, permitting regurgitation of the blood from the left ventricle into the left auricle;—all these abnormal conditions occasion impediments to the circulation of the blood through the heart, and their immediate effects are, for the most part, communicated directly to the left side, and indirectly to the right side of the heart."* As the hypertrophy in these cases is an endeavor—so to speak—towards health, the increased power compensating for the obstruction to the flow of blood caused by the valvular disease, we must not unnecessarily interfere with the symptoms.

Dilatation of the Heart.—This may occur under three circumstances. First, there may be, as has been just shown, hypertrophy with dilatation; this condition being known as *active dilatation*, when the expansion predominates over the hypertrophy. Secondly, we have *simple dilatation*, where the thickness of the walls is normal. And thirdly, there is *passive* or *attenuated dilatation*, the walls being thinned. This last is the only state which demands a few words. It is often combined with malnutrition of the heart, and fatty degeneration of the muscular fibres; both ventricles are usually affected, though the right may be so in a more marked degree than the left; and the attenuation may be so extreme that the walls are found quite collapsed after death. Passive dilatation may be due to some exhausting disease, or to inflammation of the endocardium, or perhaps to pericardial adhesion. The chief symptoms are a small, weak, and perhaps irregular pulse; coldness and slight lividity of the extremities; with giddiness, and derangement of the digestive organs. Moreover, the patient is restless at nights, gets weak

* Dr. Markham. Opus jam citat. p. 143.

and irritable, suffers from asthmatic paroxysms, palpitation is often distressing, attacks of syncope are not uncommon, and there is anasarca followed by ascites. The physical signs are,—increased præcordial dulness, undue distinctness of the heart's sounds, sometimes irregular action of the heart, sometimes reduplication of the sounds, and generally almost imperceptible cardiac impulse. There will be no murmur if the valves remain healthy. Antispasmodics, ferruginous tonics, and agents to promote the digestion of nourishing food, are the only remedies which afford temporary relief in this serious disease.

XXIV. ATROPHY OF THE HEART.

There are two forms of atrophy of the heart. One, in which the organ simply wastes and dwindles in all its parts; the other in which the texture of the muscle suffers a sort of conversion into fat—becomes affected with fatty degeneration.

Simple atrophy occurs in connection with many exhausting diseases, as cancer, tuberculosis, diabetes, &c. The whole organ diminishes in size; so that after death it may be found to weigh about five ounces instead of nine. Minutely examined, the muscular fibres are detected pale and soft, but otherwise healthy. The treatment must be that which is demanded by the constitutional affection, of which the atrophy is merely one symptom.

Fatty degeneration of the heart is a most interesting disease, which has been already incidentally noticed (p. 113). The student who wishes to study the subject thoroughly may be especially referred to the writings of Dr. Richard Quain, Dr. Ormerod, Mr. Paget, Dr. Barlow, Dr. Wilks, and Prof. Virchow.

This disease occurs under two circumstances: either alone, or in conjunction with fatty disease of other organs, as the kidneys, liver, cornea, &c. Its *diagnosis* is beset with difficulties; so that when existing alone its presence is frequently not suspected until after death, and after a microscopic examination of some of the muscular fibres of the heart. Valvular disease very rarely coexists; but where it does, the aortic valves appear to be more generally affected than the mitral. The most prominent *symptoms* of fatty degeneration are a feeble action of the heart, a remarkably slow pulse—sometimes as low as fifty or forty-five, general debility, transient attacks of giddiness or faintness, and a feeling of nervous exhaustion, with loss of tone, &c. The sounds of the heart are weak; while in advanced cases there are attacks of dyspnœa, with many or all of the symptoms which prevail in angina pectoris. When in addition there is a well-marked arcus senilis—due, as Mr. Canton has shown, to fatty degeneration of the edge of the cornea—the diagnosis may perhaps be facilitated; though in many cases of arcus senilis the heart is quite healthy, while the latter is often affected with fatty degeneration without the arcus being present. This disease seems to occur rather more frequently in men than in women: it may take place at all ages, though it happens principally at advanced periods of life: all classes of society may suffer from it: it either exists singly, or with other cardiac diseases: and it is not an uncommon cause of sudden death.

"On opening a heart thus affected," says Dr. Ormerod, "the interior of the ventricles appears to be mottled over with buff-colored spots of a singular zigzag form. The same may be noticed beneath the pericardium also; and in extreme cases the same appearance is found, on section, to pervade the whole thickness of the walls of the ventricle and of the carneæ columnæ." On microscopically examining these spots, their nature is revealed; they are not deposits, but degenerated muscular fibres. Instead of seeing transverse striæ and nuclei—the evidences of a healthy state—little can be distinguished but a congeries of oil-globules. The muscular fibres are also found to be short and brittle; and Dr. Quain has pointed out that the coronary arteries are often obstructed. Mr. Paget well remarks that "the principal character which all these cases seem to present is, that they who labor under this disease are fit enough for all the ordinary events of calm and quiet life, but are wholly unable to resist the storm of a sickness, an accident, or an operation." From the foregoing it will appear that the *prognosis* must always be unfavorable. Dilatation, rupture, and aneurism of the heart are prominent changes most frequently found in connection with this affection.

Sometimes the fat which is normally deposited upon the heart is increased on and amongst the muscular fibres to a morbid extent; and we then speak of the condition which results as *fatty growth*. This may happen alone, or in conjunction with general obesity; or it may be associated with fatty degeneration. It is possible that the arcus senilis much more frequently accompanies these cases of fatty growth than those of fatty degeneration. The symptoms of fatty growth, when it exists alone, are those of a heart enlarged and impeded in the performance of its functions. The pulse is permanently quickened above the normal standard, while its force is diminished.

In the present state of our knowledge, the *treatment* of a case of suspected fatty disease of the heart resolves itself chiefly into preventing further degeneration of tissue. The means to adopt therefore are—nourishing animal food, attention to the digestive organs, pure air, early hours, gentle exercise, the avoidance of everything which can hurry the circulation, and the use of ferruginous tonics. Soda-water will prove useful as a drink; a little brandy or sherry may be given with it. The patient should daily take a salt-water sponging-bath. Some authors object to the use of fat meats, of milk, and indeed of all oleaginous foods. But it is difficult to understand the ground on which these restrictions are recommended; since the disease is a degeneration of tissue, caused by debility or a wearing-out of the frame, rather than by an excess of power. Hence I believe that cod-liver oil, cream, and milk, may generally be given with great advantage.

These remarks are not meant to apply to the treatment of fatty growth with general obesity. In such cases the patient should be dieted according to the directions already given. (See p. 146.)

XXV. CYANOSIS.

Cyanosis (Κύανος, blue; νόσος, disease), morbus cœruleus, or blue disease, are terms applied to a condition characterized by a blue or pur-

plish discoloration of the skin; arising generally in connection with some deficiency in the construction of the heart.

The chief malformations are—permanence of the foramen ovale, allowing a passage of the blood between the two auricles; abnormal apertures in some part of the septum of the auricles or of the ventricles; the origin of the aorta and pulmonary artery from a single ventricle; a transposition of the origins of the large vessels from the heart, the aorta arising from the right and the pulmonary artery from the left ventricle; an extreme contraction of the pulmonary artery; or, lastly, the continued patescence of the ductus arteriosus, permitting a mixture of the bloods of the aorta and the pulmonary artery.

Three explanations have been given as to the immediate cause of the discoloration of the surface in these cases of malformation. Thus, some pathologists refer it solely to general venous congestion; others regard the intermixture of the two currents of blood as the cause; while a third class believes that it is partly due to congestion of the venous system, and partly to the intermingling of the venous with the arterial blood. The truth is probably this,—that the discoloration is owing to systemic venous congestion, but that it may be aggravated by certain malformations. On the other hypothesis it seems impossible to explain the admitted facts, that malformations permitting the free admixture of arterial and venous blood may exist without giving rise to cyanosis; while the latter is sometimes found where no such admixture could have taken place. The cause of the general venous congestion is some obstruction to the flow of blood through the lungs, or from or into the right ventricle; such obstruction frequently consisting in a contraction of the pulmonary artery or its orifice.

In addition to the discoloration of the skin, the patients who survive their birth suffer from coldness of the body (sometimes the temperature, as marked by the thermometer in the mouth, has been as low as 77° F.), palpitation, fits of dyspnœa, syncope on the least excitement, &c. The tips of the fingers, and sometimes of the toes, become bulbous after a time, and the nails are often incurvated. The generative organs are frequently imperfectly developed. Bronchial hemorrhage and bronchorrhœa seem to have occurred in many instances. Moreover, in cases about to terminate fatally we have congestion of internal organs, and dropsical effusions. The cutaneous discoloration is generally increased by aught which excites the circulation; while if there is no valvular lesion the sounds of the heart will be found normal. In some few cases the symptoms of cyanosis are not manifested until many months after birth. Infants affected with the disease generally die at a very early age; but occasionally, they live on even to the adult period. Males are notably more prone to cyanosis than females: a satisfactory explanation of this fact remains to be discovered.

Under exceptional circumstances cyanosis may not come on until somewhat late in life. Cases like the following are related: A lady, aged 38, under the care of Dr. Theophilus Thompson, was always well until she had an attack of cholera, which impaired her health: two years prior to her death, she suffered from fever, and from this time was cyanotic.—Bouillaud quotes an instance, where cyanosis followed a difficult labor at the age of twenty-six.—Dr. Harrison has recorded the case of a baker, who became cyanotic at 15, after using great exertion

in carrying wood.—Dr. Speer has published the history of a girl, thirteen years old, who had to fill a situation needing great exertion, and she was thenceforth cyanotic.—Dr. Reisch, of Vienna, has given an account of a woman, 49 years old, who always had good health until an attack of rheumatic fever with endo-pericarditis, after which cyanosis and dropsy set in. Auscultation detected a loud systolic bruit, which had its maximum intensity at the apex of the heart; the second sound was weak and indistinct. There was intense cyanosis of the face; with considerable swelling of the jugular veins, and evident regurgitation in them. At the autopsy, in addition to other morbid appearances, the valve of the foramen ovale was found imperfect, there being a crescentic opening which admitted the first joint of the little finger. Dr. Reisch explains the symptoms in the following way: The congenital insufficiency of the valve of the foramen ovale had given rise to no cyanosis previous to the rheumatic attack, and accordingly no communication between the blood in the auricles could have taken place; for, so long as the valves were healthy, the pressure in the two auricles remained equal, so that the passage of blood from one side to the other was impossible. But when, as the result of endocarditis, incompetency of the mitral valve became established, an increased tension was exerted on the blood in the left auricle, whereby not only a congestion of the pulmonary circulation was occasioned, but simultaneously a quantity of blood was pressed into the right auricle. Thus there was laid the foundation for a high degree of cyanosis, and the bad effects of mitral insufficiency upon the circulation acquired an enormously increased potency. The passage of blood from one side to the other must have taken place at the moment of ventricular systole, for this was manifestly the time when the difference of tension in the auricles had reached its maximum. The blood flowing from the left into the right auricle must have presented an obstacle to that entering by the venæ cavæ, and by imparting to it an impulse in the centrifugal direction, have given rise to the systolic venous impulse.

The *treatment* should be simply palliative, the organic cause being irremediable. A very nourishing diet, warm clothing, the avoidance of fatigue or undue mental excitement, and residence in a pure mild air, will give the sufferers from cyanosis every chance of life which can be afforded them.

XXVI. RUPTURE OF THE HEART.

Rupture of the heart may occur spontaneously from previous disease, or it may be caused by external violence. Rupture from disease is much more frequent on the left than on the right side of the organ; whereas when it occurs from external violence we find just the reverse. The laceration most commonly has its seat in the ventricles, and in that of the left side when disease is its source. Rupture of the valves or their tendons is generally the consequence of a prior attack of endocarditis; whereas laceration of the muscular wall of the heart most frequently is symptomatic of fatty degeneration. Laceration may also be due to an aneurism in the ventricular wall; and perhaps hydatids, by causing atrophy of the muscular fibres, might lead to it.—The rup-

ture takes place as frequently at the apex as at the base; the immediate cause is usually some sudden strain or emotion; it happens more frequently in males than females; and its occurrence is rare until after the fiftieth or sixtieth year.

Where death is not the immediate result of this accident, the symptoms which indicate its occurrence are great orthopnœa, intense prostration, syncope, and convulsions. In laceration of the valves, of the chordeæ tendineæ, or of the musculi papillares, there is sudden great oppression about the præcordia, together with a loud endocardial bruit.

In the majority of cases, rupture of the heart kills instantaneously; not so much, however, as a rule, by the loss of blood, as by the embarrassment to the play of the heart or lungs which arises from the extravasation. In more than one instance the patient has been known to survive some hours, or even days; the wound having become plugged by coagula, so that the extravasation of blood into the pericardium took place slowly and gradually.

XXVII. ANGINA PECTORIS.

This is a paroxysmal disease, first described by Dr. Heberden in 1768, who called it a *disorder of the breast;* remarking that "the seat of it and the sense of strangling and anxiety with which it is attended, may make it not improperly be called *angina pectoris.*" It is not of very frequent occurrence.

The *symptoms* of "suffocative breast-pang" consist of paroxysms of intense pain about the præcordial region, accompanied with a feeling of suffocation, and a fearful sense of impending death. The pain in the breast is variously described by sufferers as lancinating, burning, or constrictive; and it often seems to radiate from the centre of the sternum to the neck, or to the back, or to the left shoulder and arm. If the paroxysm come on while the patient is walking, immediate rest is necessary, the anguish being so extreme for the time. During the attack the pulse is slow and feeble, the breathing short and hurried, the countenance pale and anxious, the surface of the body cold and perhaps covered with a clammy sweat, while the consciousness is unimpaired. As the struggle passes off, the patient regains his usual health, and perhaps appears perfectly well.

The duration of the seizure rarely exceeds a few minutes, though it may last for half an hour, or an hour, or even longer. The attacks occur at uncertain intervals of weeks or months; but in confirmed cases the periods of recurrence approximate more and more with each successive paroxysm. The seizure may come on at any time, not only when the patient is walking, but even when in bed. The pain is most severe, and is attended with a feeling as if life were about to cease; while in some cases the paroxysm has at once proved fatal.

It necessarily follows from the foregoing, that the *prognosis* is very unfavorable; for if death do not ensue in an early seizure, it generally does so in some subsequent attack. The disease occurs most frequently in advanced life, and is much more common in men than in women. In some few instances it has seemed to have an obscure connection with

gout; and I have read of gout and angina pectoris alternating with each other in the same individual. But I apprehend this only happens in gouty subjects who have a weakened heart, either from attenuation or from fatty degeneration.

With regard to the *pathology* of angina pectoris, it may be said that our improved means of observation have rendered it almost certain that this disease is always associated with some important organic cardiac affection. In many instances fatty degeneration of the muscular fibres of the heart has been found; a condition which, sometimes at least, seems to be connected with partial obstruction of the coronary arteries.

Sir John Forbes, in an essay published in 1833, before the value of the microscope was appreciated, collected the histories of forty-five examples of angina pectoris, in which the body was examined after death. In two of the cases there was disease of the liver only; in four, there was nothing morbid except an excessive coating of fat about the heart; while in the remaining thirty-nine there was found organic disease of the heart or great vessels. Of these latter cases, in ten there was organic disease of the heart alone; in three of the aorta alone; in one of the coronary arteries alone. But there was ossification, or cartilaginous thickening of the coronary arteries, combined with other disease, in sixteen instances; and there was a morbid condition of the cardiac valves in sixteen cases likewise. The aorta was diseased in twenty-four cases, and in twelve there was preternatural softness of the heart.

The *treatment* during a paroxysm consists in the administration of stimulants, as ammonia, wine, and brandy; and of antispasmodics, such as ether, opium, chloroform, hydrocyanic acid, &c. I have found F. 85 exceedingly valuable. The patient should keep the medicine by him, in order that it may be taken on the least threatening of an attack. Sinapisms, turpentine stupes, and hot fomentations, will help to relieve the suffering.

The return of the seizure is to be guarded against by improving the general health; by great attention to diet; by the occasional use of well-selected tonics; and by the avoidance of stimulants, strong exercise, walking soon after meals, and all mental excitement. A belladonna plaster worn constantly over the præcordial region may do good.

XXVIII. CARDIAC ANEURISM.

Aneurism of the heart was formerly said to occur in two forms: either as a simple dilatation of the wall of a ventricle, forming the improperly called *passive aneurism* of Corvisart; or as a pouched fulness arising abruptly from the ventricle, constituting a tumor on the heart's surface. The latter is the only disease to which the designation of cardiac aneurism (or partial dilatation) should be applied. In it the tumor may vary in size from that of a small filbert to a growth the size of the fist; the sac is found to contain layers of fibrin or laminated coagula of blood, especially when its mouth is constricted, like arterial aneurisms; while it generally has its seat in the left ventricle, much more rarely in the left or right auricle, but never in the right ventricle.

According to Rokitansky there are two distinct kinds of cardiac aneurism. The first or acute variety depends upon a laceration of the endocardium and muscular tissue, through which the blood passes and gradually makes a pouch; while in this pouch fibrin is deposited, its entrance presenting a fringed margin of endocardium with vegetations attached. The second or chronic form is the result of some inflammatory condition of the muscular fibre, or of the investing or lining membrane of the heart. The walls of the sac consist of the endocardial and pericardial membranes unbroken, while the muscular fibre seems to be replaced by a fibroid tissue. Either kind gives rise to symptoms which are uncertain and obscure. Often the passage of the blood into the sac has caused a murmur, but this has been mistaken and thought to be due to some valvular lesion. Death usually takes place suddenly from rupture into the pericardium, or into the pleura—if the free surfaces of the pericardium be adherent, as they often are in these cases.

The *coronary arteries* may be diseased. Aneurismal dilatation and rupture of these vessels is not a frequent event. In the instances which have been recorded there have been no symptoms during life to allow of a correct diagnosis; while death has occurred suddenly, the pericardium being afterwards found filled with blood.

XXIX. FUNCTIONAL DERANGEMENT OF THE HEART.

The disorder now to be considered is of special importance on account of the mental distress to which it gives rise. For it is a curious feature in medical practice, that whereas patients with grave structural disease of the heart (prior to the occurrence of the secondary evils) seldom consider that there is anything radically wrong, individuals with mere deranged action can scarcely be persuaded that they are not doomed to an early and sudden death. The latter are unable to understand how indigestion, fast living, or the abuse of tobacco, can produce palpitation with an intermittent pulse; while the physician who assures them that there is no cardiac disease, is either regarded as one ignorant of his business, or as a good-natured fellow afraid to tell an unwelcome truth.

Functional disorder may closely simulate organic disease of the heart. There may be an irregular feeble pulse, palpitation, and fluttering; with a cardiac murmur, and subcutaneous œdema, in anæmic subjects. A systolic murmur, sometimes audible at the base and apex, may even be heard in a few healthy individuals under the influence of great nervous excitement. The local suffering is usually greater than in organic disease; the patient complaining either of a dull wearying ache in the præcordial region, or of occasional lancinating pains. Frequently there is inability to lie on the left side, owing to tenderness. There is always great depression of spirits; the digestive organs are deranged, flatulence and acid eructations being especially common; a sense of choking, or of the rising of a ball in the throat, is complained of; and there may be occasional attacks of giddiness, faintness, headache, noises in the ears, flushing of the face, violent pulsation in the aorta and other arteries, &c. There is rarely any dyspnœa, if the blood be healthy; and

even when the breathing is hurried the patient hardly refers to it, all his thoughts being fixed on the palpitation or thumping of his heart, and the pain.

To prevent any error in diagnosis, the physical signs of valvular disease, as already described, must be borne in mind. Moreover, the patient ought to be examined with the greatest care; and the practitioner, if in doubt, should reserve his opinion until he can make a second investigation. The disease perhaps most likely to be overlooked is fatty degeneration, especially if the pulse be temporarily hurried and the corneæ appear healthy.

Functional disturbance of the heart often occurs in cases of hysteria, ovarian or uterine irritation, neuralgia, and anæmia; it is frequently complained of by women at "the change of life;" it may be associated with the derangements due to nervous exhaustion,—such as over-study, mental anxiety, sexual excesses, &c.; gout, rheumatism, or chronic disease of the liver may produce it; the use of tobacco or strong tea not uncommonly originates it; and lastly it is a frequent result of all forms of dyspepsia.

The object of our treatment must be to allay the symptoms, while we also endeavor to remove their source. The cause of the suffering ought to be fully explained to the patient, and he must be led to feel confidence in our ability to cure him. To quiet the circulation antispasmodics and sedatives will be needed; few remedies of this description answering better than ammonia, ether, sumbul, henbane, belladonna, hop, opium, &c. (F. 85, 86, 89, 95, 316, 325.) The officinal belladonna or opium plaster, applied over the præcordia, gives relief. If there be constipation with unhealthy secretions, a warm aperient (F. 145, 149, 162) should be ordered. Then, if the deranged cardiac action appear to have any connection with gout, saline effervescing draughts with colchicum (F. 46, 348, 351), ought to be administered. Where there are acid eructations with dyspepsia, bismuth, soda or potash, hydrocyanic acid, &c. (F. 65, 67, 70), will be necessary; followed at the end of a few days by the nitro-hydrochloric acid in some bitter infusion (F. 378), pepsine (F. 420), and particular attention to the diet. The use of tobacco and tea should be forbidden: while it must be remembered that malt liquors very often disagree. A small quantity of brandy in soda-water is generally most suitable. And lastly, if there be symptoms of nervous exhaustion, or if the patient be anæmic, steel will be required. The best preparations in these cases, as a rule, are the citrate of iron and ammonia (F. 401, 403), the reduced iron (F. 394, 404), the citrate of iron and strychnia (F. 408), or quinine and iron (F. 380).

XXX. INTRA-THORACIC TUMORS.

An intra-thoracic tumor either consists of an aneurism; or it may be composed of cancer, of simple exudation-matter, of fibrous tissue, or of masses of fatty or steatomatous matter. Putting aside the cases of aneurism, we find that the other tumors, whatever be their nature, commonly have their origin in the glandular structures, and are developed in the mediastina. The symptoms they produce are chiefly due to the

pressure exerted on the heart or lungs, or on the nerves or vessels; and consequently there may be no indications of disease for a time, as a tumor often attains some size before it interferes with the circulation or the respiration.

The symptoms of mediastinal tumor are very variable; but speaking generally there is more or less pain, restlessness, cough, dyspnœa, or even orthopnœa, frothy or viscid expectoration, palpitation, hoarseness, frequently dysphagia, and sometimes hæmoptysis. By its irritating effects it may produce pleurisy, bronchitis, pneumonia, and inflammation of the larynx or trachea. By its pressure it may cause pulmonary collapse, if a main bronchus be obstructed; or a bulging or even perforation of the ribs and sternum; or displacement of the heart; or it may impede the circulation through the aorta, or through the superior or inferior vena cava. The dulness on percussion is more marked as the growth protrudes into the anterior mediastinum; while the auscultatory signs will vary according to the nature of the secondary phenomena.

With regard to cases of primary cancer involving the root of the lung, it is remarkable that inflammatory condensation of the pulmonary tissue, with disorganization and abscess, may result comparatively early. In the only three examples of this disease which fell under Dr. George Budd's observation at King's College Hospital, during nearly twenty years, the tumor implicated the root of the right lung.* The extent of change in the lung in these three cases was greater as the tumor was larger, and involved more completely the root of the lung; and in all, the left lung was free from adhesions, and presented only those appearances which result from recent congestion. As to the way in which these changes arose, Dr. Budd suggests that they resulted from the tumor involving and destroying all or a great part of the pulmonary nerves: and that consequently the inflammatory diseases of all the tissues of the lung in these instances is analogous to the destructive inflammation of the eyeball which results from disease involving the fifth nerve within the orbit. The lung resembles the eyeball in this respect: that all the nerves which supply it are comprised at its root in a very small space, so that they can there be destroyed or paralyzed—and the organ, in consequence, be deprived of all nervous influence—by disease of no very great extent.

The fatal termination in mediastinal tumor often takes place slowly; the patient's sufferings from impeded respiration, want of sleep and appetite, and anæmia, gradually increasing until he dies anasarcous and exhausted. Sometimes, however, death takes place almost suddenly from hemorrhage, from thrombosis, or from spasm of the glottis. All that art can do in these very distressing cases is to palliate the prominent symptoms. Great temporary relief may, however, be often given by the cautious use of diuretics or of aperients; by dry cupping, inunction with the ointment of red iodide of mercury (one part of the officinal ointment to three of lard), or by freely rubbing in the compound iodine ointment (equal parts of the ointment and cod-liver oil); by venesection, to the extent of six or eight ounces, if symptoms of pulmonary or cardiac congestion predominate; and by employing antispasmodics,—such as ether, spirit of chloroform, ammonia, belladonna, stramonium, &c.

* Medico-Chirurgical Transactions, vol. xlii, p. 215. London, 1859.

PART VI.

DISEASES OF THE THORACIC WALLS.

I. PLEURODYNIA.

PLEURODYNIA (*Πλευρά*, the side; *ὀδύνη*, pain), or rheumatism of the walls of the chest, is of importance on account of the severe pain to which it often gives rise, and partly because it is apt to be mistaken for pleurisy or pericarditis, or even for peritonitis.

This affection is sometimes associated with rheumatism of the joints, but in by far the greater number of cases there is no such combination. In nineteen cases out of twenty, the muscular and fibrous textures of the left side of the chest are alone affected. The pain may be acute, and it often comes on suddenly; being referred to the infra-mammary region (though sometimes it extends much lower), and being increased by a deep inspiration or by any stretching movement of the trunk.

The *diagnosis* is easy, with moderate care; for although there is often tenderness on pressure, with slightly impaired thoracic movement, yet there are none of the physical signs of pleurisy, &c., and the pulse does not betoken inflammation. In the numerous cases which I have seen the general symptoms have been those of impaired health, with loss of appetite, mental depression, and urine containing an excess of phosphates or urates. One of the worst examples of pleurodynia which I have met with occurred in a medical man who was suffering from acute rheumatism affecting the knees and ankles; and I well remember the incredulity with which he received my opinion that his pericardium was healthy, as well as the difficulty that was experienced in preventing him from taking calomel and having a vein opened. The success which followed the use of simple treatment, however, quite reassured him.—In tertiary syphilis there is often pain about the middle of the sternum, and sometimes costal periostitis; but a consideration of the general symptoms, together with a local examination, will prevent this disease from being mistaken for pleurodynia.—In herpes zoster or the shingles, sharp pain often precedes the appearance of the vesicles; but the suffering is usually of a burning character, is not increased by movement, and in the great majority of cases is on the right side of the body.

Pleurodynia affects men rather more frequently than women, probably because of their greater exposure to the sources of rheumatism. The residents of marshy districts, the inhabitants of damp houses, and policemen or soldiers on night duty, are very liable to this affection.

In the *treatment* of these cases over-active remedies must be avoided. Cupping, leeching, and blistering will only render the disorder more intractable. If the pain come on in the course of rheumatic fever, it

will merely be necessary to order fomentations or hot poultices in addition to the remedies which are being employed. But in ordinary cases, where the pleurodynia is the sole manifestation of any disease, a cure may generally be effected in from three or four days to a fortnight, by a mixture of ammonia, tincture of aconite, and bark (F. 371); by one or two warm water or Turkish baths; by the use night and morning of a belladonna and opium liniment (F. 281); and by plain nourishing food. Stimulants may be given, if necessary; but all kinds of beer and port wine should generally be avoided. In obstinate cases, iodide of potassium (F. 31) may be required; while cod-liver oil will often prove useful.

II. INTERCOSTAL NEURALGIA.

Neuralgia (*Νεῦρον*, a nerve; *ἄλγος*, pain) may affect the intercostal, as it does the other nerves of the body. The pain is either of a dull and continued aching character, or it comes on in sharp paroxysms; and is most frequently situated in the sixth, seventh, eighth, or ninth nerves of the left side. These nervous trunks (anterior primary branches of the dorsal nerves) pass forwards in the intercostal spaces with the vessels, and are distributed to the parietes of the thorax and abdomen. The pains, whether dull or severe, follow the course of the nerves, and extend from the thoracic wall directly backwards to the vertebræ. One or two particularly painful spots may often be detected by pressure, while sometimes there is cutaneous hyperæsthesia of the whole mammary or infra-mammary region. There are no febrile symptoms; the pleuræ, lungs, and heart are found healthy; but there are often indications of debility. The catamenia are sometimes irregular, or the flow may be supplemented by an abundant leucorrhœal discharge.

Chlorotic and hysterical women suffer most frequently from this species of neuralgia. I have met with it during the progress of Bright's disease. It may form a subsidiary phenomenon in phthisis. The pain sometimes lasts for weeks; being got rid of with the greatest difficulty in those cases where there is no obvious condition of the general health to account for it. Intercostal neuritis is the only disease with which it can be really confounded, and this is of very rare occurrence. A dull tensive aching, referred to the left hypochondrium, is sometimes complained of in affections of the spleen; but the pain is seldom troublesome until the gland is so enlarged that it can be readily felt.

The remedies which are usually the most beneficial, consist of quinine, iron, and cod-liver oil. Friction with liniments containing belladonna and aconite gives relief. Sometimes, pressure with strips of belladonna plaster, applied all round the thorax, is of great comfort. Where there are one or more obstinately tender points, the subcutaneous injection of the sixth of a grain of morphia (F. 314) will effect a cure, if employed in conjunction with remedies that improve the general health.

III. THORACIC MYALGIA.

The tendinous insertions or the fleshy bodies of the pectoral muscles, and sometimes of the intercostal muscles, may become the seats of a hot wearying pain, which is often mistaken for pleurodynia and even for more serious diseases.

This form of myalgia (*Μυς*, a muscle; *ἄλγος*, pain) is generally due to overwork of the affected muscles. It arises most frequently in males. The pain is seldom complained of in the morning, especially after a good night's rest; but it follows upon a few hours' exertion, and gradually increases towards the evening. Patients give very various accounts of the amount of suffering, but frequently the descriptions are exaggerated. No doubt some individuals feel pain much more acutely than others; so that what is regarded as almost torture by one, would be looked upon as trifling by another. The pain, however, is not on these grounds to be lightly thought of; and especially should the practitioner avoid the habit, easily acquired, of looking upon a reputed pain as imaginary, because it is spoken of in extravagant terms.

In all cases of persistent myalgia the blood is more or less impoverished, and consequently the general health is depressed. Sometimes the appetite is bad, the digestion is impaired, the bowels are constipated, there is a disinclination for work of any kind, and the patient is low-spirited. From this it follows that the treatment should consist of regulated exercise to strengthen the system, of insuring partial rest of the affected muscles by the application of a flannel bandage round the thorax, of friction with anodyne liniments, together with the administration of ferruginous tonics and nourishing food. The use of strips of opium or belladonna plaster around the painful part of the chest often does good, partly by supporting the muscles, and partly by soothing their excessive irritability.

PART VII.

DISEASES OF THE ALIMENTARY CANAL.

I. DISEASES OF THE TONGUE.

The tongue is exposed to many sources of disease and injury. Abundantly supplied with blood by the lingual, facial, and ascending pharyngeal arteries, it follows that wounds of this organ are often productive of copious hemorrhage. Being highly sensitive, comparatively slight diseases of its mucous membrane, or of its muscular fibres, are commonly very painful, owing to its free supply of nerves. In each half we find the hypoglossal (motor) nerve, and two nerves of sensation,—the gustatory branch of the fifth, and the lingual branch of the glossopharyngeal.

1. Glossitis.—Inflammation of the tongue, or glossitis (*Γλῶσσα*, the tongue; terminal *-itis*), is a rare affection, now that mercury is seldom used so as to produce salivation. It is generally met with as an accompaniment of other diseases, rather than as an idiopathic affection. Occasionally it leads to the formation of an abscess, which may be mistaken for a tumor until the pus is evacuated. When glossitis arises idiopathically, it gives rise to fever, mental depression, and general weakness. Where it is consequent upon some other affection, great constitutional disturbance may quickly ensue. In all cases the local symptoms are the same, consisting chiefly of pain, heat, and swelling. The tongue is found of a deeper red color than usual; while occasionally the swelling proceeds to such an extent that the cavity of the mouth is not large enough to contain the organ, and it therefore projects beyond the teeth. This condition, which often occurs very rapidly—sometimes in a few hours—is attended with urgent dyspnœa, and requires prompt treatment. Active purgatives should be administered by means of enemata; ice can be applied to the tongue itself; pencilling the organ with nitrate of silver may reduce the swelling; and, if necessary, a free incision must be made along the upper surface to relieve the congestion, or to let out pus if the morbid action has gone on to suppuration. If suffocation be threatened, owing to the enlargement of the root of the tongue, tracheotomy ought to be performed. Mr. Benjamin Bell saved a patient's life by this operation, in a case of glossitis produced by mercury.

2. Ulcers of the Tongue.—There are several varieties of these ulcers, most of them being very painful and difficult to heal.

The whole of the upper part of the tongue sometimes becomes superfi-

cially ulcerated, the raw surface being exceedingly tender. Severe and long-continued disorders of the digestive organs are the chief source of this form.—When the ulcerations are the result of simple inflammation, they are usually small, superficial, without definite shape, and very sensitive. They are seated about the tip or near the frænum rather than at the sides of the organ; and they are to be cured by mild diet, aperients, the application of sulphate of copper, and the extraction of carious stumps, or the removal of the tartar from any teeth which may be irritating them.—Ulcers occurring after ptyalism are easily distinguished by the accompanying affection of the gums and fetor of the breath. They will be most readily healed by the administration of saline purgatives, by a mixture containing chlorate of potash (F. 61), and by the use of a gargle formed of five grains of sulphate of copper to each ounce of water.—Syphilitic ulcers are generally superficial, and are attended with similar disease of the lips or other secondary symptoms: they appear at the sides of the tongue, are very sore, are very intractable, and are best treated by the mercurial vapor bath (F. 131) every night, or by the inunction of mercury, or by the green iodide of mercury and conium (F. 53), together with the application of nitrate of silver. The deep syphilitic ulcers usually commence as inelastic indurations, which slough in the centre; the sores then becoming deep and excavated, and the edges ragged and sloughy or thickened and hard. Their most frequent seat is the upper and back part of the tongue. They are accompanied by other tertiary symptoms; and they are generally cured—at least for a time—by full doses of iodide of potassium, and the frequent use of a gargle of one drachm of the dilute nitric acid to eight ounces of water.—The remaining forms of ulcerations are either strumous, tuberculous, or cancerous: they occur for the most part with other symptoms of these affections; while the strumous and tuberculous varieties require the general constitutional treatment proper for these affections, especially cod-liver oil.

3. Cancer of the Tongue.—Cancerous disease of the tongue may be of the *Epithelial* form, or it may present the characters of a firm *Scirrhous* tumor, or it may be of the *Medullary* kind. Of whichever nature, the disease has a tendency to run on speedily to ulceration; a foul sloughy sore forming, with ragged everted edges, and an indurated base.

The three chief *symptoms* are,—severe pain, profuse salivation, and the cancerous cachexia. At first the patient complains only of a sore tongue, with pain on deglutition; but soon the suffering becomes acute and most wearying, while frequent sharp pangs dart along the Eustachian tube to the ear. The secretion of saliva is very abundant; the fluid either flowing almost constantly from the mouth, or passing into the throat and causing an irritating cough. As the ulceration extends—perhaps involving the mucous membrane of the mouth and gums—the discharge becomes most fetid. The cachexia is early developed; for cancer of the tongue—like that of all soft vascular tissues—runs a rapid course. The nights are passed in misery; there is pain and difficulty in articulation and deglutition; there are occasional attacks of hemorrhage; the whole tongue becomes much swollen, while it may even slough; and cancerous deposit takes place in the sublingual and sub-

maxillary glands, as well as in the surrounding tissues. Sometimes the mouth becomes almost filled with an extensive ulcerated fungus; so that suffocation may be threatened. But generally speaking, death occurs from exhaustion.

The *treatment* of these cases is to be conducted so as to relieve pain and support the failing powers as far as possible. Opium in large doses becomes absolutely necessary, and by its judicious use much ease may be given for a time. (See Part I, Section 10.) Bleeding is to be checked by the application of powdered matico leaf, or of a saturated solution of perchloride of iron, or of ice. Fluid nourishment—milk, raw eggs, and essence of beef—must be freely allowed, after the patient finds it impossible to masticate and swallow solid food.

As a curative measure, removal of the diseased parts or of the entire tongue is useless. But excision may occasionally be resorted to for palliating the symptoms; as when suffocation is threatened from the swelling, when the pain is very intense, when the flow of saliva is so profuse as to keep the patient wet and miserable, or when there are repeated attacks of hemorrhage. That great relief often follows the operation cannot be doubted; and patients (even medical men, fully aware of the inevitable termination of the disease) will sometimes beg for a second operation, in the hope of gaining an extension of ease. Whether the diseased structure should be removed by the knife, écraseur, or ligature, must depend upon the part of the tongue involved and the extent of the morbid action.

To diminish the sensibility of the tongue, and to check the secretion of saliva, Mr. Moore, of the Middlesex Hospital, has recently (1861) repeated the operation of dividing the gustatory branch of the fifth nerve, as first suggested by Mr. Hilton. By section of this nerve between the disease and the brain, relief is immediately afforded; the pains and tenderness, the salivation, and the reflected irritation of the fifth nerve all disappearing. In some five cases, the relief was permanent so far as the gustatory nerve was concerned; but when the disease invaded the area of the glosso-pharyngeal nerve, new pain arose. To effect division, Mr. Moore cuts through all the soft tissues on the inside of the ramus of the jaw by an incision immediately behind the last molar tooth, extending three-quarters of an inch in a direction from the angle of the jaw. The structures divided by such an incision are the mucous membrane and a part of the mylo-hyoid muscle, with the gustatory nerve descending forward between them, about half an inch from the tooth, and nearly at a right angle with the direction of the incision. It is advisable to operate with a curved knife, as the alveolar ridge might shield the nerve from the edge of a straight one; while it is also necessary to cut outwards quite to the bone.—In one instance Mr. Moore combined ligature of the corresponding lingual artery with this operation; so as to diminish the supply of blood to the affected part.

4. Cracked Tongue, Tumors, &c.—*Cracked tongue* is sometimes a troublesome and inveterate affection, rendering eating and speaking very painful. Where there is no specific condition of the system, or no derangement of the alimentary organs to account for it, I have found a lotion of borax and glycerine (F. 268) act very advantageously. Iodide of potassium with steel or sarsaparilla (F. 31, 32) can likewise

be administered, if local remedies fail to effect a cure. The clefts or fissures may be a couple of lines in depth, and so numerous that they form an irregular series of grooves.

The surface of the tongue occasionally presents *patches of baldness*—that is to say, we find one or more smooth, oval, glossy patches. There is no ulceration or fissure, and the remainder of the surface of the organ is healthy. This appearance is combined in many cases with psoriasis palmaris; and is probably very often indicative of a syphilitic taint, when it will require a prolonged course of the corrosive sublimate (F. 27) for its cure.

Warts and condylomata are not uncommon diseases of the mucous membrane of the tongue; the former merely requiring excision, while the latter demand anti-syphilitic medicines. *Papillary patches* are sometimes met with; or, in other words, we find large spots of the mucous and submucous tissue thickened, tough, brawny, coarsely papillary, and perhaps fissured. These patches produce an unpleasant feeling, with thickness of speech; they must not be mistaken for cancer; and they may generally be cured by the administration of the iodide of potassium. When much induration is present, conium, in large doses, appears to be an efficacious remedy in producing softening.

Hypertrophy of the tongue is a rare affection. It is sometimes congenital. The enlargement generally becomes so great that the mouth is found too small to contain the organ; and a large portion is therefore constantly protruded. In some instances the prolapsed part has reached below the chin. Removal may be accomplished by the knife, ligature, or écraseur. When the frænum linguæ is shorter than usual, the individual is said to be *tongue-tied*. This condition is by no means so common in infants as the public imagine. When it really interferes with the movements of the organ, the frænum should be divided, the points of the scissors being directed downwards, to avoid wounding the ranine arteries. *Encysted* or *fatty tumors* form in the tongue or beneath it, and may require extirpation. *Firm tumors*, made up of fibrous and areolar tissue, have been found in a few rare instances growing from the tongue. When pediculated they may be snipped off without any fear of hemorrhage, unless an artery can be felt in the stalk; in which case the écraseur should be used. And, lastly, *Ranula* (*Rana*, a frog; because the voice is said to be croaking, like a frog's,) is a semi-transparent fluctuating swelling, perhaps as large as a walnut, situated under the tongue. It consists of a dilatation of the duct (Wharton's) of the submaxillary gland. A seton should be passed through the cyst, or a portion of the anterior wall may be excised.

II. INFLAMMATION OF THE MOUTH.

Stomatitis (*Στόμα*, a mouth; terminal *-itis*), or inflammation of the mouth, is a common disease in young children. It may occur in three forms—*i. e.*, according as the principal seat of the morbid action is in the mucous follicles of the mouth, the substance of the gum, or in the tissues of the cheek.

1. Follicular Stomatitis.—Inflammation of the mucous follicles of the mouth—the aphthous stomatitis of some authors—is the mildest form of stomatitis. It may be idiopathic, or it may occur as a sequela of some of the eruptive fevers, as measles, &c. The attention is first directed to the child's mouth by observing that a difficulty seems to be experienced in sucking, that there is a more free secretion of saliva than usual, and that the submaxillary glands are tumid and tender. The patient is also restless and feverish, has but little appetite, seems to experience pain in deglutition, and frequently suffers from diarrhœa with very offensive evacuations. On examination, numerous small vesicles are found about the inside of the mouth, on the tongue, and on the fauces; which vesicles by bursting form little ulcerations covered with a dirty-white or yellowish slough. These ulcerations sometimes remain separate and sometimes coalesce, forming a sore of considerable extent: in either case, as they heal, fresh vesicles appear, which again degenerate, and so the morbid action may continue for some weeks. When follicular stomatitis occurs as a concomitant or sequela of measles, it may become associated with diphtheria and produce an alarming malady.

In most cases very simple *treatment*, such as that presently to be recommended for thrush, suffices to effect a cure.

2. Ulcerative Stomatitis, or Noma.—This disease attacks the gums; the ulceration sometimes progressing to such an extent as to destroy these parts and denude the teeth.

Noma (*Νέμω*, to corrode) produces heat of the mouth, an increased flow of saliva, offensive breath, swelling of the upper lip, and enlargement with tenderness of the submaxillary glands. On looking into the mouth we shall see that the gums are swollen, red or violet-colored, readily bleeding to the touch, and covered with a layer of pulpy grayish matter. If the disease be allowed to creep on unchecked, the gums will get destroyed by the ulceration, and the teeth become exposed and loosened until they fall out. The morbid action also spreads to the inside of the cheeks, which become covered with irregular sloughing ulcerations; and the tongue assumes a swollen and sodden appearance. Ulcerative stomatitis is not uncommon; it occurs for the most part in weakly children who have been badly nourished, and exposed to cold and damp.

The *treatment* of this disease is not difficult, inasmuch as we possess in the chlorate of potash a remedy which may almost be deemed a specific.* Five grains of this salt may be given every four or six hours to an infant one year old, in a little sugar and water. When the ulcerations have healed, bark or quinine should be administered.

3. Gangrenous Stomatitis.—Gangrenous stomatitis, or cancrum

* From the effect of this agent in numerous cases Mr. Hutchinson concludes: 1. That chlorate of potash possesses a peculiar influence over all inflammatory affections of the mouth, the syphilitic perhaps excepted. 2. That it possesses a peculiar influence over inflammations attended with phagedæna or sloughing, on whatever part of the body situated. He recommends five grains as a fair ordinary dose for infants of one year, while for those older it should be proportionately increased—twenty or thirty grains being the quantity for an adult.—Medical Times and Gazette, p. 192. 23d August, 1856.

oris, or sloughing phagedæna of the mouth, is a much more formidable affection than either of the foregoing. It occurs in children of debilitated habits, between the ages of two years and five. The *symptoms* are generally these: The child is out of health, and evidently weak; and on one cheek is a hard indolent swelling. On examining the cavity of the mouth, a whitish or ash-colored eschar is seen in the centre of the cheek, which gradually increases until the slough has spread over the whole of the interior of the cheek, lips, and gums. The saliva is copious, and horribly fetid. There is great constitutional disturbance, pulmonary complications are very apt to arise, and the disease frequently ends fatally.—It has often been unjustly attributed to the action of mercury; but it may occur when not a particle of this medicine has been given.

The *treatment* must consist in the application of the nitrate of silver—in some instances, of the strong nitric acid—to the slough; in frequently syringing the mouth with solutions of chloride of zinc (F. 79), or of chlorinated soda (F. 254), or of the permanganate of potash (F. 78); and in the free administration of strong beef-tea, wine or brandy, and the chlorate of potash in decoction of bark.

The effect of mercury upon the gums and teeth varies according to the age and constitution of the recipient. Young children are certainly less susceptible to the injurious influence of this metal than adults; but cases are occasionally met with where great mischief has been produced, even in infants, by a mercurial course. Gray powder is unfortunately believed by the public to be the panacea for all infantile disorders, and hence it is administered on many occasions with great impropriety. I have seen such severe inflammation of the gums (*gingivitis*) thus set up, that the child could not venture to take the nipple into its mouth; while it has been rapidly wasting for want of food. Sometimes the gums and buccal mucous membrane become the seat of a wide-spread ulceration, with all the symptoms of cancrum oris. Where such violent action does not ensue, great mischief may yet be done to the teeth about to be cut, so that as they are shed they become dark-colored, brittle, and very liable to rapid decay. The mischief, however, does not cease with the temporary teeth, the permanent ones being also affected, though perhaps in a less degree. It has seemed to me doubtful whether the iodide of potassium is of any use in these cases. Not unfrequently, when the child is first seen by a competent practitioner, there is so much exhaustion that all his endeavors have to be directed to maintaining life; and therefore recourse is had to small doses of brandy, to the restorative soup (F. 2), and to milk or cream, leaving the elimination of the poison to time.

III. APHTHÆ OF THE MOUTH.

Aphthæ (Ἅπτω, to fasten upon) consist of small, round, white, elevated specks or patches, scattered over the tongue and lining membrane of the mouth; and sometimes extending down the œsophagus into the stomach. They form a special disorder in infancy—*the thrush:* in adult age they are apt to arise in the course of other affections, when

they are often the harbingers of death. In at least some forms of this disease, microscopical parasitic plants—the *Leptothrix buccalis* and the *Oidium albicans*—are developed in large quantity in and between the epithelial cells of the mucous membrane; the filaments and spores of these fungi rendering the epithelium friable, loose, and swollen. They are readily transferred from the infant's mouth to the mother's nipple. When the aphthous spots are abundant they may coalesce, producing a dirty diphtherial-looking membrane. The chief general symptoms are restlessness, depression, difficulty in swallowing, cough, diarrhœa, and vomiting.—The *treatment* of the thrush consists in the use of mild astringents and tonics, and the application of borax and glycerine (F. 250) to the aphthous parts. The diet must be regulated, such nourishing food as is compatible with the age being freely allowed.

Dr. Jenner states that in cases attended with the formation of parasitic plants, the application of a solution of sulphite of soda (sixty grains to one fluid ounce of water), suffices to remove the disease from the mucous membrane of the mouth in twenty-four hours. The secretions of the mouth being acid, the salt becomes decomposed, and sulphurous acid is set free, which at once destroys the parasite.

IV. INFLAMMATION OF THE PAROTID.

Cynanche parotidea (*Κύων*, a dog; *ἄγχω*, to strangle. *Παρα*, near; *οὖς*, the ear), or parotitis, or the mumps, is a specific contagious inflammatory affection of the salivary glands, and of the parotid gland especially. It first manifests itself by slight febrile disturbance, with tumefaction and soreness in one or both parotid regions; the swelling usually extending from beneath the ear, along the neck to the chin, and involving the submaxillary glands. The disease reaches its height in four days, and then declines. Very rarely, the inflammation runs on to suppuration. Occasionally, during or after the decline, the testicles or mammæ become painful and swollen.

When orchitis has occurred during the prevalence of mumps it has usually been considered as the result of metastasis. In an epidemic of catarrhal fever, however, described by M. Desbarreaux-Bernard, of Toulouse, to which the prevalence of mumps imparted a peculiar character, this explanation could hardly be adopted; inasmuch as in several patients the affection of the testes appeared at once, without any preliminary affection of the parotid whatever. It came on during the catarrhal fever; the pain, however, being only slight, and the tumefaction assuming a globular form. Individuals of all ages were attacked; and several of these were already patients in the hospital, suffering or convalescent from various serious diseases.

The *treatment*—when any is necessary—consists in the employment of milk diet and gentle laxatives, mild diaphoretics, and hot fomentations (or merely flannel) to the throat.

V. INFLAMMATION OF THE TONSILS.

Cynanche tonsillaris, or tonsillitis, or quinsy, or common inflammatory sore throat, manifests itself by fever, pain, and considerable swelling of the tonsils.

The disease is often ushered in by chilliness or a rigor, which is followed by smart fever, redness and swelling of the fauces and tonsils, a thickly-coated tongue, discharge of viscid saliva, the return of liquids through the nostrils on attempting to swallow, and difficulty of deglutition; together with—in severe cases—pain shooting from the throat to the ear, along the course of the Eustachian tube. Dyspnœa is but rarely present. Under ordinary circumstances, the inflammation runs a certain course, and terminates by resolution in a few days, merely leaving the tonsils enlarged: when violent and prolonged, however, it frequently leads to suppuration in one or both of the glands. Rigors generally announce the suppuration; and the pain is very severe until the abscess bursts, or is opened artificially.

The principal exciting cause of quinsy is cold. The liability to it is increased, during the youthful period of life, by repetitions of the attacks. It is doubtful whether it be contagious or not; but most practitioners assert that it is not.

The *treatment* required is usually very simple. A few doses of some cooling saline purgative, and the application of hot fomentations or linseed-meal poultices to the throat, will often be all that is necessary. The steam of poppy-water directed to the fauces gives great relief; and I have frequently found benefit from opiate gargles (F. 253). Blistering the outside of the throat, or the application of stimulating embrocations—as the compound camphor liniment—has seldom done any good in my hand; and I much prefer using freely the extract of belladonna, and applying a large poultice over it. Guaiacum in large doses has been recommended as a specific in quinsy, but I have never found it of much service. Ammonia and bark (F. 371), or quinine and nitric acid (F. 379), have appeared to me of far greater value.

When the inflammation has gone on to suppuration, it will generally be necessary to open the abscess. In doing this, care must be taken to puncture the tonsil with a sharp-pointed curved bistoury, the cutting edge of which is to be directed towards the mesial line of the body; for it has on several occasions happened that an awkward and unskilful operator has, by inattention to this rule, wounded the internal carotid artery. Should such an accident happen, a strong solution of the perchloride of iron must be quickly and freely applied to the wound; this excellent styptic having arrested the hemorrhage in a case, where —had it failed—a ligature would have been placed on the trunk of the common carotid artery.

Permanent enlargement and induration of the tonsils may result from acute inflammation, or this state may come on slowly in strumous children and weakly young women. The enlargement is often so great, that the fauces appear to be almost blocked up: while it produces thickness of speech, more or less deafness, and some difficulty in swallowing. Occasionally the swollen glands seem to prevent full and deep inspira-

tions. Portions of the hypertrophied organs must be excised, if the applications which have been recommended (p. 339) fail to effect a cure. Cod-liver oil is often very useful, taken perseveringly for many weeks.

VI. DISEASES OF THE PHARYNX AND ŒSOPHAGUS.

The coats of neither the pharynx nor the œsophagus are as subject to disease, as the position and office of the musculo-membranous tube which they form might lead us to expect. Occasionally, however, this canal becomes the seat of cancer, or of inflammation leading to stricture. A narrowing of the passage may also result from simple spasmodic contraction, but then it is only temporary; or from the pressure of aneurismal or intrathoracic tumors; as well as from destruction of the mucous membrane and the effusion of a fibrinous material into the submucous areolar tissue, the consequence of swallowing the strong mineral acids or caustic alkalies. I have seen only one instance in which inflammation and ulceration occurred, followed by stricture, without any appreciable cause.

Disease of the pharynx and œsophagus is attended by one prominent symptom—dysphagia (*δυς*, difficulty; *φάγω*, to eat). Difficulty in swallowing may likewise arise from tonsillitis, diphtheria, and croup; from that very uncommon affection, polypus of the pharynx; from erysipelatous or other inflammation of the areolar tissue of the neck, or from retro-pharyngeal abscess; from paralysis of the muscles of deglutition; from malignant, syphilitic, and tubercular ulcerations about the epiglottis; from spasm of the pharynx and œsophagus, as in hydrophobia; from inflammation, ulceration, or œdema of the larynx; and rarely from disease of the laryngeal cartilages.

1. Disease of the Pharynx, &c.—Sometimes, especially in hospitals and workhouses, the walls of the pharynx become affected with a *diffused erysipelatous inflammation*. There is generally low fever, with rapidly increasing prostration. Ammonia and bark (F. 371), wine or brandy, and good fluid nourishment, must be allowed very freely. The morbid action will perhaps run on to sloughing, or the patient may die from exhaustion without great care.

Extensive syphilitic ulceration of the velum and fauces has in a few instances, after healing, produced narrowing and contraction of the upper part of the throat to such a degree as to impede deglutition and to obstruct respiration. It might perhaps happen in some particular case that incising the edges of the contracted opening would afford sufficient relief; but most frequently real and permanent benefit will only result from tracheotomy. In one case the tracheal tube was worn with great comfort for eight years. Deglutition had to be slowly and cautiously performed, great care being required to masticate solids very finely. Partial or complete *adhesions of the velum to the posterior walls of the pharynx, with destruction of the uvula*, are more common; but they give rise to little or no difficulty in breathing or swallowing. *Elongation of the uvula* may be the result of chronic inflammation, or of a generally

relaxed state of the fauces. By irritating the pharynx and epiglottis the hypertrophied uvula produces an inclination to vomit at times, with a troublesome tickling cough. If astringent gargles and ferruginous tonics fail to reduce the size of this organ, about two-thirds of it should be snipped off.

2. Retro-Pharyngeal Abscess.—This is a rare disease, which is more frequently met with in children than adults. To Dr. Fleming is due the credit of first clearly describing it, and of showing that it sometimes occurs during infantile life.*

Pathology.—The abscess is the result of acute or chronic inflammation of the loose areolar tissue, situated between the posterior surface of the pharynx and the muscles on the anterior part of the spine. It may result from direct injury, or it may be the consequence of some general or specific constitutional derangement. Chronic abscesses in this situation are often connected with the strumous diathesis, and are of the same nature as the abscesses of the cervical glands. Perhaps, also, the suppuration may be in relation with some syphilitic taint. The inflammatory action often commences in a lymphatic gland at the back of the pharynx. In weakly subjects there is a fear that the inflammation will extend and produce œdema of the glottis.

Symptoms.—The characteristic symptoms are preceded by general disturbance and fever, varying in intensity according to the constitution of the child. In almost all cases there is derangement of the cerebral, respiratory, and circulating systems. At the commencement we find some amount of nausea, and soreness of the throat. Indications of difficulty in swallowing and breathing then manifest themselves; the latter soon becoming so severe, particularly when the child is placed in the recumbent posture, that suffocation may even appear imminent. There is also a fixed and retracted state of the head, with rigidity of the muscles at the back of the neck; a more or less locked state of the jaws; and a remarkable articulation—in children old enough to speak—the words being drawled out with pain and difficulty. The painful deglutition increases, until solids are refused and liquids regurgitated through the nose; frequent spasmodic attempts are made to swallow, as if there was something in the mouth; and there may be convulsions, or stupor sometimes amounting to complete coma. Death has occurred from the abscess pressing the pharynx forwards on the epiglottis and rima glottidis, and causing suffocation. On examining the fauces, a firm, projecting, round tumor is felt just beyond the base of the tongue, occupying either the median line, or inclined to one or the other side. The abscess sometimes occurs as a sequela of fever; but usually it is idiopathic.

Diagnosis.—Without caution the symptoms may be attributed to some cerebral affection, or to disease of the cervical vertebræ, or to inflammation of one of the respiratory organs. Attention to the phenomena just described, the cessation or diminution of the difficult breathing when the patient is raised from a recumbent to a sitting posture, with a careful examination of the throat, will remove all doubt as to the true nature of the case.

Treatment.—Surgical interference gives immediate relief, and soon

* The Dublin Journal of Medical Science, vol. xvii, p. 41. Dublin and London, 1840.

effects a cure. The abscess must be opened with a bistoury, shielded to near its point by lint or plaster. The head ought to be steadied during the operation by an assistant; who is to press it well forwards directly the opening is made, so as to facilitate the escape by the mouth of the pus which gushes out. A spontaneous opening but rarely occurs. And could we trust to its taking place, there would be a fear, that the abscess bursting suddenly, air and pus might be inspired into the trachea, producing suffocation.

3. Diseases of the Œsophagus.—*Simple ulceration of the œsophagus* is a peculiar disease, the pathology of which is obscure. The chief symptoms are difficulty in swallowing, sometimes so great that deglutition is impossible; pain at the epigastrium, or at the top of the sternum, or between the shoulders; with a frequent sense of nausea, emaciation and debility, and considerable mental distress. Not unfrequently the ulceration extends into the trachea; while it has also been known to progress until it has made a communication between the œsophagus and one of the bronchi—especially the left, or between the œsophagus and either the pleura, pericardium, or aorta. The treatment which is chiefly useful in these cases of ulceration consists of local applications of a solution of crystals of nitrate of silver (twenty grains to the ounce); with such constitutional remedies as bark or steel, iodide of potassium, cod-liver oil, a very nourishing diet, and sea-air. I have little doubt that life might have been saved in some of the recorded cases where death was due to slow starvation, by the formation of a gastric fistula in the manner presently to be described.

Cancer of the œsophagus may occur at any one part of the tube, or through its whole length and circumference. The disease will be of the scirrhous, or medullary, or epithelial variety; the latter probably being the most common. When it occurs as a primary disorder, distant organs are but rarely implicated in the cancerous affection, possibly because of the rapidity with which it destroys life. Most cases are fatal considerably within a year from the commencement of the symptoms.

Complaint is at first made, somewhat suddenly, of sore throat, and difficulty in swallowing. In one case under my observation the patient was much annoyed by a curious cutting pain in the ears, which symptom preceded the dysphagia.* The disease soon gives rise to decided obstruction, so that after a time not a particle of nourishment can be naturally passed into the stomach; while just above the constriction

* In another instance (seen during the summer of 1864, in consultation with Mr. Jenkins, of Philpot Lane, Fenchurch Street), the only symptoms through the progress of the disease were constant sickness and increasing emaciation. The former was so urgent and incessant, that a teaspoonful of iced water, merely taken into the mouth, at once brought on retching. And it was remarkable that this sickness commenced suddenly one afternoon at dinner, when the gentleman was apparently in sound health; while it did not cease for a single day until death took place, some four months afterwards. There was no cancerous cachexia; neither dyspnœa nor cough; and no pain anywhere, not even tenderness on making firm pressure over the neck or under the diaphragm. For many weeks the patient merely sucked a piece of linen dipped in water to check his thirst; all medicine and nourishment being administered by the rectum. At the autopsy, a slight mass of malignant disease was found occupying part of the œsophagus, but in no degree obstructing it, just above the termination of this tube in the cardiac orifice of the stomach. The irritation of the pneumogastric nerves would appear to have been the cause of the great irritability of the stomach.

there is often formed a pouch where food accumulates until it is rejected. There is also considerable pain in the canal, or in the back, or in the shoulders; nausea and retching may be most troublesome; cough or hiccup is not uncommon; there is sometimes hemorrhage, occasionally fatal through an extension of the ulceration into enlarged veins; the patient wastes rapidly and to a wonderful extent; while the cancerous cachexia becomes plainly established. Death may occur from inanition; or from the ulceration involving important parts; or from destructive inflammation of the lung, owing to the implication of one of the pneumogastric nerves. We can only hope to give temporary relief by the use of opium and nutrient enemata; or by very cautiously passing a large gum-elastic catheter (No. 14 is a convenient size) through the contracted œsophagus, keeping the instrument there, and injecting food, &c., through it.

Simple stricture of the œsophagus is generally an after-consequence of the attempt to swallow some corrosive poison. Dr. Basham has recorded* a very interesting example, which well shows the course of events in these cases. A young woman, twenty-two years of age, accidentally swallowed a very small quantity of soap-lees (a caustic solution of impure carbonate of soda). When admitted into the Westminster Hospital, five days subsequently, she was suffering principally from vomiting; which was relieved by calomel and opium, oleaginous laxatives and demulcents, milk and farinaceous diet, and by a blister to the throat and upper part of the sternum. An œsophagus tube passed easily. Ten days after her admission she was discharged apparently well. At the end of eleven months she was again admitted, suffering from urgent dysphagia. She appeared half-starved, and stated that for many weeks no solid food had been taken; and that lately the difficulty of swallowing had become so great that she could hardly get down liquid nourishment. A small gum-elastic catheter, No. 8, was introduced with a little difficulty; and beef-tea was injected into the stomach, to the great relief of the patient. This plan of treatment was continued, a larger tube being gradually used; while in a little more than twenty days there was so much improvement that she was able to swallow freely, and was therefore made an out-patient. She neglected to attend, however, and consequently eighteen days afterwards was readmitted with her former symptoms aggravated. The same treatment was again successfully resorted to, and she was kept under longer observation by employing her as an hospital nurse. She was afterwards lost sight of for a time; but in about eight months—or twenty-six from the accident—she again, for the fourth time, applied, and was admitted. Only the smallest bougies could now be passed; nutritious enemata were employed, but in a few days she died, literally of starvation.

In the management of these cases we can only trust to the repeated use of bougies, to prevent the stricture from closing. One lady under my care derived relief from constantly wearing a gum-elastic catheter of a large size; through which she injected her food and medicines. As she had lost her upper incisor teeth, the instrument was allowed to project just in front of the lips, where it caused little or no inconvenience. In passing any instrument great caution ought to be exercised; for in

* Medico-Chirurgical Transactions, vol. xxxiii, p. 99. London, 1850.

one instance it is said that an eminent surgeon forced a tube through the stricture into the thoracic cavity, and then injected half a pint of beef-tea into the pleura.

With regard to hopeless examples, it has been suggested that an incision should be made into the stomach, large enough to enable us to introduce food; and in one instance of malignant stricture of the œsophagus gastrotomy has been actually performed, the patient dying forty-five hours afterwards. Although I should be averse to sanctioning such an operation in a case of cancer, yet it would be a different matter in an instance of incurable simple stricture; for the well-known case of Alexis St. Martin (not to mention several others of a similar kind) seems to show that such treatment might be successful. I would, however, suggest that instead of making a communication between the stomach and external surface by the knife, a strong caustic—*e. g.*, potassa fusa—should be employed; through the agency of which we could gradually excite inflammation, adhesion, and ulceration. The feasibility of such a proceeding seems to be proved by a case recorded by Dr. Murchison.* In this instance a woman produced a large opening through the abdominal parietes into the stomach by means of long-continued pressure with a penny-piece. The ulcerative process was completed, so that food escaped, on the 2d of March, 1854; yet the patient was in tolerable health, with the fistula large enough to admit three fingers, in June, 1858.

The œsophagus may, like the urethra and bronchial tubes, suffer from *spasmodic stricture*. Young hysterical women are often affected with it; the principal symptoms consisting of difficulty in swallowing, an occasional sense of fulness and choking, languor, anæmia, &c. Spasmodic cannot be confounded with organic or permanent stricture, because the dysphagia is only temporary, a bougie passes with very little or no difficulty, and the symptoms are aggravated when the patient's attention is directed to them. Moreover, it may generally be readily relieved by antispasmodics (F. 86, 89), or by some tonic like the valerianate of quinine (F. 93), or the phosphate of zinc (F. 414); by the daily use of the cold shower-bath; and by the cure of any general or uterine disorder which may be present.

A curious nervous condition termed *œsophagism* is closely allied to the foregoing. It arises thus: A woman puts some five or six pins in her mouth, has her attention drawn off for a moment, and then erroneously believes that she has swallowed one. Or a nervous individual, perhaps while eating fish, is suddenly spoken to. He is startled, makes a gulp, and fancies he has swallowed a small bone which is sticking in the gullet. As the irritation increases he seeks advice. But the medical man may be misled by trusting to the patient's symptoms; or feeling, with the fingers in the throat, the upper edge of the cornu of the os hyoides, he is apt to mistake it for a foreign body. A careful investigation with the finger or the laryngoscopic mirror, or the cautious passage of a full-sized bougie, should prevent any error in diagnosis. The nervous sensation may however produce dysphagia, and will perhaps continue for weeks. Quinine, valerianate of zinc, and galvanism are the remedies to employ in obstinate cases.

* Medico-Chirurgical Transactions, vol. xli, p. 14. London, 1858.

VII. DYSPEPSIA.

Dyspepsia (*Δυς*, difficulty; *πέπτω*, to digest), or Indigestion (*In*, neg.; *digero*, to concoct or digest), is one of the most common diseases we have to treat. Anything which interferes with the healthy action of the stomach and intestines may give rise to it.

Pathology.—There is a *gastric* and an *intestinal* digestion. The first occupies on an average from two to three hours; and it essentially consists of an exposure of the food to the solvent powers of the gastric juice. This fluid consists of water, holding in solution hydrochloric and perhaps lactic acid, most of the salts which are found in the liquor sanguinis, and an albuminous matter absolutely necessary to the solvent powers of the juice—whence it is named "pepsine," or "ferment substance." Moreover it is always diluted with saliva: sometimes there is an admixture of bile. The object of the gastric juice is to render soluble the albumen, fibrin, casein, &c. (the albuminoid matters), submitted to the stomach; and this it effects by a catalytic action,* converting them into a new organic and non-coagulable substance, which has been called "peptone." Of this peptone, part is probably at once absorbed, and mingles with the blood; while the remainder, with the fatty substances of the food, passes onwards into the duodenum, &c., to be acted upon by the biliary, pancreatic, and intestinal secretions. The conversion of starch into sugar is commenced in the mouth, by the power of the secretion of the several salivary glands; but whether it is completed in the stomach, or whether its conversion there is delayed, to be again renewed in the duodenum, is uncertain. According to M. Lucien Corvisart the pancreas is to be regarded as a supplementary organ to the stomach: so that those matters which escape gastric digestion become quickly acted upon in the duodenum by the pancreatic juice. The quantity of the pancreatic juice secreted in the twenty-four hours has been estimated at seven or eight ounces avoirdupois; but though it is so much less than the gastric juice (which according to Dr. Draper amounts to seventy ounces), yet its fermentive matter is said to be ten times more effective. It of course follows from this that we have a duodenal dyspepsia, caused by vitiation of the pancreatic juice, just as as we may have gastric dyspepsia.

Causes.—The most frequent causes of dyspepsia are the use of food in too large a quantity, or of an improper nature; or the imperfect mastication of it from carelessness, or owing to the pain of bad teeth, &c. Dr. Beaumont clearly proved, in his well-known experiments on Alexis St. Martin, that spirituous liquors were most injurious to the stomach; hence persons in the habit of using them often suffer from indigestion. Another cause is an error frequently committed, of not allowing a sufficient interval between the meals, to permit of the stomach doing its work and resting: for the rule that five or six hours should intervene between each meal, cannot be long broken with impunity. Want of bodily exercise, excessive labor, undue intellectual exertion,

* Catalysis (from *Καταλύω*, to dissolve or loosen). Catalytic force is that property by which a body resolves other bodies into new compounds by mere contact or presence, without itself experiencing any modification.

mental anxiety, general debility, immoderate smoking and snuff-taking are fruitful sources of this affection; while of course disease of the mucous membrane or of the muscular coat of the stomach, and derangement of the liver or pancreas will also give rise to it. So likewise morbid states of the brain, lung, liver, or uterus may, by reflex action, produce functional gastric disorder, attended with most troublesome vomiting. Again, where the blood is rendered impure from any morbid poison in the system, as that of fever, cholera, &c., we have indigestion; while it is common in Bright's disease, when the blood is contaminated with retained urea, owing to the imperfect action of the kidneys.

The nervous irritability of many literary and scientific men has its origin in dyspepsia. Sedentary pursuits with over-mental labor cause disorders which speak by the stomach in the first instance. The truth is, unfortunately, that one man may injure his constitution by excessive devotion to good work, almost as readily as another may do so by dissipation. It would be well if Bacon's suggestion could be acted up to, —"that we make application of our knowledge to give ourselves repose and contentment, and not distaste or repining." But in these days, hard labor and scant repose are the conditions under which those who aspire to teach their fellow men must be content to live.

Symptoms.—The symptoms of that functional derangement of the stomach which is commonly known as indigestion, vary very much in nature and severity; one individual suffering severely when his dinner "disagrees" with him, while another has merely slight depression. But in the chronic cases for which advice is sought, there is commonly anorexia or loss of appetite; a sensation of pain, weight, and fulness at the epigastrium; flatulence, or the undue collection of gas in the intestinal canal; nausea and vomiting, costiveness alternating with diarrhœa, furred tongue, and foulness of breath; palpitation of the heart; pain in the loins, and aching of the limbs; with dull headache, and hypochondriasis. Occasionally the patient complains of *gastralgia* (*Γαστὴρ*, the stomach; *ἄλγος*, pain) or *heart-burn;* of *gastrodynia* (*Γαστὴρ*; *ὀδυνή*, anguish) or *cramp in the stomach;* or of *pyrosis* (*Πυρόω*, to set on fire) or *water-brash*, which consists in the frequent eructation of a thin, watery, acid, or tasteless fluid. Pyrosis occurs more frequently in women than men; it is not uncommon in advanced life; and it often exists in connection with some derangement of the nervous or uterine system, or—in some instances—with organic disease of the stomach, pancreas, or liver.

The consequences of *slow digestion* from a scanty secretion of the gastric juice, are—a feeling of fulness and distension in the left hypochondrium, as well as at the pit of the stomach, after taking food; flatulence, sour fetid eructations, constipation, a coated tongue, and loss of appetite; palpitation of the heart, irregularity of the pulse, headache, and occasionally dimness of vision; with distressing mental depression. When the stomach becomes greatly distended by gas, oppression of the breathing is often produced; owing to the descent of the diaphragm being impeded. The low spirits induced by gastric irritation may vary from slight dejection and ill-humor to the most extreme melancholy; sometimes inducing even a disposition to suicide. The patient misconceives every act of friendship, and exaggerates slight ailments into heavy grievances.

In some cases of nervous gastric disturbance the appetite is exagge-

rated, while it is hardly appeased by taking food. Digestion may take place easily and naturally, or it may be accompanied with acid eructations and pyrosis. The chief feature of *bulimic dyspepsia* (so termed by Dr. Guipon) is, however, that the desire for food returns almost directly after a good meal. The patients suffer from constant hunger; and unless they eat immediately the desire for food comes on, they get faint and low-spirited, and especially complain of a painful sense of sinking about the præcordia. The remedy which I have found most rapidly curative is cod-liver oil, pepsine being also given if there be any difficulty in digesting it: but Dr. Guipon states that he has succeeded best with minced raw meat.

Diagnosis.—The difficulty of diagnosing correctly the various morbid affections of the stomach is by no means slight; since not only are we for the most part ignorant of any direct means of ascertaining the physical conditions of this viscus during life, but the prominent symptoms of many of its different diseases are almost identically the same. Thus we find *pain and soreness at the epigastrium* not only common to most of the organic affections of the stomach—as to cancer, simple ulcer, and inflammation of the mucous membrane and deeper structures; but also to many of the merely functional derangements, being generally present in the sympathetic vomiting of phthisis and in that of several diseases of distant organs. The diagnosis may, however, be assisted by remembering that when the pain depends upon organic disease, it is generally most severe soon after taking food, especially if this be heavy and indigestible; while, when it is due to functional disorder only, it is often relieved by food. This last fact has been explained on the supposition that the uneasiness is mainly due to an unhealthy condition of the gastric secretions; which of course act the less violently the more they are diluted. In ulcer of the stomach, pain is usually constantly present, being considerably aggravated by food; in cancer, it is of a dull aching character, is most acute after meals, and often continues severe while the stomach is full; while the pain of simple indigestion—the remorse of a guilty stomach, as it has been facetiously called—only requires abstinence for its complete alleviation.

Another important symptom—*vomiting*—may be produced by a greater number of circumstances than those which give rise to pain: as, for example, by organic disease of the stomach; by mechanical obstruction of any part of the alimentary canal; by irritation in distant organs, as the brain, uterus, &c.; and by morbid states of the blood. When due to organic disease, it generally coexists with pain; and it may be diminished by eating very light food, by taking but little at a time, by counter-irritation to the epigastrium, and often by bismuth. In the vomiting from mechanical obstruction of any part of the alimentary canal, we learn much by noting the time of its occurrence, the nature of the vomited matters, and the extent and urgency of the general symptoms. Thus in stricture of the pylorus, the vomiting only takes place when the stomach is full and distended, so that the matters brought up are large in quantity. When the constriction is in the small or large intestines, the contents of the bowel are returned into the stomach by a process hereafter to be described, and then rejected. In the sickness from irritation of a distant organ, or in that caused by an unhealthy state of the blood, there is usually a constant and very depressing feel-

ing of nausea, but no pain; flatulence is also often complained of, and there is commonly disordered action of the bowels.

This leads me to speak of a third general symptom of the functional and organic diseases of the stomach, which is often very annoying, and not always easily relieved—viz., *flatulence*, or the undue collection of gas in the intestinal canal. It may arise from one or more of the following causes—*i.e.*, from air swallowed, from gas generated by decomposition of the contents of the stomach or bowels, or from gas secreted by the mucous membrane of the intestinal canal. In the first instance, the air is thrown up by eructation, and is nearly odorless and tasteless; in the second, the gases are passed upwards or downwards, are very fetid, and often accompanied by nausea, griping sensations, tenesmus, &c.; while in the third case the gas is generally expelled *per anum*, and has the odor of healthy fæces.

The subject of hemorrhage in connection with disease of the stomach has already (p. 75) been treated of. Pyrosis or water-brash, voracious appetite, depraved appetite, sick-headache, &c., are all symptoms of different varieties of dyspepsia, dependent upon various causes, and requiring special treatment.

Treatment.—Abernethy used to say that no person could be persuaded to pay due attention to his digestive organs until death, or the dread of death, was staring him in the face. However this may be, when advice is sought, the invalid is importunate for speedy relief. It is therefore a happy circumstance, that of all the organs of the body, the stomach is that on which we can exert the most powerful action, both indirectly and directly. Daily observation has taught us all how thoroughly digestion is improved by those means which invigorate the system generally; as by rest and early hours, relaxation from severe studies or from the harassing cares and anxieties of business, one day's holiday in every seven, change of air, sea-bathing, cold or tepid sponging, horse exercise, the disuse of tobacco and of alcoholic stimulants where these have been too freely indulged in, and so on.

The *regulation of the diet* alone will often effect a cure; while in no case need we expect to give any relief unless we can persuade the dyspeptic to pay attention to the quantity and nature of his food. Supposing that the physician has to deal with a severe case, it is fortunate that he can give the stomach a complete rest for twelve or twenty-four hours; or even for a longer time by resorting to nutrient enemata. Then merely the plainest food should be allowed, and only small quantities ought to be taken at a meal: milk and lime-water, gruel, sago, and arrowroot will all be useful. As we find these articles can be assimilated without causing any pain or uneasiness, we may increase the diet; and white fish (especially whiting, sole, or turbot), poultry, venison, pheasant, hare, or mutton can be ordered. Stale, or unfermented, or aerated* bread may be eaten; but vegetables (with the exception of cauliflower, asparagus, and vegetable marrow), raw fruit (save grapes

* This bread, made by the process of Dr. Dauglish, is clean and pure, and produced entirely from wheaten flour of the best qualities. It is mixed by machinery, and is untouched by the hand. Being formed without ferment or leaven (carbonic acid gas is substituted for yeast), it relieves flatulence instead of promoting it; and as it is more easily digested and more nourishing than common household bread, so it is more economical.

and oranges), pastry, cheese, beer, port wine, and undiluted spirits should be forbidden. If any stimulant be needed, a little dry sherry or pale brandy and water will prove the least injurious, and in some instances will be even beneficial. Simple aerated water—water charged with carbonic acid gas—is often very grateful to an irritable stomach; or soda-water may be recommended. Coffee (not chicory) taken upon an empty stomach occasionally acts as a valuable stimulant; but swallowed soon after a meal it merely serves to hinder digestion, and to make a simple dinner disagree. Lastly, the dyspeptic should masticate his food thoroughly, so that the digestive fluids may quickly liquefy and transform it; while he ought to keep quiet for some little time after meals, so as not to divert from the stomach the nervous force required for digestion.

After recovery from the urgent symptoms attention will still be needed to prevent any relapse. While supervising the diet scale, however, it must be remembered that too much simplicity is bad. For not only does man absolutely require a mixed food, but that which is eaten with relish is better digested than that taken with indifference or disgust. There is only a partial truth in the caution of Socrates,—"Beware of such food as persuades a man, though he be not hungry, to eat; and those liquors that will prevail with a man to drink them when he is not thirsty."—As typical of many cases met with in practice, we may imagine the following: A gentleman between twenty-five and fifty-five years of age, engaged for six or eight hours daily in his office or warehouse, with a troublesome stomach, and no great amount of vital power, not only wishes to be well, but what is rather more unusual, is anxious to take the necessary steps to secure health. To enable him to accomplish his purpose, he may be recommended to adopt for several months some such diet-table as this:

7.00 A.M.—A tumblerful of equal parts of milk and soda-water, or of milk and lime-water.

7.30 A.M.—To get up. Use a tepid or cold sponge-bath: rub the skin thoroughly with a coarse towel. Dress leisurely.

8.30 A.M.—Breakfast. A large cup of weak tea with half milk, or milk and water. Sole or whiting; or the lean of an underdone mutton-chop; or a new-laid egg lightly boiled. Stale bread and a little fresh butter.

1.00 P.M.—Luncheon. Oysters (conditionally that they agree), or an underdone mutton-chop, or a slice out of a roast leg of mutton, provided meat has not been taken for breakfast. A biscuit, or stale bread. One glass of sherry. Or, if there be little or no appetite, a raw egg beaten up in sherry-and-water, with a small biscuit, will be useful.

6.00 P.M.—Dinner. Cod-fish, smelts, turbot, or brill. Mutton, venison, chicken, grouse, partridge, hare, pheasant, tripe boiled in milk, sweetbread, boiled leg of lamb, or roast beef. Stale bread. Cauliflower, asparagus, vegetable-marrow, French beans, or sea-kale. Half a wineglassful of cognac in a bottle of soda-water. Two glasses of good sherry or of claret after dinner. A few grapes, an orange, a baked apple, or strawberries may be taken, if desired. A dose of pepsine, where needed. When there is constipation, an excellent pill may be made with four grains of pig's pepsine and half a grain or more of the extract of Barbadoes aloes.

9.00 P.M.—A small glass of cold brandy-and-water, with a biscuit; or a cup of weak tea with half milk, and a little bread-and-butter; or a teacupful of milk-arrowroot.

11.00 P.M.—Bed. To sleep on a mattress, without too much covering. The room to be properly ventilated. A fire will be very beneficial in cold weather. It is presumed that a good night's rest has been earned, by a fair amount of exercise in the open air.

With regard to *medicines* in the treatment of dyspepsia, several are useful. Perhaps the first which ought to be mentioned is pepsine, the digestive principle of the gastric juice; generally valuable when there is an imperfect performance of the functions of the stomach, and especially where this is indicated by disturbance following the use of animal food. It should be given in doses proportioned to the necessity of the case, with the two chief meals of the day: in some instances an advantage seems to be gained by the simultaneous use of a small quantity of the dilute hydrochloric acid. When the pepsine alone fails to relieve the pain of indigestion, about the one-seventh of a grain of the hydrochlorate of morphia should be combined with each dose; or when great atony prevails, the one-twenty-fourth of a grain of strychnia may be employed in the same way (F. 420). There are also other agents which increase the gastric secretions, such as the nitro-hydrochloric acid, rhubarb, ipecacuanha, and ginger; the first being often especially useful, when given in small doses well diluted (F. 378). If we wish to restrain undue secretion, we resort to moderate doses of the aromatic sulphuric acid, bismuth, conium, belladonna, opium, or hydrocyanic acid; if to relieve pain and vomiting, we may use ice, morphia, and carbonic acid —by means of effervescing draughts; while if there be an excessive secretion of acid we order alkalies.—In an acute attack of gastrodynia caused by the stomach being loaded with unhealthy acid secretions, we must endeavor to give relief by producing vomiting. For this purpose the free administration of warm water will usually suffice; or if it fail, tickling the fauces will make the stomach eject its contents. Afterwards one or two doses of a mixture containing soda, morphia and hydrocyanic acid (F. 70) may be advantageously ordered. Alkalies are not to be persistently given, however, because there is a greater secretion of gastric acid than is proper; since they will only tend to keep up the mischief by stimulating the mucous membrane of the stomach to still greater secretion, so that there will remain a surplus of free acid over the amount neutralized.—Where there is no great gastric irritability, one or other of the vegetable tonics will often prove invaluable, and recourse may be had either to gentian, calumbo, quassia, or bark. Salicin (F. 388) is especially worth trying in many instances, often agreeing well where quinine cannot be tolerated. If aperients are needed, only those of a mild nature ought to be prescribed; such as gray powder and compound rhubarb pill, taraxacum, nitric acid and senna, ipecacuanha and rhubarb, magnesia, or simple enemata, &c. (F. 147, 165, 169, 171, 179, 188). Finally, to make the cure complete, and to prevent—as far as drugs will do so—a relapse, mild preparations of steel (F. 401, 403, 408), are to be ordered; while it may be noted that frequently I have found benefit from combining pepsine with the reduced iron (F. 394). Where there is any suspicion that the digestion is still torpid for want of tone, nothing will prove of greater service than quinine and ipecacuanha (F. 384).

With regard to the use of wine and well-diluted spirits to *prevent* dyspepsia, it must be granted that they are often very beneficial. It is no doubt true that the stomach which requires stimulants to enable it to act efficiently, can hardly be said to be in a healthy state; but, at the same time, we should remember that the battle of life is not waged without much wear and tear, without almost overwhelming anxieties

and sickening disappointments, and that the digestive organs are the first to sympathize with the depressions of the mind, no less than with the fatigues of the body. Hence the precept furnished by St. Paul to Timothy may well be adopted generally,—"Drink no longer water, but use a little wine for thy stomach's sake and thine often infirmities."

VIII. GASTRITIS.

Under the head of Gastritis (*Γαστὴρ*, the stomach; terminal *-itis*), several important affections of the stomach, more or less closely connected with the inflammatory process, have to be considered. The well-directed labors of many eminent physicians, both abroad and at home, during the past few years, have done much to improve our knowledge of these obscure but very important diseases.

1. Acute Gastritis.—Acute inflammation of the mucous membrane of the stomach is a disease which in all probability never rises idiopathically. It is, however, a frequent result of poisoning by any of the irritants—as by the mineral acids, caustic alkalies, arsenic, &c.; and it sometimes occurs from swallowing boiling water, or large quantities of mustard to produce vomiting, or excessive doses of tartar emetic.

Symptoms.—In gastritis produced by irritant poisoning we shall generally find an increasing burning pain in the epigastrium, aggravated by the slightest pressure; constant distressing nausea, soon followed by violent retchings, with accelerated pulse and breathing; and great thirst, with an unremitting desire for cold drinks, which are vomited as soon as taken. Very shortly there sets in extreme prostration; denoted particularly by faintness, feebleness of the pulse, great pallor, cold clammy extremities, and intense anxiety of countenance. When the inflammation continues, the tongue becomes red, glazed, and smooth, unless it has been injured by the action of the poison; the bowels are constipated; the urine scanty and high colored; there is great restlessness and hiccups; while the prostration increases, till death takes place from exhaustion. These symptoms are not present in all cases; the immediate effects of severe injury to the stomach being sometimes comparatively slight. When the Eddystone Lighthouse was destroyed by fire in 1755, one of the keepers happened to be burnt by the fall of the molten lead. The man asserted that some of the metal had passed down his throat: but as he had gone through much fatigue after the accident, and had begun to amend at the sixth day, his statement was not credited. However, on the eleventh day, he rapidly grew worse and died; when on examining the body, a piece of lead, weighing more than seven ounces, was removed from the stomach.

Morbid Anatomy.—The morbid appearances usually found are intense dark redness, softening, sloughing, and—when one of the powerful escharotics has been taken—perforation.—Redness alone is by no means evidence of the previous existence of inflammation, since it may be produced after death by gravitation of the blood to the most dependent parts: where death occurs, too, from any cause during the process of digestion the stomach will be found red.—So also with softening and

perforation, we must remember that these may occur from the post-mortem action of the gastric juice—from the stomach actually digesting its own tissues—as was first pointed out by John Hunter.

Few subjects in pathology are more interesting than this one of *Cadaveric softening of the Stomach.* It is a condition not uncommonly found when death has occurred suddenly from an accident, soon after a meal, and when the body has been kept in a warm situation. Its most frequent site is the fundus and cardiac end of the viscus; and it is perhaps most often met with in young subjects, and after death from phthisis, or severe cerebral disease giving rise to great exhaustion. Some interesting experiments have been made by Bernard, Harley, Pavy, and others, upon this power of the gastric juice. Through a fistulous opening in the stomach of a dog, Dr. Pavy introduced, during the process of digestion, the hind leg of a living frog and the ear of a live rabbit. In both cases the parts underwent digestion after two or three hours. Hence Dr. Pavy argues, that the capability of resisting their own digestive powers, possessed by the walls of the stomach during life, and which ceases with death, is not due, as Hunter thought, to the vital force with which they are endowed. If, then, this reputed influence of the "living principle" has no foundation, what view can be substituted? Recourse has been had to the theory that the immunity to destruction which the stomach enjoys during life is due to its epithelial lining. For, it is said, while digestion is going on the gastric epithelium and mucus are constantly being dissolved, but then they are as constantly being reproduced. After death the gastric juice still acts upon the epithelium, but as no new layers are formed the deeper coats suffer. Dr. Pavy has found, however, on submitting this view to the test of experiment that it completely fails; inasmuch as he removed a considerable-sized patch of mucous membrane, and yet food was afterwards digested without the slightest sign of any attack being made on the deeper coats of the stomach. The question therefore remains unanswered up to this point. And now Dr. Pavy has another suggestion,—*i. e.*, that the protection is to be referred to the circulation within the walls of the organ of an alkaline current of blood. His argument is that the presence of acidity is necessary for the accomplishment of gastric digestion: alkalinity is a constant character of the blood: during life the walls of the stomach are everywhere permeated by a current of this alkaline blood: hence here we find an opposing influence, the effect of which is to destroy, by neutralizing its acidity, the solvent properties of the digestive fluid tending to act upon the texture of the organ. The blood being stagnant after death, the opposing influence is lost. Should life happen to close during digestion, there is only the neutralizing power of the blood actually in the vessels of the stomach, to impede the progress of attack upon the organ itself; and the consequence is, that digestion of its parietes proceeds, so long as the temperature remains favorable for the process, and the solvent power of the digestive liquid is unexhausted. The apparent contradiction to this hypothesis which is offered in the fact of the living frog's legs and the rabbit's ears being digested, is said to be a question of degree of power between two opposing influences. The very active circulation through the stomach suffices to protect its walls; while the comparatively exsanguine ears of the rabbit and legs of the frog suffer. I confess there is but little in this ingenious expla-

nation which recommends it to my mind. It may be true, though there is nothing convincing in the argument. Let us assert, for example, that the stomach is protected during life by nervous influence. May not the foregoing testimony be brought forward in support of such a view, with as much show of reason as when it is adduced in favor of the results produced by the alkalinity of the blood?

Treatment.—The treatment of acute gastritis will, in a great measure be the same, whatever may be its cause. In most cases I should rely on purgative enemata at the onset; afterwards trusting to opium, and the sucking of Wenham Lake ice—which will frequently relieve the vomiting, as well as lessen the inflammation; and perhaps at the same time allowing barley-water, milk, cold arrowroot, or gruel. It will be better to nourish the patient, however, by nutritious enemata (F. 21, 22, 23) than by food given by the mouth. In some instances fomentations applied to the epigastrium give much relief. When any of the corrosive poisons have been taken, emetics will very rarely be necessary, since the former agents themselves induce severe vomiting; while the stomach-pump should never be used. During convalescence great care will be required in regulating the diet; farinaceous substances and broths being chiefly allowed, and only in small quantities at a time.

2. Chronic Gastritis.—This form of inflammation is almost as common as the preceding variety is rare. It is fortunately a mild disorder, unless of long duration; when it may produce thickening and induration of the coats of the stomach, narrowing of the pylorus, or ulceration perhaps going on to perforation.

The *causes* are numerous. There is no doubt that it may be brought on by excess in eating or drinking. Dr. Beaumont frequently witnessed this result in Alexis St. Martin; who, in consequence of a gun-shot wound, had a permanent fistulous opening through the abdominal parietes into the stomach, thus affording an opportunity for watching the process of digestion. Under the continued use of improper food, the inflammation always became aggravated; whereas under the influence of low diet and cooling drinks the stomach rapidly recovered. Acute or chronic alcoholism is one of its most common sources. On the other hand, long-continued abstinence is a cause of chronic gastritis; as has been proved in experiments upon dogs and other animals when deprived of food. So also this disease sometimes arises during the progress of acute inflammations and febrile diseases, particularly some of the exanthemata—as scarlatina; small quantities of arsenic, in whatever way they may be introduced into the system, will produce it; sometimes the poison of gout in the blood seems to give rise to it; and, lastly, it may be due to some narrowing of the pylorus impeding the passage of food into the intestines.

The chief *symptoms* are anorexia, tenderness at the epigastrium and sternum, pain and vomiting after meals, slowness of digestion, cramps, acid or watery eructations, disordered bowels, and a furred tongue. In women there often coexists some organic or functional disease of the ovaries or uterus.

Under the influence of this form of inflammation, Dr. Beaumont noticed, in the case of Alexis St. Martin, that the gastric mucous membrane lost its healthy pale pink color, and assumed a somewhat

livid redness. Patches of the membrane were also marked with extravasated grumous blood; sometimes layers of false membrane were partially formed; while neither gastric juice nor mucus was secreted. This *active* congestion of the stomach from inflammation differs from that *passive* form which arises in consequence of obstruction to the circulation impeding the return of blood from the stomach towards the heart. Passive congestion of the stomach, leading perhaps to severe hæmatemesis, is most frequently due to some cause which prevents the free flow of blood through the liver—as "hob-nail" or gin-drinker's liver. Organic affections of the heart and lungs not unfrequently keep the stomach in a state of chronic congestion.

As regards the *treatment*, attention must be paid to those rules which have been laid down in the remarks on Dyspepsia. In many cases removal of the cause, low diet, and cold water will thoroughly cure the disease.

3. Gastric Catarrh.—Catarrhal affections of the stomach, like those of other mucous membranes, present themselves under two or three different forms. When slight they are usually spoken of as "bilious attacks;" the symptoms being little more than those of simple indigestion, such as a furred tongue, oppression at the epigastrium, vomiting of bile, giddiness, and "sick headache." If the mucous membrane could be seen in these cases, it would be found congested, œdematous, and perhaps marked here and there with patches of ecchymosis. In the treatment of these cases nothing more is necessary than a purgative pill of colocynth or aloes at bedtime, followed by a seidlitz-powder or bottle of soda-water early on the following morning. A meagre diet and plenty of cold water for the succeeding twelve hours will complete the cure.

Chronic catarrh or mucous flux may succeed a bilious attack, or it will occasionally arise as a separate affection. It often coexists with chronic bronchitis, hooping-cough, phthisis, and emphysema of the lungs. If the patient vomits, a quantity of glairy mucus is brought up, to the great relief for the time of the suffering. There is congestion of the capillary gastric vessels, with an excessive secretion of tenacious mucus. The symptoms depend upon the extent to which the walls of the stomach are covered with viscid mucus, being only well-marked when the greater part is coated. There is then evidence of a want of nutrition, a feeling of faintness and epigastric pain when the stomach is empty, a craving for food but an inability to take more than a very little when it is supplied, and a sense of oppression after eating which only vomiting relieves. Flatulence, acid eructations, heartburn, pyrosis, constipation, thirst, vomiting of glairy fluid on awaking in the morning, weakness, coldness of the extremities, &c., are often connected with gastric flux. The most useful remedies for restoring the stomach to its natural condition are those which restrain the secretion of mucus; such as the sulphite of soda (F. 48), bismuth (65, 112), kino and log-wood (F. 108), and occasionally the iron alum (F. 116). If there be much constipation, I think a dose of five grains of calomel is one of the best purgatives. Of course attention must be paid to the diet: and it will usually be better for two or three days to keep the patient almost entirely upon milk rendered alkaline by admixture with lime-water,

allowing small quantities at short intervals. Then arrowroot made with milk, bread-and-milk, and one or two eggs lightly poached, with stale bread and fresh butter, may be permitted; followed after a short time by white fish, poultry, mutton, sherry-and-water, &c.

The more severe examples of gastric catarrh produce symptoms which are often regarded as inflammatory; and hence they are often spoken of as "gastric fevers." In them the skin gets hot and dry, the pulse is quick and full, there is vomiting and epigastric pain, with urine which is loaded with lithates. Superficial ulceration sometimes results, especially when the catarrh is due to long-continued congestive disease of the portal system. The chief remedies are rest, low diet, demulcent drinks, aperients, and effervescing salines. At the commencement, if there be a sense of nausea without vomiting, an emetic of ipecacuanha will give relief. The epigastric tenderness may be best relieved by hot fomentations, or poultices, or even turpentine stupes.

4. Induration of the Pylorus.—Induration or fibroid infiltration of the pylorus appears to consist of an abnormal development of fibrous tissue in the submucous areolar membrane about the pyloric portion of the stomach. It may occur as the result of chronic inflammation, or perhaps from the healing and contraction of an ulcer, or owing to irritation caused by the habitual use of raw spirits. The appearance of the diseased structure to the naked eye somewhat resembles scirrhus, so that by some this disease has been erroneously regarded as malignant; but minutely examined it is found to be composed of tissues resembling those of a simple fibroid tumor, and not to consist of the copious cell-growth characteristic of cancer. The walls of the pylorus may be only slightly thickened; or they may be converted into fibro-cartilaginous tissue, with such contraction of the opening that hardly a quill will pass. In proportion to the amount of obstruction there will be found dilatation of the stomach, with hypertrophy of its muscular coat.

Although the pyloric region is by far the most frequent seat of the fibrous deposit, yet the whole of the viscus may be affected. In such a case the necropsy shows a large stomach of an opaque pearly-white appearance, of increased weight and density, of a gristly feel, and having its coats greatly thickened. This condition may exist without giving rise to any symptoms of importance, except in cases where there is constriction of the pyloric valve. *Fibroid infiltration* appears to be a good name for it, unless the reader should prefer the designation suggested by Dr. Brinton—cirrhotic inflammation, or plastic linitis.

The symptoms of fibroid infiltration of the pylorus are in some respects like those produced by malignant disease affecting this part. There is emaciation with progressive debility, pyrosis, acid eructations, and constipation. Although the appetite is commonly ravenous, great moderation is obliged to be practised owing to the severe suffering which a hearty meal induces. Vomiting takes place three or four hours after a meal—especially dinner; the matters brought up being partly digested, mixed with water, often yeasty-looking, and perhaps containing sarcinæ or torulæ. Sometimes the sickness only occurs at intervals of a few days; while if there be much hypertrophy the contents of the stomach are ejected with considerable force. As the patient gradually wastes,

so the thickened pyloric tissues can be felt, like a tumor, perhaps the size of a small orange, through the abdominal parietes; the swelling only being really painful when there is any ulceration. After a time, the feet and legs get œdematous, the temper becomes very irritable, the sleep disturbed, diarrhœa intervenes, and death ultimately occurs from inanition. In many instances, however, by strict attention to the diet, life may be prolonged for several years.

The treatment must consist in allowing only simple soft food,—such as milk, cream, raw eggs beaten up in sherry-and-water, strong beef-tea, and soups. Cod-liver oil often proves useful. When there is any temporary exacerbation of the symptoms, the stomach should be rested for a day or two, and nutrient enemata resorted to. The patient ought to be warmly clothed; an elastic abdominal belt gives agreeable support; while the gastric irritability may often be relieved by the application of a belladonna plaster.

5. Dilatation of the Stomach.—Dilatation of the stomach is a curious disease, to which attention has lately been directed. The enlargement is due generally to some affection of the pyloric orifice, which, causing contraction, prevents the food from readily passing into the duodenum. Hence, the stomach slowly and gradually dilates; until at last it comes to occupy almost the whole of the abdominal cavity, giving rise to appearances as if a large tumor were present. These phenomena are the more deceitful when the stomach is full, because fluctuation may then be present: when this viscus is empty, there will be a tympanitic sound on percussion.

The patient suffers severely from gastralgia, gastrodynia, pyrosis, flatus, constipation, and sometimes from vomiting. In two instances which I have watched the appetite was voracious to a marked degree; but whether this was partly the cause or the consequence of the dilatation can only be a matter of speculation. In favor, however, of its having been the cause it may be mentioned, that in one instance the symptoms during life were those of torpid digestion, with such mental depression that suicide was at length committed; while at the examination after death, no reason for the dilatation could be detected. Where there is sickness, the vomited matters are frequently very large in quantity, they rapidly ferment, are intensely acid, and often resemble yeast in appearance; while they are found, when microscopically examined, to contain large quantities of those vegetable parasites first described by Goodsir, the *Sarcinæ ventriculi*, together generally with the yeast fungus—*Torulæ cerevisiæ*. Dr. Todd discovered the sarcinæ in ulceration of the stomach with contraction of the pylorus, and he suggested that these vegetable organisms result from the long detention of food in the stomach. There is but little doubt that this explanation is correct; but it is also probable that the intensely acid fluid in which the sarcinæ are found may itself irritate and close the pylorus spasmodically. In such cases, consequently, if we check the formation of these growths we shall cure the disease. Thanks to Dr. Jenner and Professor Graham, we are enabled readily to accomplish this latter object by the administration of the sulphite of potash, or by the sulphite of soda; which latter (F. 48) is perhaps preferable, since it is a more stable salt, and is less liable to be decomposed by keeping than the sulphite of potash.

The beneficial action of either of these salts depends upon their being decomposed in the stomach by the acids generated therein, sulphurous acid gas being liberated, which quite destroys the fungi. Dr. T. K. Chambers prefers the hyposulphite of soda, in doses of gr. v to xx, thrice daily. The patient's diet should be regulated, and it will be better for him to be allowed the unfermented in the place of the common bread.

IX. ULCER OF THE STOMACH.

This is a particularly interesting and not uncommon disease, variously spoken of by authors as the *simple*, *chronic*, or *perforating* ulcer of the stomach.

The pathology, symptoms, and treatment of this affection have been especially investigated by Dr. Brinton; and from his valuable monograph many of my observations are taken.*

Pathology.—Among the 4000 cases of different diseases which formerly came under Dr. Brinton's care annually at the Royal Free Hospital, he calculated that there were at least 40 examples of ulcer of the stomach.—The ulcer is more frequent in the female than the male, in the proportion of nearly two to one. It is specially a disease of middle and advancing life, hardly ever occurring before puberty; while it is more frequent in the poor than in the rich. The ulcer is rarely smaller than a fourpenny piece, or larger than a crown piece; its shape is usually circular or slightly oval; it is much more frequently found on the posterior surface, the lesser curvature, or the pyloric pouch, than on the anterior surface, the greater curvature, or the cardiac extremity; and two or more ulcers are frequently present in the same stomach. About half the instances of this disease undergo what is probably a spontaneous cure: in exceptional cases the ulcer has been fatal in ten days, generally by perforation; sometimes by exhaustion, caused or hastened by vomiting, and very rarely by hemorrhage. In the majority of fatal instances, a period of several weeks or months precedes death. Perforation, however, is an exceptional occurrence in gastric ulcer; when it occurs, the ulcer has commonly been found on the anterior surface of the stomach. When perforation does take place, the contents of the stomach are generally poured into the abdominal cavity, where they give rise to fatal peritonitis. But in some very few instances the effusion—owing to the presence of adhesions, &c.—is confined to the neighborhood of the perforated spot; so that circumscribed peritonitis is set up, suppuration takes place, and a kind of chronic abscess is formed. This may prove fatal in many ways, as, *e. g.*, by discharging its contents through the diaphragm into the thorax; or, more fortunately, it may open externally through the abdominal walls. In the latter case a gastric fistula becomes established; which either remains open like that of Alexis St. Martin, or may gradually close and permit of complete recovery. Dr. Brinton conjectures that of every 100 ulcers of the stomach, 50 may cicatrize, 13½ perforate its walls, 3¼ corrode its large vessels, and 2 or 3 kill by the sheer

* On Ulcer of the Stomach. London, 1857.

exhaustion and inanition they involve. There is still a proportion of about 30 ulcers in every 100 left quite unaccounted for.

Symptoms.—The symptoms are liable to some variety, and hence the discrepancies which are to be found in the descriptions of different observers. The most constant indication is pain in the back over the lower dorsal vertebræ, and in the epigastrium. With respect to the latter, it is often referred to a small spot just below the ensiform cartilage, it is frequently described as dull and sickening, and it is increased by food. Sometimes the pain is associated with violent pulsations; and in some few young women it has apparently been increased by the access of menstruation. There is occasionally eructation of a sour fluid, and at times nausea and vomiting. The patient generally loses flesh, but otherwise the constitutional symptoms are slight; with this exception, that in young females amenorrhœa is often produced, especially in those cases where there is copious hemorrhage from the ulcer. After the disease has continued a longer or a shorter period, perforation may occur; or failing this, there may be a severe attack of hemorrhage. But in favorable cases the ulcer gradually heals, the pains diminish, and the patient completely recovers.

Supposing perforation to result, the symptoms will be so severe that the nature of the case cannot be mistaken. There is violent pain, beginning in the epigastrium but soon spreading over the whole belly; the abdomen becomes swollen and tympanitic: the patient assumes that position which most relaxes the abdominal muscles; and there is great anxiety, with rapidly increasing prostration. Moreover, these indications of the giving way of the coats of the stomach usually occur after a full meal, and perhaps from some sudden exertion, as that produced by vomiting, coughing, sneezing, &c. After an interval, a state of almost painless collapse sets in; and death usually occurs within thirty-six hours from the time of rupture.

Treatment.—In the management of cases of ulcer of the stomach we have chiefly to support the system, and to facilitate the cicatrization of the ulcer. When the pain is very severe, hot fomentations, sinapisms, and turpentine stupes applied over the epigastrium, give relief; in obstinate vomiting, or in hemorrhage, the application of ice is more advisable. Opium may often be administered with very great advantage, either alone in the form of the extract, or combined with henbane, Indian hemp, &c.; bismuth is also a good sedative, and may be given in ten-grain doses, thrice daily, mixed with five or ten grains of compound kino powder: where there is much flatulent nausea, Dr. Brinton recommends the iodide of potassium in small doses, with the bicarbonate of potash and some bitter infusion: when there is troublesome vomiting, hydrocyanic acid in an effervescing draught (F. 362) gives relief: and when there is but little pain or nausea some mild preparation of steel (F. 394, 403) will prove very valuable, or, if the patient can bear it, quinine and iron (F. 380) may be ordered. Supposing that aperients are needed during the progress of the case, small doses of castor-oil will be most efficacious.

Any of the foregoing remedies, however, will be almost worse than useless, unless great attention is paid to the nature of the food, and the quantity taken at each meal. In the commencement it will be better merely to allow farinaceous substances—as a little oatmeal or arrow-

root—with milk; taking care that only a small quantity be used at a time. Cold milk, mixed with one-fourth of lime-water to prevent its coagulating in the stomach, may be taken in small quantities at a time to the extent of four or five pints in the twenty-four hours. It is probable that milk thus rendered alkaline is digested in the intestines; so that its administration really rests the stomach. Should this even be rejected by the stomach, that viscus ought to be allowed a complete rest; nourishment and medicine being administered entirely by enemata. Then, as the symptoms decrease, a more strengthening diet may be gradually permitted, until the patient can enjoy white fish, light puddings, poultry, &c. During the whole progress of the case, tea, coffee, sugar, beer and other alcoholic stimulants, should be forbidden; but if the latter be called for by the wants of the system, only a little weak brandy-and-water ought to be ordered. And lastly, after a cure has been effected the patient must be warned that a careful avoidance of errors in diet, of pressure over the epigastrium, as well as of violent exercise, will be necessary for many months. A single excess, several weeks subsequent to recovery, has brought back all the painful symptoms, and again placed the sufferer's life in considerable jeopardy.

X. CANCER OF THE STOMACH.

The stomach may suffer from scirrhous, medullary, or colloid cancer; while the affection is generally *primary*. The disease often comes on gradually, the early indications of it being obscure.

Pathology.—A record of 9118 cases of death from cancer, in Paris, from 1830 to 1840, shows that the disease was seated in the uterus in 2906 cases, in the stomach in 2303, and in the breast in 1149. The pyloric aperture is the part most frequently attacked, next the cardiac orifice, and then the space along the smaller curvature. "Sometimes the cancer, at the time of death, is of small extent: but occasionally, and especially in colloid cancer, the disease spreads, until the greater portion, or even the whole of the stomach, is involved."* When the disease causes obstruction or narrowing of the pyloric orifice, the stomach generally becomes greatly dilated. Gastric cancer is more common in men than in women, while it is rare before the age of forty. Very few cases survive two years from the first appearance of the symptoms: in scirrhus—the most common variety of gastric cancer—life may rarely be prolonged for three years, while in encephaloid and colloid, death often takes place within twelve months.

Symptoms.—In the early stage there are simply indications of dyspepsia. After a time more marked symptoms set in, which vary in character according to the situation of the disease. When it is in—or near—the cardiac orifice, there will be merely pain and some difficulty on passing food into the stomach; if in the pylorus, pain and sickness, when, a few hours after eating—digestion being completed—the chyme has to pass into the duodenum; while, when the lesser curvature is the seat of the affection, the suffering may often be very slight.

* On Diseases of the Stomach, p. 161. By Dr. George Budd. London, 1855.

Speaking generally, the principal symptoms may be described thus: Pain in the epigastrium, of a burning, lancinating, or gnawing character, augmented after eating, and often increased by pressure; retraction of the abdominal wall; eructations of fetid air; frequent nausea and vomiting, at first of ingesta and glairy mucus, subsequently of a bloody sanious fluid, and sometimes of dark grumous matter having a coffee-grounds appearance; constipation; together with an extreme and increasing emaciation and debility. Occasionally a pulsating tumor is felt in the epigastrium when the cancerous mass lies over the aorta; or merely a tumor may be detected in some part of the epigastric, umbilical, or hypochondriac regions so placed as not to receive any impulse from the bloodvessel. And then, in almost all cases, the countenance will present the peculiar cachectic hue and expression so characteristic of the cancerous diathesis.

Perforation of the Stomach.—In malignant as well as in simple ulceration of the stomach perforation may take place, with escape of the contents of this viscus—fortunately not always into the peritoneum. Communications are this way sometimes formed through the parietes, between the stomach and the outside of the abdomen; or between the stomach and colon; or between the stomach and duodenum; or even between the stomach and the pleural cavities, lungs, or pericardium.

Gastro-cutaneous fistulæ may result from suppuration in the abdominal walls or from wounds, as well as from disease. Dr. Murchison has recorded an extraordinary case, where, after the introduction of a seton into the epigastrium, the patient (an hysterical woman, 34 years of age) prevented the wound from healing by making constant pressure upon it with a penny-piece; the ulceration gradually advancing, until at the end of three years (in 1854) it penetrated into the stomach, this organ having become adherent to the abdominal walls. Three years afterwards (in 1857) the opening measured four inches transversely, and three from above downwards; while directly a plug which she wore was removed, the contents of the stomach escaped. The health was delicate, but improving.

Gastro-colic fistulæ are much more common than *gastro-duodenal;* while they have generally for their cause malignant rather than simple ulceration. In gastro-colic fistula, moreover, the stomach and colon are not always found closely adherent; but a cavity may intervene, as if a mass of cancerous or tuberculous matter had connected the two, and had been gradually hollowed out. The symptoms produced by such a fistula are chiefly fæcal vomiting, and the expulsion of undigested food with the stools; owing, in the one case, to the retrocession of the contents of the colon into the stomach, and in the other to the passage of the gastric matters directly into the large intestine. When these effects follow upon the symptoms of malignant or simple gastric ulcer, the diagnosis cannot be a matter of much difficulty.

If the contents of the stomach be expelled into the cavity of the peritoneum, intense pain, collapse, and severe inflammation rapidly follow. Death generally occurs within thirty-six hours, though it may be postponed for a few days.

Treatment.—As in all other malignant diseases our treatment of cancer of the stomach can only be palliative; for the disease makes continual progress, and rapidly exhausts the powers of life. Opium,

administered either by the mouth or rectum, will be necessary; and it should be given in free and repeated doses to subdue the pain. When the vomiting is very severe, nourishment must be given by means of enemata; where it can be borne, however, a milk diet with three or four raw eggs in the twenty-four hours will be serviceable. In some instances, perhaps, it may be advantageous to lessen the work of the stomach by the administration of pepsine; but this remedy could only be of any real service at an early stage of the complaint. Cod-liver oil is occasionally easily digested. If the eructations are very fetid, a little wood charcoal will do good, or charcoal biscuits may be recommended. The extract of belladonna, or a piece of lint soaked in hot tincture of opium, applied to the epigastric region, will often prove grateful to the patient's feelings; or the subcutaneous injection of morphia can be tried; or a small blister may even be raised, and its raw surface afterwards dusted with one or two grains of morphia.

XI. DISEASES OF THE DUODENUM.

The small intestine, consisting of the duodenum, jejunum, and ileum, is a convoluted tube some twenty feet in length. The duodenum (*Duodeni*, twelve; because this portion of the bowel was said by the ancients to be equal in length to the breadth of twelve fingers) extends from the pyloric orifice of the stomach, is some ten inches long, has no mesentery, is imperfectly covered with peritoneum, and is more fixed than any other portion of the small intestines. In it, the chyme having passed through the pylorus, becomes acted upon by the bile, pancreatic secretion, and intestinal juices; the latter being chiefly derived from Brunner's glands.

With regard to the special diseased conditions of the duodenum, as distinguished from those of the small intestines generally, we know very little; and even that little is chiefly derived from examinations which have been made after death. *Duodenal dyspepsia* may be diagnosed when there is great pain about the region of the duodenum some hours after food has been taken. It is often accompanied with nausea, and a feeling of faintness; and occasionally by jaundice. The latter is not uncommon when the indigestion is due to the abuse of alcoholic liquids; in which cases also there is well-marked tenderness about the right hypochondrium, partly owing to the inflamed condition of the duodenum, and partly perhaps to sympathetic irritation of the liver.

Perforating ulcer of the duodenum presents many of the symptoms of an ulcer in the stomach, but in a mitigated form. Consequently fatal perforation occasionally takes place suddenly, when the patient has previously made but little complaint. A curious observation has been made by Mr. Curling, that a sloughing ulcer sometimes forms in the upper part of the duodenum within a few days after a severe burn, and doubtless in consequence of it; but further investigation is required to confirm the statement, inasmuch as Dr. Wilks, in many autopsies after death from burns, has found the duodenum free from all disease. When an ulcer exists, it sometimes produces diarrhœa with bloody stools,

nausea and vomiting, and great prostration; while it may destroy life by hemorrhage, or by peritonitis consecutive to perforation.

Primary cancer of the duodenum is a very rare affection. But this portion of the bowel not unfrequently becomes secondarily involved in the course of hepatic cancer, as well as in malignant disease of the pancreas or neighboring lymphatic glands. In cancer about the pylorus the disease does not spread into the duodenum as frequently as might be expected.

Obstruction of the bowels is seldom due to a mechanical impediment seated in the duodenum. I have seen an instance, however, where a very large biliary calculus had ulcerated through the coats of the gall-bladder, and where it was found, after death, as firmly impacted in the duodenum as a cork is wedged into the mouth of a bottle. The history and symptoms pointed strongly to obstruction by a biliary concretion, and to such obstruction being situated high up in the bowel, but the site could not be more accurately defined. For although the secretion of urine was very scanty, the vomiting an early symptom, and the matters ejected bilious but free from stercoraceous odor, yet the same occurrences take place in occlusion of the jejunum.

Post-mortem perforation of the duodenum may occur under the same conditions as give rise to it in the stomach, when, in addition, the pyloric orifice is so patulous that the gastric juice readily flows through it. Under these circumstances, the coats of the duodenum may even be found more extensively acted upon than those of the stomach.

XII. ENTERITIS.

Enteritis (*Ἔντερον*, an intestine; terminal *-itis*), or inflammation of the small intestines, varies much in severity; being sometimes so slight as hardly to attract notice, but often so severe as to threaten—or even rapidly to destroy—life.

The intestine is very seldom affected throughout its whole extent; but I know of no marked signs by which we can localize the morbid action, and assert that it is only in the duodenum, or in the jejunum, or in the ileum. So also the inflammation may affect all the coats of the intestine or only the mucous lining; the latter being a not uncommon disease of childhood, particularly during the progress of dentition.

Pathology.—Idiopathic enteritis is rare, the inflammation being generally due to some constitutional cause; and hence we may have a tubercular form, a typhoid variety, &c. When inflamed, the intestinal mucous membrane will be found of a deep venous red color, exceedingly congested, and covered with an excess of mucus. If the morbid action be confined to the duodenum the affection is known as *duodenitis*. Sometimes numerous ulcers are found scattered through the whole of the small intestines, especially when there has been long-protracted diarrhœa. In typhoid fever the solitary glands and Peyer's patches in the lower part of the ileum, and sometimes in the cæcum as well as the ascending colon, are chiefly affected; the ulceration occasionally progressing to such an extent as to cause perforation.

A thickened state of the coats of the intestines frequently results from inflammation of a chronic or subacute kind. An irritable mucous membrane accompanies this condition; whilst the peristaltic movements are impeded by the deposit of exudatory matter in the intestinal walls. Hence, it results, that the characteristic symptoms are attacks of diarrhœa—or even mild dysentery—alternating with constipation and retention of scybala; together with slight tenderness on pressure, and a feeling of resistance on practising palpation over the affected parts. Friction with iodine ointment, a nourishing but unstimulating diet, and regulation of the bowels by astringents or by mild alterative aperients—according as diarrhœa or constipation exists—will often remove the deposit. Thickening from malignant disease can scarcely be confounded with that from simple inflammatory action, provided the constitutional symptoms be fairly taken into consideration; and if it be also remembered that the deposit in the former always assumes a nodulated form rather than a continuous thickening.

Symptoms.—Enteritis is generally preceded by rigors, hot skin, thirst, and a hard and frequent pulse. The patient then begins to complain of severe pain in the abdomen, especially around the umbilicus, and of distressing nausea and vomiting; while he lies on his back with his knees drawn up so as to relax the parietes of the abdomen. Very quickly these symptoms are followed by great restlessness, high fever, prostration of strength, anxiety of countenance, obstinate costiveness, and—in severe cases—delirium. As regards the pain, it must be remembered that it is increased by the slightest pressure; in colic, on the contrary, pressure gives relief. The matters vomited are usually highly offensive, and are sometimes stercoraceous. The pulse is at first full and hard, but it soon becomes wiry and almost imperceptible.

Muco-enteritis, or inflammation of the lining membrane of the intestine, sometimes occurs in young children from six to eight months old. The disease is spoken of as infantile remittent fever, but those physicians are probably correct who look upon it as typhoid fever. The child is hot and restless in the early stages, and suffers from thirst; the tongue is dry, or covered with a brownish crust; there is frequent screaming; disturbed sleep; vomiting; distension of the abdomen from flatus, with pain which is increased on pressure; and irregularity of the bowels—in most cases diarrhœa, the fæces being green and offensive, and often discharged with considerable force. Towards night there is an exacerbation of the febrile symptoms. Thus far the disease does not differ much from a sharp attack of diarrhœa. Severe constitutional symptoms, however, soon set in; such as great febrile oppression, thirst, vomiting, dryness of the tongue, watery diarrhœa, &c.; followed by rapid and unexpected exhaustion, or sometimes by coma, with a peculiar pale, waxen appearance of the body. These symptoms may come on before the disease has lasted any considerable time, and whilst it can scarcely be distinguished from the ordinary bowel complaints of children. It should be remarked that an erythematous redness is generally observed around the anus.

Diagnosis.—Enteritis may be mistaken for hernia, or for obstruction of the bowels from some internal cause. A careful examination of those regions at which intestinal protrusion may take place, should be made; while the general history of the case must be well considered.

In mechanical obstruction the symptoms come on slowly, the pain is fixed, and there have often been previous attacks of constipation; while in intussusception there is sudden pain like that of colic, with the discharge of a bloody mucus.

Enteritis from chronic poisoning is not to be easily distinguished from inflammation due to natural disease. But in the former the vomiting is most urgent, the stomach rejects everything, there is diarrhœa after taking food, and the pain is less severe. Where there is the least doubt, however, all the excreta should be analyzed; while until the uncertainty is removed, care must be taken that the food and medicines cannot be tampered with.

Hysterical tympanites, peritonitis, cerebral disease, and suppression of urine—either of which may induce sickness and constipation—have been mistaken for enteritis, though it seems difficult to imagine how such errors could be committed.

Treatment.—Opium freely administered is invaluable; while hot fomentations sedulously applied to the abdomen will also give great relief. Perfect quiet in bed must be enjoined. All purgatives are to be rigidly avoided; but attempts may be made to empty the lower parts of the intestinal canal with simple enemata, especially by warm water thrown up in large quantity, gradually and slowly, by means of a long flexible tube (such as that of the stomach-pump). After the inflammation has ceased, mild aperients, particularly castor oil, may be prescribed; followed by vegetable tonics, such as the infusion or tincture of bark. In strumous subjects cod-liver oil, or glycerine and steel wine, do good service. The diet should be very simple, and ought to consist chiefly of demulcent drinks, broth or beef-tea, and farinaceous foods with milk. Ice or cold water may be freely allowed. Where there is a disposition to collapse, stimulants must be resorted to.

In children the same kind of treatment ought to be pursued, though opium must be given to them with great caution. The warm bath, and hot fomentations or linseed poultices to the abdomen, will give relief. Chlorate of potash in weak tea or sugared water is often efficacious; or if an astringent be needed, the tincture of kino and decoction of logwood will answer our purpose.—When the child is at the breast, no other food should be allowed; otherwise the diet must be very mild, consisting chiefly of milk with a little broth, and nicely flavored mucilaginous drinks. Goat's milk is often more easily digested than cow's or ass's milk; especially if the animal be kept clean, and fed upon hay and clover. Moreover, whichever milk be ordered, it ought to be tested with litmus-paper; so that if it be found to have lost its alkaline property, the acidity may be neutralized by the addition of three or four grains of soda to the half-pint, or with a few drops of the saccharated solution of lime. Where there is much exhaustion, from ten to thirty minims of brandy in thin milk arrowroot, or cold water, may be given at short intervals; while sometimes, when the case has seemed almost hopeless, I have been much gratified at finding recovery follow upon the use of a solution of raw meat (F. 2).—The mercury and chalk powder is often given to children directly an inflammatory disorder is diagnosed. I have seen it administered in muco-enteritis, and invariably it has aggravated the symptoms.

XIII. INFLAMMATION OF THE CÆCUM.

The cæcum or its appendix—situated in the right iliac fossa, and covered only anteriorly and laterally by peritoneum—may be seriously diseased without any other part of the intestines being involved. Thus, severe colic and even fatal ileus may arise from the lodgment in this portion of the alimentary canal of hard fæcal matter, skins or stones of fruit, portions of unripe apples or plums, biliary and intestinal concretions, balls of lumbrici and oxyurides, &c. Sometimes the intestinal matters accumulate to such an extent as to produce a targe tumor; and many are the cases where patients have recovered upon passing an immense quantity of fæces, after a careless examination has led the practitioner to diagnose ovarian disease, or abscess or cancer of the right kidney. When any of the morbid matters get impacted in the vermiform appendix of the cæcum, dangerous inflammation ending in abscess is very likely to arise; while, as we shall presently see, the persistence of disease in the appendix may form the starting-point of the morbid process in the cæcum itself.

The inflammatory process may affect only the vascular mucous surface, or all the coats of the cæcum; in either case, the affection being termed *cæcitis* (*Cæcus*, blind; terminal *-itis*) or *typhlitis* (*Τυφλος*, blind; terminal *-itis*). So we may merely have *inflammation of the appendix cæci*, which is attended with more acute symptoms than simple typhlitis. Or the abundant areolar tissue which connects the cæcum to the psoas and iliac muscles may be especially involved, and then *perityphlitis* (*Περὶ*, around; *τυφλὸς*; terminal *-itis*) is the rather pedantic name applied to the disorder.

Whether it be true or not that an important part of the process of digestion is carried on in the cæcum, it cannot be denied that irritation and perhaps the suspension of the functions of this part by disease soon gives rise to prominent *symptoms*. Thus there is always more or less general constitutional disturbance, slight fever, nausea, and often constipation; together with fulness and tenderness about the right iliac region, the pain being rendered exquisite by pressure upon the cæcum or the parts in its immediate vicinity. The patient lies on the right side, with the trunk somewhat bent and the knees drawn up, so as to relax the tissues about the seat of inflammation. The pulse is not quickened to the same extent, nor is the countenance as anxious, as in peritonitis or enteritis. Supposing the disease to progress, the peritoneal surface of the cæcum becomes involved, the appendix gets inflamed, and we soon have evidence of the existence of general peritonitis; while the areolar tissue may also be affected, and suppuration and abscess result. The latter may open externally, or into the intestinal canal, and the patient recover; but sometimes the matter is discharged into the cavity of the peritoneum, causing great suffering, and in a few hours death.

When the inflammation begins in the appendix from constitutional causes or owing to the escape into this part of morbid matters, the symptoms are generally very acute; consisting especially of excruciating tormina, tympanites, hiccup, violent sickness, pain in the right ovary or testicle and thigh, and obstruction of the bowels. Gangrene of the affected part and general peritonitis frequently ensue and prove fatal.

Or, a portion of the large intestine and cæcum with the vermiform appendix may slough off, be passed away in a stool, and yet restoration to health will perhaps follow at the end of a few weeks. In tuberculous typhlitis ulceration occurs more frequently in the appendix than in the cæcum itself.

The early symptoms of perityphlitis are severe pains shooting from the right iliac region, diarrhœa and tenesmus, nausea, mental depression, fever, &c. The parts around the seat of inflammation become swollen, and unless resolution takes place suppuration occurs. Frequently the abscess opens into the cavity of the cæcum, and with care the patient recovers.

Occasionally the physician meets with cases of chronic inflammation of the cæcum, in which the symptoms come on very slowly, with failing health, weakness and loss of flesh, colicky pains in the right iliac region, flatulence and anorexia, and alternately diarrhœa with constipation. Frequently the mucous coat of the bowel ulcerates, and then there are numerous mucous discharges with attacks of hemorrhage; the loss of blood at times being considerable. Where there is much thickening of the walls of the cæcum and tumefaction, the case might be mistaken for an aneurism of the iliac artery. If death occur, it is generally from exhaustion; while at the necropsy the intestinal coats are found considerably thickened, inflamed, and ulcerated. Very rarely is there perforation.

The *treatment* of all affections of the cæcum requires considerable caution. I have had to watch a few cases where no little mischief has arisen from the abuse of purgatives; and in one particular instance had it been necessary for me to state the cause of death, I could hardly have conscientiously given any other certificate than—"Compound colocynth pills." Generally speaking, anodyne fomentations or poultices will require to be assiduously applied, while opium is given internally. This latter remedy must be used so as to keep the patient free from pain; and its influence should be maintained for several days. Prolonged hot hip-baths often give great relief. Effervescing drinks, lemonade, and ice will be useful in relieving the nausea; while if it appear necessary to obtain an action from the bowels, castor-oil enemata may be employed. Great care must be taken to keep the patient quiet in bed, as well as to enforce the use of only liquid nourishment, until all symptoms of disease have completely passed away. When there are indications of suppuration having occurred, milk or cream, raw eggs, essence of beef, and bark with brandy or port wine will be needed. If the abscess point externally, it should be cautiously opened.

In chronic cases I have seen most good from simple nourishing food, warm bathing, sedative applications (F. 265, 281) used night and morning, the administration of cod-liver oil, and the employment of small doses of the mineral acids with quinine (F. 379) or of iodide of ammonium and bark (F. 38).

XIV. DYSENTERY.

Dysentery (*Δυς*, difficulty or badness; *ἔντερον*, intestine) consists of a specific inflammation and ulceration of the mucous membrane—occa-

sionally also of the other tissues—of the colon, especially perhaps of the lower part of this gut and the rectum; being attended with considerable febrile disturbance, and soon giving rise to great prostration. It has been sometimes termed *colitis*. Cases, however, are occasionally seen in which the ulceration does not stop at the ileo-cæcal valve, but extends for many inches up the small intestines.

Causes, &c.—Severe dysentery is now a comparatively rare disorder is this country, either as an idiopathic affection, or as a complication of some other disease. It appears, however, occasionally to prevail as an epidemic in our prisons, or in unhealthy localities; for during the last ten years (1853–62) the deaths registered from it in England have annually ranged between 1044 and 1943. In tropical regions it is at times very prevalent, and is often particularly fatal to our soldiers and sailors. Miss Nightingale has remarked that the percentage of mortality in acute and chronic dysentery was perhaps greater in the Crimea (1854–55), owing to bad food, than has ever been known in any disease except the worst form of epidemic plague.

Dysentery has been ascribed to wet and cold, to contagion, to malaria, polluted water, intemperance, deprivation of fresh vegetables and fruit, bad or insufficient or salt food, to detention in crowded barracks or transport ships, to insufficient clothing and bedding, to retained excretions, to drastic purgatives, &c. All cachectic states of the system predispose to it, in those countries where paludal fevers are rife. Moreover, intermittent or remittent fevers and dysentery often coexist, or they succeed each other in the same individual. Whether malaria is an exciting cause of dysentery, as it is of paludal fevers, is uncertain.

Symptoms.—At the commencement, there is uneasiness and pain in the abdomen, of a griping character (*tormina*), with a frequent inclination to go to stool, which is followed by relief. As the disease becomes developed, and ulceration or sloughing commences, the desire to empty the bowel is more frequent, and the ease which succeeds more transient: the evacuations are thin, mucous, and bloody; and frequently they are mixed with small, hard, separate lumps of fæces, termed *scybala*. The scanty evacuations soon produce distress rather than relief; the patient is constantly tormented with tenesmus and griping; the stools become fetid, dark-colored, and mixed with blood and purulent matter and shreds of lymph; while the bladder sympathizes with the rectum, causing frequent micturition. The urine also is high-colored, and gives rise to scalding when passed: sometimes there is strangury.—In all instances there is more or less fever and constitutional disturbance; the tongue is furred, and the papillæ prominent; pulse quick and small; skin harsh, hot, and dry; thirst urgent, with no appetite; while there is dyspnœa, and great prostration. In fatal cases, the abdomen becomes tense, full, and tender, especially on pressure; the pulse gets weaker; the tongue dry, red, glazed, and aphthous; there is wakefulness, or short disturbed snatches of sleep; the evacuations are extremely offensive and watery; there is a repulsive corpse-like odor about the body; hiccup comes on, with great exhaustion and emaciation; and death soon follows.

Complications.—This disease may become complicated with some form of continued fever, with scurvy, with enlargement or inflammation of the liver, or with hepatic abscess. The two latter occurrences are so

frequently met with in hot climates, that in all cases the liver should be daily examined; such examinations being continued for some short time after the prominent symptoms have ceased. Whether dysentery and abscess of the liver have any mutual relation is still undecided; but the balance of evidence seems to be in favor of their being dependent on the same cause, though unconnected with each other. Out of many hundreds of cases of dysentery which occurred in Millbank prison during seven years, not one (according to Dr. Baly) was complicated with hepatic abscess.

Terminations.—Dysenteric inflammation, when violent, may end in perforation of the bowel and fatal peritonitis; or in rupture and fæcal abscess; or in ichorhæmia and secondary abscesses; or in healing of the ulcerations, with subsequent troublesome constipation from the contraction of the cicatrices; or in fatal exhaustion, particularly where the mucous membrane has got sphacelated.

When the disease becomes *chronic*, it is often most intractable. There is usually atrophy of the mucous membrane, with degeneration of the glands; or imperfectly cicatrized ulcers remain in the mucous lining of the cæcum, colon, or rectum. Many of these cases ultimately recover; but in other instances the sufferer gradually wastes away, the skin becomes dry and scaly, there is improvement one day with a relapse the next, the tongue is florid and glazed, the discharges of fæcal matter mixed with thin pus and blood are most offensive, while the griping pains and tenesmus, &c., exhaust the patient so thoroughly that death is looked forward to as a welcome source of relief.

The immediate mortality from this disease, in hot climates, varies from five to thirty per cent. of those attacked. According to several authorities, where it does not at once terminate fatally, it leads (when once fairly impressed on the system) to so much suffering and slow exhaustion, that life is ultimately destroyed by it.

Pathology.—By many good observers this disease is thought to commence as an affection of the tubular and solitary glands of the large gut, which glands get enlarged and filled with a jelly-like substance. After a time the glandular structures rupture and an ulcer is formed, and this happening in several parts large patches are produced by the ulcerations running into each other; while the intervening mucous membrane gets inflamed and pulpy, secretes a large quantity of mucus, and readily bleeds under the influence of any irritation. After death the most extensive ulcerations are found; with perhaps portions of the mucous coat in a sloughy or gangrenous condition.

Rokitansky states that the dysenteric process is divisible into four degrees or stages, ranging from inflammation and softening of the mucous lining of the colon to complete mortification. Dr. Parkes considers that ulceration is always present, and that the solitary glands are much affected. Dr. Habershon thinks it probable that the diseased condition is closely allied to that of the pharynx in diphtheria; and that in severe examples the membrane rapidly sloughs, without antecedent ulceration.

Treatment.—Bloodletting, both by the lancet and by leeches applied in the track of the colon, is usually recommended, and is, I believe, still practised by many. In the dysentery of this climate, it is worse than unnecessary to bleed; while it is equally injurious to administer large

doses of calomel. And this is probably the case in most countries; but it is certainly so when the morbid action has advanced so far that there is ulceration running into gangrene of the affected tissues.

In the early stages our object ought to be to soothe the inflamed membrane, and to remove all sources of irritation. Hence demulcent drinks must be freely given; while the diet is to be free from stimulants, and of the lightest kind—farinaceous food, cream or milk, and thin broths. Perfect rest in bed, in a well-ventilated apartment, is desirable even in mild cases. The warm bath may be frequently employed with great advantage; while the wet compress, fomentations, and hot poultices always afford great relief. When we fear the lodgment of scybala, a few doses of castor oil may be given, the action of which should be aided by enemata of gruel. The bowels having been thus acted on, no remedy appears to exert so good an effect as ipecacuanha. This agent seldom produces nausea and vomiting, when given in large doses; while it is beneficial by its action upon the skin, by causing an increased secretion of mucus, and by restoring the deranged capillary circulation of the liver and intestine to its normal state. The best mode of administering this drug, either in the dysentery of tropical regions or in such severe forms of it as occasionally occur in this country, is as follows: A large and hot linseed poultice, containing two or three tablespoonfuls of mustard, is to be applied over the epigastrium; a full dose of opium, proportionate to the age, is to be exhibited in the form of an enema or suppository; and then thirty or forty-five minutes afterwards (the use of fluids having been interdicted for three or four hours previously), a dose of from thirty to sixty grains of ipecacuan powder should be given in the form of a bolus, or wrapped up in wafer-paper, or suspended in a small mucilaginous draught. A second dose is seldom needed; but if required it may be ordered at the end of six, twelve or twenty-four hours.

When the dysenteric inflammation has reached an advanced stage—when there is extensive disorganization of tissue—then there are still two points to be aimed at—viz., to support the general strength, while the diseased structures are to be kept as quiet as possible. Under these circumstances, ipecacuan, followed by tonics, astringents, and opiates, are to be the tools with which we work. Where the patient is weak and anæmic, we may try such remedies as salicin, quinine, bark, cascarilla, or some mild preparation of steel: when the dejections continue abundant and frothy and sanguineous, we are to use bismuth, gallic acid, kino, logwood, and sulphate of copper: while in both classes, but chiefly in the last, opiates by the mouth, or often preferably by the rectum, will be invaluable. The diet ought to be generous; milk, raw eggs, strong broths, restorative soup (F. 2), ripe grapes, and perhaps stimulants being necessary. In scorbutic cases a free supply of lemon or orange juice is to be allowed.

For chronic dysentery the patient must seek relief in a mild, dry, equable climate. If unable to do so, he should be treated according to the principles just inculcated. The remedy which seems to have had the most salutary effect in the chronic dysentery from which our soldiers suffered in the Crimea, was morphia. One grain of the hydrochlorate was given twice or three times a day, with some aromatic spirits of ammonia and nitrous ether.

XV. DIARRHŒA.

In most works on practical medicine many varieties of diarrhœa are described, such as feculent, the bilious, the mucous or catarrhal, the dysenteric, &c. These subdivisions are, however, quite unnecessary. It would seem much better to apply the term *diarrhœa* (*Διαῤῥέω*, to flow through) to all examples of simple purging; that is to say, to those cases in which the alvine evacuations are frequent, loose, or liquid, without any coexistent inflammation of the intestines.

Causes.—The causes of diarrhœa are numerous; the most common being overfeeding, or the use of improper food,—such as unripe fruit, raw vegetables, pork, veal, goose, duck, salmon, &c. It may follow exhaustion consequent upon starvation, or the drinking of foul water, or the inhaling the fumes from decaying animal or vegetable matter, or great mental emotion, or exposure to damp and cold or to too great heat. From the latter cause relaxation of the bowels is common during the summer months; hence it has been termed summer or English cholera. Diarrhœa is often also a symptom of many different diseases, as of phthisis, typhoid fever, &c.

Symptoms.—In addition to the purging there is generally some degree of nausea, a furred tongue, foulness of the breath, flatulence, griping pains, acid eructations, and tenesmus. Moreover, the stools are unhealthy; either consisting of liquid fæces, or of a watery feculent mucus, or of a thin frothy serum, or of a pale yeast-like matter. In severe summer cholera the evacuations are often composed chiefly of bile, the pains in the abdomen become violent, there are cramps in the legs, the patient complains of being chilly, and the depression is frequently great.

The way in which hemorrhage occurs, the blood being passed by the rectum, has already (p. 76) been noticed. The reader may, however, be reminded that blood sometimes appears in the stools from engorgement of the portal system causing congestion of the whole mucous lining of the alimentary tract; such engorgement being due to disease of the lungs, heart, or liver, obstructing the circulation. Hemorrhage may also arise from ulceration—either simple or malignant—of the stomach; from disease of the intestinal glands, as in typhoid fever, and sometimes in phthisis; from ulceration about the colon or rectum, as in dysentery; from polypus of the rectum, or from cancer of this part; and lastly from the giving way of one or more of the hemorrhoidal veins, as in instances of piles. When the blood is mixed with fecal matter and intestinal mucus, the case may be mistaken for simple diarrhœa, unless the practitioner examine the stools himself, as he ought to do in most cases.

Prognosis.—This is usually favorable, except in the diarrhœa of young children, or of old people with enfeebled frames, or in purging complicating some exhausting disease. Nevertheless, the fatality has much increased since 1838, when the deaths from it in England amounted to 2482. Thus in 1847, the number was 11,595: in 1849, 18,887: in 1854, 20,052: in 1857, 21,189: in 1859, 18,331: and in the three following years 9702, 18,746, and 11,112.

Diagnosis.—Diarrhœa is distinguished from dysentery by the absence of blood from the stools, and by the comparative mildness of the tenes-

mus and general disturbance. From cholera, by the slight severity of the symptoms, &c.; though this affection often commences with symptoms of common diarrhœa.

It must be remembered, that in examples of fecal accumulation there is constantly tenesmus with the frequent passage of small quantities of liquid fæces. I have seen more than one instance where the patient's life has been endangered by recourse being had to chalk mixture and opium, when the removal of the mass by enemata and the scoop ought to have been adopted. Again, cases in which the power of the sphincter ani becomes diminished, either from paralysis or from very great prostration, are sometimes mistaken for diarrhœa. When the rectum is irritable and the sphincter weak, matters which would otherwise remain some hours and accumulate pass away at once; but of course no benefit can arise from treating such cases as if they were instances of simple purging. The recumbent posture, ferruginous tonics, and good diet will more probably effect a cure.

Treatment.—This will manifestly depend upon the cause. When the purging arises from the presence of some offending matter in the intestinal canal, the expulsion of such matter must be aided by administering from five to ten grains of powdered rhubarb, or about two fluid drachms of the tincture of rhubarb, or half a fluid ounce of castor oil; combining a few drops of the liquid extract of opium with the draught if there be much pain. When no such cause exists, we may endeavor to relieve the symptoms by a draught of ether and opium (F. 85); or by two or three doses of calomel and opium (F. 25); or by the chalk mixture with catechu, &c. (F. 97); or by the aromatic powder of chalk and opium of the British Pharmacopœia; or by sulphuric acid and opium (F. 100); or by a mixture of matico and rhatany (F. 105); or by kino and logwood (F. 108). Many cases may be quickly cured by thoroughly washing out the rectum with warm water, and immediately afterwards employing the officinal opiate enema, or a suppository of opium (F. 340). Where the irritation appears to be kept up by fecal fermentation, no remedy proves more serviceable than vegetable charcoal (F. 98). Ipecacuanha and opium are especially useful in the diarrhœa of children, or in that of adults when due to inflammatory congestion of the mucous membrane of the intestine (F. 333, 324, 339). Attention must invariably be paid to the diet; emollient drinks, tapioca or sago or milk arrowroot, custard or baked rice puddings, and white fish only being allowed during, as well as for a few days after, the attack. If any stimulant be needed, a little cold brandy-and-water will not prove injurious. When the intestinal canal is irritable, subjecting the individual to attacks of diarrhœa on slight causes, great benefit may often be derived from constantly wearing a flannel roller wound twice or thrice round the abdomen. This practice will also be found useful by those who have resided in tropical climates; and who, having suffered from yellow fever, dysentery, &c., are liable to looseness of the bowels.

XVI. EPIDEMIC CHOLERA.

Cholera (*Χολὰς*, the bowels, and *ῥέω*, to flow; or, according to Dunglison, from *Χολὴ*, bile, and *ῥέω*, because it arises principally from a super-

abundance of acrid bile) is probably the most fatal disease known in the annals of medicine. It is variously spoken of as *Malignant*, or *Asiatic*, or *Algide Cholera;* this latter term (*Algeo*, to be cold) having reference to that diminution of animal heat which is one of the signs of this disorder.

It is generally believed that epidemic cholera is of Eastern origin, that it first made its appearance in India in 1817, and was imported into England in 1831. According to Dr. William Farr, cholera has probably always existed in England; but from the description given by Sydenham, in the seventeenth century, it may at least be doubted whether the disease he speaks of was not rather of the nature of dysentery than identical with that under consideration.

We are just as ignorant of the reason of its origin, as we are unable to explain why it should have raged in this country in 1831-32, 1848-49, 1853-54, and not during the intervening years. All that our experience has taught us is this: that cholera attacks the poor in a much larger proportion than the rich; and that as we remove destitution, filth, foul air, and the causes of disease generally, so we destroy the agencies through which this formidable malady operates.*

The first two epidemics of this disease in England (1831–32, 1848–49) were the most severe; and each continued fifteen months. They began in October, spread gradually, increased, and then as spring advanced gradually subsided, to burst out afresh with the hot weather. It is worthy of notice, that in both epidemics the cholera entered England after the wheat harvest was over, at the close of the hot season; and that it was most fatal during and after the wheat harvest of the following year. In 1848–49 there were 55,181 deaths from this disease in England alone, not including 28,900 from diarrhœa; the mortality from these two causes, in 1849 only, being respectively 53,293 and 18,887.

In 1853 there were 32 deaths from cholera in the metropolis between the commencement of February and the end of July; in August, 48 deaths; in September, 99; in October, 293; in November, 318; and in December, only 62. During the early part of 1854, the disease had nearly disappeared: so that until the 1st of July only 16 fatal cases occurred. But it now again became epidemic, and between the 1st and

* As examples of the effects of overcrowding, the following are selected from a number of similar cases. Within the walls of an establishment for pauper children at Tooting, there were crowded 1395 children. Little more than 100 cubic feet of breathing space was allowed for each child; although as we know 500 is the smallest amount which can be given compatible with safety, while it ought to be 1500. One night—during the epidemic of 1853-54—cholera attacked 64 of these children: 300 were attacked in all, and within a week 180 perished. In the workhouse of Taunton there were 276 inmates. In some of the rooms the breathing space was not more than 68 cubic feet for each person. Cholera swept away 60 of these inhabitants in less than a week. At the county jail of the same town, the breathing space allowed to each prisoner ranges from 819 to 935 cubic feet. While the poor were being destroyed in the workhouse in this wholesale manner, not a single case of cholera or of diarrhœa occurred among the prisoners.

Again, cholera is a usual attendant at native festivals in India, when crowds of people are collected together. At the Juggernaut it was an annual visitant. The town of Pooree contained 35,000 inhabitants, while the number of pilgrims sometimes amounted to 150,000. The inhabitants were usually healthy in June, or July, just prior to the festival; but immediately on the arrival of the pilgrims, when the lodging-houses became crowded with inmates, cholera would suddenly break out, and destroy hundreds in a few days. On the dispersion of the crowd the disease disappeared as suddenly as it was generated.

22d of July, the mortality was 38; during the week ending 29th July, there were 133 fatal cases; and it then rapidly increased, until in the week ending 9th September there were 2050 deaths from cholera, and 276 from diarrhœa. Having now attained its maximum, the affection slowly declined, but did not entirely cease until the end of December; the total mortality from it in the metropolis in 1854 being 10,696.

The estimate has been made by Dr. Farr, that little less than five millions of the people of the United Kingdom were attacked by cholera or diarrhœa in the epidemics of 1848–49 and 1853–54; and that a quarter of a million of those so attacked, died. The mortality from cholera and diarrhœa in 1849 was at the rate of 41 in 10,000; while in 1854 it was at the rate of 22 in 10,000 of the population.*

Symptoms.—The cholera usually manifests itself in three stages. In the first, there is diarrhœa and vomiting, which are considered by Dr. Stevens as efforts of nature to expel the morbid poison from the blood and from the body; in the second stage, there are in addition, cramps, spasms, coldness of the body, and sinking of the pulse; while in third and last, there is collapse.

Considered somewhat more in detail, the chief symptoms may be described as copious vomiting, with purging, of a peculiar flocculent rice-water kind of fluid; severe cramps in the lower extremities and abdomen, rendering the muscles as hard as wood, or drawing them into knots, as it were; sometimes, in the early stage, albuminuria, followed by complete suppression of urine; thirst, usually very urgent; and diminished circulation and impeded respiration, causing intense prostration, with icy coldness of the surface of the body, the tongue, and even the breath. There is also lividity or blueness of the lips, and of the skin generally; alteration of the voice, which becomes whispering and unnatural; together with shrinking and pinching of the face, and indeed of the whole body. Notwithstanding the diminution of temperature, however, the patient probably complains of oppression; while he often prefers to lie uncovered. Moreover, the sharp pinched appearance of the features, the muddy-looking complexion, and the sinking of the eye with flattening of the cornea are so characteristic, that the expression they give rise to is known as the *facies choleritica*. Then there soon follows a gradual lessening of the breathing; a diminution, or absolute disappearance of the pulse; and, at length, a complete arrest of the circulation. In all such cases the intellect remains clear until the last; the sufferer being sometimes hopeful, sometimes quite callous to his fate. Death generally takes place in from three to eighteen hours. Patients who survive beyond this period frequently show signs of amendment, and occasionally rapidly get well. But often the improvement is tran-

* In May, 1854, cholera broke out in Port Louis; and although prompt measures were taken to arrest the progress of the disease and to mitigate its force, they proved of no avail. The average deaths in this town before the breaking out of the disease were 70 a month: afterwards they exceeded this number daily. The population of Port Louis and its suburbs is about 50,000; and by the end of May it was reported that 10,000 of the inhabitants had fled. On the 5th of June there were said to be 170 deaths, and on the 6th 130. The progress of the disease was so rapid, that in some cases scarcely two hours elapsed between seizure and death. The whole capital became a scene of desolation; nearly one-half of the houses were closed, and in the streets few persons were met except those who hurried along with medicine.—Three Visits to Madagascar, during the Years 1853, 1854, 1856. By the Rev. William Ellis, pp. 111 to 114. London, 1858.

sient, and they subsequently die poisoned by their own secretions—by the continuance of the suppression of urine; death being then preceded by headache, drowsiness, tonic or clonic spasms, vomiting, stertor, and coma. In more favorable cases a mild febrile exacerbation follows, which subsides gradually in a few days; or this consecutive fever may be of a more severe type, and the patient may sink into a low typhoid condition, from which, under proper treatment, however, he slowly recovers. The attack is sometimes preceded by slight diarrhœa, but more frequently it comes on suddenly without any warning.

If we examine the stools in cholera we shall find that they consist of an abundance of water, a large quantity of epithelium, a little albumen, a trace only of biliary matter, and a large amount of salts, but particularly of chloride of sodium. The rice-water appearance is due to the suspended epithelium.

Pathology.—The only explanation which can be given of the cause of cholera is, that it is due to some *materies morbi*—a septic agent; the existence, increase, power, and transmission of which from place to place is favored by some particular state of the atmosphere associated probably with a high temperature. The action of the poison is undoubtedly encouraged by filth of all kinds. As far as I can glean from the recorded evidence—and I have carefully studied the subject—it certainly appears to me to be, to a certain degree, contagious: in other words, I believe that human intercourse has a share in propagating the disease, though it is not the only means of effecting its diffusion. We must remember, however, that cholera, like other contagious disorders, can only be taken by a person predisposed to disease: we may indeed compare a contagious or infectious disorder to a seed, which, unless put into a fit soil, undergoes no change—does not grow or take root.

Whether the cholera poison (*cholerine*) enters the blood through the skin, through the lungs—which is probably the case—or through the alimentary canal as Dr. Snow believed, is a question which cannot be said to have been satisfactorily solved. But on examining the evidence adduced to prove the latter hypothesis, Dr. Baly came to the conclusion that no sufficient reasons have been found for adopting the theory that the poison is swallowed with the food or drink, is reproduced in the alimentary canal, and being discharged with the excretions propagates the disease by finding access in the same way to the stomachs of others.

When an epidemic of cholera is prevalent there are certain conditions which render individuals liable to the disease. These *predisposing causes* are undoubtedly the use of bad, unwholesome food; such as stale meat or fish, shell-fish, high game, bad vegetables, unripe fruit, impure water, &c. The effect of exhalations from badly constructed sewers is highly injurious; the influence of noxious trades and nuisances is powerful; while intemperance, uncleanliness, vitiated damp air, are all prolific predisposing causes. So again, anything which lowers the vital powers will predispose; as great fatigue, too long abstinence from food, diarrhœa, &c. Hence in cholera-times, it is most important to reside in a well-ventilated house, in an elevated, airy, dry locality; to live by rule; to strictly avoid the use of purgative medicines; and to be most careful to check any tendency to looseness of the bowels by the recumbent position, and by chalk mixture, opiates, and aromatics, since such looseness causes debility, and thus predisposes a person to

receive the choleraic poison. I do not believe, however, that common diarrhœa can produce the specific poison of cholera, as some imagine, any more than it can give rise to the poison of small-pox or measles.

Morbid Anatomy.—Post-mortem examinations have thrown but little light on this disease. As one of the foci of the morbid action, we naturally look first to the gastro-intestinal mucous membrane; but beyond distension of the follicles with serum, an œdematous condition of the mucous lining, patches of venous congestion, and here and there rupture of the vessels producing ecchymosis, we find nothing.—The symptoms, moreover, indicate great exhaustion of the abdominal ganglionic nervous centres, while there is also a marked loss of tone in the capillary circulation. May not these effects be due to the altered condition of the blood? This fluid is usually of a tarry appearance and consistence, the proportion of water being much diminished, the amount of fibrin being either reduced or unaffected, and the corpuscles increased; while the serum is rich in albumen, it contains a slight excess of urea, and though its salts collectively are perhaps diminished, yet the potash and phosphates are increased.—The brain, heart, lungs, and liver are usually found healthy; Dr. Ayre's statement that the latter organ is always congested, having been contradicted by other observers. The kidneys are sometimes discovered gorged with venous blood.

The bodies after death are found much shrunken, and of a dusky or livid color; while usually putrefaction is more delayed than usual. Very remarkable contractions of the voluntary muscles are sometimes noticed shortly after death from this disease. In the *Cholera Gazette* for 1832, it is mentioned that in India the dead bodies of the soldiers were so violently convulsed, that their comrades, "in order to calm the timid, bound the limbs to the bed-frame." Another remarkable circumstance is, that the temperature of the body often rises after death from cholera; the increase of heat being maintained for many hours. This rise of temperature sometimes happens together with the muscular contractions, but often also without.

Treatment.—Every article of the Materia Medica has been tried in this disease; large doses of calomel, opium, brandy, sulphuric acid, cajuput oil, castor oil, croton oil, creasote, chloroform, sugar, sulphur, acetate of lead, logwood, emetics, oxygen gas, hot-air baths, venesection, &c., having been the favorite remedies. Directly a case recovers, the sanguine practitioner imagines that he has cured it, and immediately sets goose-quill to paper to record his success. The consequence is, that the medical journals—and even the daily papers—in cholera-times, are filled with letters and communications recommending the most opposite and useless remedial agents; these epistles not only frequently serving to show the weakness and credulity of the writers, but also tending to bring discredit on the medical profession generally.

Mercury has been highly praised by some practitioners, and especially by Dr. Ayre; who shows that of 725 unequivocal cases treated with it, 360 recovered. But it has been pointed out by Drs. Baly and Gull, in their Report on Cholera to the College of Physicians, that under opposite plans of treatment, the recoveries even in severe cases averaged from 45 to 55 per cent., according to the period of the epidemic. Consequently the *facts* adduced by Dr. Ayre are not worth much.—Again, Dr. George Johnson has strongly advocated the use of

castor-oil. The Medical Council of the Board of Health, after investigating several cases treated by this agent, report on 20th September, 1854—"From the above abstract, the details of which have been carefully investigated by the Committee, it appears that, in 89 cases of cholera, treated by 14 different practitioners, with castor-oil, on the plan recommended by Dr. Johnson, 68 were fatal; recovery having occurred only in 15 cases, while 6 remaining cases are still under treatment."

The only plan of treatment really deserving of notice, since it is the only one based upon a scientific foundation, is that by salines, as suggested by Dr. Stevens: a plan, no doubt, which will often fail, but which will succeed much more frequently than any other. The following is an outline of it, as most successfully used on a large scale, in the prison of Coldbath Fields, during 1832.* Patients presenting the premonitory symptoms—diarrhœa and vomiting—were removed into an observation ward, where an even temperature was constantly maintained. A seidlitz powder was immediately administered; if sinking was felt without purging, three or four teaspoonsful of Epsom salts were added to the powder. On these agents acting, plenty of thin beef-tea, well seasoned with salt, was given; if there was any pain, a sinapism was applied to the gastric region; and thirst was relieved with seltzer, soda, or pure water *ad libitum*. Most of the cases were thus cured. If, however, cramps, coldness, or sinking of the pulse came on, the patients were considered as cholera cases in the second degree. The following was then administered about every half-hour: Sodii chloridi gr. 20, Sodæ carbonatis gr. 30, Potassæ chloratis gr. 7, dissolved in water. If there were much irritability of stomach, a large sinapism was applied; if much heat or burning pain, an additional quantity of carbonate of soda was added to the mixture. In cases in the stage of collapse, a strong solution of the same salts, dissolved in hot water (100° Fahr.), was thrown into the bowels, and repeated every two or three hours. Sinapisms were also applied to the stomach, between the shoulders, &c.; and in the cold stage, frictions with warm towels were used. A pure air for the patient to breathe was considered of the greatest importance.

In addition to the above, I would try the effect of placing the sufferer in a tepid hip-bath, and then pouring cold water over the head, back, and chest. Directly afterwards the patient should be removed to bed, and put between warm blankets; while if this cold affusion were followed by amendment, it ought to be repeated every six or four hours. In mild cases, the "wet-sheet envelope" will favor reaction; but it has only proved mischievous in severe instances. When the vomiting is severe, or the thirst insatiable, nothing gives more relief than permitting Wenham Lake ice to be continually sucked. The patient is also to be isolated as far as possible. He is to have plenty of fresh air; and care must be taken that the water he drinks is uncontaminated,—particularly that it has not been drawn from a well near any sewer. Moreover, his excreta should be received in a pan containing Condy's or Burnett's disinfecting fluid, and then at once thrown away.

The greatest caution will subsequently be required for many days as to diet; not a few deaths having occurred from the too early use of ani-

* On Asiatic Cholera, &c., pp. 37–40. By Dr. William Stevens. London, 1853.

mal food. As a rule, broths and farinaceous substances only should be allowed, without any solids whatever, until the renal secretion has been fully re-established, and all the symptoms have vanished.

XVII. COLIC.

Colic (*Κῶλον*, the large intestine) is characterized by severe twisting pain in the belly, especially about the umbilicus, occurring in paroxysms. There is no inflammatory action in simple colic, and the pain is relieved by pressure: it is accompanied by constipation, and often by vomiting; while there is neither fever, nor quickness of pulse, nor depressing anxiety as in enteritis, although the pain may be as severe.

Attacks of colic often arise from indigestion accompanied with flatulence; the suffering being severe until vomiting, or eructation, or expulsion of the wind by the anus gives relief.—A second common cause is the presence in the bowel of morbid secretions, or of retained excrementitious matters; easily cured by hot brandy-and-water, and a dose or two of castor-oil.—Then we may have to treat nervous or spasmodic colic, such as occurs from fright, cold, hysteria, gout, &c.; and which demands the use of antispasmodics, like ether, chloroform, and opium.—While, fourthly, we may have colic from mineral poisons, such as copper, lead, &c.

Flatulent colic, or that which arises from the undue accumulation of air in the stomach or intestines, is attended with pain, depression, and coldness of the surface. The air is generally derived from the decomposition of the food and glandular secretions; though there is every probability that, in certain states of the system, gaseous exhalations take place from the mucous membranes. Air swallowed with the food may be a cause of excessive flatulence, as is often seen in infants when they have been fed from a bottle by a careless nurse.

Flatulence (from *Flo*, to blow up,) may exist as an idiopathic disorder, or it may be symptomatic of some other affection. In the first case, the flatus is usually most abundant when the patient has been fasting, and its presence is unaccompanied by any marked derangement of the general health. Nervous and hypochondriacal women, who partake freely of tea, are liable to it; or it may be produced by the use of any food which is liable to undergo fermentation. There is generally a want of tone about the system, and especially a relaxed condition of the muscular fibres of the intestinal walls. In the second case, the flatulence is an attendant upon indigestion, inflammatory disorders of the stomach or bowels, organic diseases of the liver, peritonitis, typhoid fever, uterine or ovarian irritation, gout, &c.

Idiopathic flatulence is generally to be cured by the avoidance of vegetable food and beer; by the use of tonics, especially the mineral acids with strychnia or nux vomica (F. 376, 378); and by the exhibition of creasote (F. 41) or vegetable charcoal (F. 98). In tympanites from intestinal atony, and weakness of the abdominal muscles, electricity is very useful; it being sufficient to apply both electrodes on different points of the abdominal parietes, and not to place the positive

electrode in the mouth and the negative in the rectum, as advised by Becquerel. Where the distress proves so urgent that immediate relief is demanded, a draught containing spirit of chloroform or ether, carbonate of magnesia, &c. (F. 62, 85, 86), will be found most efficient; while a turpentine stupe may be applied over the belly. The symptomatic variety will have to be treated in various ways according to its cause. Conditionally that their employment is not forbidden by the nature of the existing disease, enemata of turpentine, assafœtida, and rue (F. 189) will be useful; while when the quantity of air is excessive, its escape may be facilitated by passing the tube of the stomach-pump for several inches up the rectum.

In *copper colic* the pain often comes on very suddenly, and is aggravated by pressure. The bowels may act regularly, but there will generally be nausea and vomiting. The complexion is of a peculiar sallow hue, the countenance is anxious, the eyes appear sunken and the lips livid, while around the gums is a purple line which is characteristic of copper poisoning. This disease is met with among copper-plate printers. Attempts must be made to eliminate the poison from the system by purgatives; while the patient is to be relieved by hot baths, turpentine stupes or sinapisms, and the administration of ether with opium.

Lead colic—or *Colica Pictonum*, so called from its former frequency among the Pictones or inhabitants of Poictou—has superadded to many of the symptoms already mentioned, an intense grinding or twisting sensation around the navel, with retraction of the abdominal integuments towards the spine, and pain in the back. The existence of a blue or slate-gray line around the edges of the gums is a pathognomonic symptom of the presence of lead in the system (p. 286). Painters most frequently suffer from lead colic, in this country: they often have several attacks before the muscles of the arms become affected with paralysis, causing *drop-wrist*. Sleeping in a recently painted room, drinking fluids which have been kept in leaden vessels, taking snuff adulterated with lead, &c., are not unfrequent causes of this affection.

In the treatment of lead colic, our first object must be to get the bowels to act. This is usually accomplished with difficulty; but it may generally be best effected by administering a large dose of calomel and jalap, followed by a draught containing sulphate of magnesia (F. 140). Two or three hours subsequently the patient may be placed in a warm bath, and part of the water injected into the bowels. Should these means fail, an ounce of castor oil must be given; or two or three doses of sulphate of magnesia with sulphuric acid (F. 142). Opium will afterwards be necessary to remove all the pain; only farinaceous food ought to be allowed; and the purging should be kept up for a few days by the sulphate of magnesia (F. 141), administered every morning. The application of electricity by induction—Faradization—is sometimes an excellent palliative, giving relief to the pain more speedily than any other remedy. If the practitioner be afraid of the electricity at first intensifying the suffering, the patient may be put under the influence of chloroform. When the attack has been relieved, and the bowels have

been freely acted upon, the iodide of potassium should be administered (F. 31); while a hot sulphur bath (F. 125) may be ordered. Benefit will be derived from frequently repeating the latter.

XVIII. CONSTIPATION.

Constipation (*Constipo*, to crowd thickly together,) may arise during the progress of any acute or chronic disease, or it may happen as an idiopathic affection. In either case too much importance is usually attached to its occurrence, and consequently it is often treated with unnecessary activity.

The alvine evacuations, in a properly fed man, amount to 4 or 5 oz. daily (91 lbs. to 114 lbs. in the year). There is some variation in different individuals with regard to the frequency with which the bowels act during health. As a rule, most people have an evacuation every day; but some persons habitually go to stool twice in the twenty-four hours, while others only have an operation every second or third day. The most important consequences which result from habitual costiveness (by which term is meant, a departure from the standard natural to each individual) are irritation of the gastro-intestinal mucous membrane, and perhaps the reabsorption of excrementitious matters. The functions of the stomach, liver, pancreas, &c., become imperfectly performed; and hence complaint is made of a sense of oppression, mental and bodily; while the intellectual faculties are dulled, the complexion gets sallow and pasty, the skin is dry, the urine is scanty, and such motions as come away are pale, clay-like, and very offensive. In obstinate cases the sufferer may lose all power for exertion, he may have frequent attacks of headache, fits of palpitation of the heart are not uncommon, neuralgic pains torment him, and he perhaps becomes a confirmed hypochondriac.

The causes of constipation are numerous. It may arise from structural disease of the intestinal coats, *e. g.* tumor, cancer, and the contraction of cicatrices; or from some painful affection of the rectum, such as hemorrhoids and fissure of the anus; or from debility of the abdominal walls, so that the parietal muscles cease to contract firmly, and thus fail to assist the peristaltic movements of the intestines; or from disease of the nervous system; or from the secretions of the liver or pancreas or intestinal glands becoming disordered, or merely deficient in quantity. But of all causes the most frequent is a torpid condition of the colon, leading to insufficient contraction of this gut with the accumulation of fecal matter. It occurs in old people, in individuals weakened by exhausting disease, in chlorotic females, in the votaries of fashion accustomed to indolent and luxurious habits, in those who neglect to attend to the calls of nature, as well as in such as are engaged in sedentary occupations. In addition to constipation there is defective appetite, slow digestion, a pale sodden tongue indented at its edges, flatulence, fetid breath, a dingy complexion with dark lines under the eyelids, and low spirits. When there is an accumulation of fæces the masses may be felt through the abdominal parietes, unless these walls are loaded with fat. Large collections sometimes take place about the

cæcum, in the sigmoid flexure of the colon, and in the rectum. Sometimes the quantity of retained fecal matter gets so excessive that a large abdominal tumor is formed; which will perhaps give rise to jaundice by its pressure on the biliary duct, or to œdema by impeding the flow of blood through the inferior vena cava. Cases have been observed in which the abdomen has been enormously distended, where a motion has not been passed for ten or twelve weeks, and where the contents of the rectum have had to be scooped away to procure room for the use of enemata. It is sometimes urged, however, that an accumulation cannot have taken place, because the patient is tormented with tenesmus, and as he says with diarrhœa. But the fact is, that when the descending colon and rectum become blocked up, small quantities of fecal matter may flow through a channel formed in the mass, or they may pass between the substance and the walls of the bowel, and so lead to deception. I have seen several such cases, occurring in delicate females during the period of pregnancy.

In attempting to cure habitual costiveness, the grand aim of the practitioner must be to do away with the use of purgative drugs. This cannot usually be effected at one rude blow; but it is possible at once to substitute simple aperients for the various patent medicines, the mischievous blue pills, and the nauseous black draughts, with which the public are so fond of tormenting themselves. The remedies that may for a time be employed, at properly regulated intervals, are castor oil, olive oil, rhubarb, magnesia, syrup of senna, sulphate of soda (F. 144, 148), small doses of aloes (F. 149, 150, 154), inspissated ox-gall (F. 170), taraxacum (F. 147), Seidlitz powders (F. 169), glycerine, podophyllin, and ipecacuan (F, 30, 160), &c. An imitation of the Cheltenham or Carlsbad waters (F. 180, 182) will often prove useful: or simple electuaries (F. 194) may be tried; or five or ten grains of liquid tar, formed into pills, and taken every night at bedtime for some weeks sometimes succeed: or frequently it will be much better if the patient can be persuaded to trust to enemata of soap-and-water, of salt and barley-water, or of castor oil (F. 188, 189, 190). A suppository made with sixty or eighty grains of cocoa butter, or of the same quantity of soap, can be easily introduced into the rectum, and will generally act quickly. To restore tone to the colon, tonics are invaluable; and hence many of the prescriptions just recommended contain these agents in combination with purgatives. But after ten or fourteen days the aperient medicines must be gradually discontinued and tonics alone trusted to; the best drugs of the latter nature being quinine (F. 379), sulphate of zinc (F. 177, 413), nitro-hydrochloric acid (F. 378), preparations of nux vomica (F. 387, 404, 409), pepsine (F. 420), and cod-liver oil (F. 389). In nervous cases a pill of valerianate of zinc and belladonna (F. 410), taken twice or thrice daily, often acts advantageously; while in those cases of chronic disease attended with suffering, where opium is needed, the constipating effect of this drug may generally be obviated by combining the extract of belladonna with it (F. 340, 344).

None of the foregoing remedies will prove of permanent service unless attention be paid to diet. It is of the greatest importance that the food be wholesome and digestible; a variety of dishes being only injurious when they lead the patient to eat to excess. Vegetables are often objectionable, more especially if they produce flatulence; while

the necessity for them, until the function of digestion is healthily performed, can often be obviated by the use of ripe fruits in the morning. When the latter fail, figs or prunes soaked in olive oil may succeed. Oatmeal porridge for breakfast is regarded as a specific by some patients; while others look to their pipe or cigar for affording the necessary stimulus. Brown bread, containing the bran, can often be substituted for the fine bread usually consumed; but for the stomach to be able to utilize that outer covering of the wheat, rich in gluten and fatty matter, it must be strong enough to digest it properly. The aerated loaf is generally to be preferred either to brown or the common white bread, since it is certainly more easily assimilated.

Daily exercise in the open air, either on foot or on horseback, stands foremost amongt the remedies for constipation. General indolence, with too much sleep, must be avoided. There are very few cases of costiveness with dyspepsia, arising from sedentary pursuits, that may not be cured by the sufferer retiring to bed at eleven o'clock, and drinking a tumblerful of spring water; rising at seven in the morning and taking a bottle of soda-water, then walking for three-quarters of an hour, and afterwards breakfasting upon weak tea with plenty of milk, and meat, bread, &c. In the hepatic sluggishness of old age, nothing is more beneficial than a daily walk, or even than a ride in an open carriage.

There are, in conclusion, one or two suggestions which may be advantageously remembered. Thus, it is very necessary that the bowels should be solicited to act at a regular hour every day; soon after breakfast being perhaps the best time. A sponge or shower-bath every morning gives tone to the alimentary canal. In some instances, where the liver is congested or the secretion of intestinal mucus deficient, marked benefit arises from wearing the "wet compress" at night; this application merely consisting of two or three folds of thin flannel or calico, wrung out in tepid water, laid upon the abdomen, and covered with gutta-percha or oil-silk. When the abdominal muscles are weak and flabby, and the peristaltic action of the contractile fibre-cells of the intestinal walls is deficient, galvanism proves of great utility. And lastly, in the cases especially of children and old people, gentle kneading of the abdominal muscles, or friction with some stimulating liniment, will often produce a daily evacuation without any discomfort.

XIX. OBSTRUCTION OF THE BOWELS.

Intestinal obstruction is a fearful disorder which may arise from several conditions. Before mentioning these, it may be remarked that when there is obstruction with fecal vomiting the disease is often called the *Ileus* (*Ειλέω*, I twist or contract); while it is also known as the *Iliac passion*, *Volvulus*, and *Colique de Misèricorde*. The most frequent cause perhaps of an obstruction to the passage of the fæces through a part of the intestinal tube is strangulated hernia; and consequently in every case of obstinate constipation the practitioner should make a careful examination of those parts of the abdomen, thigh, and hip, and—in women—of the vagina, at which the intestine may protrude.

Pathology, &c.—Dr. Haven has collected, from various sources, the histories of 258 cases of intestinal obstruction; which—without including examples of inguinal, femoral, or umbilical hernia—he has thus tabulated:*

Three divisions of the causes of intestinal obstruction are made, viz.:

1. *Intermural*, or those originating in and implicating the mucous and muscular coats of the intestinal walls:
   - *a.* Cancerous stricture.
   - *b.* Non-cancerous stricture, comprising—
     1. Contractions of cicatrices following ulceration.
     2. Contractions of walls of intestine from inflammation, non-cancerous deposit, or injury.
   - *c.* Intussusception.
   - *d.* Intussusception associated with polypi.
2. *Extramural*, or those causes acting from without, or affecting the serous covering:
   - *a.* Bands and adhesions from effusion of lymph.
   - *b.* Twists or displacements.
   - *c.* Diverticula.
   - *d.* External tumors or abscesses.
   - *e.* Mesocolic and mesenteric hernia.
   - *f.* Diaphragmatic hernia.
   - *g.* Omental hernia.
   - *h.* Obturator hernia.
3. *Intramural*, or obstructions produced by the lodgment of foreign substances:
   - *a.* Foreign bodies, hardened fæces, concretions having for nuclei gall-stones, &c.

In the first class, the large intestine is affected more than twice as frequently as the small; in the second class, the reverse happens. The average duration of the attack of obstruction is shorter in the first class than in the second; on the whole, the average is about three weeks. Sir Astley Cooper mentions three other causes of obstruction, viz., hernia at the ischiatic notch, at the foramen Winslowii, and perineal hernia; but none of these causes existed in either of the 258 cases.

In 169 examples of intestinal obstruction collected by Mr. Phillips†—69 were instances of invagination or intussusception; 60 of strangulation by the constriction of bands, adhesions, and abnormal openings; 19 were caused by disease of the coats of the bowel; 11 by impaction of the hardened fæces, or concretions; and 16 were owing to the pressure of tumors external to the bowel.

When the strangulation is due to *bands* or *twists*, the lower part of the ileum is the most frequent seat of the mischief. There may be only one band, and it may have various attachments in different cases. Most commonly, perhaps, it is connected by one or both ends with the mesentery. In some rare instances a portion of bowel has slipped down into the pelvis in front of the pedicle of an ovarian tumor, and has become fatally strangulated.—In *Intussusception*—that condition where one

* American Journal of the Medical Sciences, vol. lvi. Philadelphia, 1855.
† Medico-Chirurgical Transactions, vol. xxxi, p. 3. London, 1848.

part of the bowel is drawn into another portion, just as the finger of a glove is pulled within itself—the passage gets more or less obstructed by the congestion, effusion, and inflammation which result. Most frequently the intussusception is single, though three or four or even ten distinct invaginations have been found in the same subject: the traction is usually from above downwards,—that is to say, the upper segment of the bowel is drawn into the lower: in probably half the cases, the ileum and cæcum are protruded into the colon: it is most common in young children and in old age:* while in addition to the sickness, constipation, sudden violent pain, &c., there is often a discharge of blood and mucus per anum. Spontaneous reduction of the invagination may take place; but when it does not happen, inflammation of the peritoneal coats of the involved portion of the bowel usually sets in between the third and seventh days, the opposed surfaces probably becoming adherent in from five to eight days from the commencement of the peritonitis. Where the intussusception does not cause complete obstruction weeks may elapse without any inflammation occurring. In a considerable number of instances the inflammatory action ends in gangrene, and many inches of the included sphacelated bowel may come away by the rectum, leaving the canal of the gut free; so that a cure will often ensue if care be taken not to disturb the adhesions.—*Intestinal concretions* are rare in man. They consist principally of phosphate of ammonia and magnesia, with some phosphate and carbonate of lime; these salts being deposited around a fragment of undigested food, indurated fæces, a gall-stone, &c. —With regard to *cancerous stricture*, the sigmoid flexture of the colon and less frequently the rectum are the parts usually affected. There is always a history of previous suffering; there have been discharges of blood and mucus from the bowels; whilst the fæces have been small and flattened, or reduced to the size of the stem of a tobacco pipe. Moreover, the general symptoms of malignant disease are superadded to the signs of occlusion of the intestinal tube.

Symptoms.—The principal symptoms of obstruction of the bowels are constant vomiting, which is at first simple,—consisting of the contents of the stomach and mucus, but which in a few days becomes stercoraceous or fecal; pain varying in degree, often very severe; gradually increasing tympanites, with violent borborygmi, unless the occlusion be high up; severe hiccup, particularly in strangulation of the upper part of the small intestine; great mental depression; and the pathognomonic symptom—constipation. Very careful palpation will often detect, at an early period, a feeling of increased fulness just above the obstruction; while percussion elicits diminished resonance, more marked at this point than elsewhere. In almost all instances, the prostration sets in early; acute peritonitis very commonly occurs in a few days; and gangrene is most frequent in intussusception and obturator hernia. The lower the obstruction is situated the less urgent will be the vomiting: if, for instance, it is in the duodenum, the vomiting will be incessant from the beginning; if in the colon, it may be absent for some time. It might be thought that the ileo-cæcal valve would prevent the return of the contents of the colon into the ileum; the preliminary dilatation, however,

* The deaths from Intussusception in England during the year 1862 were 280. Of these 65 occurred in infants under one year of age; and 101 in individuals beyond the age of fifty-five.

renders this valve quite patulous. When urine is freely secreted, the obstruction cannot be very high up, since absorption is only partially checked. The urine, however, may be scanty when the seat of occlusion is low down, if there be copious vomitings of fluids; or if there be present much fever.

From the time of Galen the occurrence of fecal vomiting has been explained on the supposition that it was effected by an antiperistaltic movement of the intestinal canal. Dr. Brinton, however, has shown conclusively that the natural peristaltic action of the bowel above the occluded point is not reversed; but that the intestinal contents are gradually propelled until stopped at the obstructed point. Here they accumulate so as to distend the canal with a liquid mass; and then a double current is formed, one at the surface or periphery of the tube having the direction of the peristalsis itself, and one in its centre or axis having exactly the reverse course.

When the obstruction is in some part of the upper tract of the small intestine, and our treatment fails to remove it, death usually occurs in a period varying from five to ten days; while occlusion of the colon, from being attended with much less pain and distress, may not prove fatal for several weeks. Moreover it must be remembered that in cases apparently quite hopeless, a spontaneous cure sometimes takes place even at the last moment; so that the more protracted the duration of the disease, the greater is the chance of recovery.

Treatment.—In the management of cases of obstruction of the bowels, there is at first a period when the diagnosis can only be doubtful. At this early stage purgatives may be resorted to, though they need never be of a violent or drastic nature. An ounce of castor oil may be given; or preferably an enema (F. 189, 190, 191) may be tried, the patient being directed to retain it for an hour or two, if possible. But directly the practitioner is convinced that there is some mechanical obstruction to the passage of the stools, all remedies of this class must be withheld, since they are positively mischievous.

Under these circumstances the increase in the severity of the symptoms is to be retarded by attention to the nourishment of the patient, and by alleviating pain. As regards the first point, it is certain that the more freely food and fluids are partaken of, the greater will be the distension, torment, and danger. It is absolutely necessary therefore that the sufferer exercise great self-denial; and that instead of attempting to quench his thirst with copious draughts, he be content to alleviate it by sucking ice and frozen milk, as well as by frequently washing out his mouth with cold water. To support the strength, small quantities of extract of beef, or soup thickened with flour and eggs (F. 1, 2, 3, 5), may be given; a little tea with cream is often refreshing; while brandy-and-water will form the best stimulant. If the vomiting be severe, food by the mouth must be stopped, and nutrient enemata (F. 21) trusted to.—The second indication is to be carried out by the administration of opium; which is invaluable in these cases, since it relieves or removes pain, checks spasm and contraction, diminishes the peristaltic action of the bowels, and supports life by lessening waste of tissue. Large quantities will usually be needed; and no preparation is better than the officinal extract, given at first in grain doses every four, six, or eight hours. Relief will also be afforded by the free application of

belladonna mixed with extract of poppies (F. 297) over the abdomen, together with the assiduous employment of large hot poultices or fomentations.

But it may be inquired,—Are there no direct means which may be tried in order to overcome the obstruction? There are two: A surgical operation, and the injection of large quantities of fluid with manipulation of the intestines by pressure upon them through the abdominal walls. The want of success which has attended the operation of gastrotomy has been so universal, that many excellent surgeons now consider it unjustifiable; arguing, that while on the one hand this proceeding has almost always proved fatal, on the other, many desperate cases which have been let alone have ended favorably, recovery setting in just as all hope was being abandoned. Allowing the great force of these objections, it still seems to me that there are a few—possibly exceptional—instances where surgical interference may be the means of prolonging life, when all else seems to have failed. Thus, if we can be certain that the obstruction is due to malignant disease or to some tumor in the sigmoid flexure of the colon or rectum, opening the colon in the left loin (Amussat's operation), and forming an artificial anus, may be the means of relieving much suffering and prolonging life. So also in cases where the obstacle is in the transverse portion of the colon, the same proceeding may be resorted to in the right loin. Again, if by a careful and searching examination we can come to the conclusion that the occlusion is in the small intestine, and is caused by a diverticulum, or by a constricting band of organized lymph round the bowel, it is the duty of the surgeon to perform gastrotomy. On the contrary, in the case of intramural obstructions, of intussusception, of stricture from the contraction of cicatrices, of obstruction complicated with enteritis or peritonitis, in neither of these instances has any operation the least chance of success.—The use of large enemata, with manipulation, remains to be mentioned. And first it must be remarked, that though this proceeding is here spoken of at the end of this section, it is really to be practised at a very early stage, and certainly before there is any fear that the tissues have become gangrenous. Supposing that ordinary injections have failed in their object, the patient should be placed on his back, with the pelvis considerably elevated while the shoulders are depressed. A long stomach-pump tube is then to be carefully passed as high as it will go; the anus is to be compressed around the tube by pressure with the hand and napkins; and warm water is to be slowly injected, as much as possible being thrown up, until there is distension of the bowel. As the fluid is allowed to come away the surgeon is to press with the flat of his hands upon the abdomen so as to move the coils of the intestine upon one another, and to press them upwards against the diaphragm. This proceeding may be adopted more than once; and in many cases it will be advantageous to have the patient under the influence of chloroform while practising it. —Inflation of the bowel is a hopeful proceeding in the intussusception of children. The air should be slowly injected, until the abdomen is greatly distended; while stimulants ought to be at hand, since the proceeding is apt to give rise to syncope.

Inasmuch as I should never resort to the use of crude mercury in

doses of one or two pounds, or of small shot, or of strong tobacco injections, these agents need not be noticed, except to mention that they have each been recommended.

XX. INTESTINAL WORMS.

Helminthology (*Ἕλμινς*, a worm; *λόγος*, a discourse) or the science which treats of the internal parasites of man and animals, has of late years attracted considerable attention. The number of these different parasites met with in the human subject is rather large (at least thirty-one), for there is scarcely a tissue or organ in the body in which they are not known to lodge and nourish themselves. The classification of the helmintha into those inhabiting the intestinal canal and those residing in other organs is only to be sanctioned on the ground of convenience; for scientifically such a division is imperfect.

There are seven principal entozoa (*ἐντὸς*, within, and *ξῶον*, an animal) occasionally found inhabiting the human intestinal canal. Of these, four possess an alimentary tube, and are therefore called hollow worms, or *Cœlelmintha* (*κοῖλος*, hollow, and *ἕλμινς*); while there are three which have no abdominal cavity, and are hence termed solid worms, or *Sterelmintha* (*στερεὸς*, and *ἕλμινς*).

In the first class we have the following:

1. The *Tricocephalus dispar*, or long thread-worm, is a small nematode (*Νῆμα*, a thread, and *εἶδος*, form) helminth, usually found in the cæcum and large intestines. It measures from an inch and a half to two inches in length, and has a very slender body. This parasite is said to be often present in considerable numbers, even in the intestines of healthy persons; and certainly it must be very prevalent in some localities, if M. Davaine's calculation is correct, that half of the inhabitants of Paris are infested by it. During life these worms give rise to no special symptoms.

2. The *Ascaris lumbricoides*, or large round-worm, is found in the small intestines, especially of ill-fed children. This nematode helminth somewhat resembles in size and appearance the common earth-worm, varies in length from six to twelve or fourteen inches, is of a light yellow color, is unisexual, and the female is larger than the male. Although the habitat of this worm is the smaller intestines, yet it may pass upwards into the stomach or downwards into the colon; and consequently be vomited in the one case, or evacuated with the stools in the other. Sometimes these worms are very numerous: thus Dr. Hooper has recorded an instance in which a girl voided upwards of two hundred in one week. The symptoms which they give rise to are usually obscure; but there may be thirst, disturbed sleep with grinding of the teeth, moroseness with low spirits, pallid countenance, fetid breath, swelled belly, emaciated extremities, depraved appetite, slimy stools, itching of the nose, tenesmus, and irritation of the anus.

3. The *Oxyuris vermicularis*, or small thread-worm, is found in the rectum, about the sigmoid flexure of the colon, and even in the cæcum and lower end of the ileum. It is the smallest of the intestinal worms averaging usually about a quarter of an inch in length, while the female

is longer than the male. This nematode worm is very frequently met with in children, and is permanently got rid of with great difficulty. It is very rarely found solitary, being generally present in groups or masses. The symptoms produced by those oxyurides are, chiefly intolerable itching and irritation about the anus, tenesmus, depraved appetite, picking of the nose, offensive breath, and disturbed sleep.

4. The *Sclerostoma duodenale* is a small nematode worm, about the third of an inch long, but unknown in this country. It is very common in Egypt, its presence in the small intestines of the natives giving rise to severe anæmia. The people of Northern Italy also suffer from it.*

In the second class we find three species:

1. The *Tænia solium*, or common tapeworm of this country, belongs to the cestode (*Κεστός*, a girdle, and *εἶδος*) group of helminths. It may occur singly, or there may be some three or four tæniæ. This parasite consists of a number of segments; it exists in the small intestines; and it varies in length from five to fifteen yards, and in breadth from two lines—at its narrowest part—to four or five at its central or broadest portion. The head of this parasite—perhaps more properly its root—is small and flattened; having in its centre a projecting papilla, armed with a double circle of hooks, around which are four suckers or mouths, by which the worm attaches itself to the mucous coat of the bowel. The generative apparatus consists of a ramified canal or ovarium containing the ova, and of a minute spermatic duct, both occupying the centre of each joint or segment. It is probably nourished by imbibition through its tissues, just as algæ imbibe nourishment from the sea-water in which they float. The researches of Küchenmeister have shown that the Tænia solium is the same parasite as the Cysticercus cellulosæ (pork-measle) of the pig, though in a different stage of development. The symptoms which arise from the presence of the tapeworm are not very striking, its existence being generally unsuspected until single joints are passed in the stools. In certain cases, however, there is a continual craving for food, debility, pain in the stomach, vertigo, noises in the ears, attacks of faintness, restlessness, emaciation, and itching about the nose and anus.

2. The *Tænia mediocanellata* is a cestode worm, with its segments somewhat larger than those of the common tapeworm. It differs from the latter also in other respects, but particularly as regards its head, which is furnished with large sucking-discs but is destitute of any hook apparatus. The "measles" or cysticerci which produce this helminth are found in the muscles of cattle. According to Dr. Cobbold the hookless tapeworm is as common in this country as the Tænia solium, for which it is generally mistaken. "One may even go so far as to state that, admitting occasional exceptions, the hooked worm infests the poor, and the hookless worm the rich. This circumstance accords with the

* The *Distoma crassum* and the *Distoma heterophyes* (small trematode helminths) have also been discovered in the small intestines. The first variety was once found by Mr. Busk in the duodenum of a Lascar; the second kind was discovered by Dr. Bilharz, of Cairo, in two cases.—Dr. Cobbold has also shown that the common *Ascaris mystax* of the cat may infest the human intestine. This nematode worm is especially characterized by the presence of alaform appendages, one being placed on either side of the head. The male acquires a length of about two inches and a half, whilst the female is nearly twice as long. The cases in which this helminth has been detected in man are only three or four in number.

fact that the lower classes subsist chiefly on pork, whilst the wealthier prefer mutton, veal, and roast beef."*

3. The *Bothriocephalus latus*, or broad tapeworm, is almost peculiar to the inhabitants of Switzerland, Russia, and Poland. It is the largest cestode helminth ever met with in the human subject; sometimes, according to Dr. Cobbold, attaining a length of more than twenty-five feet, and a breadth of nearly an inch. The extreme fertility of the Bothriocephalus latus may be imagined by considering that each foot of the well-developed worm contains 150 segments or joints, each joint possessing its own ovary and male organs. Hence each joint is fertile; and as each ovary would produce 8000 ova, it may be calculated that ten feet of such a worm would produce 12,000,000. These parasites are very rarely met with in this country, but nevertheless they are so occasionally. Professor Owen, examining the collection of a worm doctor in Long Acre, found three specimens: two had come from persons who had been in Switzerland, but of the third nothing was known.

Symptoms.—The most common symptoms produced by intestinal worms are—colicky pains and swelling of the abdomen; picking of the nose; itching of the rectum and fundament; foulness of the breath; irregularity of the bowels; grinding of the teeth at night; a frequent feeling of malaise; and voracious or impaired appetite. The most conclusive sign is the passage of some of the worms, or of joints of them, in the fæces; and indeed without this, the other symptoms are but of little value.

When intestinal worms produce much irritation, the nervous system may become affected by reflex action; and hence convulsions or epileptic attacks or chorea are not unfrequently the result. Kuchenmeister mentions, without confirming the observation, that Dr. Ficinus, of Stolberg, regards habitual cephalea in the crown of the head as dependent upon tapeworm. He found this symptom almost always accompanied with this parasite, although only so in women.

Treatment.—We have several remedies for the round and tapeworms, such as the oil of turpentine (F. 183), santonin (F. 185), kousso (F. 184), kamela (F. 182), calomel with scammony or jalap (F. 159), and especially the liquid extract of fern-root. I am in the habit of trusting to the latter; which may be employed in full doses even for children three or four years old, and which is to be thus administered. On the first morning the practitioner commences hostilities with a dose of castor oil, aloes, or a Seidlitz powder; while during the day he takes care to keep the patient on very low diet, only allowing a little good beef-tea. At night the purgative is repeated, so that the worm or worms get thoroughly uncovered by the removal of the contents of the alimentary canal. Consequently they receive the full benefit of the, to them, poisonous dose of male fern, which is taken the first thing on the following morning, according to F. 187. By this means, perhaps once or twice repeated, there will seldom be any difficulty in removing the whole worm, including the head.—To prevent its re-formation, tonics should be given, especially the mineral acids in infusion of quassia.

* Entozoa: an introduction to the Study of Helminthology, with Reference more particularly to the Internal Parasites of Man, p. 243. London, 1864.

The patients should also be directed to take plenty of salt with their food; and to have the latter well cooked.

The oxyurides may generally be killed by enemata of cold water, or of infusion of quassia, or of steel and quassia (F. 192), or of common salt (F. 188), or of lime-water, or of fifteen minims of sulphuric ether in an ounce of water, or of the tincture of the perchloride of iron—in the proportion of half an ounce to half a pint of water for adults. Mercurial purgatives have seemed to me to act beneficially, while sometimes large quantities of the worms have come away after an attack of bilious diarrhœa. Nevertheless it is often very difficult to effect a thorough cure in the case of patients tormented with the Oxyuris vermicularis; and the only chance of doing so is by persevering with the enema twice a week for a month or longer. The worms may be apparently quite destroyed, and for a time there will be a cessation of annoyance; but again and again they return, until the sufferer gives up all treatment in disgust.

XXI. PERFORATION OF THE BOWEL.

The intestine may be perforated owing to disease in the coats of the bowel, or from the extension of ulceration affecting adjacent organs. The first class of cases has been already treated of; and it has been shown how perforation may take place in fever, inflammation of the cæcum, dysentery, cancer of the stomach or bowel, &c. The second division remains to be briefly considered—viz., where the perforation occurs from without inwards.

Hydatid disease and *abscess of the liver* not unfrequently end by perforating the bowel; when hydatids or pus, as the case may be, will either be vomited or passed away in the stools. The symptoms of hepatic disease, the slow growth of hydatid tumors, the occurrence of local peritonitis, and the character of the discharge, will render the diagnosis of these cases comparatively easy.—In the same way *abscesses of the spleen and kidney* may open into the bowel.

Calculi from the gall-bladder sometimes enter the bowel by direct ulceration through the apposed coats of the reservoir for the bile and the duodenum. This has generally been the case in those instances where an impacted gall-stone has produced obstruction of the bowels, the concretion having been too large to pass down the cystic duct.

Ovarian cysts have often emptied themselves by a communication taking place between them and the cæcum, colon, or rectum. The subsidence of the tumor, together with the passage of the cystic fluid per anum, will point to the true nature of this occurrence.—Many examples of *extra-uterine fœtation* could be referred to where the sac containing the fœtus has formed a communication with the cavity of the rectum. As the fœtus decomposes, its soft parts and bones are gradually voided per anum; while with care the mother will gradually recover. Indeed, one or two rare instances are known in which extra-uterine pregnancy has twice occurred in the same woman, with this same favorable result. *Ovarian abscess* as well as *abscess the result of pelvic cellulitis*, may open into the rectum. In both instances *fecal abscess* almost invariably

results, owing to some portion of the contents of the bowel passing into the purulent cyst. The suppurative process is thus kept up: so that these abscesses burrow in all directions, opening into the bladder, vagina, groin, and perhaps again into the rectum. The wife of a medical man was long under my care with such an abscess; there being at one time three separate openings in the groin from which pus, urine, and liquid fæces used to be discharged. The practitioner may try to effect a cure with strengthening food, tonics, opiates for the mitigation of pain and diarrhœa, cod-liver oil, sea air, and carefully adapted pressure; but usually his efforts will fail, and the patient gradually sink.

In *cancer of the uterus* it is no very uncommon circumstance for the ulceration to extend through the uterine or vaginal walls into some portion of the bowel which has previously become adherent to the diseased mass. In such cases there is often also a fistulous communication with the bladder, so that the poor woman's sufferings are greatly increased by the constant escape of fæces and urine at the vaginal outlet. Fortunately such untoward events only occur towards the termination of life; since, beyond giving temporary ease by sedatives, nothing can be done to afford effectual relief.

Suppuration in the abdominal parietes, the consequence of inflammation excited by falls, blows, &c., often simulates deep-seated disease. The abscess may open externally, or into the peritoneal cavity, or into some part of the intestinal canal. When the purulent collection tends towards the surface, the diagnosis is not difficult; but when the matter burrows among the muscles, and is confined beneath the fascia of the abdominal wall, the case is very likely to be mistaken for peritonitis, malignant disease of some internal organ, or for some affection of the cæcum, liver, kidney, spleen, &c. It is important that the true nature of the case should be detected as soon as possible; since all risk is avoided by making an early opening, so that the contents of the abscess may be discharged externally.

XXII. DISEASES OF THE RECTUM.

The diseases of the terminal portion of the alimentary canal are numerous and important. They often give rise to serious bodily suffering; but in almost all instances they cause great mental depression. Indeed, like disorders of the sexual organs, they produce an amount of anxiety greatly disproportionate to their gravity; for it is fortunate that most of them readily yield to well-devised treatment. Although the rectum is some six or eight inches in length, yet the greater number of its diseases may be said to be situated within two inches of the anus. Consequently they are easily detected by a tactile or visual examination, while local remedies can be employed without difficulty.

1. Inflammation, Prolapsus, Polypi, Stricture, &c.—Unless due to violence or the presence of some foreign body simple *inflammation of the rectum* is, I believe, a very uncommon affection. In former days it may have been more frequently met with; since drastic purges, large doses of aloes or calomel, and the abuse of intoxicating drinks

were very likely to provoke it. Moreover, the inflammatory process more rarely extends to the rectum from contiguous parts than might be expected; for during the past seventeen years I have very seldom met with such an occurrence, though a large number of severe ovarian, uterine, and vaginal diseases have come under my observation.—When rectitis does take place, its chief symptoms are a sensation of intense heat around the anus, severe pain shooting up the sacrum and back, spasmodic contraction and excessive sensitiveness of the sphincter ani, tenesmus with the passage of dark-colored and gelatinous mucus, irritability of the bladder, and considerable constitutional disturbance.—The chief remedies consist of rest in bed, a milk and farinaceous diet, sedative enemata (F. 339), and the repeated use of the hot hip-bath.—Where there are dysenteric symptoms, a large dose of ipecacuanha (see p. 438) may be administered with the greatest benefit.

The *foreign bodies* met with in this portion of the bowel may consist of substances which have been swallowed, such as the stones of fruit, fish bones, coins, &c.; of concretions formed in the intestines, having a gall-stone or some mass of indigestible matter as a nucleus; and of articles forced through the anus, such as pieces of wood, syringe-pipes, gallipots, bottles, ferrules, &c. The ingenuity of the practitioner will often be taxed in the extraction of these bodies; for he must be careful to act as gently as possible, remembering that all the coats of the rectum may be lacerated without great care. Indurated fæces are to be removed with a lithotomy scoop, or with the handle of a strong spoon.

Irritable ulcer of the rectum, or *fissure of the anus*, is apparently a very slight affection, but it gives rise to the greatest suffering. The ulcer is generally superficial, about the eighth of an inch broad, and the third of an inch long; while it is seated immediately within the anus. It may often be exposed by spreading out the anal orifice with a hand over each buttock; but when it cannot be made visible in this manner, a speculum should be employed. The introduction of neither this instrument nor the finger can frequently be borne, however, without the use of chloroform, so intense is the pain which an examination produces. On this account also the ulcer is often a cause of constipation, the patient deferring the act of defecation through fear of the suffering. The fæces in their passage irritate the sore, and produce spasm of the sphincter ani; an acute burning pain resulting which may last for two or three hours after the bowels have acted.—The disease is more common in women than in men; while in the former it not unfrequently gives rise to ovarian pain with irritability of the bladder. Moveover, it may produce such tenderness of the surrounding parts that sexual intercourse cannot be borne.—In attempting to heal the ulcer care must be taken to avoid fretting it by strong aperients, while at the same time the bowels must not be allowed to get confined. Small doses of castor oil, or of an electuary of senna and taraxacum (F. 194), may be beneficially ordered, or a dinner-pill containing pepsine and the watery extract of aloes (F. 155) may be tried. With regard to local applications I have found none so beneficial as a combination of mercurial ointment (oz. $\frac{1}{2}$) with belladonna (gr. 20); which may be best applied by forming it into sticks, the third of an inch in diameter and an inch and a half in length, with cocoa butter. Astringent ap-

plications are seldom of any service; while I would especially caution the practitioner against the use of the nitrate of silver. I have seen this caustic produce such intense suffering, lasting for hours, that I shall never again sanction its employment. The foregoing means failing to effect a cure a slight operation must be performed; which consists in making a longitudinal incision through the centre of the ulcer and the superficial fibres of the sphincter ani, so as to keep the part at rest while the healing process goes on. The bowels should be previously cleared out by a dose of castor oil; and immediately after the operation one or two grains of the extract of opium must be administered so as to induce constipation for about three days. An aperient may then be given: while for some time subsequently the motions should be kept rather soft, a proceeding often best accomplished by the administration of cod-liver oil, with small doses of taraxacum. It only remains to add that if there be—as there often is—a little external pile near the fissure, it should be snipped off when the ulcer is incised; while any derangement of the general health which may be present must be attended to.

Chronic ulceration of the rectum, with thickening of its coats, may arise as one of the secondary effects of syphilis. It may also be due to the deposit of tubercle, the ulceration not going on to perforation of the coats of the bowel; or it may perhaps be owing to a depressed state of the general health. It is to be cured by treating the cause of the morbid action, and by the employment of anodyne suppositories.

An intractable *rodent ulcer* has been met with at the margin of the anus, the sore gradually creeping up the rectum. An ointment of sulphate of zinc (F. 294), steel with arsenic (F. 381, 399), and cod-liver oil are the remedies to trust to. *Chancres* are also sometimes found in the same situation.

Stricture of the rectum may arise from chronic inflammation of the mucous membrane and submucous areolar tissue. It appears to be slightly more common in women than men, probably because the former are subjected to more numerous sources of irritation. One case has come under my observation in which the disease was attributed to a very lingering labor; and certainly the pressure of the fœtal head, perhaps for three or four days, would seem likely to set up inflammatory action. The stricture may be limited to a ring of condensed tissue, when it is said to be of the annular form; or it may be confined to one side of the bowel, as when it follows the healing of an ulcer; or almost the whole of the gut may be narrowed and indurated. In the King's College museum there is a preparation showing great thickening of the entire walls of the rectum, the hypertrophy being such that the passage is greatly contracted. Above the stricture the bowel is usually somewhat dilated. In the majority of cases the constriction is within two inches of the anus, so that it is readily reached by the finger; but it may be placed higher up, and even at the junction of the sigmoid flexure of the colon with the rectum, when the careful use of the bougie will be needed to detect it. The disease is essentially chronic, the contraction increasing slowly. It produces constipation, small stools, great difficulty in voiding solid motions, straining and bearing-down efforts, pain

in the loins and sacrum, mental depression, flatulence, and a mucous discharge. After a time the mucous membrane may ulcerate; the ulceration giving rise to a burning pain in the bowel, with occasional discharges of blood. This form of stricture must not be confounded with simple spasmodic contraction of the canal, such as may at times arise when the part is irritated by hemorrhoids, ulcer of the anus, &c. It must also be carefully distinguished from constriction due to malignant disease. Fibrous tumors of the uterus, when they fill the pelvic cavity, compress the rectum and prevent the passage of solid fæces; so that without an examination an erroneous diagnosis might be made.

The treatment required for the cure of stricture is troublesome and tedious. In some instances dilatation by bougies suffices, taking care to pass an instrument occasionally for some months after an apparent cure, and indeed until all traces of indurated tissue have become absorbed. Where the contraction is great, a sponge-tent (F. 426) may be employed at first, subsequently using bougies. For the relief of a callous annular stricture it may be advisable to make four or five slight notches in different parts of the ring, with a straight probe-pointed bistoury, afterwards plugging the part with oiled lint, and at the end of a few days beginning the use of bougies. In all cases the motions should be kept soft by sufficient doses of a simple electuary (F. 194). To relieve pain, suppositories of opium and belladonna (F. 340) answer better than any other remedies.

There are two forms of *prolapsus of the rectum*. In one, the most common, there is protrusion of only the mucous membrane; in the other, all the coats of the bowel are prolapsed. This disease is not unfrequently met with in children, especially in such as are badly nourished or have a strumous taint. Want of tone in the sphincter ani, constipation, straining at stool, prolonged diarrhœa, the irritation of worms, disease of the urinary organs, stone in the bladder, &c., are its chief causes. The size of the protrusion varies. There may be only a fold of mucous membrane forced down, or the inverted bowel will perhaps be prolapsed to the extent of five or six inches. Moreover, at first, the protrusion occurs only when the bowels act; but after a time the descent may follow any exertion, such as standing, coughing, &c., so that there is almost constant prolapsus. In the latter cases the intestinal mucous membrane gets indurated, and occasionally ulcerated; the sphincter ani becomes exceedingly flaccid; and there is a general sense of weight and distress about the body, with pain, which is greatly aggravated on attempts at defecation.

In the treatment of these cases we have to reduce the prolapsus, and to prevent its return by removing the cause. The replacement is seldom attended with difficulty, though a little patience may be needed. In some children directly the bowel is returned it is forced down, and this happens again and again; but the tendency to protrusion may generally be overcome, for the time, by making pressure with a pad of lint and then drawing the buttocks rather firmly together with a broad strip of adhesive plaster. The general health must always be attended to; plain nourishing food being allowed, with bark or steel or cod-liver oil, as may be necessary. Care is also to be taken that the secretions are natural and that the bowels act regularly; small doses of mercury and

chalk, of taraxacum, of magnesia, or of cream of tartar, often acting beneficially. After each evacuation the bowel is to be immediately replaced, the anus well sponged with cold water, and an astringent injection thrown up. The latter may consist of a little alum and decoction of oak-bark (gr. 10 to fl. oz. iij), or of the tincture of perchloride of iron and water (min. xx—xl to fl. oz. iij). Occasionally, a suppository, made with from five to twenty-five grains of tannic acid and twenty or thirty grains of cocoa butter, has seemed to me much more efficacious than the astringent enemata. With regard to young children too, it is often advantageous to make them pass their motions in a recumbent posture, so as to prevent violent straining.

When medical treatment fails, recourse must be had to a surgical operation. Different proceedings have been recommended, but in bad cases they are all, with one exception, very apt to fail. Thus, I have known instances where nitrate of silver, nitric acid, potassa fusa, or the actual cautery, has been applied to the mucous membrane so as to produce superficial sloughs; and this treatment proving useless, two or three folds of mucous membrane and skin, at the margin of the anus, have been excised. In one instance the surgeon had even cut out a portion of the sphincter muscle, with the effect of somewhat constricting the anal orifice; but a few weeks after the operation the bowel came down as badly as before. The really most efficacious plan is that proposed by the late Mr. Copeland; which consists in taking up several small folds of the mucous membrane at different points of the prolapsed bowel with the forceps, and very tightly ligaturing their bases. The ends of the ligatures are then to be cut off, the intestine returned, and a dose of opium administered. The patient keeps in bed for some days, while the ligatures come away; and must not be surprised if the bowel afterwards descends occasionally, as it may do so until the several ulcers have contracted and healed. I have found this simple proceeding act very favorably in females, without inducing any bad after-consequences. It is apt to be followed by retention of urine, but the catheter will only have to be used for a day or two.

Polypus of the rectum is more common in children than in adults. The pedunculated growth arises from the mucous membrane, and it may be either soft or follicular, or firm and fibrous. The chief symptoms are uneasiness about the fundament, a frequent desire to go to stool, and a mucous discharge which is more or less mixed with blood. The growth generally descends when the bowels act, and has to be replaced. I have only met with some three or four examples of rectal polypi in women and children, and in these cases I have removed the growth with the scissors. But I think, as a rule, that it may probably be safer to apply a ligature and then to cut off the tumor below it; since if hemorrhage did happen in any instance there would certainly be a difficulty in checking it.

A *villous tumor*, very similar to that which occurs in the bladder, has in a very few instances been found growing from the mucous membrane of the rectum. Such a growth generally has a broad base; while it is chiefly remarkable for its excessive vascularity, and consequently for its tendency to bleed. In the four or five cases which have been re-

corded, a permanent cure seems to have resulted from the removal of the tumor by ligature.

The functional affections of the rectum give rise to as much mental and bodily suffering as the diseases attended with change of structure. *Simple neuralgia* of this part may persist for many weeks, without altogether subsiding for a day. The passage of the motions aggravates the pain; and though there may be a frequent desire to go to stool, yet little or no fecal matter follows many of the attempts at evacuation, since there is usually troublesome constipation. In some cases the patient points to one spot as the seat of a fixed pain; though on an examination no breach of surface can be detected. The treatment consists in improving the general health by nourishing food, with pepsine (F. 420) to aid digestion, if needful; in administering quinine or zinc, steel, and cod-liver oil; in keeping up a regular action of the bowels by simple enemata (F. 188); and in relieving the perverted or augmented sensibility by suppositories of opium and belladonna (F. 340).

An irritable sphincter muscle causes symptoms somewhat resembling those due to an ulcer, but of less severity. There is pain in defecation; while if the finger be introduced into the bowel the muscle will grip it tightly, the sphincter being felt like a firm and hard ring. Nervous women seem most liable to this spasmodic affection, often suffering from it rather severely during the time that the catamenia are on. A cure may generally be effected by improving the nervous tone, by using mild laxatives, by employing an ointment of belladonna and iodide of potassium (F. 306) around the anus, and by the occasional passage of a bougie.

The opposite condition to the foregoing, or *atony of the rectum*, may arise, with a healthy or a morbid condition of the sphincter. The impaired power of the muscular coat of the bowel deprives the patient of the force necessary to completely expel the stools; so that the fæces frequently accumulate until there is great distension. Complaint is made of constipation, tenesmus, a sense of weight and fulness, and often of forcing pains. On making an examination a hard mass of fecal matter will be felt blocking up the bowel; which mass will have to be removed by the scoop. The reaccumulation may be best prevented by tonics containing zinc and extract of nux vomica (F. 409.) If any aperient be needed, one or two grains of the extract of Barbadoes aloes, with the same quantity of quinine, should be taken at dinner.

Pruritus of the anus is a troublesome affection not uncommonly met with in patients suffering from hemorrhoids, dyspepsia, or intestinal worms—particularly the oxyuris vermicularis. Old people often complain of it; while it also afflicts many women towards the end of pregnancy, or such as have uterine disease, or those who have recently got over "the change of life." The itching is worse at night than at other times, and it often prevents sleep. The friction resorted to for relief causes the tissues about the anus to become thickened and furrowed.

The treatment which will be found most successful consists in the use of cold bathing or sponging; daily exercise in the open air; a diet free from seasoned dishes, coffee, and all kinds of alcoholic stimulants; and a cool bed-room, with a mattress instead of the enervating feather bed. A regular action of the bowels is to be maintained; and hence it may be

necessary to order an electuary of senna and taraxacum (F. 194), or small doses of rhubarb and blue pill (F. 171), or simple enemata (F. 188). The best local remedies are tobacco-water (F. 265), or a lotion of corrosive sublimate and prussic acid (F. 263), or a wash of borax with morphia and glycerine (F. 268), or the application of a piece of lint dipped in the liquid extract of opium, or the use of the vapor of chloroform. In obstinate cases the physician will have to administer arsenic with some bitter infusion (F. 52), or iodide of iron and sarsaparilla (F. 32), or tar pills or capsules (F. 36). An examination should always be made so as to detect, and subsequently to remove, any local cause which may be present; and more especially to make sure that the irritation is not due to the presence of pediculi.

The rectum and anus, like other organs of the body, may be absent or malformed. These *congenital imperfections* have been well described by Mr. Curling, Mr. Ashton, and many French and German authors; but the most complete account of them is to be found in the excellent work of Dr. Bodenhamer.* They are but rarely met with. Thus, at the Dublin Lying-in Hospital, during the seven years' mastership of Dr. Collins, 16,654 children were born, in only one of which was there an impervious condition of the gut. And, again, at the same institution, 13,933 children were born during the seven years commencing November, 1847, out of which number three had imperforate anus and one an occluded rectum (Drs. Johnston and Sinclair). In some cases the child is born with every appearance of healthy conformation; but in others the defect is at once appreciable. Hence, the accoucheur should always be careful, in examining the new-born infant before it is dressed, to see that the anal aperture appears well-formed.

The chief varieties of these congenital vices of conformation, are the following:

1. *Preternatural narrowness of the anus.* In most cases the contraction can be overcome with small sponge-tents and bougies. If, however, the symptoms are urgent and the contraction very great, the aperture should be enlarged by making three or four notches with a probe-pointed bistoury. A tent of oiled lint must be introduced, and subsequently the orifice ought to be kept sufficiently dilated with bougies.
2. *The anus imperforate with the rectum normal.* There is either a persistence of the membranous septum of fœtal life, or a prolongation of skin over the aperture of the bowel. In either case, the meconium distends the part, and therefore marks the site for an operation. This consists in making a crucial incision, removing the angles of the flaps, and subsequently introducing a bougie every day until the parts are healed. Where the septum is thin, a puncture with the bistoury might suffice.
3. *The anus entirely absent, with partial or complete non-development of the rectum.* An incision may be made at the site of the normal situation of the anus, and if the bowel be reached it is to be gently drawn down, opened, and its edges secured to the margins of the

* A Practical Treatise on the Ætiology, Pathology, and Treatment of the Congenital Malformations of the Rectum and Anus. New York, 1860.

external wound. If, after penetrating to the depth of an inch, the gut cannot be detected, the practitioner should wait a few hours; since the rectum may perhaps be forced down as it gets distended with meconium and is no longer kept back by resisting tissues. When these attempts to reach the bowel fail, colotomy in the left groin, or less preferably in the left loin, is the only resource.

4. *The anus absent, but having its office fulfilled by a preternatural opening in an abnormal situation.* Frequently no interference is required in early life. Subsequently, the patient may be anxious for an attempt to be made to procure an outlet for the fæces at the natural site, but any operation for this purpose is attended with danger. Sometimes the unnatural orifice is in the vagina, in the male urethra, &c.
5. *The anus normal and opening into a cul-de-sac; from the upper part of which extends the rectum contracted to the size of a small cord, or having its walls thickened and firmly glued together, or being entirely absent.* The diagnosis is very difficult, and always uncertain. Colotomy in the left loin will generally be found the only available resource.
6. *Anus, rectum, and colon absent.* In some of these cases there has been an opening in the abdominal walls, or in the loins, communicating with the cæcum or with the small intestines.

2. Fistula in Ano.—An abscess not unfrequently forms in the loose areolar tissue around the rectum, either as the result of local irritation or of some constitutional affection. It may be deep-seated, the pus quickly increasing in quantity, and having a tendency to burrow backwards; this form being accompanied by severe throbbing pain, and considerable disturbance of the system. The superficial abscess gives rise to much less suffering, is small, and soon points externally. The treatment of either variety consists in the application of poultices, rest in bed, and in letting out the pus immediately fluctuation can be detected. After this evacuation the part may thoroughly heal, and complete recovery follow. But sometimes, owing to the constant action of the sphincter and levator ani muscles, the wound merely contracts, a fistulous passage by the side of the rectum resulting.

There are two forms of fistula,—one, *complete*, in which a probe can be introduced from the external orifice upwards into the bowel; and the other, a *blind external fistula*, where the mucous coat of the rectum is not perforated. The external aperture in either kind is often small, and not easily detected; it is generally placed near the anus, but sometimes is one or two inches distant; and it may be concealed in a furrow, or may be found in the centre of a little button-like eminence. The complete fistula is much the most common; while it proves the most annoying, inasmuch as flatus and intestinal mucus and fluid fecal matter pass along its track, giving rise to great discomfort as well as to painful spasmodic contractions of the sphincter. The irritation of these foreign matters occasionally produces recurrent attacks of inflammation and suppuration; so that the sinus, instead of remaining simple, has one or more tracks branching from it. Fistula in ano often coexists with phthisis, being probably due to tubercular inflammation of a portion of the rectum, followed by ulceration and perforation. Suppuration is set

up in the areolar tissue by the irritation of feculent fluid, and in a short time the abscess bursts externally.

Some few fistulæ will heal kindly when attention is paid to the general health, when the parts are frequently bathed with tepid or cold water, and when some astringent lotion (F. 264) is daily injected along the sinus. But, in the majority of cases, a cure can only be effected by dividing the tissues which intervene between the external and internal opening, including the fibres of the sphincter ani.—The performance of this operation is not forbidden by the presence of tubercle in the lungs, provided the pulmonary disease be not far advanced nor running a rapid course. As a rule, I always recommend a consumptive patient who is improving under treatment and gaining weight, to allow the beneficial action of remedies to be as little interfered with as possible; and I regard an anal fistula as one of those complications which can only exert an injurious influence, while the operation required for its cure may be said to be simple and harmless.

3. Hemorrhoids.—The tumors known as hemorrhoids (*Αἷμα*, blood; *ῥέω*, to flow), or piles, are divided into two varieties,—the *external*, or those situated outside the sphincter muscle; and the *internal*, or those within it. In many cases the two kinds are found coexistent. They are rarely met with until middle-age, and are generally believed to be more common in women than in men. As sedentary occupations tend to produce them, this opinion is probably well-founded. Amongst their other causes may be mentioned pregnancy, abdominal tumors, habitual constipation, and all diseases that retard the return of blood from the rectum; also the frequent use of drastic purgatives, which tend to produce congestion of the bowel; together with a torpid action of the liver, disorders of the urinary organs, straining to pass hardened fæces, over-rich living, an hereditary tendency, and a long residence in tropical climates.

External hemorrhoids consist either of a knot of varicose veins, or of one or more cutaneous excrescences. In the first case, the veins may contain fluid blood; but more frequently their contents have coagulated, so that we may find one or several tense and purple swellings. According to some authorities these sanguineous tumors are due to the rupture of one of the hemorrhoid veins, with the formation of a very delicate cyst round the extravasated clot. However this may be, when such piles are painful, great relief can be afforded by incising them and squeezing out the clots. With regard to the cutaneous excrescences they consist chiefly of hypertrophied skin and areolar tissue. They are seldom single, while not unfrequently there is a prominent ring of them at the margin of the anus.

The treatment of external piles is directed either to the mitigation of the heat and tingling and discomfort, or to the complete removal of the tumors. Generally, the latter can only be effected by excising the growths with a pair of curved scissors; allowing the wound to heal in the ordinary manner. The operation is seldom followed by much bleeding: yet if any artery be seen pumping out blood it should be secured. Moreover, the integument at the base of the pile must not be cut too freely, or troublesome contraction of the anus will follow upon the completion of the cicatrization. But in very many instances great, if not

permanent, relief may be given by more simple measures. First, by regulating the bowels, taking care that a daily evacuation is produced without any straining or irritation. This may easily be done by administering some aperient confection (F. 194); or by giving a dinner-pill containing the extract of Barbadoes aloes, with a little pepsine or nux vomica (F. 155, 175); or by the use of simple enemata (F. 188). Then, the anus should be thoroughly sponged with cold water every night and morning, as well as after each action of the bowels; while if the tissues be relaxed and indolent, some tannic acid, or alum, or solution of subacetate of lead, may be added to the water. The application of the ointment of galls and opium often affords comfort. The diet must be regulated, plain nourishing food being allowed; but alcoholic stimulants, coffee, and highly seasoned dishes had better be interdicted. Plenty of walking exercise is also important. Supposing that the piles are inflamed, the morbid action may be controlled by hot bathing and the use of poultices; or very often the application of ice acts more speedily and effectually. And, lastly, if the tumor be swollen and sensitive, the evacuation of the contained clot, as before mentioned, is the plan to pursue. Although this proceeding is very simple, yet the patient should keep the recumbent posture for some hours afterwards, to avoid all risk of hemorrhage.

Internal hemorrhoids are of three kinds. Most frequently we find them in the form of spongy vascular growths, having a red granular appearance, and a soft elastic texture like that of erectile tissue. A second variety is made up of the lower branches of the plexus of hemorrhoidal veins, which branches are dilated and often plugged with coagula. While a third kind consists of pendulous tumors, composed of fibro-areolar tissue.

Internal piles may be single or multiple. They protrude during defecation; but in time, as the sphincter becomes dilated from their pressure, and relaxed by the attacks of hemorrhage, they are found to be constantly down save when the patient is in the recumbent posture. When they only appear externally at the time the bowels are moved, they especially require to be replaced directly after the stool; since if this precaution be neglected, they are apt to become congested and inflamed owing to the constriction of the sphincter. The bleeding varies from a mere tinging of the evacuations, to the escape of many ounces; and though the blood is occasionally venous, yet much more commonly it is arterial. Sometimes the flow seems to take place periodically, in which case it may serve to relieve congestion of internal organs—particularly of the liver. When it is remembered that hemorrhoids are symptomatic of disordered digestion, hepatic congestion, or of some disease interfering with the circulation,—and that they produce constant uneasiness, irritability of the bladder, an annoying muco-purulent discharge, with frequent losses of blood,—it is not surprising that patients afflicted with them become thin and sallow and anæmic.

In the treatment of internal as of external piles it is of great importance to remove and prevent congestion of the abdominal viscera, to insure a healthy action of the bowels, and to look carefully to the general health. Sometimes the injection of half a pint of cold water every morning proves useful; while some astringent (matico, tannic acid, alum, or tincture of perchloride of iron) may be added to it, if there be hemor-

rhage. When the patient is unable to replace the protruded piles, the practitioner must do so for him; first puncturing them freely, if they are painful and swollen. In a few instances, where there has been delay in seeking advice, the amount of constriction has been such, that strangulation and mortification have occurred; so that nothing could be done but poultice the tumors until they have sloughed off, while the suffering has been relieved by full doses of opium.

A radical cure must be made in those cases where the piles are large and painful and bleed freely, and where the constitution is suffering from them. This may be effected by cauterization, excision, or the ligature. Prior to either operation any derangement of the liver which may be present ought to be relieved; while the bowels are to be thoroughly cleared out with a dose of podophyllin or calomel, followed by castor oil.—*Cauterization* acts most favorably if the growths are small, vascular, and florid. The tumors being well-protruded, every part of their surface is to be painted either with nitric acid, the acid solution of nitrate of mercury, or with potassa fusa; taking great care to avoid touching the skin, and afterwards oiling the parts well before replacing them. The eschar usually separates in a few days; and then, if the contraction produced by the inflammation and cicatrization be sufficient, a second application of the caustic will be uncalled for.—*Excision* is a very effectual proceeding, and possesses many advantages; but it is open to the great objection of being often followed by dangerous hemorrhage. To remedy this some surgeons have employed the écraseur; but the chain of this instrument can seldom be adjusted without difficulty, hemorrhage has followed its use, and in some cases anal stricture has subsequently occurred owing to undue contraction of the cicatrix. With the same object of preventing hemorrhage Mr. Henry Smith has invented a clamp (an improvement on the instruments previously used), by which the base of the tumor is seized and compressed for a few minutes, and the free portion of the tumor excised. The divided surface is carefully dried, strong nitric acid or the actual cautery applied, and the parts being oiled the clamp is taken off, and the patient put to bed, where he remains for two or three days.—The operation by *ligature* is that commonly practised; for though the cure is rather tedious, yet it takes place without much pain or danger. The pile being well forced out (by the use of a warm water lavement, if necessary), the surgeon draws it down with a pair of pronged forceps, makes a notch with the scissors at its base, and then encircles it tightly and securely with a ligature of waxed twine. If the tumor be large, it is better to tie it in two portions by means of a double ligature passed through its base with a curved needle. The operation is to be repeated on all the piles separately, so that each may be fairly strangulated. A full dose of opium should be subsequently given, ice may be applied if there be much pain, constipation is to be maintained until about the fourth morning, and the patient ought to be kept in the recumbent posture until the ligatures come away on the fifth or sixth day.

4. Cancer of the Rectum.—Malignant disease in this situation may be of the scirrhous, medullary, or colloid form. The early symptoms are not well-marked, little suffering arising until a difficulty is experienced in passing the stools. Consequently, when the practitioner

is consulted, the coats of the bowel are generally found extensively infiltrated with cancer, producing considerable contraction. Severe lancinating pains are then complained of, there are frequent attacks of hemorrhage, there is an abundant offensive and purulent discharge, together with considerable debility and loss of flesh. If the disease be situated at the upper part of the rectum, it may escape detection unless the examination be carefully made; but in most cases by the time advice is sought the growth has extended downwards within easy reach of the finger, while the gut has become firmly fixed. In women, as ulceration goes on, a communication is often effected between the vagina and rectum.

The *treatment* consists in palliating the severe suffering which is always produced, sooner or later, by this affection. The bowels must not be allowed to get blocked up, and yet opium in some form is absolutely necessary. In many instances, however, the constipating effect of this drug may be overcome by combining the extract of belladonna with it, as is done in F. 339, 340, 343. So also the hypodermic employment of morphia (F. 314) is less frequently productive of constipation, than the exhibition of this salt by the mouth. Indian hemp, aconite, chloroform, and ether, may all be useful in various combinations (F. 315, 317, 330, and 337). Where there is such a rare occurrence as almost complete closure of the bowel by the disease, before the powers of life have become much deteriorated, existence may be prolonged for a few months by making an artificial anus in the left loin. Mr. Curling mentions a case where Mr. N. Ward performed colotomy under these circumstances, and where the patient survived the operation for eight months; much relief being afforded by the diversion of the stools from the cancerous mass.

Epithelial cancer sometimes attacks the anus, and may extend up the rectum. In a remarkable instance which had resisted the application of potential caustics, and which had returned after the performance of excision by Prof. Siebold, Mr. Curling repeated the latter operation. This gentleman took care to cut wide of the affected tissue, while he removed nearly the whole of the sphincter muscle on the right side. Seven years have gone by since the operation, without any relapse; though for the last of these years there has been a tumor of a doubtful nature high up in the pelvis.*

* Observations on the Diseases of the Rectum. Third Edition, p. 154. London, 1863.

PART VIII.

DISEASES OF THE LIVER.

The liver is the largest gland in the human body; measuring about twelve inches in its transverse diameter, and about seven in its antero-posterior. Its weight in healthy adults is generally allowed to be from 2 to 4 lbs. avoirdupois; though remarkable differences are to be found in the statements of authors on this head. According to calculations made by Dr. Frerichs from some eight hundred observations, the actual weight varies from 1.8 to 4.6 lbs. avoird.; the relative weight fluctuating between the one-twenty-fourth and one-fortieth of that of the body. The liver is increased in size during the progress of digestion, partly because there is a greater afflux of blood to it at this time, and partly owing to the deposit of amorphous matter in the hepatic cells.

The following vessels are found in the liver: Large and numerous lymphatics, biliary ducts, and branches of the portal vein, of the hepatic artery, and of the hepatic veins. The branches of the biliary ducts converge into two large trunks (one from the right and one from the left lobe) which leave the liver at the transverse fissure; these trunks by their union constituting the hepatic duct. The latter then joins with the cystic duct, forming the ductus communis choledochus, which opens into the descending portion of the duodenum by an orifice common to it and the pancreatic duct. The portal vein and hepatic artery are the afferent, while the bile-ducts and hepatic veins form the efferent vessels. The portal vein carries to the gland the blood from which bile is to be secreted, while by the hepatic artery aerated blood is supplied for the nutrition of the organ: the bile-ducts take away the biliary secretion which has been separated from the portal blood, and by the hepatic veins the residue of blood is returned into the general circulation through the inferior vena cava.

The four operations conducted by the liver, as well as the nature of the bile, have already been noticed (p. 38). It only remains, therefore, to add that the secretion of bile is *increased* by rich abundant food, spices, and alcoholic drinks; by indolence and heat; by mercury?; by podophyllin, taraxacum, and rhubarb; by the hydrochlorate of ammonia; as well as by the mineral acids, and benzoic acid. Conversely, it is *diminished* by a light diet, with the avoidance of all alcoholic fluids; by exercise and early rising; by residence in a temperate atmosphere; by the iodide of potassium; and by the carbonate of soda taken while digestion is going on.

I. CONGESTION OF THE LIVER.

The hepatic circulation is affected by so many different agencies that hyperæmia, congestion, or the undue accumulation of blood in the capillary vessels of the liver is a morbid state frequently met with. Moreover, it is the initiative step in almost all the structural diseases of this organ.

The simplest form of this condition is that which results from some obstruction to the circulation of the blood through the hepatic and the portal veins—*passive congestion.* Examples of this variety are met with in cases of valvular affections of the heart, as in instances of mitral obstruction and mitral insufficiency, and more particularly where there is incompetence of the tricuspid valves; in those morbid states of the lungs which impede the passage of the blood through the pulmonary artery, such as emphysema, collapse, &c.; as well as in the diseases that diminish the size of the thoracic cavity. Violent exercise, particularly soon after meals, gives rise to temporary engorgement of the liver; to which is probably due that stitch in the side which compels the sufferer to rest. Under the influence of congestion the liver is found after death enlarged in every direction, with its capsule tightened or distended, and its parenchyma tough. On making a section of the gland, dark red patches may be seen, consisting of the gorged hepatic veins; around which are lighter-colored parts, corresponding to the delicate branches of the portal vein. During life, obstructive hyperæmia of the liver is attended with a sense of constriction and weight in the right hypochondrium; there is often slight jaundice, nausea, and dyspepsia; the urine is scanty, high-colored, and frequently contains bile-pigment, with traces of albumen; while the bowels are confined, and the hemorrhoidal veins probably become enlarged. In health, percussion affords a dull sound from the sixth right rib down to the costal margin; whereas, in the state under consideration the area of the dulness becomes much more extended. Palpation, too, will detect the increase in size. Moreover, there will also be present the symptoms of the primary cardiac or pulmonary disease, which subsequently often ends by producing general dropsy, &c. Our treatment can only be palliative. In the early stages saline purgatives (F. 141, 143, 150, 152) act favorably by causing a drain from the portal system. At a later period, the use of mild aperients must be combined with a mineral acid, or ammonia, ether, &c. (F. 147, 161, 165). Where the heart or lung affection which gives rise to the congestion is not far advanced the careful use of the sulphur springs of Harrogate (F. 466), the waters of Carlsbad (F. 496), or those of Kissingen (F. 493), or of Marienbad (F. 497), will frequently afford considerable relief.

Passive congestion usually leads to a diminished excretion of bile; the secreting cells remaining active, but the passage of the bile from the lobules and through the small gall-ducts being delayed, owing to the compression which is exerted by the loaded bloodvessels. The ducts consequently become gorged with bile—*biliary congestion.* Supposing this condition to be kept up for any length of time, the cells of the gorged lobules get impaired and their power of reproduction diminished; since not only is their nutrition interfered with, but they become atro-

phied when their functions are not duly called into play, just as all tissues do.

In *active congestion* the capillaries of the hepatic artery are chiefly involved; serious structural changes arising in proportion to the intensity of the hyperæmia, and the frequency of its recurrence. This state is brought about by causes which increase the functional activity of the gland. The chief of these are—the presence of morbid matters in the blood; the suppression of habitual discharges, such as a hemorrhoidal flux, or of the catamenia at the critical period of life; a long residence in hot climates, particularly in marshy districts; deranged nervous influence, examples of which may be seen in hyperæmia from mental excitement; and probably atony of the bloodvessels, owing to disease of their coats. As has already been remarked, the liver always contains more blood, and its secreting cells are more active during the process of digestion, than at other times: hence excessive eating and drinking, irritating articles of food, alcoholic drinks, &c., must unduly stimulate the gland. Strong healthy individuals, residents in a temperate climate, and who take plenty of active exercise, may counteract the evil effects which flow from a too rich and abundant diet; while those of sedentary habits, who pamper themselves, are sure to suffer. The cure of these cases is to be effected by the removal of the cause. Great benefit will be derived from the use of horse-exercise, walking, &c.; from the employment of laxatives containing rhubarb, aloes, and sulphate of soda, &c. (F. 144, 145, 148, 172); from recourse, when necessary, to the mineral acids (F. 377, 378); and especially from the adoption of a simple diet, consisting chiefly of fish, rice, fresh vegetables, &c.

Extravasated masses of blood—*apoplexy of the liver*—are sometimes found in the hepatic tissue or beneath its capsule, as the result of great congestion induced generally by morbid changes in the blood. These cases of hemorrhage may be met with in scurvy, in purpura, in ichorhæmia, and especially in the malarious fevers of tropical climates. The extravasations are often numerous; while the blood may be found in masses varying in size from a pea to a hen's egg, or it may be infiltrated through the parenchyma converting the tissue into a pulpy mass. The effusions are probably directly due to some disease of the coats of the vessels—such as fatty degeneration, leading to rupture.

The effusion of serum into the substance of the liver—*hepatic œdema*—is said by Dr. W. Thomson* to have been often observed uncombined with marks of acute inflammation. It cannot be a common condition, however, since very few authorities make any mention of it. In a case of fatal remittent fever reported by Dr. Morehead, the liver was found of a dark olive color, reaching two inches below the right ribs, and touching the point of the eighth left rib. It weighed 4lbs. 4 ozs., while on cutting and pressing it, six ounces of serum freely oozed from the surfaces. The parenchyma broke down readily under the finger; and the incised surfaces presented a dark olive color, with brown intermixture, but not the mottled redness of congestion.

* A System of Practical Medicine, vol. iv, p. 180. Edited by Alexander Tweedie, M.D., &c. London, 1840.

II. HYPERTROPHY OF THE LIVER.

Hypertrophy of the liver is characterized by an increase in the secreting cells, causing enlargement of the entire gland. There is no growth foreign to the natural structure to be found in the organ,—simply an excess of the normal tissue.

The hepatic cells may be either increased in size or multiplied in number; while in proportion to the increase the volume of the liver will become enlarged, perhaps to more than double its natural bulk. This hypertrophy may arise from long-continued congestion, such as is met with in the residents of tropical climates or of malarious districts; while it may likewise occur in consequence of disease in other parts. Thus, it has been sometimes found in leucocythemia, in phthisis, in dysentery, and in saccharine diabetes. Partial hypertrophy may be of a compensatory nature; that is to say, a portion of the gland having been rendered comparatively useless by disease, the healthy part has its cells enlarged so as to prevent systemic derangement.

The functions of the liver are seldom interfered with in true hypertrophy. But its correct diagnosis is important lest active remedies should be improperly used. If any good can be effected in these cases it is only by regulating the diet, and enjoining residence in a temperate latitude.

III. INFLAMMATION OF THE LIVER.

The inflammatory diseases of the liver, though often met with in temperate climates, are particularly common in tropical regions. In describing them, I shall speak first of hepatitis—or inflammation of the peritoneal investment of the liver, or of the substance of the gland, or of both combined: secondly, of cirrhosis, or that slow form of inflammatory action which affects the areolar or connective tissue: thirdly, of syphilitic hepatitis: and fourthly, of the diseases of the bloodvessels. The subject of inflammation of the gall-bladder and bile-ducts will be considered subsequently.

1. Hepatitis.—The term hepatitis (*Ἡπαρ*, the liver; terminal *-itis*) seems better than that of suppurative inflammation as proposed by Dr. Budd, inasmuch as the morbid action does not necessarily end in suppuration and abscess. However, the name is not very important, provided the nature of the affection be understood.

Pathology.—In a few cases the coats of the liver and the capsule of Glisson become inflamed (*Peri-Hepatitis*), without the peripheral tissue of the gland being implicated to any extent. This happens in general peritonitis, or it may occur in consequence of some wound or contusion. Occasionally too, the peri-hepatitis is the result of an extension of pleuritic inflammation on the right side; or it will ensue from disease in the liver itself, such as abscess, hydatid cysts, and cancer. The results are very seldom serious unless the coats of the portal or hepatic veins get attacked, the inflammation generally soon terminating in resolution. Sometimes opacity and thickness of the capsule remains, with adhesions between the apposed surfaces of the peritoneum.

But most commonly the substance of the liver is the seat of the inflammation. In a few instances the morbid action is diffusely extended over the whole organ (*Hepatitis diffusa parenchymatosa*), and it may lead to softening and acute atrophy, or to induration. The inflammation, however, is much more commonly circumscribed (*Hepatitis vera circumscripta, suppuratoria*); and then abscess is a frequent result. The series of changes which take place in inflammation of the liver, as this disease is usually met with, have been so clearly described by Dr. Morehead, that I shall give a condensed account of that which he has sketched from actual observation.* In the first stage of parenchymatous hepatitis there is vascular turgescence; and could the gland be examined, the pathologist would find the structure redder and softer than natural, while blood would ooze freely from it when cut. At this period the inflammation often ends in resolution; but if it proceeds, then interstitial exudation of coagulable lymph soon follows in different parts of the organ, inflammation of the entire substance being very rare. When the lymph maintains the liquid form in which it is exuded, there is hope of complete recovery by reabsorption and resolution. Supposing, however, that it coagulates in the interstices of the parenchyma, then one of three conditions will ensue: either the liquid portion may be absorbed, and the solid lymph become organized into fibrous tissue; or the exuded lymph, instead of undergoing organization, may re-liquefy, be absorbed, and disappear; or the lymph degenerates into pus, the tissues where it has been deposited soften and melt down, while the whole gets more or less circumscribed by membrane of low organization,—in short, hepatic abscess has formed. Then, more lymph exudes from the inner surface of the investing membrane, undergoes certain changes, and is converted into pus; the sac becomes distended, the bulk of the liver is increased, and tumefaction takes place; adhesion of apposing serous surfaces follows; and the circumscribing wall becoming thin on one side by the liquefying process, pointing and rupture succeed. This is just what happens in the case of an ordinary phlegmonous abscess; in which the central parts of the lymph—those most remote from the living tissues—change into pus, while the peripheral portions—those adjacent to the living structure—get organized into membrane. In the liver the abscesses are seldom single, though sometimes several small ones coalesce. They may also be superficial, or deep-seated; but most frequently they are of the latter kind, and have their seat in the right lobe. If diffuse suppuration of the liver ever happen, it must be very rare; since Dr. Morehead asserts that he has no knowledge of it.

Causes.—Europeans residing in tropical climates, who live too freely, seem liable to suffer from hepatitis. The morbid action may be induced by some mechanical injury; though it is seldom that this is a cause. The disease is sometimes due to ichorhæmia from suppurative inflammation of the portal vein, or of the veins of the systemic circulation. Ulceration of the intestines, of the stomach, of the gall-bladder or gall-ducts, are all causes of suppurative hepatitis: and perhaps a hot climate alone, by deranging the functions of the gland, may give rise to it, as may also marsh-fevers. Spirit-drinking often produces adhesive inflammation and induration of the liver; but not the suppurative form.

* Clinical Researches on Disease in India. Second Edition, pp. 327 to 330. London, 1860.

Symptoms.—At the onset there is tenderness over the gland, which will be most marked when the peritoneal investment is affected. Then, as the morbid action progresses, we find high fever, with a hot skin, great thirst, and scanty urine; the fever sometimes assuming a typhoid character. There is also fulness of the right hypochondrium from enlargement of the gland, with increased dulness on gentle percussion; pain—more or less severe—in the region of the liver, which is increased on pressure, deep inspiration, or cough; and an inability to lie on the left side. Moreover, there may be occasionally a yellow tinge of the conjunctiva, but rarely complete jaundice. More or less urgent dyspnœa, sympathetic cough and vomiting, and troublesome hiccup are generally present. When the pain is of a sharp lancinating character, it is supposed to indicate inflammation of the serous and fibrous coverings of the gland; when dull and tensive, the parenchyma is the part affected. Again, where the convex surface of the organ is the seat of the inflammation, the chest symptoms will predominate; when the concave, the stomach derangements will be the most marked. It is well known that in hepatic affections, the right clavicle and shoulder become the seats of gnawing and aching sympathetic pains; sometimes also—probably when the left lobe of the liver suffers—pain is referred to the left shoulder. According to Annesley, pain in the right shoulder is a sure indication that the disease is in the right lobe. Andral has noticed that in some instances the only pain has been in the head; and this has been sufficiently intense, constant, and long continued, to attract exclusively the patient's attention.

The formation of hepatic abscess is chiefly signalized by the occurrence of chills—perhaps of distinct rigors, hectic fever, gastric disturbance, pain or tenderness, tension of the abdominal muscles on palpation, a feeling of weight in the region of the liver, and a dry cough. The physical signs of the enlargement of the gland will be present; and while the hectic fever increases the patient emaciates, there is increasing prostration, and either diarrhœa or dysentery sets in. A few remarkable cases have occurred, where the symptoms during life have been so obscure that suppuration has not been suspected, and yet a large abscess has been found on post-mortem examination.

Terminations.—The most favorable termination of hepatitis is of course by resolution. Where this happens the pain and fever gradually abate, and the patient is soon well. The inflammation may, however, as has been shown, go on perhaps to diffuse suppuration; but much more frequently to the formation of circumscribed abscesses, or even to gangrene.

Abscesses of the liver not uncommonly attain a great size; and, in extreme cases, have contained several pints of pus. The prognosis is always unfavorable. Hepatic abscesses may possibly undergo a spontaneous cure from absorption of the liquor puris, and degeneration of the pus corpuscles. They may burst into the peritoneum, and give rise to fatal peritonitis. In a few instances, they appear to have opened into the biliary ducts, so that their contents have passed into the duodenum. Most frequently, however, when the matter gets near the surface of the gland, adhesive inflammation is set up in the portion of peritoneum immediately above it, and lymph is poured out, which glues the organ to adjacent parts—to the abdominal parietes, the diaphragm,

stomach, or some part of the intestines; the pus being then discharged externally, or into the lung, or pleura, or stomach, or colon, &c.

Hepatic suppuration and dysentery often occur together. We are indebted to Dr. George Budd* for proving—contrary to the opinion formerly entertained—that dysentery is, in at least most of the cases, the primary disorder, the abscess the secondary; the latter being caused by the fetid gaseous and liquid contents of the large intestine, or by the unhealthy pus resulting from its ulceration, being absorbed and conveyed immediately to the liver. Abscess of this gland may also occur from other causes besides those already mentioned, the most common being ulceration of the rectum, bladder, vagina, &c.

Very rarely the inflammation terminates in gangrene, or gangrene may follow suppuration. In one of the patients of the Dreadnought Hospital Ship, mortification resulted from opening an abscess.

Treatment.—Various observers have recognized that the strength of the patient requires to be supported in this disease, rather than to be lowered by bleeding and the administration of mercury. The latter remedy is, however, still used very indiscriminately; and Dr. Abercrombie's observation remains true, that mercury is employed "with very undefined notions as to a certain specific influence which it is believed to exert over all the morbid conditions of this organ. If the liver is supposed to be in a state of torpor, mercury is given to excite it; and if it is in a state of acute inflammation, mercury is given to moderate the circulation, and reduce its action."† But it may be laid down as a general rule that neither the abstraction of blood, nor the production of salivation, will exert any favorable influence in hepatitis. And further, experience seems to prove that every kind of *active treatment* is contra-indicated; but it is especially so, when we infer that suppuration has taken place.

Purgatives, in the early stages of those cases not preceded by dysentery, appear to be useful by increasing the circulation through the portal capillaries, and thus diminishing congestion in the capillaries of the hepatic artery. If there be a suspicion of portal stagnation—as is indicated by a yellow-coated tongue, scanty alvine discharges, a diminished secretion of urine, and a dingy state of the skin—then Dr. Morehead advises the employment of small doses of blue pill with ipecacuanha, or of the extract of taraxacum with an alkali, and the external application of nitro-hydrochloric acid by means of a compress. Emetics have been recommended in the early stages; but though they promote the discharge of bile, yet the compression exerted on the liver by the abdominal muscles during vomiting may prove very unfavorable. Moreover, when nausea and vomiting have been set up by antimony or ipecacuan, it is often difficult to subdue the irritability of the stomach; especially as the disease itself has a tendency to produce sickness. Sedatives will usually be indispensable, and there is no objection to the best agent of the class, viz., opium. Where dysentery is present, it must be checked by ipecacuan, morphia, and astringents, according to the directions given at p. 438. In all cases at the onset, it will be

* On Diseases of the Liver. Third Edition, p. 86, &c. London, 1857.

† Pathological and Practical Researches on Diseases of the Stomach, &c., p. 360. Edinburgh, 1828.

necessary to restrict diet; while the patient must be confined to the recumbent posture.

When the inflammation has gone on to the formation of pus, good nourishing food, with tonics—such as quinine and iron, the nitro-hydrochloric acid and bark, &c.—will be required. Where there is restlessness and pain, they should be subdued by opium; the bowels must be regulated by rhubarb, or by rhubarb and aloes; and wine ought to be allowed in proportion to the weakness of the patient.—If, in course of time, we can be quite sure that the surface of the abscess is adherent to the abdominal parietes, we may—after making an exploratory puncture with a grooved needle—open it with the knife, or what is perhaps better, may puncture it with a trocar; but great judgment and caution will have to be exercised. On the whole Dr. Budd seems to be in favor of allowing the abscess to burst of itself. And I suppose that Mr. Waring is of the same opinion; for in the summary which this gentleman has published of eighty-one cases operated on, there are sixty-six deaths with only fifteen recoveries, while he fears that even this proportion appears too favorable owing to the non-publication of unsuccessful cases.

2. Cirrhosis.—Induration of the liver, or cirrhosis (*Κιρρὸς*, yellowish) consists of chronic inflammation and hypertrophy of the areolar tissue which pervades and covers the liver.

Pathology.—Interstitial hepatitis comes on gradually, and at first gives rise to no peculiar symptoms. But, as the areolar framework slowly gets hypertrophied, the liver becomes abnormally firm and subsequently contracted. Hence results a diminution in the calibre of the branches of the portal vein, as well as of the hepatic artery and duct. From this, atrophy of the lobular structure of the liver ensues; the hepatic cells undergoing fatty or granular degeneration, or in parts of the gland becoming completely destroyed. The diminished flow of the blood through the portal vein favors congestion of the capillaries of the gastric and intestinal mucous membrane, whence arise hemorrhages; whilst it also produces engorgement of the capillaries of the peritoneum, and hence ascites.

On slicing the gland, it is found hard and tough; while the firm and thickened connective tissue is seen to form thin lines between irregular masses of lobules. At the parts on the surface corresponding to these lines, the capsule is drawn in, so that the surface has a "hobnailed" appearance; the tissue of the liver is also paler than natural, owing to the presence of the broad lines of grayish-colored tissue, and it is often yellowish from accumulation of biliary matter in the cells. Hence, a section of the liver has the grayish-yellow color of impure bees-wax; and this disease has, in consequence, been termed by the French *cirrhosis.**

Causes.—The most common cause of cirrhosis is spirit-drinking; which has led English practitioners to call it the *gin-drinker's* liver. When alcohol has been introduced into the system in the ordinary way by the stomach, analyses show that a greater proportion of it is present in the liver and nervous system than in any other organs of the body. Undiluted spirits are more injurious than those mixed with water, owing to

* See the works of Morehead and Budd, already quoted from.

their more immediate absorption from the stomach into the portal vein producing much greater irritation of the liver.

It is worthy of notice, that the alcohol taken in wine or beer is not as destructive as that taken in the form of ardent spirits. Dr. Paris explains this by supposing that in the first case the alcohol is not only more intimately mixed with water, but that it exists in combination with its extractive matter; and consequently that it is incapable of exerting its full effects before it becomes altered in its properties, or, in other words, partially digested. A hot climate increases the vicious effects of alcohol.

Symptoms.—These are generally few and obscure, until the effused fibrin begins to interfere with the flow of the portal blood, and to offer an impediment to the secretion and escape of bile. Slight enlargement of the liver is present in the early stages; but as the fibrous tissue contracts and the lobules atrophy, the size of the gland becomes diminished, while the spleen gets hypertrophied. Then pain in the right hypochondrium, indigestion, flatulence and constipation, occasional feverishness, a dry and rough skin, with an unhealthy sallow look, are the most prominent symptoms. When relief has been obtained by the use of purgatives and an abstemious diet, the patient probably fancies himself well, and pursues his usual occupations; though at the same time he finds that he gets gradually weaker and thinner, and that his complexion remains sallow. After a time there are attacks of diarrhœa, the appetite fails, the urine gets scanty and is loaded with lithates, while the emaciation and debility increase.

At the end of some months, or perhaps one or two years, the increasing contraction of the effused lymph greatly obstructs the circulation through the portal vessels: an exudation of serum takes place from the extreme branches of the veins converging to form the vena portæ; and hence the belly becomes enlarged by dropsical effusion, which gradually increases so as to cause great distension. The veins on the surface of the abdomen get dilated—showing that the current of the portal blood is seriously impeded; and occasionally hemorrhage from the distended portal system gives rise to an effusion of dark blood into the stomach and intestines. In a few rare instances the attack of hemorrhage has constituted almost the first symptom of cirrhosis; so that death may really occur from this cause, if the loss of blood be great, in the midst of apparent health. When ascites has once occurred, it continues, increases, and in some twelve months or so the patient dies from exhaustion. Or a fatal termination may occur at an earlier period from pneumonia, peritonitis, jaundice and toxæmia, or from diarrhœa.

Treatment.—Although confirmed cirrhosis is quite incurable, yet it is probable that when the disease is early submitted to treatment its progress may be at least much retarded.—At the commencement we may do much good by insisting upon the complete disuse of all alcoholic drinks, by forbidding the employment of coffee and curry and highly-seasoned dishes, by supporting the strength with plain animal food, and by removing any complications as they arise. With regard to medicines we shall find that aperients are always needed. Perhaps the most useful are the sulphate of magnesia (F. 141), or the sulphate of soda (F. 143), or the resin of podophyllum (F. 160), or the acid tartrate of potash with taraxacum (F. 194). An imitation of the Carlsbad waters (F. 181) has

often seemed to me to act favorably; and may be recommended where the patient is unable to drink the real waters at their source (F. 496), or to pay a visit to Marienbad (F. 497). Some authorities recommend cupping or the application of leeches over the liver. Where it is evident that the loss of blood cannot be borne, repeated small blisters may be employed; and considering that gin-drinkers are the last class of people likely to derive benefit from bleeding, it would seem better to have recourse to them rather than to active depletion.—Supposing there is a well-founded suspicion of any syphilitic taint in the system, iodide of potassium (F. 31) would probably do great good; following up its effects by quinine and the iodide of iron (F. 382), or especially by the waters of Kreuznach (F. 484), or perhaps of Aix-la-Chapelle (F. 483), or of Neuenahr (F. 485).

Where it is evident that the degeneration of the hepatic cells has become far advanced, active aperients and mineral waters only increase the prostration, and tend to hasten the setting-in of dropsy. Attention must then be more directed to the condition of the digestive organs, aiding their action by the nitro-hydrochloric acid (F. 378), or by pepsine and extract of nux vomica (F. 420), or by tincture of rhubarb in some bitter infusion (F. 370). Inunction over the liver with the compound iodine, or the red iodide of mercury ointment, may sometimes serve to stimulate the eliminating function of so much of the gland as can act, when acholia seems to be threatening.—If there be hemorrhage, such astringents as turpentine (F. 102), gallic acid (F. 103), or nitric acid (F. 104) will be most likely to check it; very cold drinks being also allowed, while a bladder of ice may be occasionally placed over the abdomen.—When ascites has taken place, mild diuretics, purgatives, tonics, and sedatives are the agents with which we may hope to palliate the suffering and to prolong life for a short time. But if there be urgent dyspnœa or general distress from the dropsy, the fluid must be removed by tapping; a proceeding, however, which does not afford satisfactory results, since the serous effusion is sure to reaccumulate in a week or two.

3. Syphilitic Hepatitis.—Syphilitic inflammation of the liver is generally accompanied with other tertiary symptoms of the venereal infection. The disease manifests itself, according to Dr. Frerichs,* in three forms: (1) As simple interstitial hepatitis and peri-hepatitis. (2) As hepatitis gummosa; in which white depressions, like cicatrices, are found to contain yellowish nodules of a rounded form and dried appearance, varying in size from a linseed to a bean. And (3) as waxy, amyloid, or lardaceous degeneration, to be considered in a subsequent section. All three forms may coexist in the same liver, or either may be present independently of the others. (See note, p. 216.)

The symptoms produced by the first two varieties are seldom very striking; for while one portion of the gland is being rendered unfit to perform its functions, other parts become hypertrophied and take on extra work. The diagnosis, however, is made somewhat easy by the presence of the syphilitic cachexia, and the other indications of constitutional infection. The spleen is also generally found enlarged in these

* A Clinical Treatise on Diseases of the Liver. Vol. ii, p. 152. Translated by Dr. Murchison for the New Sydenham Society. London, 1861.

cases, and sometimes there is albuminuria.—The remedies consist of iodide of potassium (F. 31), the mercurial vapor bath (F. 131), and rest from all mental or bodily labor. Where there are symptoms of renal disease, the iodide of iron (F. 32) had better be alone trusted to.

4. Diseases of the Bloodvessels.—The *hepatic artery* and its branches may be involved in disease affecting the liver generally,—as in cirrhosis, cancer, tubercle, &c.; or this vessel may be the sole seat of morbid action, as is seen in the atheroma of its coats, aneurismal dilatation, and obstruction of its canal. In many instances it is impossible during life to do more than guess at the exact nature of the affection. As regards aneurism of the artery the chief indications are,—the presence of a pulsating tumor, pain from irritation of the hepatic plexus of nerves, and jaundice from the compression exerted on the biliary ducts. Generally death takes place from rupture and internal hemorrhage.

The *portal vein* may be affected in different ways. Blood-coagula are at times found obstructing its channel; being formed under the same circumstances as give rise to thrombi in other parts, or from some disease confined to the liver and interfering with the circulation through it. As a general rule, these clots are the cause, not the result, of inflammation of the venous coats. The obstruction for the most part comes on some time after disease—cirrhosis, chronic atrophy, chronic peritonitis, &c.—has given obvious proof of its presence. The abdominal veins get prominent and dilated, there is diarrhœa with rapid wasting, the spleen becomes enlarged, and a large quantity of ascitic fluid is rapidly poured out. The more sudden and complete the obstruction, the less time there is for the collateral circulation to be established; and consequently the more marked will be the effects. The fatal termination may sometimes be postponed by the use of astringents to check the diarrhœa and hemorrhage, by employing food which can be easily assimilated, and by the operation of tapping. The latter proceeding, however, is not to be resorted to until absolutely necessary.

The portal vein returns the venous blood from the digestive organs, and carries it to the liver. Inflammation, ulceration, or suppuration of the viscera in which the roots of this vein have their origin, is most frequently the cause of suppurative disease of the vein itself. This affection may also, however, have its source in inflammation of the bile-ducts, especially where the latter morbid process is due to gall-stones. The prominent features of suppurative portal phlebitis are headache, violent fever, great prostration, rigors, profuse sweating, pains in the epigastrium or the right hypochondrium, bilious diarrhœa, enlargement of the liver and spleen, and jaundice; followed frequently by the symptoms of peritonitis, and occasionally by metastatic purulent deposits in the liver or lungs or joints; and terminating in fatal exhaustion or coma. Remedies are of little avail; but quinine and opium may be employed to subdue the rigors and pain, while the patient's strength is supported by milk and raw eggs, solution of beef (F. 2), and demulcent drinks (F. 19).

With regard to adhesive inflammation of the portal vein but little is known. For frequently it cannot be distinguished from the other inflammatory diseases of the liver during life: while as it is not fatal like

the suppurative form, recent examinations have not been made. The changes found after death, and which show that it has at one time existed, consist of certain linear fissures over the obliterated branches, with atrophy of the lobules naturally supplied by them.

Rupture of the portal vein, from fatty degeneration of its coats, has been met with; so has ossification aud calcification; while more commonly some of the branches have been found dilated, in consequence of the obstruction of others.

The *hepatic veins* commence in the capillaries of the vena portæ, the three large branches which result opening into the inferior vena cava. These veins are generally found enlarged after death from valvular disease of the heart. They are very rarely the seat of adhesive inflammation; but when they are so, it gives rise to thickening of the coats, or to obstruction of the affected branches. Suppurative hepatic phlebitis is rather more common, occurring as the consequences of abscess of the liver. Blood-poisoning generally ensues.

IV. SUPPRESSION OF THE FUNCTIONS OF THE LIVER.

The secretion of the bile may be suspended (*acholia*, from *Ἀ*, priv.; *χολή*, bile) owing to acute atrophy, as well as from cirrhosis, fatty degeneration, &c. This subject has already (p. 38) been generally treated of; but its importance is such that it requires further consideration.

1. Acute Atrophy of the Liver.—Acute or yellow atrophy of the liver (sometimes spoken of as *acute wasting*, *softening of the liver*, *diffused hepatitis*, or *fatal jaundice*) is one of the most remarkable diseases to which the human body is subject. It may possibly be owing to impaired nutrition; and it consists, as a rule, of a rapid and complete destruction of the hepatic cells through every part of the gland. But it seems impossible to doubt that in a few instances the disintegration of the hepatic cells has been less extensive; the secretion of bile being consequently very defective, yet not entirely suppressed.

Causes.—Women are most obnoxious to this very rare affection than men. Pregnancy seemes to predispose to it; and it has happened more frequently between the third and seventh months of gestation than at other periods. It would appear to be most common from about the age of seventeen to thirty.

Among the alleged exciting causes it is necessary to mention grief or anxiety, sudden alarm, and fits of passion: venereal excesses, syphilis, and the excessive use of mercury: drunkenness with dissolute habits: the influence of malaria: and the poison of typhus. Yellow fever has many points of resemblance with the disease under consideration.

Some remarkable cases are recorded, the majority of them soon ending fatally, where several members of the same family have been struck down in succession with acholia. Dr. William Griffin met with four instances in one household, all within a few weeks of each other, and all occurring without any preliminary remarkable symptoms to indicate

the impending danger. Two of the patients recovered.* Dr. Hanlon attended three sisters who were attacked with this form of jaundice within eleven months of each other, only one of them being restored to health.†

Symptoms.—There may be a preliminary stage, in which complaint is chiefly made of headache, loss of appetite, thirst, drowsiness, mental and bodily depression, irregularity of the bowels, and tenderness of the abdomen. At the end of a variable period, the conjunctivæ become yellow, and the skin gets slightly jaundiced. These precursory symptoms may last a few days, or upwards of three or four weeks; while they may be altogether absent. When present they often fail to attract serious attention, the patient continuing to follow his usual occupation.

The symptoms which directly arise from acute atrophy of the liver are jaundice, sometimes with the formation of petechiæ and large ecchymoses; and vomiting, at first of the contents of the stomach with mucus, and then of a matter like coffee-grounds owing to the presence of altered blood.—The effects upon the nervous system are manifested at the onset by irritability and great despondency; but soon there is wandering, which merges into noisy delirium and convulsions, followed by stupor and deep coma.—The pulse is at the commencement slow; but as the cerebral disturbance is manifested it rises in frequency to about 120, becoming slow again as stupor sets in, and getting frequent and small as the fatal termination approaches.—The tongue and teeth are coated with black sordes; while the abdomen is often tender, pains being complained of about the epigastric and right hypochondriac regions. The extent of hepatic dulness rapidly diminishes, while that of the spleen increases. There is always obstinate constipation; hard clay-colored stools coming away under the influence of purgatives, with subsequently evacuations which are black from the presence of blood.—The urine is natural in quantity, though, from an inability to pass it, the catheter may be required. On analysis, this secretion is found loaded with bile-pigment, and perhaps is albuminous. A microscopic examination of concentrated urine will generally detect the presence of tyrosine and leucine; the former appearing as long needle-shaped crystals and small star-like bodies, the latter as finely-marked laminæ and globular masses with fissured surfaces and concentrically-thickened walls.—Then, lastly, the jaundice increases; bed-sores form over the sacrum, if life be prolonged beyond a week or ten days; and there are hemorrhages from the nose, stomach, bowels, bronchi, &c.

This disease usually ends fatally within a week from the appearance of the acute symptoms; while sometimes death occurs at the end of eighteen or twenty-four hours. It has been doubted whether recovery ever takes place; but although the cases in which the termination is favorable are very rare, yet it seems certain that some such have been met with.

Pathology, &c.—Examination after death reveals a considerable diminution in the size of the liver, the reduction being often to the extent of one-half or even two-thirds of the normal volume. The capsule is

* Medical and Physiological Problems, &c. By Drs. William and Daniel Griffin, p. 88. London, 1845.

† Clinical Lectures on the Practice of Medicine. By Robert J. Graves, M.D., &c. Second Edition. Vol. ii, p. 225. Dublin, 1848.

found opaque and puckered, while the parenchyma is flabby and shrunken: the cut surface presents a dark-yellow hue, the outline of the lobules is invisible, and the bloodvessels are almost empty: while under the microscope either no hepatic cells can be detected but only brown granules of biliary matter with oil-globules, or isolated cells loaded with fat or pigment are discovered. The gall-bladder is usually empty, and the bile-ducts are free from any obstruction. In most of the recorded cases, the spleen has been congested and enlarged. Sometimes the glandular epithelium of the kidney has been found in a state of fatty degeneration.

"Acute atrophy of the liver," says Frerichs, "belongs to those obscure processes, as to the nature of which various opinions may be advanced, without it being possible for any one of them to obtain a general acknowledgment. The fact of the disappearance in a few days of one-half or one-third part of the original volume of a large gland abounding in blood, without any alteration in the bloodvessels leading to it, has a complete analogy in no other disease." * Rokitansky and others have referred the destruction of the hepatic cells to the action of the bile—to a bilious liquefaction. Buhl looks upon the disease as analogous to typhus. While again, it has been regarded as a diffused inflammation, the destruction of the cells by fatty degeneration arising from the accompanying acute exudation-process.

As no morbid appearances are found in the brain or its membranes to explain the nervous symptoms, they must be referred to changes in the blood. Frerichs attributes the cause of the blood-intoxication to the arrest of the hepatic functions consequent on the destruction of the secreting cells, and to the derangement of the renal secretion so that elimination of urea is stopped. The former of these causes includes not only the absorption of bile, and the retention in the blood of the substances from which this secretion is formed, "but also the cessation of the powerful influence which the liver exerts over the processes of metamorphosis of matter, and the simultaneous passage of the disintegrated glandular substance into the blood."

Treatment.—Our ignorance of the primary nature of this disease, no less than its severity and rapid progress, renders the treatment empirical and almost useless. The favorite remedies are at first drastic purgatives, then the mineral acids, and subsequently diffusible stimulants as depression sets in. Ice may be freely given to check the vomiting. Where the diagnosis is doubtful, and especially where the distinction between acute atrophy and bilious fever remains uncertain, Frerichs recommends large doses of quinine dissolved in acids.

2. Acholia from other Causes.—Blood-poisoning may arise from all diseases which produce complete disorganization of the liver; and may be attended with jaundice, hemorrhages, delirium, coma, &c. On the other hand, these symptoms may be absent; for it is certain from the experiments which disease is constantly performing, as it were, for our instruction, that the constituents of the bile may be retained in the blood, for a time, without marked injury.

* A Clinical Treatise on Diseases of the Liver. Vol. i, p. 227. Translated by Dr. Murchison for the New Sydenham Society. London, 1860.

The chief diseases which ultimately lead to destruction of the glandular epithelium, and consequently to complete arrest of the functions of the liver, are—cirrhosis, fatty degeneration, and extensive cancer; as well as those affections which produce an impermeable state of the ductus communis choledochus, or of the hepatic duct. In these cases it not uncommonly happens that severe indications of cerebral disturbance, quickly ending in fatal coma, are suddenly superadded to those morbid symptoms which may have been long present.

3. Chronic Atrophy of the Liver.—This disease is in no way connected with acute atrophy. It results from all those conditions which tend to arrest the capillary circulation through the gland, and hence to lessen its nutrition.

The *causes* which diminish the size and functional activity of the liver are chiefly,—long-continued compression of the organ; such as may arise from tight lacing, extensive pleuritic effusion, great hypertrophy of the heart, constant distension of the ascending and transverse colon, chronic peritonitis, &c. The various forms of adhesive inflammation, either of the capsule or parenchyma, occlusion of the hepatic capillaries, obliteration of the trunk of the portal vein, the development of new growths, the cicatrization of abscesses, &c., will also tend to produce more or less extensive atrophy.

The *symptoms* that ensue from a persistent defective secretion of bile are developed slowly and insidiously. In the commencement there is usually imperfect performance of the function of digestion, flatulence, alternately diarrhœa and constipation, pale-colored stools, a dry sallow state of skin, and a falling off in flesh and strength. Then percussion shows that the dimensions of the liver are gradually lessening, so that sometimes there is scarcely any appreciable dulness. Of course, the digestive derangements lead to increasing debility; the patient, in the course of many months, becomes very anæmic, and much wasted; and there may be fatal exhaustion, &c. Very frequently general dropsy sets in, which soon ends the suffering.

After death, the liver is found flabby and uneven on its surface, with its capsule wrinkled; while it is either partially or wholly atrophied, according to the extent of the alterations which have been produced in the larger bloodvessels and biliary ducts. The hepatic cells in the portions of the gland affected are shrivelled up and much diminished in size, of a pale color, devoid of granular contents, and perhaps loaded with oil or particles of bile-pigment. The capillary vessels appear more or less impermeable, while the trunk and branches of the portal vein are often enlarged. More rarely, the portal vein or the hepatic artery is plugged up.

A carefully directed plan of *treatment*, when early commenced, may do much to prolong life. The diet must be light but nourishing; being free from rich dishes, sugar, and fermented drinks. Warm clothing ought to be used, and over-fatigue carefully guarded against. To aid digestion recourse may be had to pepsine (F. 420); or to the purified ox-bile with ammonia (F. 170); or to what has answered better in my hands, a daily dinner-pill of ipecacuanha with quinine or rhubarb (F. 44, 384). To combat the anæmia in these cases, it appears to me more advisable to trust to bark and the mineral acids, rather than to ferrugi-

nous tonics; for the latter have sometimes seemed to give rise to hepatic congestion, and to have increased the mischief. This remark does not hold good, however, with regard to the waters of the various chalybeate springs, which may often be used with much advantage. Consequently we may send the invalid to Harrogate (F. 466), Spa in Belgium (F. 467), Kissingen in Bavaria (F. 493), or to Marienbad in Bohemia (F. 497).—When dropsy has set in, diuretics are to be resorted to; the patients being generally too weak to bear the employment of drastic purgatives. If the ascitic fluid be excessive, temporary relief must be afforded by paracentesis.

V. DEGENERATIONS OF THE LIVER.

1 Fatty Degeneration.—The hepatic cells in their normal state always contain a certain amount of oil; the degree varying with the nature of the food which has been digested. But in *fatty liver*, or *fatty degeneration of the liver*, the quantity is very much increased; so that the cells may be seen, on a microscopic examination, to be gorged with oil-globules, diminishing the normal granular matter and quite obscuring the nucleolated nuclei. This condition is of frequent occurrence in pulmonary consumption, as well as in fatty degeneration of other important organs—like the kidneys, &c. Persons who live too freely, who indulge in alcoholic drinks, and who lead indolent lives, frequently suffer from it. It has also been met with in instances of constitutional syphilis; as well as after death from some acute diseases, such as ichorhæmia, typhus, small-pox, erysipelas, &c. If we wished to produce a fatty liver, we could hardly follow a better example than that of the poulterers of Strasbourg; who keep their geese in small cages, deprived of exercise, in a heated atmosphere, and with a large supply of food.

It is probable that the accumulation of fat (chiefly olein) takes place only in the secreting cells; there being no deposit in the intercellular spaces of the parenchyma. Frerichs reminds us that appearances are not unfrequently in favor of a deposition in the intercellular spaces, inasmuch as in preparing sections for microscopic examination a number of cells become destroyed, and their fatty contents escaping, they appear to lie external to the cells. Unless the quantity of oil be considerable, it is often impossible to say that there is fatty degeneration without a minute examination. In the case of excessive degeneration, however, the gland is found of a dull yellow color; it may be increased in breadth, but diminished in thickness; and it is generally greasy and soft and flabby. The weight of the liver either remains unaffected, or it will be slightly increased, or it may be much diminished. The cut surface usually presents a reticulated appearance; there being reddish-brown patches corresponding to the hepatic veins, and around them light yellow rings which are conformable with the periphery of the lobules—the region of the portal vein. This nutmeg-like appearance is not characteristic of fatty degeneration, however, since it may occur in hepatic congestion, &c.

According to Frerichs the alteration in the hepatic cells usually commences at the periphery of the lobules, in the region of the interlobular vessels belonging to the portal vein; while it gradually advances towards the centre of the lobules supplied by the hepatic veins. The process may be said to consist of three stages. In the first, the cells in the neighborhood of the ramifications of the portal vein become fatty: in the second, the degenerated cells extend more than half-way to the centre of the lobules: while in the third, similar cells are found as far as the central vein.

Unless there be considerable accumulation of fat in the hepatic cells, the functions of the liver are not deranged; and there is neither pain, jaundice, nor dropsy. If the cells be much loaded, however, they may impede the circulation of blood in the capillaries, as well as obstruct the excretion of bile. Under these circumstances gastric catarrh, indigestion, a sense of weight and fulness in the right hypochondrium, a pasty complexion, sometimes constipation or occasionally diarrhœa with pale clay-colored stools, anæmia, hemorrhoids, possibly ascites, and even fatal exhaustion or complete acholia, may result. But it is very seldom that there are these serious symptoms; perhaps because the primary systemic disorder proves fatal before there is time for their occurrence.

The *treatment* of these cases scarcely requires consideration, inasmuch as it is comparatively of little importance when this condition occurs in phthisis, syphilis, &c. But if it should be diagnosed as the sole affection of the system (which is very rarely accomplished), its cure ought to be attempted; while, as we have merely to free the hepatic cells of their excess of fat, the minute elements of the liver not being disorganized, there is every reason to hope for success. The most important remedy is the regulation of the diet; alcoholic drinks, sugar, amylaceous matters, and fat being interdicted. A large proportion of plainly cooked animal food may be allowed, with a moderate allowance of fresh fruits, &c. Torpidity of the bowels is to be overcome by active exercise in the open air; as well as by rhubarb or sulphate of soda, or by the use of the waters of Carlsbad, Kissingen, &c. The two remedies from which the best results may be expected are the hydrochlorate of ammonia and iodide of potassium; but should they appear to induce debility, or to destroy the powers of the stomach, they must be exchanged for bitter vegetable substances.

2. Amyloid Degeneration.—This structural disease of the liver does not demand much attention in this place, since its pathology has already (p. 116) been treated of with as much latitude as the present extent of our knowledge will allow.

The important condition known as amyloid degeneration (the *waxy*, *albuminous*, *lardaceous*, or *scrofulous liver*) may coexist with fatty liver, or with cirrhotic induration, or with syphilitic cicatrices and gummatous nodules, or it may alone be present. In it the glandular structure of the organ is gradually converted into a dense material; and hence results destruction of the gland-cells, with abolition of their functions. The liver is found after death much increased in weight and size, so that, instead of weighing from three to four pounds avoirdupois, it may average eight or nine; its substance is tough, and somewhat resembles yellow wax; and the cut surface presents only faint traces of lobules.

Minutely examined, the cells are found compressed, irregular in form, and with their nuclei atrophied.

This peculiar state of the liver occurs in phthisis much more rarely than fatty liver does, with which, however, it has been sometimes confounded when in an early stage. It is frequently met with in the subjects of constitutional syphilis, even when the osseous system is healthy. But it is perhaps most commonly found in young male adults who have long suffered from scrofulous caries of the bones; whence it was at one time thought to be peculiar to this disease. The infiltration takes place insidiously, the first indication of its existence being the increased size of the gland. The biliary secretions lessen as the cells degenerate. Then the circulation gets impeded, as well as the escape of bile from the ducts; so that the superficial veins of the abdomen enlarge, a small quantity of fluid collects in the peritoneum, anæmia to a marked degree sets in, while occasionally the skin and conjunctivæ become of a yellow tinge.

The spleen and kidneys are likewise very generally involved in the morbid process; while sometimes the lymphatic glands, as well as the gastro-intestinal mucous membrane, are also affected. The renal disorder is more serious and fatal than the hepatic; its existence being rendered certain by the persistent presence of albumen in the urine, together with waxy-looking casts of the secreting tubules. On the subject of treatment it need only be remarked that disappointment has hitherto followed almost all attempts at cure. The disease slowly but steadily advances to a fatal termination. If any good can be done, it is by the use of remedies directed to the relief of the cause. Thus, if there be constitutional syphilis, iodide of potassium or iodide of iron should be employed; if there be disease of the bones surgical interference may be of some avail; while in other cases attempts are to be made to relieve the prominent symptoms. The general health must be attended to; and the system supported by ferruginous tonics, warm or tepid sea-water baths, and easily digested nourishing food.

3. The Pigment Liver.—After death from severe intermittent, remittent, or continued fevers, the liver is sometimes found to present a blackish or chocolate color; brown insulated figures being observed upon a dark ground. The cause, &c., of this change of color has been particularly examined by Frerichs; who says that it is due to the accumulation of pigment matter in the vascular apparatus of the gland. On magnifying fine sections of the hardened tissue, accumulations of pigment are to be seen in the capillary network of the portal and hepatic veins; while the branches of the hepatic artery also contain quantities of black coloring matter. The same melanotic matter may often also be found in the parenchyma of the spleen; while the kidneys, brain, and other organs are less constantly implicated. The pigment is carried to the tissues by the blood; and if this fluid be minutely examined, it will be seen to contain small granular masses, together with nucleated pigment cells having black granules in their interior. It is generally believed that the melanotic matter is formed in the spleen; owing to stagnation of the blood in the venous sinuses, arising from the intense congestions which affect this organ in all malarious fevers.

The chief consequence of this pigment formation is an impediment to

the circulation of the blood through the liver; so that the gland at first becomes congested, and subsequently atrophied. The non-arrest of particles of the pigment as they circulate through the liver and lungs, allows them to be carried to the brain; in the narrow capillaries of which they accumulate, where they may subsequently induce severe cerebral disturbance.

The occurrence of this condition shows how necessary it is to cure all diseases dependent upon marsh miasmata as quickly as possible; lest the capillaries of the liver get loaded with melanotic matter, leading to their destruction, and of course to atrophy of the gland. When the latter is established—as indicated by gastric catarrh, a grayish-yellow color of the skin, diarrhœa, and severe cerebral symptoms or ascites—it will be too late to hope for benefit from the employment of quinine, &c.

VI. HEPATIC TUMORS.

The most significant new formations which have their seat in the liver are the hydatid tumors and cancerous infiltrations. There are, however, two or three other growths occasionally met with: but they are of so little importance, that they only require a very brief notice.

1. Cystic Tumors of the Liver.—Encysted knotty tumors, containing a cheese-like substance, have been described by Dr. Budd. They are found in the substance of the gland varying in size from a large pea to a small potato; they are of a white or pale yellowish color; and they have a nodulous form. A minute examination shows that the steatomatous-looking matter is composed of a mass of irregular granules and free oil-globules, while occasionally a few plates of cholesterine can be discovered. These tubera appear to have their origin in inflammation of the mucous lining of the hepatic ducts; in consequence of which morbid process a duct becomes closed at some point, so that no outlet remains for its secretions. The latter therefore accumulate, dilate the affected canal, and at length form the unorganized cheese-like matter.

Sacculated pouches or cysts, containing a glairy fluid, are formed in the same manner as the knotty tumors. Cruveilhier has reported a case where the liver must have been crowded with these irregular cavities, each containing mucus more or less tinged with bile. The signs of pre-existent hepatitis were distinct. The patient died from exhaustion, his chief symptoms having been jaundice and daily increasing debility.

Simple serous cysts, with clear watery contents, are sometimes found scattered through the liver. They are seldom much larger than small beans, are lined with tessellated epithelium, and they have not seemed to have any connection with the bile-ducts. In some instances coexisting cysts have been discovered in the kidneys.

2. Cavernous Tumors of the Liver.—These tumors are not uncommonly found on the upper surface of the liver, especially in the bodies of aged persons. They are developed in the hypertrophied con-

nective tissue. On looking at the gland, one or more dark blue-colored and irregular spaces are seen, varying in size from a pea to a common hen's egg; on cutting into which a tissue is found resembling that of the corpora cavernosa of the penis, containing a quantity of dark blood. According to Rokitansky a connection can always be traced between the latter and some of the branches of the portal vein; while the structures will be found prominent or collapsed according to the amount of blood contained in their compartments. As far as we know these cavernous vascular spaces give rise to neither local nor general disturbance.

3. Tuberculosis of the Liver.—Tubercular deposits are very rarely discovered in the liver, and probably never as a primary disease. Where they have been found, it has been in connection with far advanced tuberculosis of other organs, especially of the abdominal viscera. Hepatic tubercle occurs over all portions of the gland, in the shape of semi-transparent miliary granules, or as yellow adipose deposits; the patient generally succumbing to the constitutional affection, before there has been time for the stage of softening to set in. Still, small vomicæ do occasionally form, and then care will be required to distinguish them from a morbid dilatation of the gall-ducts. Rokitansky* states that this latter condition is almost invariably met with in combination with hepatic tubercle, and is not unfrequently coexistent with tubercular disease of other organs. These dilatations or cavities are of the size of a millet-seed to a pea, with flaccid parietes; they are filled with viscid, muco-bilious, dirty-green matter; they are scattered throughout the liver; and they consist of swollen capillary gall-ducts. The hepatic tubercles exist at the same time, and at various distances from the cavities: occasionally a tubercle will be found near one of the latter, but it is not characterized by the symptoms of secondary deposit accompanying the fusion of tubercular matter.

4. Hydatid Tumors of the Liver.—Hydatid (Ὑδατὶς, a vesicle,) tumors occur in the liver more frequently than in any other organ: but they are occasionally met with in the subperitoneal areolar tissue, the spleen, omentum, muscles of the heart, brain, kidneys, lungs, and bones—particularly the tibia.

Pathology.—These growths consist of a sac, formed by the condensation of surrounding tissue, lined by a thin bladder or cyst, and filled with a limpid, colorless, salt fluid; floating in which numerous small cysts similar to that lining the sac, and varying in size from a small seed to a fowl's egg, may usually be found. To these cysts or bladders Laennec gave the name of Acephalocysts—bladders without heads (Ἀ, priv.; κεφαλὴ, the head; κύστις, a bladder). The acephalocyst lining the sac is composed of finely laminated and friable coats, about the firmness of coagulated albumen. Sometimes it contains no floating hydatids, or very few; in other cases it is literally crammed with them; and these again, it is said, may contain a third, and the latter even a fourth generation. To distinguish these different kinds, as well as to mark the mode of their increase, naturalists have divided these productions into two species: 1st, the *acephalocystis endogena* of Kuhn—likewise called

* A Manual of Pathological Anatomy. Vol. ii, p. 150. Translated by Dr. Sieveking for the Sydenham Society. London, 1849.

socialis vel prolifera by Cruveilhier, the *pill-box hydatid* of Hunter—which is the kind most commonly developed in the human subject, and in which the fissiparous process of generation takes place usually from the internal surface of the parent cyst, the progeny being sometimes successively included; and, 2d, the *acephalocystis exogena* of Kuhn—*eremita vel sterilis* of Cruveilhier—which develops its progeny generally from the external surface, and is found in the ox and other domestic animals. The true nature of these acephalocysts has long been a subject of investigation. M. Livois seems, however, to have settled the question by his discovery that they are the dwelling-place of those minute animalcules to which Rudolphi gave the name of *Echinococci* (Ἐχῖνος, the hedgehog, and κόκκος, a berry), from the cylinder of hooks surrounding the head. M. Livois states that the echinococci exist in all acephalocysts, and this observation has now been confirmed by Dr. Budd and many other observers. When an acephalocyst is opened, its inner surface is seen to be studded with numerous white opaque spots, which are found by the microscope to be distinct echinococci heads.

The relation of hydatids to tapeworms has only recently been clearly made out. But it is now certain that echinococci are merely the progeny of the tapeworm in a special stage of development,—in short, they are the larval conditions of the small Tænia echinococcus of the dog and wolf. Consequently, "whilst the mature worm has thus a very limited territory for its place of residence, its peculiar larvæ, on the other hand, are found dwelling in a great variety of animals. Amongst the bearers are men, monkeys, sheep, oxen, deer, camels, the giraffe, and other ruminants; also the horse, ass, zebra, several feline animals, and perhaps the squirrel."* This immature tapeworm—the scolex of the tænia echinococcus—is a transparent, colorless, oval-shaped worm, displaying an apparatus of suctorial prominences with a variable number of hooklets at the cephalic extremity, and measuring about the one two-hundredth of an inch in length, and rather less in breadth. In structure the parasite is a mere integument, one-half—the head and neck—being susceptible of retraction into the other half. The head is a flat disc at the extremity of the neck, having imbedded in its substance an apparatus of small hooks, thirty-four in number, disposed in a circle. Immediately behind the head are four rounded suctorial processes, beyond which follows the body, while at the extremity of this is a short peduncle by which the animal attaches itself to the wall of the acephalocyst. When the animal is viewed with its head retracted within its body, the circle of hooks is seen through the transparent integument appearing like a ring in the centre of the body. †

Symptoms.—When a hydatid tumor forms in the liver, its growth is generally slow. It gives rise to little inconvenience beyond a sensation of weight, so that it is sometimes found after death where there has been no suspicion of its presence during life. When the tumor is of a large size, it may then be easily felt; while the volume of the liver is increased. Fluctuation cannot always be easily made out, nor can any peculiar vibratory sound (hydatid fremitus) be obtained save in excep-

* Entozoa: an Introduction to the Study of Helminthology, &c. By T. Spencer Cobbold, M.D., &c., p. 261. London, 1864.

† Erasmus Wilson on the Echinococcus Hominis. Medico-Chirurgical Transactions, vol. xxviii, p. 26, &c. London, 1845.

tional cases. If the cyst inflames, violent pains result: sometimes it compresses the portal vein or vena cava, causing ascites and œdema of the legs. It may burst into the peritoneum, producing fatal peritonitis; or into the lung; or into the hepatic duct—whence its contents may pass through the common duct into the duodenum. Sometimes it opens directly into the intestines, or through the abdominal wall; in the three latter cases, the contents will often be entirely discharged, and the sac ultimately closing up will leave the patient well. When the tumor bulges into the thorax it interferes with the proper performance of the functions of the lungs and heart, and it may burst into the pleural cavity. If it open into the base of the lung, or into the bronchi, the patient becomes so worn out with the constant expectoration of hydatids and puriform matter, while the constitutional disturbance is so severe, that he generally sinks under it.

Sometimes a hydatid tumor gets well without opening; namely, by the secretion of a thick, putty-like matter within its sac. Whether this secretion is the result of the death of the hydatids, or whether it is the cause of their destruction, is uncertain.

The echinococcus disease is endemic in Iceland; so that, according to Leuckart, many of the practitioners not unfrequently have upwards of 100 cases under treatment at the same time, while it is the cause of nearly one-sixth of the total number of deaths. For every 100 Icelanders there are 1100 head of horned cattle, while every peasant has on the average six dogs; which dogs have constant access to the water used by their masters for drinking, &c.—The ova of the tænia echinococcus are thus swallowed by the human subjects; and passing from the stomach or bowel into the liver, undergo development there.

Diagnosis.—When a large hydatid tumor occupies the right hypochondrium, it need not necessarily be situated in the liver; for it may have its origin in the omentum, or in the subperitoneal areolar tissue, or in the right kidney. One of the largest tumors of this kind that I ever saw was diagnosed during life as arising from the liver; but it was found after death to be seated in the omentum. In the same way, when the tumor fills the left half of the abdomen chiefly, it will often be difficult to say whether it is connected with the spleen, omentum, or left kidney.

Treatment.—Several agents have been supposed to possess the power of stopping the growth of hydatid tumors. The chief of these are iodide of potassium, calomel, and common salt: sulphur baths and electricity have also been employed. Most observers now agree that little benefit is derived from such remedies. But I confess that my faith in the power of full doses of iodide of potassium to cause absorption of the fluid portion of the cysts, and thus to insure the destruction of the hydatids, is greater than that of most other physicians. And indeed, I should speak more strongly upon this point, were it not for the feeling that my diagnosis may possibly have been wrong, in the two cases of well-marked hepatic tumor which were cured by the persevering use of this salt. However, the fact remains, that, rightly or wrongly, in my judgment the patients had hydatid cysts in the liver, and both got well while they were taking the iodide of potassium.*

* While this sheet was printing, one of these patients died. Her history is as follows: Mrs. D., ætat. 24, fair complexion, slender and delicate, came under my care

When the tumor is large, is increasing in size, and is productive of distress with general derangement of the health, surgical interference is called for. The operation may consist of simple tapping; or of a careful incision, when we are sure that the cyst is firmly adherent to the integuments; or of tapping, with the injection of a solution of iodine, or of diluted alcohol; or, of the opening of the echinococcus-sac by the repeated use of caustic (Vienna paste). As a rule, the removal of the fluid by tapping (using a trocar equal in size to a No. 6 or 8 catheter) suffices for the destruction of the scolices, the latter perishing, often without coming away. Should a cure, however, not result from the first operation, it may be desirable to repeat it; and then to pass an India-rubber drainage-tube through the puncture, so as to draw off the secretion as fast as it is formed, and thus to insure contraction of the cyst.

5. Cancer of the Liver.—Every form of cancer, not even excepting the gelatiniform or colloid variety, has been met with in the liver. Medullary or soft cancer appears to be more common than the scirrhous or hard kind.

Pathology.—Hepatic cancer commonly takes the form of distinct and well-defined masses implanted in different parts of the gland; or, in some exceptional instances, portions of the liver may be infiltrated with cancerous matter, the diseased segment merging insensibly into the

on the 19th December, 1862. She says she has been married twelve months: never been pregnant; catamenia irregular. Is suffering from a large swelling occupying the right side of the upper part of the stomach, which was first detected very shortly after her marriage. Has been under the care of Dr. Budd, at whose suggestion Mr. Hulke passed a fine trocar and canula into the front part of the liver. This was done early in the spring of 1862, but no fluid came away, and she felt no inconvenience from the operation. On examination I found a large solid mass (apparently made up of the liver in front, and some foreign structure behind), occupying a large portion of the right side of the abdomen, pushing up the diaphragm, and encroaching considerably on the right side of the chest. No fluctuation or hydatid fremitus could be detected. She suffered from shortness of breathing, attacks of palpitation and faintness, and was weak, &c. My diagnosis was,—a large hydatid tumor of the liver; and it was afterwards learnt that this was Dr. Budd's view of the case.—She was ordered a very nutritious diet, and a mixture containing three grains of iodide of potassium, with ammonia and bark, three times a day. As there was also constant pain in the side, a belladonna liniment was prescribed.

This patient generally saw me once a week for several months after her first application. She steadily improved; the liniment was soon left off; and then cod-liver oil was ordered to be taken once, and subsequently twice a day. During the whole time the iodide of potassium was continued, but in diminished doses. On the 29th April, 1864, my note runs thus: "Cured. Is becoming quite stout. She is probably two months advanced in her first pregnancy. To discontinue all treatment."—On the 18th December, 1864, Mr. Tyler delivered her of a live child, after a tedious labor of 48 hours. She recovered from this pretty well, but did not appear to get up her strength. On the morning of the 6th January, 1865, she sat up to pass water, suddenly complained of feeling very faint, rallied for a minute or two, and immediately fell back dead.

Thirty hours afterwards an examination of the body was made; Mr. Tyler, Mr. Campbell de Morgan, and myself being present. The cause of death, as had been surmised, was a clot obstructing the pulmonary artery. On reflecting the abdominal walls, the liver looked large yet very healthy: but on removing this gland from its bed a tumor was found at the posterior part, about the size of a cocoa-nut deprived of all shell. On cutting into the growth, it was seen to be completely filled with dead hydatids, somewhat resembling soddened pieces of dirty wash-leather. There was not a drop of fluid in the parent, or in the contained cysts; while many of the latter must have been at least as large as a fowl's egg when they were living.

healthy tissue without any distinct line of demarcation. In the first case, the nodules usually vary in size from a pea to an orange, though they are sometimes much larger; while the smaller they are, the more abundantly do they stud the organ. Frequently they present an appearance as if spherical masses of firm lard were imbedded in the parenchyma; though in scirrhus their consistence may be as great as that of cartilage. Very rarely there is a well-defined capsule. Occasionally there is hemorrhage into the cancerous stroma; which, if abundant, may produce rupture of the serous covering of the liver, and cause sudden death. The portal vein and its branches are much more commonly implicated in the disease than the hepatic venous vessels; the lymphatic glands and vessels are often involved; and the bile-ducts may be compressed or obliterated.

With regard to infiltrated cancer it is only necessary to say that it seldom occurs without the nodulated form being likewise present, and that extravasation of blood and bile are often found in its structure. In both forms the hepatic cells in the neighborhood of the disease are usually discovered in a state of fatty degeneration.

Symptoms.—When a liver contains numerous masses of cancer, we shall find (in addition to the general indications of malignant disease) that it is generally much enlarged, extending far below the false ribs, even to the brim of the pelvis; while its regular form is lost, and uneven bulging prominences can be detected on the surface. The nodulous masses do not give rise to inflammation of the hepatic tissue; but when superficial, they often cause peritonitis, which is generally very partial, and of the adhesive kind, so that after death the tumors are found adherent to the diaphragm or to the abdominal walls. The remaining symptoms are somewhat obscure; loss of flesh and strength, constant diffused pain and tenderness, disorder of the digestive organs, and great irritability with mental depression, being generally the most prominent. Jaundice occurs more frequently than ascites; while in about one-fifth of all the cases both these conditions may be combined. The formation of gall-stones not unfrequently adds to the suffering. The duration of hepatic cancer, excepting in the case of scirrhus, is usually short; life sometimes closing within six months from the first appearance of the symptoms, while it is very seldom prolonged for two years.

Where the disease presses upon the common duct so as to render it impermeable, the gall-bladder may become greatly distended. In one instance it thus acquired the size of the fœtal head.

Causes.—Malignant disease of the liver is for the most part a secondary affection; that is to say, it results from the transfer of cancer-cells by lymphatics and veins from the breast, stomach, kidney, &c. When primary, it does not occur before the age of thirty-five; while though it frequently spreads to contiguous organs, it only rarely contaminates remote structures.

Treatment.—Our remedies can only be palliative; such drugs as calomel, corrosive sublimate, iodine, and arsenic only serving to impoverish the blood, and to hasten the fatal termination. Relief to the pain must be given by sedatives—especially by opium, conium, and belladonna; while the digestive organs should be strengthened by mild tonics, and a light nourishing diet.

VII. DISEASES OF THE BILIARY PASSAGES.

Under this head we have to consider those diseases which affect the biliary ducts, from their commencement in the glandular parenchyma, to their termination in the duodenum; so that it comprehends the disorders of the hepatic duct and its capillary branches, the cystic duct, the ductus communis choledochus, and the gall-bladder. The diseases of these passages give rise to important symptoms in proportion to the extent to which they impede the flow of bile from the liver, and the degree in which the hepatic parenchyma is involved in the morbid process.

1. Inflammation of the Biliary Passages.—The biliary ducts and gall-bladder may be attacked by different forms of inflammation. Thus, there may be *catarrhal* inflammation; in which (as in similar affections of other mucous membranes) the secretion of mucus is increased, while it is also altered in quality, becoming viscid or muco-purulent.—Occasionally the cystic or the common duct will thus become obstructed with a firm plug of mucus; but as the latter does not get organized, it is carried onwards or breaks up after a time, so that the excretion of bile is again rendered free. The lining membrane of the capillary ducts may also be thickened by catarrhal inflammation; their diminished calibre leading to retention of the secretion, and consequently to dilatation. This disease generally has its origin in catarrh of the stomach and duodenum; the extension of it to the gland taking place through the common duct. In *exudative* or *plastic* inflammation, there is either a firm fibrinous or a croupal product. This forms casts of the tubes, blocking them up, and leading to their dilatation. These exudations are very rarely met with: but they have been found after death from typhus, ichorhæmia, cholera, &c. And then, the biliary passages may suffer from *suppurative* inflammation, leading to the secretion of pus and a thick kind of mucus tinged with bile. When the abnormal action is of long continuance, ulceration may be set up. Ulceration of the gall-bladder is often found when this reservoir is irritated by one or more gall-stones; the concretion and the ulceration not always standing in the relation of cause and effect, because both may originate at the same time from an unhealthy condition of the bile. Moreover, the mischief set up by decomposing bile may induce ulceration without any concretion being formed.

Inflammation of the mucous membrane of the biliary passages gives rise to *symptoms* of variable severity. The gall-bladder, cystic, and common ducts are more obnoxious to this morbid action than the hepatic ducts; since they are most likely to be irritated by gall-stones and unhealthy conditions of the bile. When there is merely catarrhal inflammation, we find slight tenderness, tightness about the epigastric and right hypochondriac regions, nausea, a sluggish action of the bowels, mild fever, and jaundice—if the mucus secreted be sufficiently viscid and abundant to choke up many of the ducts; the symptoms ending in a beneficial attack of diarrhœa as soon as the pent-up bile finds its way into the duodenum. Supposing, from any cause, the bile is unduly retained in its natural reservoir, it may decompose and give rise to much

irritation and inflammation; which processes, as already mentioned, are very likely to end in suppuration and ulceration. The inflammation may be confined to the gall-bladder, or it may extend from it to the cystic and common ducts. Ulceration of these parts may also arise from the irritation of biliary calculi, from defective nutrition of the system, and it has been found by several observers after death from remittent fever. The immediate consequences may be perforation, effusion of bile into the abdominal cavity, and fatal peritonitis; or, if adhesive inflammation have previously occurred, abscess may result and open into the bowel or externally; or closure of the cystic duct may follow, rendering the gall-bladder useless and causing the bile to flow continuously into the duodenum, often without giving rise to any marked results. The case is very different in the latter respect when there is permanent closure of the common duct; since it leads to the gradual destruction of the hepatic cells, to the atrophy of the capillary blood-vessels, and to a complete wasting of the lobular substance. Some remarkable cases have been recorded where the patients have thus lived for several months after there has ceased to be any discharge of bile from the liver, since none could be secreted; and in which there has been deep and persistent jaundice, attacks of gastric or intestinal hemorrhage, wasting with hectic fever, and sometimes constipation alternating with diarrhœa. Death has occurred from gradually increasing exhaustion; and, strange to say, without the occurrence of any cerebral disturbance.

The biliary passages may all become dilated, from their origin in that plexiform network in which the hepatic cells lie, to the termination of the common excretory duct of the liver and gall-bladder in the duodenum. Generally speaking the expansion is only partial. In either case, it may arise from the habitual accumulation of inspissated bile; from compression of the ducts by tumors or disease of the parenchyma; from inflammatory swelling of the mucous lining diminishing the calibre of the tubes, and so leading to the retention of their secretions as well as of the bile; and from obstruction by calculi, catarrhal or croupy exudations, &c. Owing to obstruction of the duodenal orifice, the ductus communis choledochus has been found enlarged to the diameter of the small intestine. When the gall-bladder is unable to get rid of its contents in consequence of occlusion of the cystic duct, the residuary bile may be absorbed; but if the lining membrane continues to secrete mucus, dropsy of the cyst will result from the accumulation. Moreover, if the obstructing substance act at all like a valve, permitting the ingress of bile, but preventing egress, a large pear-shaped or globular tumor may be found containing some pints of fluid. Under these circumstances, rupture of the bladder has been prevented by tapping; an operation which can be safely performed provided there are adhesions to the abdominal wall.

With regard to the *treatment* of inflammation of the biliary passages there seems to be considerable confusion. The application of leeches over the right hypochondrium is regarded as absolutely necessary by some authorities; but it is difficult to understand how "local depletion" in such an organ as the liver can be effected, unless indeed there has been extensive adhesive inflammation of the visceral and parietal layers of the peritoneum. The efficacy of blisters, when the leeches have

subdued the pain and fever, is said to be great. Nevertheless, it is excusable to doubt the possibility of our power to reduce increased action in the liver, by augmenting the tissue changes in a limited portion of the abdominal walls. And again, the administration of mercury is strongly recommended to increase the quantity of bile; although if there be one principle in medicine which ought more constantly to be borne in mind than another, it is that an organ inflamed to a greater or less extent should be rested as completely as possible. In all probability the truth is, that we cannot control these inflammations by active remedies; and he will prove the best physician who is content to put his patients in the most favorable condition for allowing them to pass through their several stages, without complicating the action by a line of treatment of which we cannot give a rational explanation. The incurable cases will run their course, in spite of all that may be done. On the contrary, those examples that naturally end in recovery will be best aided in their progress by rest, a restricted diet, and warm baths; with simple aperients if there be constipation, or conversely with astringents. If there be pain, fomentations and sedatives will relieve it; if there be fever and thirst, simple diluents are to be freely allowed; while if there be exhaustion, it must be combated by easily digested restorative food, and ammonia with bark, &c. Supposing we could feel certain that the obstruction was due to a portion of inspissated mucus, an emetic might drive the tenacious plug onwards. Where catarrhal inflammation becomes chronic, and some few months elapse without the customary discharge of bile freely returning, the employment of the nitro-hydrochloric acid (F. 378), or a visit to one of the mineral springs, had better be recommended. The waters of most service are those of Carlsbad (F. 496), Marienbad (F. 497), Kissingen (F. 493), and the like.

2. Entozoa in the Biliary Passages.—The proper habitat of the *Ascaris lumbricoides* is the small intestine. But every now and then this worm migrates upwards into the stomach, or downwards into the colon and rectum. Moreover, it may perforate the abdominal walls. Consequently, it is not surprising, that in a few instances a lumbricus has found its way, by the duodenal orifice of the ductus communis choledochus, into the gall-bladder or up the branches of the hepatic ducts; a journey which it would more easily accomplish, if the opening were stretched by the previous passage of a calculus or hydatid. The consequence has been very considerable irritation of the ducts, as well as obstruction to the flow of bile. Cases of fatal jaundice have occurred from the blocking up of the common duct by a large round worm; rupture of the duct has taken place from the same cause; while if this helminth passes into the branches of the hepatic duct it may not only impede the flow of bile, but set up catarrhal or exudative inflammation, dilatation and perhaps rupture of the duct, ulceration, or suppuration. Lobstein found a gall-stone in the common duct, the nucleus of which was composed of a round worm.

The *Distoma hepaticum* (more correctly, the *Fasciola hepatica*), familiarly known as the liver-fluke, is a flat trematode helminth, rather more or less than an inch in length, and about half-an-inch broad. It has a perforated oral, and an imperfect ventral sucker; the latter serv-

ing as "an anchor or holdfast," while both are employed as organs of locomotion. The oral disc also assists as "a prehensile organ for taking in the biliary secretion on which the animal feeds;" whilst the pharyngeal sphincter prevents the regurgitation of food after it has distended the stomachal passages (Cobbold). The œsophagus is short; it ends in two primary intestinal divisions, which in their course give off numerous secondary branches, and these again subdivide; all these tubes terminating in blind cæcal extremities. The male and female generative organs are in the same individual.

The Distoma hepaticum is the pest of grazing cattle, when they are confined to marshy or wet grounds. In sheep it produces the disease called the *rot;* in which affection the liver is sometimes found containing several hundred flukes. It has been estimated that upwards of one million sheep and lambs die annually in this country from the rot, some of the epidemics being much more severe than others. This entozoon has been very rarely found in the human subject. Mr. Partridge obtained one from the gall-bladder of a patient who died at the Middlesex Hospital, which Professor Owen considered was in no respect different to the Distoma hepaticum of the sheep. M. Duval also discovered several in the portal vein (see p. 53); and other instances have been reported. As the presence of this fluke in man has never been diagnosed during life, no treatment has been adopted. In sheep, the severe effects of the rot seem to admit of palliation by removing the animals to dry ground, feeding them on beans and peas, &c., and by the free administration of common salt.

The *Distoma lanceolatum* is much smaller than the Fasciola hepatica, measuring only the third of an inch in length, and about one line and a half in breadth. Instead of being rounded at each end like the latter, it has a lanceolate form, the caudal being more obtuse than the oral extremity: it has two suckers: the œsophagus divides into two blind and non-branching intestinal tubes; and each individual has male organs, as well as ovaria and oviducts and a long uterine canal. This species is found in the liver of the ox and sheep, but less frequently than the Fasciola hepatica.

Only three instances are known where the Distoma lanceolatum has been detected in the human subject. Bucholz obtained several from the gall-bladder of a prisoner who died of typhus at Weimar. Chabert found a large number in the stools of a girl, which were expelled after a dose of empyreumatic oil. And Dr. Kichner, of Kaplitz in Bohemia, met with the case of a young girl who died after suffering pain in the liver for some years, and whose gall-bladder contained eight calculi with forty-seven specimens of this small trematode helminth. The liver weighed eleven pounds.

3. Gall-Stones.—These concretions are more frequently formed in the gall-bladder than in the substance of the liver—in the branches of the hepatic duct. Solitary calculi, when found in the gall-bladder, are globular or oval or pear-shaped: associated gall-stones usually have numerous polished facets, the result of pressure and mutual attrition; while when several stones are found accurately fitted to each other, they are said to be articulating. Very rarely, these bodies have the shape of

flattened, leaf-like concretions, with glistening metallic surfaces; or they may assume the figure of pale-blue six-sided discs. Gall-stones which are formed in the branches of the hepatic duct are small, rough, or tuberculated, and of a dark color—so that they have been compared to black pepper-corns; while in a few instances they have been found branched and moulded to the shape of the bile-ducts in which they have been developed. And, lastly, gritty sand-like deposits (biliary gravel) are met with in the excretory passages of the liver; consisting either of very minute calculi, or of a powder made up of cholesterine and cholochrome.

The size of gall-stones varies from that of a small seed to a fowl's egg. Solitary are usually larger than associated stones. Their weight is inconsiderable; but when fresh their specific gravity is greater than that of water or bile, though on being dried it becomes less, so that then they readily float in water.—Their shades of color vary from a pearly white (when consisting of almost pure cholesterine) to a deep black; but perhaps most frequently they are of a reddish-brown tint.—According to Frerichs, two forms of structure are met with: (1) The simple, homogeneous calculi, of a uniform texture, and presenting an earthy, saponaceous, or crystalline fracture. They are rare. (2) The compound calculi, consisting of a central nucleus, surrounded by a body or case of greater or less thickness, which in its turn is usually covered by an outer crust. In the majority of calculi there is a brown or black *nucleus*. Dr. Thudichum in his admirable treatise* has shown that this nucleus sometimes consists of casts of the biliary tubes. Rarely it has been formed of some foreign body,—as of a dried-up ascaris, a fragment of a Fasciola hepatica, a plum-stone (the stone having been developed in an abscess of the liver, the result of a perforating gastric ulcer), and part of a needle three-quarters of an inch long. Sometimes four or five nuclei are observed, the result of the consolidation of originally separate calculi. The *body*, or that part of the concretion between the nucleus and crust, is generally striated, and consists of radiated crystals of cholesterine; or it presents concentric laminæ; or it is formed of an irregular mixture of cholesterine, with coloring matter and the products of decomposing bile. The outer *crust* can often be separated from the body like a shell: it consists of concentric layers, of different thickness; and it may be made up of cholesterine, or of a compound of cholepyrrhin and lime, or of carbonate of lime.—The ingredients of gall-stones are,—cholesterine (commonly from 80 to 90 per cent.); cholochrome or coloring matter, combined with earthy and alkaline salts—such as phosphate and carbonate of lime and magnesia; together with biliary and fatty acids. Gall-stones arise from a decomposition of the bile, akin to putrefaction. The cholesterine of human bile "is dissolved in the taurocholate of soda. But as soon as the acid of this salt is decomposed the cholesterine is set free, crystallizes, and deposits upon any particle that may happen to be within easy distance, in the manner of all crystals, which like to post themselves upon prominent bodies." (Thudichum, p. 167.)

The tendency to gall-stones is rarely manifested until between thirty

* A Treatise on Gall-Stones: their Chemistry, Pathology, and Treatment, p. 60. London, 1863.

and forty years of age, though a few instances are recorded where these bodies have been found during infancy, and even in the new-born child. It is probable that females are more liable to gall-stones than males, owing to their more sedentary habits. Excess in eating and drinking seems to predispose to the formation of these substances; and so does the habit of taking only one meal daily, in consequence of which the gall-bladder is not emptied as often as it should be. Moreover, gall-stones are thought by some authorities to occur more frequently in individuals of a tubercular, cancerous, or gouty diathesis, than in persons of a sounder constitution.

Calculi are but seldom met with in the branches of the hepatic duct. In this locality they generally present the appearance of small black seeds. They may give rise to dull pains about the liver, sometimes shooting to the shoulder; to symptoms of intermittent fever; to gastric disturbance, with nausea; while as they, for the most part, only cause temporary obstruction to the flow of a small quantity of bile, there is no jaundice.—The hepatic duct is rarely blocked-up by a concretion. When it is, the symptoms consist of intermittent pains, bilious vomitings, jaundice, and enlargement of the liver owing to the escape of bile from all the ducts being prevented. Sometimes fatal rupture of the hepatic duct has occurred.—Gall-stones may be present in the gall-bladder without producing morbid derangements. Occasionally, however, they set up catarrhal or plastic inflammation, with pains about the epigastrium, right shoulder, and hip; loss of appetite, indigestion, and constipation; while now and then ulceration and perforation have occurred. When the calculi leave the bladder and enter the cystic duct, they give rise—unless very small—to well-marked symptoms (hepatic or gall-stone colic). There is pain, commonly of an excruciating character, the patients throwing themselves about the bed, so as to get relief by change of posture; while the right hypochondriac and especially the epigastric regions are very sensitive to pressure. Nausea and vomiting rapidly come on, the ejected matters consisting of half-digested food; the bowels are confined, and get distended with flatus; in thin individuals the distended gall-bladder can be felt; there may be rigors, but more commonly only a sensation of coldness; while the pulse is almost always retarded. The larger the stone the greater will be the suffering and the longer its duration. If the stone recede into the bladder, the symptoms all cease; if it remain impacted, we may have dropsy of the gall-bladder, and perhaps ulceration or gangrene of the duct; while when it is forced onwards into the common duct there is a sense of partial relief. The pain returns, however, when the small duodenal orifice is reached. If the common duct be long occluded, jaundice must make its appearance, since there is no outlet for the bile. Where the obstruction is permanent the jaundice will gradually increase, the liver progressively enlarges, and the gall-bladder becomes much distended; while death will ultimately occur, unless the stone be forced into the bowel, or unless it induces adhesive inflammation and gets into the intestine or through the abdominal walls, after ulceration and perforation have taken place.

At the end of an attack of biliary colic, the fæces should always be examined for the calculus; which can only be effectually done by washing them on a sieve with large quantities of water. Unless the stone come away, it may lodge in some portion of the small intestine, gradu-

ally become incrusted with fæcal matter, and at the end of a few months produce fatal obstruction of the bowels. On the 2d September, 1858, I saw, in consultation with Mr. H. J. Radcliffe, of Brentford, a lady fifty-nine years of age, who had experienced a severe attack of jaundice the previous Christmas. For this attack she had failed to have advice. Her recovery had apparently been perfect. On my visit she was suffering from complete obstruction of the bowels; which proved fatal eight days afterwards, *i.e.* fifteen days from the commencement of the seizure. At the autopsy, a gall-stone, surrounded with layers of animal matter and as large as a walnut, was found tightly wedged into the ileum just six inches above the cæcum.*

In the treatment of gall-stone disease we have first to relieve the pain and other derangements; and secondly, to cause the expulsion of the concretion, as well as prevent the formation of any fresh ones. For the first purpose, a hot water or vapor bath will be useful. Then the abdomen should be covered with the extracts of belladonna and poppies (F. 297), and hot fomentation flannels or large linseed poultices. At the same time, a full dose of opium or morphia with ether, and tincture of belladonna (F. 315) is to be given; or if there be much sickness the officinal opiate enema, to which thirty drops of tincture of belladonna have been added, must be employed. The inhalation of chloroform or ether is also of great service. Ice should be sucked to relieve the vomiting; unless from the patient's condition it be thought better to encourage the sickness, which can be best done by giving large draughts of hot water containing carbonate of soda. With regard to the quantity of opium that may be exhibited, no positive rule can be laid down. The dose must generally be sufficient to relieve the pain, but still it is to be given with caution; while care ought to be taken that it is discontinued immediately ease has been procured. Moreover, when full doses have been employed for a few days in succession, fatal narcotism may occur unexpectedly. Cases somewhat like that related by Dr. Percival† are not so very rare.—The second indication in the treatment—the expulsion of the calculus and the prevention of further formations—is to be carried out by the administration of purgatives. Castor oil, Seidlitz powders, or the officinal pills of colocynth and henbane, generally act well. Remedies for dissolving gall-stones are useless. Where there are no active symptoms, and yet it is believed that one or more calculi remain in the gall-bladder, saline aperients (F. 148, 149) should be persevered with for some time. A visit to the springs of Carlsbad (F. 496), Vichy (F. 479), Ems (F. 486), or Eger (F. 498), may be strongly recommended. In all cases the diet ought to be carefully regulated; and such exercise recommended as can be borne without inducing any pain.

* Lancet, p. 447. 30th October, 1858.

† "A youth who was admitted into the hospital at —— on account of a violent spasmodic disease, which recurred periodically in the evening, after trying a variety of remedies, was directed to take the *extractum Thebaicum*, in such a quantity as might prove sufficient to mitigate the violence of the paroxysms. The dose amounted to twenty-two grains, and was repeated every night, during the space of a week, without producing any soporific effect. On the eighth night it was observed that he had no return of the spasm; and in the morning he was found dead. It is probable that a sudden alteration had taken place in the nervous system of this patient, and that the opium in consequence of it, exerted, with full force, its usual powers on the body."—The Works, Literary, Moral, and Medical, of Thomas Percival, M.D., &c. Vol. iii, p. 422. London, 1807.

VIII. JAUNDICE.

Jaundice (from the French *Jaunisse*), or Icterus (perhaps from *Ἰκτὶς*, a weasel, the eyes of which are yellow), is a prominent symptom of many varied morbid actions. Like albuminuria, glucosuria, &c., it is not a separate disease; but rather a symbol indicative of changes going on in important internal organs.

Pathology.—The manner in which jaundice is produced has long engaged the attention of pathologists; and even now further observations and experiments are needed to solve many of the difficulties surrounding this question. According to Dr. Budd, it may be set up in two ways: 1st, by some mechanical impediment to the flow of bile into the duodenum, and the consequent absorption of the retained bile; and 2d, by defective action on the part of the secreting substance of the liver, owing to which the biliary ingredients accumulate in the blood. Hence we may have jaundice, as the result either of obstruction or of suppression.

With regard to the first point there is no dispute, and it is allowed that the greatest number of cases of jaundice are due to the reabsorption of secreted bile. But as to the second hypothesis Frerichs argues that, if it be true, the biliary acids and bile-pigment ought to accumulate in the blood in cases of granular liver, just as urea accumulates in the circulation in granular degeneration of the kidneys. Yet all attempts to detect traces of the essential elements of the bile in the blood generally, and in that of the portal vein in particular, have failed; neither the coloring matter nor the acids of the bile having been found. Moreover, Moleschott kept some frogs alive for several weeks after depriving them of their livers; but no trace of the elements of bile could be detected in the blood, lymph, urine, or muscular tissue. Frerichs therefore suggests that those cases of jaundice which occur without any mechanical obstruction of the excretory ducts of the liver (such as the jaundice of pyæmia, typhus, and snake-bites) are due to an arrested consumption of the biliary acids which have been reabsorbed into the blood, either from the intestine, or directly from the liver. He endeavors to show, that even in health, all the bile formed in the liver does not pass into the ducts, but that a portion of it enters the hepatic veins along with the sugar. The biliary acids thus entering the blood, or which become reabsorbed from the intestine, are supposed to undergo certain changes from oxidation; which may thus account for the quantity of taurine that has been found in the healthy lung, and for pigments which are naturally voided in the urine. When, however, anything interferes with these normal metamorphoses in the blood, it is thought that the complete change of the colorless bile into urinary pigments is arrested, and that the intermediate substance—bile-pigment—is formed in the blood, so as to color the various tissues and secretions.—Now there are great objections to this theory of Frerichs, and Dr. Harley has especially shown that the view as to the bile-acids being changed into bile-pigment is quite untenable. It will be remembered (see p. 40) that this gentleman believes that while some of the constituents of the bile are generated in the liver itself, there are others which exist preformed in the blood. "If this view of the biliary secretion be correct, it is per-

fectly evident that when the secretion of bile is arrested, those substances which the liver generates will be entirely wanting, while those which it merely excretes from the blood will accumulate there as soon as their excretion is prevented."* Consequently, in jaundice from obstruction all the elements of the bile will be reabsorbed into the circulation; while in that from suppression there will only be an accumulation in the blood of the coloring matter of bile and cholesterine, no bile-acids being present, since none have been formed.

Causes.—It need hardly be said that jaundice is due to some derangement of the functions of the liver. The chief difficulty is, however, in assigning the nature or origin of the derangement in different cases, since this gland is affected by many dissimilar agencies. To make the subject as clear as the present state of medical science will permit, the causes of jaundice may be thus arranged:

1. *Narrowing of the hepatic and common ducts,*—
   - α. Catarrhal inflammation of the mucous lining.
   - β. Compression of the under surface of the liver by fecal accumulations in the colon; by large ovarian tumors; by the pregnant uterus; as well as by cancerous and other degenerations of the lymphatic glands in the fissure of the liver.
   - γ. Obstruction by gall-stones, plugs of inspissated mucus, hydatids, and foreign bodies which have entered the ducts through the orifice in the duodenum.

2. *Closure of the hepatic and common ducts,*—
   - α. Adhesions between the walls, the result of adhesive inflammation or of ulceration.
   - β. Firm impaction of gall-stones and other bodies.
   - γ. Constant pressure from without by carcinomatous and other tumors of the pylorus, of the duodenum, of the head of the pancreas, and of the outer surface of the liver.

3. *Constriction or closure of the bile-ducts within the liver,*—
   - α. Cancer, hydatid tumors, inflammatory exudations, &c., implicating the larger branches or the capillary tubes to a great degree.
   - β. Pressure exerted upon the ducts by enlargement of the hepatic cells in fatty degeneration.
   - γ. Congestion of the bloodvessels, the dilated capillary vessels compressing the ducts.

4. *Destruction of the hepatic cells,*—
   - α. Acute atrophy.
   - β. Cirrhosis.
   - γ. Amyloid and fatty degenerations, &c.

5. *Jaundice without structural changes in the liver.*—There is either impeded circulation through the gland from distant disease, or some morbid change in the blood, or deranged innervation, or a combination of all three conditions. Or perhaps some of the ingredients of the bile

* Jaundice: its Pathology and Treatment, p. 21. London, 1863.

may be present in the blood in greater excess than the hepatic cells can separate. This set of causes may be thus tabulated:

α. Diseases of the lungs, heart, and nervous system.
β. Mental emotions.
γ. Dyspepsia.
δ. Snake-bites, alcohol, chloroform, &c.
ε. Ichorhæmia, typhus, and relapsing fever.
ϑ. Remittent and intermittent fevers.
η. Yellow fever.
θ. Epidemic jaundice.

The foregoing table is only formidable in appearance. It needs no explanation, since the different diseases which give rise to jaundice have been treated of in the preceding pages. And after all, the point which it is chiefly important to bear in mind is this,—that all forms of jaundice may be included under two heads, those due to suppression of the biliary functions, and those which arise from reabsorption of the secreted but retained bile. After jaundice from obstruction has existed some time, however, suppression likewise occurs; owing to the backward pressure exerted on the hepatic parenchyma by the over-distended bile-tubes impeding the circulation of the blood.

Symptoms.—The skin and conjunctivæ are of a yellow color; the urine has the hue of saffron, or a brownish-black tinge, according to the quantity of bile-pigment present; and the fæces are whitish, or of a light clay appearance. A peculiar itching of the skin is occasionally complained of; there may be exhaustion, drowsiness, giddiness, and peevishness; a bitter taste is sometimes experienced; the pulse is often slow; while the function of digestion is more or less interfered with, especially as regards fatty articles of food. The addition of nitric acid, drop by drop, to some urine on a white plate, produces the well-known play of colors from brown to green, blue, violet, and red, which is characteristic of the presence of bile-pigment. In some exceptional instances, the corneæ, or the aqueous and vitreous humors have become jaundiced, and then all objects appear of a yellow hue.

When the disorder is of long continuance, there may be stupor, delirium, and other indications of cerebral derangement; the patient also becomes weak and thin from mal-nutrition; and frequently there appears to be a tendency to hemorrhage—as epistaxis, bleeding from the gums, purpura, &c. Supposing there is obstruction from a gall-stone, the most acute suffering is induced; the pains being paroxysmal, and often attended with vomiting and hiccup. Should the concretion not pass through the duct, fatal exhaustion may set in.

Dr. Harley has well shown that the pathology of jaundice resulting from suppression is totally different to that arising from obstruction; and he points out a new mode of distinguishing these two conditions. Thus, in jaundice from suppression, the urine, if analyzed, will be found to contain only those biliary ingredients which exist preformed in the blood; while in jaundice from obstruction, besides these, the urine also contains the materials generated in the liver itself, and which have been reabsorbed into the circulation from the overcharged gall-bladder and ducts. To detect these conditions add gently to about two fluidrachms

of urine half a drachm of strong sulphuric acid, and a fragment of loaf sugar the size of a pea. If at the line of contact of the two liquids a purple or scarlet color is produced, it proves that the acids of the bile are present, and the jaundice is due to obstruction; but if merely a browning of the sugar be produced, the case is probably one of suppression.

Treatment.—The treatment of jaundice will of course depend upon the nature of the cause which has given rise to it. For it is clear, from the foregoing remarks, that the remedies which may effect a cure in suppression, will only aggravate the mischief in obstruction.

To detail all the remedies which may be called for, would only be to repeat the suggestions thrown out in many of the sections on the various diseases of the liver. It will therefore suffice to say that in jaundice from suppression the secretion of bile may be stimulated by purgatives,—such as mercury, podophyllin, and sulphate of soda with taraxacum, &c.; by benzoic acid; by the mineral acids; and by the alkalies, in small doses, taken on an empty stomach, since they excite the flow of gastric juice, which in its turn acts upon the liver and gall-bladder.

On the contrary, in jaundice from obstruction, attempts must be made to remove the impediment, and if possible to diminish the activity of the hepatic cells until this has been accomplished. Most frequently a gall-stone forms the obstructing body, and the treatment required under these circumstances has been already described. To check the activity of the liver, recourse is to be had to simple aloetic purgatives, or to a mixture of the sulphate and carbonate of magnesia, as well as to mild diuretics. The food ought to be light and capable of being easily digested; while alcoholic stimulants should be avoided. Dr. Harley speaks highly of the use of pig's bile in cases of long-continued obstruction. Two capsules, each containing five grains of the prepared bile (F. 170), are to be given between two and three hours after the meal, when gastric digestion being almost concluded the food is about to pass into the duodenum. The bile thus taken, seems in a measure to supply the deficiency of the natural secretion; the persistent absence of which causes great emaciation with weakness, and ultimately death from exhaustion, owing to the imperfect manner in which the food becomes assimilated.

PART IX.

DISEASES OF THE PANCREAS AND SPLEEN.

I. DISEASES OF THE PANCREAS.

THE pancreas (*Πᾶν*, all; *κρέας*, flesh) is a conglomerate body, analogous in structure to the salivary glands, though of a softer and looser texture. In length it varies from six to eight inches, its breadth is an inch and a half, and its weight from two to three ounces. From five to eight ounces of pancreatic juice are secreted daily: this fluid being analogous to saliva, viscid, alkaline, and having a sp. gr. of 1.008. It transmutes starch into sugar and lactic acid, and forms fats into an emulsion so that they become easily absorbed; this action of producing fatty emulsions being increased by the mingling of the pancreatic secretion with the bile, as well as with the intestinal juices derived from Brunner's and Peyer's glands, and the follicles of Lieberkühn, &c.

Disease of the pancreas is comparatively of rare occurrence. The symptoms are generally obscure; so that it is commonly impossible to diagnose the exact nature of the disease, or its extent, although we may feel tolerably certain that this gland is the seat of mischief.

The morbid conditions of the pancreas which may be met with are—congestion, hypertrophy, inflammation, suppuration, induration, serous softening, fatty degeneration, atrophy, simple cystic tumors, hydatid cysts, and scirrhous or medullary cancer. Calculous concretions—composed of carbonate and phosphate of lime, cemented by animal matter—are not uncommonly found in the pancreatic duct or its branches: they are usually of a white color, of variable size—ranging from a pea to a walnut, and they exist either singly or in numbers up to fifteen or twenty. These various affections are generally accompanied by enlargement and tenderness of the gland; while they often give rise to pain in the epigastrium with fulness or hardness, a sensation of heat and constriction, salivation, nausea and vomiting, loss of appetite, inodorous eructations, mental depression, and debility with emaciation. In some cases the vomiting has proved exceedingly obstinate; the matters ejected being large in quantity, thin, ropy, and with a slightly sour or saltish flavor. Where the common choledic duct is pressed upon by a tumor of the pancreas, or is involved in structural disease affecting the head of this gland, there will be persistent jaundice. Fatty stools have also been noticed in connection with certain diseases of the pancreas; for if the pancreatic juice is not secreted in due quantity, or if its flow into the duodenum be obstructed, the oily

portions of the food will not be reduced to an emulsion, and hence instead of being absorbed must be discharged with the fæces.

The *treatment* of supposed pancreatic disease can only be conducted on general principles; that is to say, by chiefly alleviating the most prominent symptoms. As regards those cases where the vomiting is troublesome, drugs seem to be perfectly useless. In one instance I found benefit from the employment of enemata containing a little opium and the solution of raw beef (F. 2); together with the introduction of a large seton in the abdominal wall over the seat of the gland. This seton was employed empirically, and in despair from finding all other treatment ineffectual.

II. DISEASES OF THE SPLEEN.

The spleen is of oblong and flattened form, soft, elastic, very vascular, and of a dark purple color; while in appearance it more resembles the placenta than any other organ. It is situated in the left hypochondrium; its weight being very variable, but averaging six ounces, its length about five inches, and its breadth rather more than three inches. The external surface is convex, and separated from the lower ribs by the under surface of the diaphragm: the internal border is concave, is in relation with the cardiac end of the stomach, and is divided by a vertical fissure—the hilus, at which apertures are found for the entrance and exit of the vessels and nerves. As the spleen has no excretory duct, it is often classified with glands similarly constructed (the thyroid, thymus, and supra-renal capsules); but whether the ductless glands have all a common function is uncertain.

Dr. Crisp regards the spleen as "comparatively an unimportant organ in the animal economy;" and considers "that one of its offices is that of affording an adequate supply of blood to the stomach and liver, and to act as a reservoir for the blood when the balance of the general circulation is deranged;" while another office is "to secrete an albuminous fluid, which performs some part in the process of sanguification." —The result of Mr. Gray's investigations led him to conclude that the function of the spleen "is to regulate the quantity and the quality of the blood."*

The proposition, that the presence of this gland is absolutely necessary for the maintenance of life, cannot be supported. The spleens of many animals have been removed; and where the operation has not proved directly fatal (owing to the shock to the system or to the development of peritonitis), the general health seems neither to have suffered, nor the duration of life to have been shortened. In the year 1835, a Mr. Eagle advised all farmers to remove the spleens of their pigs for the purpose of fattening them more readily; while he also seems to have hinted that the extirpation of this organ would be justifiable in some cases of phthisis in the human subject.† And this proposal has

* On the Structure and Use of the Spleen. By Henry Gray, F.R.S., &c. London, 1854.

† A Treatise on the Structure and Use of the Spleen. By Edwards Crisp, M.D., &c., p. 138. London. No date. Dr. Crisp gives the Lancet for 1835, as his authority; but I have been unable to find any remarks on this subject in the volumes for the year mentioned.

not been deemed altogether unworthy of notice; for not only has the operation been performed, but Dr. Gustav Simon, of Darmstadt, has written a work on purpose to condemn it.* As, however, this gentleman compares it with ovariotomy, and looks upon both as unjustifiable proceedings, his views might not be considered of much value were it not that they are in some measure enforced by the histories of certain curious cases. Amongst these is to be found the doubtful instance related by Fioravanti in 1549, who persuaded Zaccarelli to excise the spleen (weighing thirty-two ounces) of a young Greek lady, by making an opening into the abdomen through the left side. The patient is said to have been quite well in twenty-four days.—In 1826, Quittenbaum removed an enlarged spleen, after passing a ligature round the vessels forming a pedicle of the organ; but the patient (a married woman, 22 years old) died in six hours. There was, however, cirrhosis of the liver with ascites.—Dr. Küchler's case occurred in 1855, the spleen being removed while the patient (a man, 36 years of age) was under the influence of chloroform. He seemed comfortable immediately after the operation; but sank suddenly at the end of two hours, from internal hemorrhage.—The case of Dr. Julian Schultz also happened in 1855. A woman fell from a height on to a cart-rack, which penetrated between the ribs and made a wound through which the spleen protruded. The latter was removed, and the patient left the hospital in good health at the end of a month.

The spleen has been partially removed in a few instances with success. Thus, in December, 1738, Mr. John Ferguson related to the Fellows of the Royal Society the history of Thomas Conway, who was wounded with a large knife, which passed through the muscles of the fore-arm and into the left hypochondrium. The man was not seen until twenty-four hours after the accident; when the spleen was found protruded and quite cold, black and mortified. A strong ligature was placed above the unsound part, and three ounces and a half of the gland cut off; the remainder being returned into the abdomen, with the ligatures hanging externally. The latter came away on the tenth day, and the recovery was subsequently complete.†—M. Berthet has reported the following: A man in the prime of life had the left side laid open by a cut. Eight days afterwards, M. Berthet found a hernia of the spleen, this gland being softened and emphysematous, and giving off a putrid smell. A ligature was placed around the protruded part, and most of the latter was immediately excised. The patient was cured; and afterwards enjoyed good health for thirteen and a half years. He then died from pneumonia; and at the autopsy there was discovered the remainder of the spleen about the size of a hazel-nut, attached to the stomach.‡

The spleen may suffer from congestion, inflammation, softening, abscess, and gangrene; from tubercular, or from malignant disease; from fibrinous deposits—the remains probably of extravasated blood; from

* Die Exstirpation der Milz am Menschen, nach dem jetzigen Standpunkte der Wissenschaft beurtheilt. Giessen, 1857.

† The Philosophical Transactions (from 1732 to 1744), Abridged, &c., vol. ix, p. 149. London, 1747.

‡ Archives Générales de Médecine. 4e Série, tome v, p. 510. Paris, 1844.

the formation of serous and hydatid cysts in it; and also from simple enlargement.—Individuals of all ages are liable to the foregoing affections; but they are more commonly met with among the residents of tropical and marshy than of temperate countries.

It can be readily understood that an organ like the spleen,—made up of an elastic fibrous framework (trabecular tissue), of Malpighian corpuscles, and of spleen-pulp—may become overdistended with blood from slight causes, and especially from such as interfere with the action of the skin, or of the liver, or of the kidneys. But congestion thus produced is seldom of any consequence, unless from its long continuance the elastic power of the organ gets so reduced that the accumulated blood cannot be urged forward. Probably in cases of the latter kind inflammation may be set up, leading either to softening or to permanent induration.—In cases of suppuration, the spleen generally becomes connected with other organs by firm adhesions. The contents of the abscess may thus make their way through the diaphragm and into the left lung, so as to be expectorated; an instance of which, ending in recovery, has been recorded by Dr. Nasse, of Bohn. So also, the pus may be discharged into the stomach, colon, or peritoneal cavity; while in other cases it obtains an exit through the muscles and skin.—I am only acquainted with a very few recorded examples of tubercular deposit occurring merely in the spleen; but genuine tubercles are not unfrequently found scattered through this gland in the bodies of children who have died from tabes mesenterica, as well as of adults who have perished from general tuberculosis.—Cancer occurs very rarely; while where it has been discovered there has usually existed malignant disease of the liver and mesenteric glands.—When the spleen is ruptured from a blow, &c., death generally occurs with all the symptoms of internal hemorrhage.

Enlargement of the spleen (vulgarly known as "ague-cake") is readily diagnosed by the situation of the tumor in the left hypochondrium, by its general appearance and shape, and by the history of the case. It results most commonly from intermittent fever or ague; but as a rule only after several attacks. Patients affected with tumid spleen can sometimes be immediately recognized by their peculiar sallow and unhealthy aspect, by the dingy discoloration of the conjunctivæ, and the anæmic appearance of the gums and oral mucous membrane. The sufferers are also not unfrequently liable to hemorrhage from various tissues of the body; there is deranged digestion, irregularity of the bowels, and dark-colored offensive motions; there is muscular debility; and we often find a general unhealthy state of the system, with a tendency to sloughing sores from slight causes. The gland may be tender on pressure; but severe pain is seldom present unless the peritoneal covering be acutely inflamed. In protracted cases, general dropsy may set in. When the blood is much altered from its natural condition, as it often is with the splenic cachexia, we can sometimes detect a systolic cardiac bruit; but abnormal præcordial dulness with cardiac murmur may likewise arise from an enlarged spleen displacing the heart upwards, and preventing the free descent of the diaphragm and full expansion of the left lung.

In many splenic affections the disease seems to have wonderfully little effect on the general health; a feature which lends further support to

the physiological doctrine that this gland is not a very important one. In some few cases which have been under my care, the enlargement has been so great that the gland has occupied the entire left half of the abdomen; and in these, general debility has been the prominent symptom. The structure of the spleen may not be otherwise than healthy in such instances of enlargement; or the tissues may be indurated and the capsule thickened; or there may be numerous cysts scattered throughout the gland.

When the enlargement is the result of ague, purgatives with bark or quinine will be necessary. In other cases steel, or the bromide of potassium may prove the most efficacious remedies. Mercury in any form is injurious; and so is depletion. Under all circumstances, the general health must be supported by good nourishing food; as well as by cheerful mental occupation, with residence in a dry and bracing locality.

PART X.

DISEASES OF THE ABDOMINAL WALLS.

I. INFLAMMATION OF THE PERITONEUM.

THE peritoneum (*Περιτείνω*, to stretch all over) or serous membrane lining the abdominal and pelvic cavities, and investing the viscera, may suffer from acute or chronic inflammation.

1. Acute Peritonitis.—Acute inflammation of the peritoneum is a serious disease, accompanied with pain and swelling of the abdomen, and severe symptomatic fever. It may attack individuals of all ages, and every rank in life; though it is perhaps seen most commonly among the poor, since cold and damp will induce it in systems enfeebled by bad living. The average annual number of deaths from peritonitis, registered in England during the ten years 1853–62, has been 1443; the greatest mortality (1563) having occurred in 1861.

All serous membranes become vascular and of a bright-red color under the influence of the inflammatory process; a large number of small scarlet patches at first appearing, which gradually coalesce and spread until perhaps the whole tissue presents the characteristic hue. The morbid action may end in resolution, merely leaving the peritoneum opaque and thickened; or if it proceed beyond a certain stage there will be effusion of serum—perhaps to such an extent as to produce inflammatory dropsy, or coagulable lymph may be poured out, causing adhesion between the apposed surfaces of the membrane. In extreme cases suppuration and ulceration take place; and sometimes the large or small intestines have been perforated. Those parts of the peritoneum covering the stomach, omentum, mesentery, and bladder, appear less apt to become inflamed than the portions over the convex surfaces of the liver and spleen, the iliac fossæ, and the small intestines.

The earliest *symptom* in many instances is pain; which is at first confined to parts, but soon extends over the whole abdomen, is increased on pressure, and is attended with high fever. It is sometimes preceded by chilliness and rigors, with a feeling of weakness; in other cases it comes on abruptly, with acute distress in some part of the abdomen, frequently in the hypogastric or one of the iliac regions. The pain is generally exquisitely severe, it causes much depression, and is aggravated by any movement which calls the abdominal muscles into action,—such as passing a stool, voiding urine, or even taking a full inspiration. An examination can scarcely be borne, pressure—even the weight of light bedclothes—being insupportable; the patient consequently lies quiet on his back, with his knees bent, and the legs drawn up. The abdomen is

tense, hot, and frequently tympanitic; the bowels are constipated, and there is often nausea and vomiting; the skin is burning and very dry; while the pulse is rapid and weak, the respirations are hurried, there may be hiccup, and the tongue is thickly furred. Moreover, the countenance is always expressive of suffering, and of great anxiety. After a time the belly ceases to be tympanitic, but remains somewhat enlarged from the effusion of serum. When a fatal termination is approaching, the abdomen often becomes much distended, the pulse gets very feeble and quick—140 or upwards, the countenance assumes a ghastly expression, a cold clammy sweat covers the body, and death occurs from exhaustion within eight or ten days from the beginning of the symptoms.

The principal *causes* of peritonitis are cold and damp, mechanical violence, perforation of the stomach or intestines, the bursting of hepatic abscess, &c. It may also arise from inflammation of the stomach or intestines; from disease of the ovaries and uterus; and from the contamination of the blood by morbid poisons—especially perhaps by that of erysipelas.

That fearful malady of women recovering from child-bearing termed Puerperal Fever, is very generally accompanied by peritonitis; or perhaps it may be more precise to say that in the most common form of this disease the force of the poison seems to be expended upon the peritoneum. It usually comes on about the third day after labor, but sometimes not until the fifth; beginning with one or more rigors followed by fever. The inflammation commences in the uterine portion of the peritoneum, and spreads rapidly over the whole of its surface; while in its symptoms it does not differ from common acute peritonitis. It seems to result from contamination or poisoning of the blood, either by putrefaction of part of the placenta left in the uterus, or by the absorption of some of the products of inflammation; or it may arise from indirect exposure to the poison of erysipelas, or to effluvia given off by the dead body; or it may be due to direct contagion, as is seen in lying-in hospitals. There is, unfortunately, no doubt that this disease may be carried by a third person from one parturient woman to another (see p. 43); hence a practitioner when he has attended a patient with puerperal fever, is bound, I believe, to discontinue for a time his attendance upon cases of labor. Changing his clothes, washing his hands with a solution of chlorine or of cyanide of potassium, wearing oil-silk gloves, will not—it is to be feared—prevent him from carrying the poison of this malignant disease about him; and I should therefore recommend, that he absent himself from the lying-in room for at least three weeks from the last day of his exposure to the fever. In proof of the justice of these remarks it may be mentioned, as noticed by Dr. Armstrong, that in an epidemic of this disease which occurred in Sunderland in 1813, forty-three women suffered; of these, forty were attended in their labors by one surgeon and his assistant.

In the *treatment* of acute (as well as of puerperal) peritonitis, the patient's diet must at first be restricted to milk and water, arrowroot, and beef-tea; allowing plenty of diluents, such as iced water, tea, barley water, &c. The greatest quiet ought to be maintained in the sick-room, the air of which should be warm but pure. As I have no faith in the power of antiphlogistic remedies for checking the inflammation, so I

never resort to them. But we have one remedy which is invaluable, and that is opium. This drug should be given, in grain doses, every three or four hours until the pain is thoroughly relieved; and I believe that by it alone we may often save the patient's life. Sedative fomentations, properly and sedulously applied, also give great relief; or covering the abdomen with a mixture of four parts of extract of poppies to one of extract of belladonna, and then fomenting, will prove very serviceable. As I have adopted this plan of treatment in all my cases for the last few years, and am fully convinced of its value, I trust that it will be fairly tried without inflicting general bleeding, blisters, antimony, and mercury on the sufferer. Even leeches are quite unnecessary; provided the fomentation flannels be applied loaded with steam, and that they are changed every fifteen or twenty minutes. Linseed or hemlock poultices, made thick enough to retain their heat for three or four hours, may be advantageously substituted for the fomentations as soon as the patient can bear their weight without inconvenience.—In all instances purgatives by the mouth do harm; but if there be evidence to show that the large intestine is oppressed with fecal matter, the latter should be removed with one or two enemata.—Directly great exhaustion sets in stimulants must be given; no agent of this class being better than brandy. Essence of beef, cream, raw eggs, quinine, and ammonia are also often invaluable in staying that prostration which, unless properly treated, soon ends in a fatal collapse.

2. Chronic Peritonitis.—This is sometimes the sequel of an acute attack, though more frequently an independent affection.

M. Louis is of opinion that this disease, when not following acute inflammation, is always complicated with tubercles. But Dr. Hodgkin says,*—"My own inspections would lead me also to the conclusion that chronic peritonitis is very frequently conjoined with tubercles; yet this concurrence has not been so uniformly supported by cases observed in this country as it has been by Louis's cases. That form of peritonitis which is accompanied by copious effusion, and which might easily be regarded as ascites, occurs without any appearance of tubercles. The same may be said of other cases in which the concrete product of inflammation had been more considerable."

Young children, especially such as manifest the strumous diathesis, are very often affected with *tubercular peritonitis*. It is by no means confined to them, however, for it is not unfrequently met with in adults between 18 and 25 years of age; particularly in those who, being hereditarily predisposed to phthisis, have led dissipated lives, or have been exposed to great hardships with insufficient food. In examining the peritoneum after death its substance may be found studded with miliary tubercles; or there may be a more abundant tubercular deposit, which with lymph glues the coils of intestines together, while it covers the liver and spleen with thick cheesy membranes. Sometimes one or more of the masses of tubercle in their softening give rise to ulceration and perforation of the intestinal coats; a fecal abscess alone resulting, since effusion of the contents of the bowel is prevented by the adhesions which have previously formed. In the same way different portions of

* Lectures on the Morbid Anatomy of the Serous and Mucous Membranes. Vol. i, p. 149. London, 1836.

intestine may communicate with each other by fistulous openings, without even fecal abscess resulting. I have also seen the fecal abscess lead to perforation of the abdominal parietes—an artificial anus.—As a general rule, the mesenteric glands are enlarged and indurated; while, if the morbid action has been of some duration, they will be found softened in their centres.

The *symptoms* of chronic peritonitis are somewhat obscure, the abdominal pain being usually slight. There are often attacks of colic, while at other times there may be fever with diarrhœa. Generally, treatment gives relief for a time; but after a few weeks the abdomen again gets tender and becomes tense, there is more obstinate diarrhœa with nausea, while the patient wastes rapidly and becomes very anæmic. After a time effusion of fluid takes place, the abdomen enlarges, and fluctuation is felt. When with tubercular peritonitis there is combined disease of the mesenteric glands, phthisis, &c., the disease rapidly progresses towards a fatal termination.

The *treatment* must consist in attention to the bowels; in allowing a mild but nutritious diet, with plenty of milk or cream, raw eggs, and the solution of raw meat (F. 2); and in employing blisters or stimulating liniments to the abdomen. The application of the iodine liniment diluted with three or four parts of spirit, or of the compound iodine ointment, may also be recommended. I think I have seen benefit likewise from the internal use of iodine—particularly the iodide of iron, from bark with sedatives, and especially from cod-liver oil. These cases are, it need scarcely be added, very unpromising.

II. ASCITES.

Ascites (Ἀσκὸς, a wine-skin or leather bottle,—because of the swollen condition of the belly), or dropsy of the peritoneum, consists of a tense swollen condition of the abdomen, owing to the presence of a watery fluid in the cavity of the serous membrane by which it is lined.

Causes.—The dropsy may arise from chronic peritonitis; from cirrhosis, cancer, obliteration of the portal vein, and scrofulous disease of the liver, causing obstruction to the free passage of the blood through the system of the vena portæ; from Bright's disease of the kidney; from disease of the heart, or of the aorta; from disease and enlargement of the spleen; from malignant affections of the omentum; and from a few other more simple disorders. Cirrhosis and renal disease are, however, the most common causes.

Pathology.—This subject has already been treated of in the remarks on dropsy (p. 88).—The fluid of ascites is usually clear, of a pale yellow color like urine, of an alkaline reaction, and often loaded with albumen. An analysis of this fluid by Marchand showed the composition to be as follows:

Water,	952.30
Albumen,	23.80
Urea,	4.20
Chloride of sodium,	8.10
Carbonate of soda,	2.10
Phosphate and sulphate of soda,	0.60
A viscid substance,	8.90
	1000.00

Symptoms.—The appearance of the patient is often characteristic. The upper part of the body may be much wasted, the features pinched, and the countenance very anxious, while the abdomen is greatly enlarged. On examining the latter it is not only found distended, but the integuments have a shining appearance, while the superficial veins are generally dilated. Fluctuation is more or less appreciable, according to the quantity of fluid and the thickness of the abdominal walls. In the advanced stages, there may be considerable dyspnœa, owing to the pushing upwards of the spleen, stomach, and liver. Auscultation of the chest shows that the respiratory murmur cannot be heard as low as in health; that there is tubular breathing in the interscapular regions, especially towards the left side; and that the apex of the heart is elevated, and rather pressed to the left. Commonly there is anasarca—infiltration of limpid serum into the areolar tissue—with the ascites; in most cases the former being confined to the lower extremities, though the face and arms may also be affected, particularly in examples of renal dropsy. The tissues affected with anasarca "pit," on applying pressure. The urine is usually scanty, and often loaded with lithates; while in ascites from cirrhosis it generally contains bile, and in that from renal disease there is an abundance of albumen.—The general health gradually deteriorates; while the patient gets weak and emaciated, loses all appetite, is restless at night, and suffers much from mental depression.

Diagnosis.—In typical cases the diagnosis is easy enough; but every now and then the physician meets with an instance where a very thorough investigation is needed to prevent any error.

On examining a case of ascites, in which the fluid effused is tolerably abundant, a general fulness of the abdomen can be distinctly noticed. If the patient be standing upright, the fulness will seem to be most prominent below the level of the umbilicus; but on lying down, the abdomen will become more flat, while both the flanks will bulge outwards. When placed on one side, the lowermost part will exhibit the greatest prominence. Supposing the quantity of liquid to be excessive, there may be found a general abdominal enlargement, uninfluenced by the posture assumed; while the abdomen will also appear to encroach considerably on the thorax, and the xiphoid cartilage with the cartilages of the lower ribs will be much everted. By practising palpation some very characteristic signs may be discovered. The great evenness of the enlargement, together with the sense of resistance and weight which is experienced on pressing the hand towards the spine, will first excite attention. Then the evident sense of fluctuation communicated to the fingers arrests attention; the waves being finer, and following more or less quickly upon the impulse, in proportion as the distension is great, and the fluid serous or of a watery consistence. Œdema of the abdominal wall, or the presence of much fat, obscures this last sign. On percussion, there will, in most cases, be found well-marked resonance over the higher parts of the belly, owing to the floating of the intestines; thus—as a rule—prominently distinguishing ascites from ovarian dropsy. I say, in most cases, for the distension is sometimes so great that the breadth of the mesentery is not sufficient to allow the intestines to reach the surface of the fluid, or the coils of intestines may be bound down by adhesions formed of coagulable lymph; and then in

either case, dulness must, of course, result. Again, there is occasionally—though very rarely—resonance on percussion in ovarian dropsy. This may happen after tapping, from the cyst filling with air; or it may occur from a communication forming between the cyst and the intestine, and so allowing of the escape of flatus from the latter into the former. I have noticed, however, that ordinarily where there is any real difficulty in the diagnosis of ascites and ovarian dropsy, the mere fact of difficulty may be taken as presumptive evidence in favor of the case being one of ascites. Ovarian dropsy very rarely simulates ascites. In both diseases there will be dyspnœa, which will be urgent in proportion to the distension. The quantity of the ascitic effusion is sometimes remarkably large. Several years since I was obliged—owing to the severe orthopnœa which existed—to tap a patient in the Hospital for Women suffering from ascites; when 460 ounces of a clear, urinous-looking fluid, loaded with albumen, were removed, the whole of which had been secreted in rather less than one month.

Prognosis.—This is always unfavorable in ascites from organic disease. When it is merely due to the action of cold causing congestion of the kidneys, or to functional derangements of the heart, or to an anæmic state of the blood, the danger is comparatively slight.—The deaths registered in England as due to ascites, average about 750 annually.

Treatment.—Supposing that the cause of the dropsy is remediable, our object must be to remove it. The cases where this can be done, are, however, quite exceptional. We have therefore to try and procure absorption of the fluid; and with this intent recourse is had to drastic purgatives, diuretics, and perhaps to mercurials. With regard to purgatives, few agents generally act better than the compound jalap powder, in doses varying from sixty to one hundred and twenty grains. Elaterium (F. 157) is often useful; so is calomel with jalap (F. 159), podophyllin (F. 160), gamboge with aloes and blue pill (F. 174), and croton oil (F. 168). The best diuretics, perhaps, are the acetate of potash, squills, and broom tops (F. 219); or the solution of potash, nitrous ether, and digitalis (F. 220); or spirit of juniper, nitrous ether, and winter green; or digitalis and squills, with blue pill or taraxacum (F. 219, 224); or urea (F. 225), where the kidneys are healthy; or nitric acid and taraxacum, where a tonic action is also needed. The hydrochlorate of ammonia, either singly or with taraxacum (F. 60), has been found useful in Germany. I have seen benefit also from the iodide of potassium, combined with the ammonio-citrate of iron (F. 32), when there has been great debility. As a rule, in ascites dependent upon renal disease, diuretics do harm; while calomel, blue pill, &c., prove especially pernicious. We had better therefore, in such instances, trust to purgatives, to nitric acid in some bitter infusion, together with frequent hot-air or vapor baths.

When the distension gives rise to much distress, we must resort to paracentesis. In performing this operation, the individual to be tapped ought to lie upon the left side, along the edge of the bed; and the trocar and canula should be introduced midway between the umbilicus and pubes. The horizontal position is preferable to any other; since it is the most comfortable to the patient, no pressure is required upon the abdomen, and especially because syncope is much less likely to fol-

low the evacuation of the fluid. After the operation I pad and tightly bandage the abdomen, and generally continue the use of compression for two or three weeks, or even longer where it seems to be beneficial; while at the same time iodide of potassium is given, and occasionally alterative doses of mercury. In spite of all treatment, however, the fluid is usually—but by no means always—re-secreted; and in such cases the disease ultimately proves fatal.

III. ABSCESS OF THE ABDOMINAL PARIETES.

Severe contusions of the abdominal walls may be produced by kicks, blows, a fall upon some prominent object, or a squeeze between the buffers of two railway carriages, &c. The consequences are often very serious. A blow sometimes causes death immediately, owing to syncope from the shock to the solar plexus of the sympathetic. In other instances there may be laceration of some internal structure, with hemorrhage; the injured individual, often but not necessarily always, dying at the end of a few hours, from the combined effects of shock and loss of blood. Occasionally, the contusion causes rupture of an internal organ, with extravasation of its contents. There may be no bruise nor other external symptoms of injury, and yet the tissues of the gall-bladder, liver, spleen, stomach, intestinal canal, or pregnant uterus may be torn through. The patient either dies soon afterwards from collapse, or from hemorrhage; or, surviving these dangers, from peritonitis after a longer interval. On the other hand, instances have occurred of laceration of the liver or kidney, where the patients having got over the first effects of the succeeding inflammation have yet fallen victims, at the end of a week or so, to blood-poisoning from the absorption of the extravasated fluids. And, lastly, a contusion may only set up inflammatory action in a limited portion of the abdominal wall, this action going on to suppuration.

Independently of external violence, an abscess in the abdominal parietes may be due to the extension of disease from other parts. Thus, it sometimes results from inflammation and suppuration of the vermiform appendix of the cæcum, the pus working its way to the surface somewhere about the right inguinal region. So again, suppurative inflammatory action is apt to occur in the areolar tissue of the pelvis, or in either ovary, especially in delicate and strumous women; the abscess afterwards pointing in one of the groins, in the hypogastric region, or in the vagina, bowel, &c. Inflammation and suppuration of the adipose and areolar tissues around one of the kidneys (perinephritic abscess) may occur from a blow or fall upon the back, or from some derangement of the general health. In favorable cases the abscess points in one loin; but occasionally the pus burrows amongst the muscles of the dorsal region, and may ultimately be discharged into the ureter, or into the cavity of the peritoneum. And, lastly, a circumscribed abscess may form in the peritoneum, as the result of partial or general peritonitis; the pus, confined by adhesions, either approaching the surface at some part of the abdominal wall, or bursting into the sac of the peritoneum, or into the bowel, &c.

The *diagnosis* of abscess in the abdominal wall is not always so easy as might be imagined; except, of course, in those cases where the tumor is prominent and has softened, allowing fluctuation to be readily detected. Spasmodic contractions of portions of the abdominal muscles are very apt to occur under the influence of emotion, palpation, &c., the tense parts communicating to the hand of the examiner a feeling very much like that of a tumor. The rectus muscle on either side, traversed as it is by from three to four tendinous intersections (the lineæ transversæ), often contracts in one or two divisions and gives an erroneous sensation to the hand applied over it. Steady pressure, together with the withdrawal of the patient's attention from the proceeding, will often relax the muscular fibres and prevent any erroneous conclusions being drawn. An abscess in the epigastric region may be sometimes seen and felt to pulsate, owing to the force derived from the aorta. But this generally occurs in thin subjects; the pulsation ceasing if the tumor be lifted up, or if it be gently moved to one side away from the influence of the deep vessels. Disease of the liver, and a distended gall-bladder, have given rise to the impression that an abscess was present in the right hypochondriac region; while enlargement of the spleen has acted in the same manner on the left side. And, lastly, a bladder distended with urine has been mistaken for an abscess, until further inquiry has led to the use of the catheter.

The *treatment* of abscess in the abdominal wall is not very difficult; for, directly the practitioner is certain that pus is present, a free incision should be made into the most prominent part of the tumor to permit of the ready escape of the matter. If there be merely a hard circumscribed swelling, however, attempts may be made to check the inflammatory process and to insure resolution, by rest, fomentations, and the administration of carbonate of ammonia (F. 361). In cases where suppuration has become established, and the abscess has not been opened, fecal fistula has sometimes resulted; the pus making its way externally and at the same time burrowing backwards, until the ulceration has extended into a portion of adherent bowel.

IV. PHANTOM, OR MUSCULAR TUMORS.

The fact has been noticed, in the preceding section, that spasmodic contractions of portions of the abdominal muscles are apt to give rise to a feeling as if a well-defined tumor were under the hand of the examiner. But in alluding to this circumstance, attention was more particularly directed to those instances where only the muscles of the anterior wall of the abdomen take on this curious action under the influence of manipulation. The cases now to be treated of are much more remarkable; for in them it would seem as if all the abdominal muscles were concerned in producing an appearance exactly resembling that caused by a large foreign body.

As far as my experience goes, these large phantom tumors occur only in the female sex. The pseudo-growth varies in size from an ordinary melon to that of a fœtus at the full term. In some women they give rise to many of the symptoms produced by gestation; so that we have

the condition known as spurious pregnancy,—the *grossesse simulée par illusion pure*, of French writers. Occasionally, the imaginary gestation is followed by a spurious parturition; and I have seen a lady walking about her apartment, with sharp and frequently recurring pains of labor, and surrounded by all the paraphernalia of the lying-in-room, where there was no pregnancy nor even a real abdominal tumor.

The muscular tumors which simulate disease, may appear entirely or partially to fill the abdominal cavity. They are either stationary and firm and unyielding, or they change their relative position from day to day, or they seem movable and as if attached by a long pedicle. Moreover, they may be insensible to the touch, or acutely tender; and they perhaps temporarily melt away under the influence of steady and prolonged manipulation, or they disappear for a period and then return, or they remain persistent for years.

The question naturally arises—What is the *nature* of the abdominal swelling in this affection? It was long thought that the symptoms of spurious tumors or pregnant uteri were due simply to the distension of the intestines by flatus, combined with the excessive deposition of fat in the abdominal integuments and in the omentum. We are told that on examining the body of Joanna Southcott after death, the womb appeared smaller than natural, free from disease, and contained neither "the promised Shiloh, nor any other fœtus." But the walls of the abdomen were four inches thick from fat, the intestines were distended with gas, and the omentum was one large mass of adipose tissue. Very possibly the combination of these conditions may alone have sufficed to produce the disorder in other instances; but without a doubt in the majority of cases, there is something more. This additional something is probably irregular or excessive action of the diaphragm and other abdominal muscles, by which the intestines are forced low down in the cavity of the abdomen. In many instances, also, it has been thought that irritation or chronic inflammation of one or both ovaries existed; this irritation producing contraction of the muscles by reflex action. And, again, it has not unfrequently been found that the patient was suffering from retroversion or retroflection of the uterus.

That the *diagnosis* is often a matter of difficulty is certain from the serious mistakes which have been made by eminent men. In the statistical account of eighty-one cases of ovariotomy collected by Mr. Benjamin Phillips,* it is shown that in as many as five instances no tumor at all was found upon cutting into the abdomen; and at least two more examples of this blunder have occurred since this gentleman's report was published.—When these swellings seem to shift their position, they may be mistaken for movable kidneys. It is well known that occasionally both the renal organs present an unusual degree of mobility, or one kidney may be movable to a considerable extent, while the other is stationary. So also a spleen displaced downwards may form a palpable tumor, as low as the left iliac region; and should there also happen to be any displacement of the pancreas, a very puzzling enlargement will result.

The chief points, by attention to which the practitioner may hope to avoid error, are the following: (1) As the patient lies on her back, with the abdomen exposed, there will be all the appearance of a solid tumor;

* Medico-Chirurgical Transactions, vol. xxvii, p. 468. London, 1844.

but on practising percussion, a resonant sound will generally be obtained. This test, however, is often rendered uncertain by the excessive deposition of fat in the abdominal walls or in the omentum; while there may be such great intolerance of pressure, that it will hardly be possible to make a satisfactory tactile examination. (2) There is usually a considerable arching forwards of the lower dorsal and upper lumbar vertebræ; so that the practitioner can easily pass his hands under the patient's loins. (3) Very often, positive symptoms of ovarian or uterine irritation are present. The chief of these consist of tenderness on manipulation over one iliac region, irregularity or suppression of the catamenia, an abundant leucorrhœal discharge, intense backache, and neuralgic pain extending down one leg, combined perhaps with retraction of the limb. And (4), if the patient be slowly, but thoroughly placed under the influence of chloroform, the abdomen will be seen to flatten and the tumor to entirely subside; the latter slowly melting away, in proportion as the anæsthetic relieves the diaphragmatic and abdominal muscles from the influence of the reflex nervous action. As consciousness returns, however, the muscles become tense and prominent, and the swelling gradually forms again: until the tumor is found possessing all its original characters, by the time the anæsthesia has completely passed off.

The general *symptoms* presented in these cases demand a short notice. The patients are generally in bad health, being often anæmic; while they are also sufferers from those varied phenomena which are so constantly set down as due to hysteria, or to the so-called "spinal irritation." They are not unfrequently the victims of neuralgia; and they either have amenorrhœa, or dysmenorrhœa, or leucorrhœa. The digestive functions are ill-performed, and the bowels are consequently constipated. The disposition is often tranquil; the patients like to be quiet and rather shun the society of their friends; and, if allowed, they will pass much of their time in bed. Doubtless, in some cases, bad practices are resorted to. But in none of the examples which have fallen under my notice have there been any indications of an attempt at feigning disease. Indeed, the swelling always gives rise to great mental uneasiness and depression, and is the cause of advice being sought.

The *treatment* of these phantom tumors must be carried out with care and patience. Where there is any chronic inflammation or irritation about the uterus or ovaries, the morbid state must be removed according to the rules which are laid down in the subsequent pages of this volume. Until the uterine functions are naturally performed, it will be useless to hope for much benefit. Then, the general health is to be improved; which may generally be effected by the employment of bark and one of the mineral acids, or of ferruginous tonics, or of zinc with strychnia or nux vomica, and of mild aperients. A good nourishing diet must be allowed; the power of the digestive organs is to be restored by pepsine or other drugs; and it will prove of great advantage if the patient can be sent to the sea-side. The nature of the case ought to be fully explained to her; while she must be led to feel confidence in our ability to effect a perfect cure. And, lastly, the abdominal muscles are to have their abnormal irritability removed by the frequent use of galvanism, by shampooing, by giving support to them with a well-adjusted belt, and by the employment of tepid or salt-water baths.

PART XI.

DISEASES OF THE URINARY ORGANS.

Under this head it is proposed to treat of the diseases of the kidneys, supra-renal capsules, and bladder. I am not aware that disease of the *ureters*, occurring primarily, has ever been diagnosed during life. After death, one or both of these canals are not unfrequently found much dilated or contracted; either owing to some congenital malformation, or the pressure of morbid growths, or to the extension of disease downwards from the kidney, or upwards from the bladder. One remarkable case of *hydronephrosis* (Ὕδωρ, water, and νεφρὸς, the kidney), or dropsy of the kidney, has been recorded by Rokitansky, and another by Kussmaul; in both of which the right ureter had become obstructed, owing to compression by an irregular branch of the renal artery. This form of dropsy, from obstruction by calculi, tubercular or malignant deposit, the pressure of tumors, &c., is not so very common.

The kidneys are ovoid bodies, situated one on each side of the vertebral column, in the lumbar region. Each gland receives blood from the aorta by the renal or emulgent artery; from which blood, as it flows through the kidney to be carried back by the emulgent vein into the inferior vena cava, the urine is removed by the epithelium lining the numerous secreting tubes—the tubuli uriniferi. Each kidney is about four or five inches long, and two broad; the weight varying from four to six ounces. In some subjects only one kidney is found, which is placed on the right or left side, and is generally somewhat enlarged. Or the two glands may be united; the junction occasionally being formed by a flat band of true renal tissue extending across the vertebral column, producing the so-called "horseshoe kidney." Sometimes the fusion of the two organs into one is still more complete; and then a large kidney is found lying in the median line, rather than in one of the lumbar regions. And again, one kidney may occupy its normal site, while the other is movable; or in a very few instances, an extreme mobility of both the glands has been found. The movable organ can be detected, feeling like a tumor; it may generally be shifted, to a certain degree, downwards and forwards; and compression with the hand usually gives rise to a peculiar faint or sick sensation.

Amongst the curiosities of medical literature must be placed the report of a case in which the right kidney was removed by operation.* The patient, fifty-eight years of age, had the misfortune to have a large semi-solid tumor in the right hypochondrium, attached by a pedicle.

* The Medical and Surgical Reporter, p. 126. Philadelphia, 1861. Quoted from the Gazette Hebdomadaire de Médecine et de Chirurgie, tome ix, p. 92. Paris, 1862.

His urine was albuminous, and had been so for the six years during which the growth had existed. Dr. Wolcott diagnosed a cystic tumor of the liver! On the 4th June, 1861, this practitioner made a long incision over the prominent body, ligatured the pedicle, and removed the tumor. An examination showed that it consisted of the kidney, affected with encephaloid cancer; its weight being about two pounds and a half. The man died, fifteen days after the operation, from the exhaustion caused by profuse suppuration.

I. INFLAMMATION OF THE KIDNEYS.

Nephritis (*Νεφρὸς*, the kidney; terminal *-itis*), or inflammation of the substance of the kidney, sometimes sets in without any appreciable exciting cause, especially perhaps in strumous subjects; or it may arise from exposure to cold and damp, from the formation of calculous matter, from various mechanical injuries, from poor living combined with intemperance, from the abuse of diuretics, as well as from the administration of cantharides or oil of turpentine. It is, comparatively, a rare disease. As in inflammation of other organs, so in the kidney the morbid action may end in resolution, or it will go on to suppuration; in the latter case variable sized abscesses resulting, which sometimes cause entire destruction of the gland. In most examples of nephritis, the mucous membrane lining the pelvis and infundibula is involved in the disease; inflammation of this tissue being known as *pyelitis* (*Πύελος*, a trough; terminal *-itis*).

The *symptoms* of nephritis are chiefly these: Neuralgic pains in the loins—especially in the region of the kidney; the pain sometimes extending along the ureter to the neck of the bladder, or to the groin, scrotum, or testicle, and being increased by pressure or by exercise. There is often also numbness of the thigh; and, in men, retraction of the testicle on the affected side. In addition, there is much constitutional disturbance,—usually indicated by shivering, fever, nausea, and vomiting, with great thirst; a hard, frequent, and full pulse; together with constipation and tympanitis. Occasionally there is complete suppression of urine; but more commonly, though the desire to empty the bladder is frequent and urgent, yet the secretion is scanty, high-colored, and often contains renal casts with blood and pus corpuscles. Sometimes the disease causes death at an early stage, by inducing coma; owing to the retention of urea in the blood, and the consequent poisoning of the system (p. 34). In other examples, again, typhoid symptoms appear, and the patient gradually sinks from pure exhaustion.

When the inflammation terminates in resolution, the sufferer appears to get well; but the gland is often left somewhat indurated, and thus perhaps is laid the foundation for future disease. Where one or more abscesses form, they lead frequently to ulceration, perforation of the capsule, the formation of renal fistulæ, and the establishment of a purulent discharge; these consequences being accompanied by hectic fever, which most times ends fatally. In more favorable cases, however, the pus passes out by the natural passages, and is found in the urine; not

unfrequently continuing to be thus discharged for months or even years, before a complete cure or death takes place. Renal abscess is sometimes a secondary affection. Thus, the irritation produced by a calculus in the pelvis of the kidney is a frequent cause of suppuration. It may arise from long-continued obstructive diseases of the urinary passages,—as chronic stricture of the urethra,* enlarged prostate, tubercular or malignant disease involving the ureter, &c. There are also grounds for believing that it may result from purulent absorption.

In examining the urine for pus, reliance is more to be placed on the evidence obtained by the microscope than on that derived from a chemical analysis. Pus corpuscles are round, pale, granular, and indistinctly nucleated. Under the influence of a drop of dilute acetic acid they lose their granulated appearance, swell considerably, and have their nuclei made much more distinct. An instrument with a $\frac{1}{4}$ inch object-glass will suffice for the examination, though the $\frac{1}{8}$ of an inch glass is better. The best test for pus is the solution of potash; on the addition of which a muco-gelatinous mass is formed, more or less viscid according to the proportion of the abnormal ingredient. Nitric acid also shows the presence of a small quantity of albumen, which is derived from the serum of pus. The detection of pus in the urine is by no means a proof that the kidney is affected; for the purulent matter may be derived from the mucous lining of the urethra, bladder, or ureters. In women suffering from leucorrhœa, a small quantity of pus is often found, which has its origin

* A well-marked example of this fact has been reported by Dr. W. Rutherford. The case—an epitome of which is now given—is very instructive, not only as showing the origin, but also the progress and termination of some forms of renal abscess: A young soldier of the 18th Regiment, in due course of service proceeded to India; from whence, after nearly three years, he was invalided to England, owing to repeated attacks of dysentery and intermittent fever, with an obstinate stricture of the urethra consequent upon a long-continued gonorrhœa. After treatment at Chatham, he returned to his regiment at Buttevant, on 27th June, 1861. On the 17th September he was admitted into hospital on account of intermittent fever and stricture. He complained of great pain, straining to pass urine, and rigors. The urine came away "guttatim;" all attempts to pass a catheter failing, until the 9th October, when a very fine catheter was got into the bladder, and a considerable quantity of urine drawn off. There was difficulty of micturition afterwards, but no positive retention: the quantity of urine seemed natural, it contained mucus, was alkaline, but at no time could any pus be observed in it. On the 16th October a tumor was found in the hepatic region: it rapidly increased in size, there were daily rigors, and symptoms of a typhoid character. On the night of the 26th October, a sudden discharge of purulent matter took place by the mouth. On the 27th October an incision was made into the tumor, and a small quantity of thick grumous pus evacuated. Afterwards ten or twelve ounces of pus escaped daily from the wound; the amount expectorated diminishing until the 28th, when it ceased. Death occurred on the 29th October.

At the *autopsy*, a considerable portion of the lower lobe of the right lung was found connected by recent adhesions to the diaphragm; the pulmonary parenchyma being infiltrated with pus. On detaching the lung from the diaphragm an abscess was discovered: it communicated superiorly with the bronchial tubes, laterally with the external abscess which had been opened, and inferiorly through an opening in the diaphragm with an abscess in and around the right kidney. This gland was found buried in a mass of adhesions, mixed up with purulent matter; the cortical substance contained a number of small abscesses; one of which, the size of a hen's egg, communicated with the collection of matter in the surrounding areolar tissue. Some of the abscesses communicated with the calyces or pelvis of the organ. The left kidney also contained several small circumscribed abscesses in the cortical structure, about the size of peas. There were no calculi. The structure of the liver proved to be healthy. A close, semi-cartilaginous structure was found in the membranous portion of the urethra, through which a small silver probe could scarcely be passed.—Statistical, Sanitary, and Medical Reports for the Year 1861. Army Medical Department, p. 497.

in the lining coat of the vagina. Moreover, an abscess situated in other parts, occasionally bursts into the urinary passages, as in pelvic cellulitis, &c.

The *diagnosis* requires care, lest the suffering from congestion and inflammation be confounded with that which arises from mechanical irritation of the kidney, perinephritis, spinal disease, or lumbago. In irritation of the kidney from a stone—calculous nephralgia—the symptoms closely resemble those just described. But as the calculus passes along the ureter to the bladder, the local suffering is much greater than in nephritis, while the general disturbance is less. The sudden relief which follows the entry of the stone into the bladder, will reveal the true nature of the attack when there has been any doubt. In perinephritis, (*Περὶ*, around; *νεφρὸς*; terminal *-itis*), and in spinal disease, the symptoms are less acute, come on much more insidiously, and give rise only to pain in the affected part; the bladder seldom being irritable, while there is no retraction of the testicle. And so, with regard to lumbago, we find neither nausea nor vomiting, the appetite remains unaffected, the bowels are not constipated, and there is no fever. Moreover, the urine does not contain renal casts, nor albumen, nor pus; although it may be loaded with urates.

The *treatment* of nephritis ought to consist in the use of warm fomentations, frequent hot hip-baths, the vapor or hot-air bath, mild purgatives, and diaphoretics,—especially those containing opium, such as Dover's powder. Our object, indeed, should be to rest the inflamed gland, and to get its work done by the skin and mucous membrane of the bowels. The patient must remain in bed; his diet ought to be low, with a moderate allowance of simple diluents; while if there be urgent sickness, sinapisms may be applied to the epigastrium.

As soon as symptoms of prostration set in, or immediately there are any indications of suppuration, support must be given. Milk, cream, raw eggs, essence of beef, stimulants and tonics, are of great service. Solid food is to be freely allowed directly there is sufficient power to digest and assimilate it.

II. ACUTE DESQUAMATIVE NEPHRITIS.

This renal affection has its origin from many causes, as intemperance, starvation, exposure to wet and cold, and the cholera-poison, &c.; but especially is it often due to scarlet fever.

Pathology.—Acute desquamative nephritis (acute inflammatory dropsy) consists essentially of disease of the epithelial or gland-cells lining the convoluted uriniferous tubes, induced by their having to eliminate from the blood some matter which is not naturally excreted by the kidneys. The cells, having their functions thus modified, suffer changes as regards their nutrition; they become atrophied and disintegrated; while from their rapid desquamation they tend to check secretion by mechanically obstructing the tubes. During the time that the gland-cells are undergoing these changes, the circulation through the vessels of the Malpighian tuft also becomes impeded; so that an effusion of serum and fibrin takes place into the cavities of the tubes. The serum which exudes

from the congested Malpighian capillaries mingles with the urine and renders this fluid albuminous; while the fibrinous material solidifies, entangles in its substance the cast-off epithelial cells, and escaping with the urine is detected in this secretion in the shape of epithelial tube-casts. If any of the walls of the vessels give way, as they will do under the influence of the pressure to which they are exposed, blood corpuscles will also be found entangled in the casts, while the urine will present a dark-colored sediment.

In the event of the disease terminating fatally, both kidneys will be found affected, considerably increased in size and weight, of a pale yellow or even cream-colored hue, and marked with irregular extra-vascular patches. Minutely examined, the convoluted tubes of the cortical portion of the gland are seen to be crowded with desquamated epithelial cells, some tubes being more distended than others. The straight tubes of the medullary cones are comparatively unaffected. The Malpighian bodies are found engorged.

Just as cases of scarlet fever, small-pox, &c., are met with in which the eruption is very slight or entirely absent, so we may have general dropsy with albuminuria without desquamation of the renal epithelium. In these examples of *non-desquamative disease of the kidney*, there are often prominent symptoms of blood-poisoning; owing as Dr. George Johnson has shown to some failure and imperfection in the effort to eliminate the morbid material from the system.

Dr. Basham doubts the correctness of the terms desquamative and non-desquamative nephritis. He suggests, as more applicable, the names of acute and chronic albuminous nephritis; or (out of respect to the distinguished physician who first discovered this form of disease) that of morbus Brightii in its acute or chronic form. Dr. Basham well remarks that this copious shedding of epithelium is common to all free epithelial mucous surfaces, when they are the seat of inflammatory engorgement or irritation; and that consequently we might as reasonably speak of desquamative bronchitis, or desquamative catarrh, as of desquamative nephritis.* Allowing the justice of these observations, it may still be urged that the mechanical consequences of the desquamation are so much more serious in the case of the kidneys than of the bronchi, that extra attention may well be fixed upon the occurrence in the former instances; while it may be questioned if any advantage would arise from adopting the terms proposed to be substituted.

Symptoms.—As a general rule, the disease is ushered in with rigors and chilliness; these symptoms being soon followed by feverish reaction, headache, restlessness, pain with tenderness in the loins, and often vomiting. The dropsy, which it gives rise to, is an early symptom: the face first becomes puffy, followed by general swelling of the areolar tissue throughout the body, and by effusion of fluid into one or more of the serous cavities. At the same time there is a frequent desire to pass urine; which is scanty, of a dark smoky color, and on being tested by heat and nitric acid is found to be highly albuminous. Examined microscopically, it is seen to contain masses of coagulated fibrin, epithelial casts and cells, blood corpuscles, and occasionally crystals of uric

* On Dropsy connected with Disease of the Kidneys (Morbus Brightii), &c. Second Edition, p. 20. London, 1862.

acid. The epithelial casts and cells sometimes inclose a small quantity of fatty matter; but this circumstance need not lead to an unfavorable prognosis unless a large proportion of the cells are seen distended with oil, when it must be feared that the kidney is passing into a state of fatty degeneration.

The earliest signs of improvement are the disappearance of the dropsy, a diminution of the albumen and renal epithelium, and an increase in the quantity of urine secreted. It is not uncommon for a patient during convalescence from this disease, to pass from four to six pints of urine during the twenty-four hours; the natural quantity averaging only from two to two and a half or three pints.

The very unfavorable phenomena which follow a suppression of the functions of the kidneys have already been described (p. 34). It may, however, be remarked, that when the blood becomes loaded with urea a strong urinous odor is often to be detected in the perspiration, in the breath, as well as in the matters vomited. In one marked case of uræmic toxæmia, occurring after scarlet fever, which I saw in consultation with Mr. Kingsford, of Sunbury, a large linseed poultice applied over the loins gave out a sickening and very disgusting smell; the effluvium being so powerful that it pervaded a large house. This stench was more abominable than anything I had ever smelt before; and it served to prove that the blood was highly contaminated. According to Dr. Thudichum, one of the principal features of uræmia is the retention in the blood of the coloring matter of the urine—urochrome. This urochrome, so retained, undergoes decomposition, and yields uropittine and omicholic acid; which, circulating with the blood, vitiate all the tissues and taint the secretions.*

It is very curious that acute desquamative nephritis from scarlatina is more frequent after a mild than after a severe attack, owing probably to the want of caution which is often observed in such cases during the period of desquamation. The patient gets exposed to cold, and immediately the escape of the fever-poison through the pores of the skin is checked; which poison, as a consequence, is directed to the kidneys in larger quantities than they can bear. The disorder usually commences about the twenty-second day from the setting-in of the fever.

Diagnosis.—The preceding observations leave nothing to be noticed under this head, except as to the analysis of the urine for albumen.

When examining the urine for albumen, two tests must be employed —heat and nitric acid. On applying heat, 150° to 175° Fahr., to albuminous urine in a clean test-tube, the albumen coagulates and produces a cloud varying in density. This cloud commences at the part of the tube nearest the heat, and can be seen to gradually extend through the fluid as the boiling point is gradually approached. Coagulation only takes place, however, when the urine is acid; for alkaline, or even neutral, urine may be loaded with albumen, and yet heat will produce no deposit. In such a case the secretion must be rendered acid by the addition of nitric acid until the deposit is thrown down: heat being then applied to make sure that the precipitate remains unchanged. It will not do merely to add a drop or two of acid and then apply heat, for under these circumstances the urine may be loaded with albumen and

* British Medical Journal, p. 519. 5th November, 1864.

yet no deposit be formed; a circumstance that Dr. Bence Jones has supposed to be due to the formation of a nitrate of albumen, which is soluble in a weak and even boiling solution of nitric acid, but is insoluble in a more acid mixture. The nitric seems preferable to the acetic acid, which is sometimes recommended; because an excess of the latter dissolves albumen during boiling. Moreover, heat alone must not be trusted to in any case, since it renders the urine cloudy when there is an excess of earthy phosphates; this cloud being dissolved by nitric acid, while the albuminous deposit continues permanent. Again, nitric acid alone may give rise to turbidity, owing to the decomposition of the urates held in solution, and the precipitation of amorphous uric acid; the latter being decomposed, and the urine rendered clear though of a brown tint, on using heat. It may be worth remembering also, that the use of copaiba sometimes produces in the urine a substance which is precipitated by nitric acid, and which thus looks like albumen.

In order to form a rough and ready estimate of the quantity of albumen passed in the urine, we may note the space occupied in the test-tube by this substance when it has become coagulated by heat, and has been allowed to subside by rest. Dr. Christison speaks of seven degrees of coagulability; but I have for a long time found it better, in taking notes of cases, to adopt such a quaternary division as the following: (1) Completely coagulable by heat,—the albumen occupying nearly the whole tube. (2) Strongly coagulable,—half the tube. (3) Moderately coagulable,—a fourth of the tube. (4) Slightly coagulable,—only a hazy appearance, undistinguishable from a deposit of phosphates until nitric acid is added.

Prognosis.—This may generally be favorable. The chief points to be feared are the occurrence of uræmia, owing to suppression of the functions of the kidneys; or, if this danger be got over, there must still be felt some anxiety, lest permanent structural disease of the glands should set in. Care must be taken not to discontinue treatment until the urine is found by chemical and microscopical examination to be quite healthy.

Treatment.—In seeking to cure acute inflammation of the kidney, we have to remember—as Dr. George Johnson remarks—"that there has been, first, a morbid condition of the blood, which has excited disease in the kidney; and that, as a secondary consequence of the renal disease, the blood has become contaminated by the retention in it of urea and other excrementitious matters."* Our double object must therefore be to rest the affected glands, while we purify the blood by means of the other excretory organs. To carry this plan into practice, the patient ought to rest in bed, in a moderately warm room, and be placed on milk diet; at the same time allowing him plenty of simple drink—water, tea, or barley-water. In order to get the skin and bowels to act freely, a hot-air or hot-water bath (F. 119, 130) must be used once daily for three or four times; while diaphoretic medicines (F. 209, 211, 217) are to be administered, together with saline or other purgatives (F. 141, 151, 160, or 169). In many instances, elaterium (F. 157), given so as to produce free purging, is very beneficial; but for children I usually prefer the compound jalap powder, in doses varying from fifteen to forty grains. Dry cupping over the loins often seems to be useful.

* On Diseases of the Kidney, p. 126. London, 1852.

Powerful diuretics should never be had recourse to in this disease; since in the early stages they do great mischief, while in the latter they are unnecessary. Where symptoms of uræmia set in, the remedies already mentioned (p. 38), are to be resorted to.

Directly the feverish phenomena have subsided, attempts may be made to improve the quality of the blood, as well as to diminish the escape of the albumen, by the administration of steel; no preparation answering this double purpose better than the tincture of perchloride of iron (F. 392). At the same time, the patient may be permitted to leave his bedroom, though he is to be confined to the house: he may have tender animal food, with plenty of milk and one or two raw eggs daily. Spirits and beer had better be avoided; while wine, freely diluted, ought only to be allowed if it seems really required. Under this treatment the dropsy will subside, and the albumen gradually diminish until none can be detected in the urine. It is always advisable to examine the latter, every few weeks, for some time after a cure appears to have been effected. Moreover, the patient will have to clothe warmly, wearing flannel next the skin; while he must long avoid exposure to cold and damp.

III. CHRONIC DESQUAMATIVE NEPHRITIS.

For our knowledge of this disease we are entirely indebted to the able researches of Dr. George Johnson: the following remarks are consequently a mere epitome of his observations.*

Chronic desquamative nephritis is characterized by a long-continued shedding of the renal epithelium, which appears in the urine in a more or less disintegrated state. The tubes gradually lose their epithelial lining, and subsequently become atrophied or filled with a new material; or they may continue to be nourished, secrete serum into their cavities, and so at length get dilated into cysts. Meanwhile the renal bloodvessels undergo changes, and the kidney becomes wasted and indurated. The urine is, for the most part, albuminous; it is usually greater in quantity and of a less density than in health, varying from 1005 to 1015. If we examine it microscopically, we shall find abundant amorphous granular matters, either scattered or in the form of cylinders, which have evidently come from the renal tubes, and which are known as *granular epithelial casts*. The disease is frequently a consequence of chronic gout—Dr. Todd used to speak of it as the *gouty kidney*—or of some allied disorder of the general health; while it may happen as a result of acute desquamative nephritis. In some instances it comes on so insidiously, that unless the urine be examined it may escape detection, until perhaps the patient is seized with a fatal attack of suppression of urine.

This affection produces great changes in the blood, and many and various constitutional disorders consequent upon these changes; amongst which the most frequent are anasarca, dropsy of one or more serous cavities, inflammation of the serous membranes, hypertrophy of the

* Opus jam citat., p. 168. Also, Medico-Chirurgical Transactions, vol. xxx, p. 165. London, 1847.

heart—with or without disease of the valves, and, lastly, either structural changes, or great functional disturbance of the nervous centres.

To speak rather more in detail, chronic nephritis may exist for some time without producing any marked *symptoms;* or the renal disease may be masked by the progress of some pre-existent and causative malady. Thus I have seen instances of chronic gout where the disease of the kidney has become far advanced without having manifested itself by any special signs; and hence in all such cases the urine should be frequently tested. In many examples, however, this form of nephritis is attended with failing health and strength; the skin is harsh, dry and sallow; the appetite is variable, sometimes bad, at other times voracious; there may be dyspepsia, diarrhœa, rheumatic pains, or some pulmonary derangement; and in several instances there have been frequent attacks of hemorrhage from the nose. The patient loses flesh, but this loss may be concealed by the anasarcous swelling of the body; though dropsy is by no means a constant feature of this affection. Indeed, many cases prove fatal without the occurrence of dropsy in any form; while in others there may be merely a puffiness about the face and eyelids, with slight swelling of the ankles. The urine is passed more frequently than in health; and especially has the patient to rise once or oftener in the night to empty the bladder. On testing this fluid it may be found of normal color, reaction, specific gravity, and free from any blood; while if the disease be in an early stage there may be no albumen. But in all instances, if the secretion be allowed to stand, and the sediment be minutely examined, the microscopist will detect a granular material in small masses and cylinders; which consist of disintegrated epithelium from the basement membrane of the tubes, washed out with the urine. As the disorder advances the epithelium becomes shed more abundantly, and the urine gets albuminous.

This affection often makes but slow progress, and where it happens as a secondary disorder, the cure or retardation of the latter will have a very beneficial influence upon it. But when it gradually advances, complications arise; the heart or lungs get diseased, the nervous centres become implicated, and convulsions or coma set in. Of course the *prognosis* must be partly regulated by the mode of living which the patient adopts, and the steadiness with which he will follow the rules prescribed for him.

The *treatment*, for the most part, resolves itself into the adoption of means for the removal of the morbid state of the blood and constitution generally; of which the renal affection is only a result and a manifestation. When the disease is the consequence of gout, we must regulate the diet—disallowing sugar and all fermented liquors; attention should be paid to the various excretory functions; while such remedies ought to be employed as are indicated by the patient's general condition and state of health. Great benefit will always be derived from keeping the skin warm, and from the occasional use of the warm-water, air, or vapor bath: diaphoretic medicines (F. 209, 211) are also useful. Gentle aperients; dry cupping over the loins frequently repeated, or counter-irritation to the same part by sinapisms, tartar-emetic ointment, or ammonia liniments; quinine, iron, and other tonics—these are all remedies which often afford considerable relief. Mercurials, and especially all diuretic medicines, are strictly to be avoided. In cases attended with

dropsy, we may every now and then use those purgatives which produce copious watery stools, such as elaterium, gamboge, jalap, &c. (F. 151, 157, 158, or 168). Sometimes there is spontaneous diarrhœa; and this is not to be checked unless it produces exhaustion.—When there is much depression, as there usually is after a time, we must avoid drastic purgatives, and simply get the skin to act freely by the exhibition of some diaphoretic draft at bedtime; or especially by the use of the hot-air bath, repeated every night, or on alternate nights. The mineral acids with bark (F. 376), or salicin (F. 388), or steel and pepsine (F. 394), may temporarily impart a sense of renovation; while cod-liver oil (F. 389) will often prove beneficial. The diet should be generous, with animal food twice daily, if it can be digested; and a moderate quantity of wine may often be allowed with advantage. Flannel drawers and waistcoats ought to be worn all the year round. Change of air, particularly a sea-voyage, often proves very valuable.

IV. DEGENERATIONS OF THE KIDNEY.

1. Fatty Degeneration.—In the year 1827, Dr. Bright first pointed out the frequent connection of anasarca and other dropsical affections with a degeneration of the structure of the kidneys; the prominent character of which is the deposition of a peculiar granular matter in the substance of the renal gland, together with the gradual atrophy of its cortical and tubular structure. Hence this affection is commonly known as *Bright's Disease*, or as *granular degeneration of the kidney*. By some pathologists the term *Bright's disease* is applied to all renal disorders attended with albuminuria; these gentlemen holding that this affection is one morbid process, which runs through various stages. The investigations of Dr. George Johnson have thrown considerable doubt upon the correctness of this view; for they appear to prove that there are at least two or three great classes of renal disease. In the following remarks I have again to avail myself of this gentleman's labors.

Fatty degeneration of the kidney may be the consequence of acute desquamative nephritis; or it may arise from scrofula, bad living, constant exposure to wet and cold, intemperance, &c. Hence the renal textural changes are but the expression of that which no doubt primarily is a blood disease.

The appearances in the urine characteristic of this disorder are the following: A scanty secretion, which is highly albuminous, and of low specific gravity; it is generally, in the early stages, free from sediment; and, when examined by the microscope, is found to contain neither renal epithelium, nor casts of tubes, or, if any, only small waxy (hyaline) casts. After an interval, variable in different cases, while the general characters of the urine remain unaltered, there appears a light, cloudy sediment, which is usually found to contain some of the small waxy casts, in which are entangled one or more globular or oval cells inclosing a considerable number of oil-globules; several of the cells being completely filled with oil, and presenting the appearance of dark opaque

masses. Usually, several of the casts have adhering to their surface many small oil-globules, which have probably escaped from ruptured cells; while numerous cells containing oil, together with detached oil-globules, are scattered over the field of the microscope.

When the urine is of a natural color, highly albuminous, and presents a large number of oily casts and cells, the *prognosis* is most unfavorable. Dr. Johnson says that these appearances indicate as serious and intractable a malady as tubercular disease of the lung. He has examined the urine in a considerable number of these cases, and in no one instance did he find that this secretion regained its normal condition, or ceased to be albuminous. The patient's life may be prolonged by careful management, but he cannot hope to be cured.

The odor imparted to healthy urine by the digestion of asparagus must have been noticed by every one; while most practitioners are doubtless familiar with the smell of violets which the renal secretion gives off in patients who are taking turpentine, as well as with that of pepper when attempts are being made to check a gonorrhœa by cubebs. It has been stated by De Beauvais, that in albuminuria these effects are not produced; and from experiments which have been performed it would seem that, with a few exceptions, the observation is correct.

The chief *symptoms* produced by this disease are—gradually increasing debility; a frequent and irritable pulse; a striking pallor—perhaps combined with puffiness—of the face, as well as of the skin generally; a disposition to frequent micturition, the patient having to rise once or oftener in the night to pass water; and dyspepsia, with attacks of obstinate vomiting. There is always a tendency to grave inflammations of the serous membrane—such as pericarditis, peritonitis, meningitis, and pleurisy; and occasionally to amaurosis, sometimes attacking both eyes, and perhaps due to fatty degeneration of the retina. Then we have anasarca of the limbs, with dropsy of the different cavities; in rare cases (unless there be coexistent heart disease) œdema of the lungs, setting in suddenly, and rapidly producing serious dyspnœa; convulsions, probably due to the effects of the retained urea upon the nervous system; and ultimately coma, which soon ends in death.

In the *treatment*, we can do little more than palliate the symptoms, and so hope to prolong life. The diet should be regulated; and abstinence from intoxicating drinks, starch, sugar, and perhaps fatty articles of food, insisted upon. As a rule, there is considerable risk in administering any preparation of opium, where the urea is imperfectly eliminated from the blood; although in hopeless cases, when we find great irritability and restlessness, an opiate may be prescribed, on the principle of choosing the least of two evils. Where the anasarca of the lower extremities is considerable, punctures should be made with a sharp-pointed lancet on the outside of the legs; afterwards wrapping the limbs completely in chamois leather. In other respects, the rules laid down in the preceding section must be attended to.

2. Amyloid Degeneration.—To say much upon this subject would only be to repeat in a wearisome manner the remarks which have already (p. 116) been made. Suffice it therefore to notice that waxy, lardaceous, or amyloid degeneration of the kidney probably never exists alone, for it is a constitutional affection; that the effect of it is to ren-

der the kidney inefficient as an excreting organ, and ultimately useless; that it causes the urine to be albuminous, while there may sometimes be found waxy or hyaline casts of the tubes, but little or no renal epithelium; and that the victims of it present all those marked symptoms which are usually set down as due to Bright's disease.

Professor Virchow states that a large proportion of the cases of Bright's disease, and especially of the chronic ones, are assignable to this change. The changes which the kidney undergoes cannot be distinguished immediately with the naked eye; so that not until iodine has been employed, can it be said what the disease really is. If a solution of iodine be applied to the anæmic cortical substance, a number of brownish-red points appear, corresponding to Malpighian bodies, with sometimes fine streaks also, which are the afferent arteries; and next to this, when the disease is very severe, red parallel lines are also seen within the medullary cones, lying very close to one another. These are all arteries.

Two excellent essays on this disease, illustrated by the reports of thirty-four cases, have been published by Dr. T. Grainger Stewart, of Edinburgh.* From these examples the *symptoms* appear to run the following course: An individual who has had scrofula, disease of the bones, or syphilis, or who is merely of a weak constitution naturally, finds that he is losing strength, that he suffers from thirst, and that he passes large quantities of urine. He has to rise in the night to micturate; and altogether three or four times the natural amount (fl. oz. 50) of urine may be excreted in the twenty-four hours. At the end of the day the feet and ankles are observed to be more or less swollen, but a night's rest removes the œdema. As the lassitude increases, a swelling and hardness about the hepatic and splenic regions can be detected, owing to enlargement of the liver and spleen. On examining the urine it is found albuminous, of a low specific gravity, pale in color, and of an acid reaction; while on placing a portion of the scanty sediment which it contains under a quarter of an inch object-glass a few delicate, transparent, waxy or hyaline tube-casts are seen. These casts are formed by the coagulation of an exudation from the bloodvessels into tubules denuded of epithelium: if the affected tubules contain a few cells, epithelial elements will be observed inclosed within the casts. This state of affairs may continue for months, or under favorable circumstances for a few years. But sooner or later, very distinct evidence of anæmia is observable; the amount of albumen increases considerably, while the quantity of urine diminishes; attacks of diarrhœa increase the debility, where the intestinal mucous membrane becomes affected with waxy degeneration; and ascites or general dropsy sets in. Ultimately the patient sinks, either from effusion into the serous cavities, from bronchitis, from pulmonary consumption, from exhaustion, or from convulsions and coma due to uræmic poisoning.

As regards the *treatment* much good may be effected in the early stages by a nourishing diet, by residence at the sea-side, and by the persevering employment of ferruginous tonics. Where there is any evidence of the previous existence of syphilis, iodide of potassium and some

* "On the Waxy, or Amyloid Form of Bright's Disease." Edinburgh Medical Journal, February, 1861, and August, 1864.

bitter infusion (F. 31), or iodide of iron (F. 32, 390), will often prove of great service.

V. DIABETES MELLITUS.

Diabetes mellitus, melituria, or glucosuria, is a complicated form of disease characterized by the secretion of a large quantity of urine containing sugar. The amount of sugar varies from a few ounces, to one or even two pounds in the twenty-four hours.

Diabetic sugar has the same chemical composition as that found in most kinds of fruit—grape sugar, or glucose. It differs from cane sugar in being less sweet, and less soluble in water; in being rather more soluble in dilute alcohol; and in being dissolved by strong sulphuric acid, instead of charred and blackened as the cane variety is.

Pathology.—For remarks upon this head, as well as for the derivations of the various synonyms for saccharine diabetes, the reader is referred to Part I, p. 30. It may be again mentioned, however, that this disorder is only here considered for the sake of convenience; since, with our present knowledge, we cannot say that diabetes is a disease of the kidneys, or of the liver, or of the lungs, or of the nervous system, or of the stomach. In examples of it, sugar may be detected in the blood, sweat, tears, saliva, and fæces, as well as in the urine.

Symptoms.—The first indications of this disease are not generally well-marked, complaint being merely made of malaise and a sense of feverishness. But it is early noticed that large quantities of urine are passed, having a faint odor somewhat like that of apples. Owing to the quantity of water thus got rid of by the kidneys, it can be readily imagined that the most prominent effects will soon be great dryness and harshness of the skin; together with hardness of the fæces and constipation, and urgent constant thirst, which it is difficult to allay. After a time the general health begins to give way, and there is muscular weakness with a loss of all sexual power. Then follow such symptoms as pain in the loins; coldness of the extremities, and yet a sense of burning in the hands and feet; increasing debility, with a manifest shrinking of the frame and rapid diminution in weight; a chloroform-like smell of the breath; sponginess of the gums, and probably decay of the teeth; mental depression and irritability; together with a constant feeling of sinking in the stomach, inducing a voracious appetite. This disorder commonly progresses slowly and insidiously, and often ends in—or becomes associated with—pulmonary consumption. It almost always proves fatal.

There would appear to be grounds for believing in the presence of some connection between diabetes and cataract. At all events when the former has existed some time the latter may occur; the cataractous condition being symmetrically developed in both eyes. The cataracts are of the soft kind; and no cases have been seen where there was reason to suspect further disease of the eyeball.

Diagnosis.—Diabetic urine has a sweetish taste and odor, is generally of a pale straw color, does not undergo putrefaction even when kept for several weeks, and is secreted in very large quantities. In health, the average quantity of urine passed by an adult in the twenty-four

hours may be said to be two and a half or three pints; while in the disorder under consideration this quantity may be increased to fifteen, twenty, or even thirty pints. The specific gravity is also very high, varying from 1030 to 1050; the more aggravated the disease, the greater being the density.—On evaporating a few drops of diabetic urine, on a glass slide, beautiful crystals of grape-sugar may often be obtained. Dr. Gibb has also succeeded in procuring them from the tears.

Several tests have been proposed for the detection of sugar in urine. Thus we have,—

The Fungus Test.—Prior to the publication of Dr. Hassall's admirable paper,* much obscurity existed with regard to the development of vegetable fungi or torulæ in the urine. From this gentleman's researches it seems certain that urine, when it has been allowed to stand for a few days, may under certain conditions present two varieties of fungi. The *penicilium glaucum* is very commonly generated in acid urine, which contains albumen or mucus or epithelium. The greater the amount of animal matter, the more abundantly is this fungus developed. It ordinarily passes through three stages of formation; existing first as sporules, these passing into thallus, while from this proceeds the perfect or aerial fructification. But in acid saccharine urine, freely exposed to the air at a moderate temperature, there is developed a *sugar fungus*, and this is met with in no other condition of that secretion. It is identical with the yeast plant. The sugar fungus passes through three stages of development; though if the amount of sugar in the urine be small, growth may not proceed beyond the condition of sporules, the thallus and aerial fructification not being attained. The sporules and thallus are larger than those of the penicilium glaucum, while the perfect fructification in the two species is wholly distinct. The presence of this sugar fungus indicates the vinous fermentation, its development being accompanied by the disengagement of carbonic acid and the formation of alcohol. The penicilium glaucum and the yeast fungus not unfrequently exist together in diabetic urine; but the latter —it must be repeated—is alone peculiar to it, and may be found when the quantity of sugar is too small for detection by the potash and copper tests.

The Potash Test.—Add to the suspected urine, in a test-tube, about half its volume of liquor potassæ, and boil the mixture gently for a few minutes. If sugar be present, the liquid will assume a dark brown tint. If, on the contrary, the urine be healthy, it will only be very slightly darkened.

Care must be taken—as Dr. Owen Rees has pointed out—that the liquor potassæ does not contain lead, as it often will if it has been kept in a white glass bottle. When it does so, the sulphur in the urine produces a dark color with the lead, which might lead to an incorrect diagnosis. The test-solution should therefore be kept in a green glass bottle, free from lead.

The Copper Test.—A little of the suspected urine is to be placed in a test-tube, and a drop or two of a solution of sulphate of copper added, so as to give the mixture a slight blue tint. A solution of potash is

* Medico-Chirurgical Transactions, vol. xxxvi, p. 23. London, 1853.

now added, in quantity equal to about half the volume of urine employed: this will throw down a pale blue precipitate of hydrated oxide of copper, which, if there be any sugar, will immediately redissolve, forming a purplish-blue solution. The mixture is then to be gradually heated to the boiling-point; when, if sugar be present, a yellowish-brown precipitate of suboxide of copper will be deposited. If there is no sugar, a black precipitate of the common oxide of copper will be thrown down. This test is sufficiently delicate for all ordinary cases; but it cannot be trusted to when the quantity of sugar is small. It is commonly known as Trommer's test.

There are various forms of the copper test, but the principle of action is the same in all. Dr. Roberts, physician to the Manchester Royal Infirmary, has recommended the following: A test-fluid having been prepared with eight grains of sulphate of copper, thirty grains of tartrate of potash, and an ounce of liquor potassæ, it is to be used in this manner. Partly fill a test-tube—say to the depth of an inch—with the solution: apply heat until it begins to boil, and then add two or three drops of the suspected urine. If it be ordinary diabetic urine, the mixture, after an interval of a few seconds, will turn *suddenly* of an intense opaque-yellow color, and in a short time an abundant yellow or red sediment falls to the bottom. If, however, the quantity of sugar present be small, the suspected urine is added more freely, *but not beyond a volume equal to that of the test employed.* In this latter case it is necessary to raise the mixture once more to the boiling-point. It is then allowed to cool slowly. If no suboxide has been thrown down when it has become cold, then the urine may with certainty be pronounced sugar-free.

It sometimes happens that albumen is found in diabetic urine. When present, it prevents the formation of the precipitate of suboxide of copper. Under these circumstances, the urine should be filtered through animal charcoal; which substance separates albumen, uric acid, and fatty matters, without interfering with the passage of the sugar.

The Fermentation Test.—Add a few drops of fresh yeast, or a little of the dried German yeast, to the suspected urine, and completely fill a test-tube with the mixture. Put some of the urine also into a saucer, and then invert the tube and stand it upright in this vessel, taking care that the tube remains full and free from bubbles of air: set aside in a warm place, having a temperature of about 80° Fahr. for some eight or twelve hours. If sugar be present, it begins very shortly to undergo the vinous fermentation, by which it becomes converted into carbonic acid and alcohol; which change will be recognized by the bubbles of carbonic acid causing gentle effervescence, and afterwards collecting in the upper part of the tube. When the urine is free from sugar, no gas will be formed.

To estimate the *quantity of sugar* contained in diabetic urine, Dr. Roberts* has suggested that it is only necessary to ascertain the specific gravity of the urine both before and after fermentation, and from the loss of density occasioned by the conversion of the sugar into carbonic acid and alcohol, to calculate the amount of sugar destroyed. Thus the sp. gr. and temperature of a specimen of urine are to be noted. About four ounces of the same specimen should then be placed in a

* Edinburgh Medical Journal, p. 326. November, 1861.

twelve-ounce bottle, and a lump of German yeast (the size of a small walnut) added. The mouth of the bottle must be covered with a piece of glass or card to prevent evaporation. Fermentation soon begins, if the glass be kept in a warm place; while by the end of twenty-four hours the process is not only completed, but the froth and scum are dissipated from the surface, so that the density and temperature may be taken. The fermented urine will be found to have lost a density varying from thirty to forty degrees, according to the amount of sugar destroyed. This diminution of density holds such proportion to the sugar originally present in the urine, that for every degree of density lost we may count one grain per ounce of sugar in the urine. Thus,—

Density of diabetic urine before fermentation, . . .	1040 degs.
Density after fermentation, ...	1002 "
Density lost by fermentation, ...	38

These 38 degrees indicate that the urine contained exactly 38 grs. of sugar per fluid ounce, or 740 grains in the imperial pint. It is necessary to remember that the temperature of the two specimens should be about the same, as a variation of 10° F. affects the sp. gr. about one degree.

Prognosis.—In no disease can it be said with so much truth as in diabetes, that the patient holds his fate in his own hands. If he will exercise self-control, and be satisfied to eat that he may live, instead of endeavoring to gratify his palate, his life may be prolonged for some years—provided there be no organic disease.

The chief circumstances which enable us to give a favorable opinion are,—a healthy condition of the lungs; the absence of albuminuria; a marked diminution of the quantity of the urine, as well as of its density, on the sufferer being confined to an animal diet; an increase of body-weight, and of muscular power; a lessening of the sense of hunger and thirst; a healthy condition of the teeth; and the occasional appearance of moisture on the skin.

Those cases are very unfavorable where the patient suffers from repeated attacks of bronchitis; where tubercles have become developed in the lungs; where there is albumen in the urine; where the quantity of urine continues large and the sp. gr. high; where there is gradually increasing loss of flesh and strength; and where there is any hereditary tendency to the disease. It should be remembered that occasionally inosite or muscle-sugar seems to replace the grape-sugar; so that while the tests for the latter indicate improvement, the general symptoms continue to progress. Inosite can be detected by evaporating the solution containing it, with a little nitric acid, to dryness on platinum foil. The residue is to be moistened with a little ammonia and a solution of chloride of calcium, and again evaporated to dryness, when a lively rose-red color appears. The true sugars do not give this reaction (Neubauer).—Inosite has also been found in the urine of Bright's disease.

Treatment.—Our knowledge of the actual nature of this disease being faulty, a complete cure cannot be expected from the treatment; though it is surprising how much improvement diabetics often manifest, for a long time, from a well-conducted course of remedies. The first, and by far the most important, point is to regulate the diet; which should be nutritious, and as free as possible from every saccharine or

amylaceous material. Of all kinds, animal food is the best; and the patient may take his choice of different sorts of meat, poultry, game, white fish, and eggs. There would seem to be no objection to milk, as it is probable that the sugar of milk contained in it does not undergo the glucose transformation. Cream, cream or Neufchatel or Stilton cheese, and butter, are in no way injurious. Greens, cauliflower, broccoli, spinach, water-cresses, and celery may also be allowed in small quantities, if desired; but fruit, rice, sago, tapioca, arrowroot, oatmeal, maccaroni, confectionery, and potatoes—which contain a large quantity of starch—must be forbidden. Patients would be much better without bread; when used, care should be taken that it is well fermented and stale, and it will be as well to have it toasted. The bran loaf (F. 9) recommended by the late Dr. Camplin, has often very salutary effects, when taken continuously; and to abstinence from starch as it exists in ordinary bread, and the employment of this substitute, Dr. C. no doubt owed the prolongation of his own life for several years after he became diabetic. Gluten bread has been largely used, but I have found very few persons able to take it for any length of time. It is certainly superior to common bread, though inferior to the bran loaf, or to Dr. Pavy's almond rusks and biscuits. These are made with blanched almond powder and eggs; the former having been freed from sugar by washing with boiling water slightly acidulated with tartaric acid.* The thirst may sometimes be best appeased by pure spring water, or iced water, or soda water, which are also very grateful to the stomach; or by Bordeaux wines and Vichy water, when wine is not contra-indicated. Weak beef tea, or mutton broth, will occasionally allay thirst better than other kinds of drink. Beer, raw spirits, and tea should be avoided; but the latter is less injurious than coffee. Weak brandy-and-water, or claret, may sometimes be allowed; while for variety, when stimulants are needed by the system, we may substitute gin, whiskey, Burgundy, and Moselle. If the patient wish to pay a visit to one of the foreign mineral springs he may be recommended to go to Vichy (F. 479), or Carlsbad (F. 496); the waters of either of which fashionable baths may prove useful for a time. And, lastly, the clothing must be warm, the whole body being covered with flannel or chamois leather; for cold and damp are especially to be avoided.

Amongst the medicinal remedies opium is the most important, since under its use the patient is not only greatly soothed, but his symptoms are mitigated, and the specific gravity of the urine lowered: it may be advantageously given in the form of Dover's powder. The hot-vapor bath will often excite the skin to action, when other means fail, and thus be productive of much comfort; and so also with the warm-water bath. The Turkish bath, once or twice a week, is a convenient remedy. The citrate of ammonia or potash with steel (F. 403) often proves very valuable; it should be taken for two or three weeks at a time, then discontinued, and recommenced according to the general strength. In some cases quinine proves useful, especially when combined with opium —one grain of each three or four times a day. Cod-liver oil, and suet

* Bran bread and biscuits, gluten bread, and almond rocks and biscuits, may be obtained from Van Abbott, 5 Princes Street, Cavendish Square; Blatchley, 362 Oxford Street; and Hill & Son, 60 Bishopsgate Street

boiled in milk, not only do good generally, but patients have often remarked that they have felt more comfortable after these alimentary substances than after many other kinds. Creasote (F. 41) has also been thought beneficial, especially by Dr. Watson, who believes that it tends to check the conversion of the food into sugar. Glycerine, for sweetening tea, custards, light puddings, &c., has been recommended as a substitute for sugar; but while patients do not generally allow that it is palatable, it has the disadvantage of often causing diarrhœa, of increasing thirst, and of not diminishing the total amount of sugar excreted in the twenty-four hours. Under the influence of strychnia, improvement has been manifested in several instances: the general health improving, while the quantity of urine and its specific gravity have lessened.

A few years ago, M. Piorry treated several cases of glucosuria by the administration of large quantities of sugar; at the same time insuring abstinence to a great extent from all fluids. The remedy was given in the form of half a pound of treacle or honey daily; or sometimes from seven to ten ounces of the best white sugar were taken in the same time. Independently of the fact that very few English patients will submit their stomachs to such an ordeal for more than two or three days, it is certain that the consumption of so much saccharine matter is worse than useless.

VI. DIURESIS.

The term Diuresis (*Διὰ*, through; *οὐρέω*, to pass urine) is applied to that condition in which an excessive quantity of pale limpid urine is daily excreted. It is often spoken of as Diabetes Insipidus; the only objection to which is that it may be confused with saccharine diabetes, while there is not the least connection between the two affections. For although it was at one time believed that the urine in cases of chronic diuresis contained a tasteless kind of sugar, yet this view has now been completely disproved; and it is allowed on all hands that no saccharine matter of any kind is ever present.

The two chief *symptoms* in this affection are,—insatiable thirst (polydipsia), and the elimination of a large quantity of urine. Generally, the watery constituent of the latter is alone increased, the total amount of urinary solids not being greater than in health. This was the case in a delicate young lady, suffering from uterine disease, seen by me in consultation with Dr. George May, of Reading; in which instance eight quarts of pale urine were passed in the course of twenty-four hours, sometimes for many days in succession. At the same time, a very few examples are recorded, where the urea and chloride of sodium have both been found considerably above the normal standard. The amount of urine passed is sometimes so great that it has been believed to be in excess of the fluid consumed. Patients, especially young females, will produce tables very clearly kept, showing that when the whole quantity of fluids drunk in the day has been two pints, the urinary secretion has amounted to as many quarts or even to much more. From a glance at a little note-book now before me, I find A. B. recording that on the 14th

January the whole quantity of nourishment taken consisted of one pint and a half of fluids, half a pint of jelly, five small oranges, seven slices of toast or bread and butter, and one bun: while the urine discharged was seven quarts. On the following day, the consumption of fluids and solids was slightly lessened, and the urine fell to six quarts. And in this way the report goes on for many weeks, six or seven quarts of urine resulting from a pint and a half of cocoa or coffee. Discussion with patients thus infatuated answers no good purpose. It is much better quietly to suggest that the tables are by no means extraordinary; at the same time insisting that further observations of the kind are not only quite unnecessary, but must not be made. Nevertheless, it is really a question whether there may not be some excess of the urine over the liquid taken, under certain circumstances. If there be, one of three explanations—as Dr. Parkes points out—must be adopted: (1). Either the body becomes poorer in water, and so loses weight. (2). Or, water is absorbed by the skin and lungs. (3). Or, water is formed in the system by the direct union of its elements—oxygen and hydrogen. No reference is here made to the absorption of dropsical effusions, because the removal of these fluids in this manner has no bearing on the argument in question.

In the *treatment* of those cases where there is only an excess of the urinary water we cannot do better than employ one of the astringent preparations of steel. The tincture of the perchloride of iron (F. 101), or the iron alum (F. 116), will generally answer every purpose. Sometimes a dose of opium at night may do good; or if the action of the skin be suppressed a few warm baths can be ordered. When the urinary solids are increased, indicating undue waste of tissue, the cause must be sought before the effect can be removed. Especially ought the symptoms of nervous exhaustion to be looked for; while, if present, cod-liver oil, phosphoric acid and nux vomica (F. 376) will probably prove useful. In all cases the amount of fluids consumed must be regulated.

VII. CHYLOUS URINE.

Urine of a milky appearance from the presence of fatty matter, in a molecular state, is known as chylous urine. In addition to the fatty matter there is generally present one or more of the following ingredients,—blood corpuscles, fibrin, albumen, and an imperfect albumen like that of chyle (albuminose ?).

The importance to be attached to the fact of the urine being chylous varies in different cases. The most favorable instances are those where at some time in the twenty-four hours the secretion is healthy, containing neither chyle nor albumen. In one of the examples of this disease, presently to be mentioned, which has fallen under my notice, the urine passed in the morning before taking food has more often than otherwise been healthy; the chylous condition setting in with the digestion of the breakfast. But in the instance of a lady under the care of Mr. Cubitt, of Stroud (Beale's "Archives of Medicine," vol. i, p. 11, London, 1857), the urine passed in the morning, after a night's rest, was milky; while

at no time was it ever so during the day. Mr. Dutt has also recorded ("Lancet," 26th July, 1862) a similar instance; the patient, a male Hindoo, passing urine free from chyle during the day, while that voided during the night and in the morning was deeply loaded with it. A microscopic examination of chylous urine shows that the fatty matter is present in a molecular state; but if, in addition, cells of renal epithelium loaded with oil-globules are found, such will indicate the coexistence of Bright's disease.

On examining the kidneys after death in cases where the urine has been chylous, no alteration perceptible to the naked eye has yet been discovered. Nevertheless, the disease may possibly depend upon some structural change in these glands; owing to which certain constituents of the blood filter through the vessels into the urine. Dr. Carter, of Bombay, has detailed ("Medico-Chirurgical Transactions," vol. 45, p. 189, London, 1862) the particulars of three instances which have led him to believe that this affection is the consequence of a direct admixture of chyle and urine—a leak from the lacteal track into the urinary. With regard to these cases it seems highly probable that the explanation is correct; but further observations, particularly post-mortem investigations, must be made before we can accept this view as generally applicable. Dr. G. R. Bouyun, of Demerara, has described (Golding Bird's "Urinary Deposits," 5th Edit. p. 422, London, 1857) some cases of this disease in which the chylous state of the urine was always accompanied by attacks of irritation, fever, and emaciation; while he seems to prove that the affection is often epidemic at Demerara, especially amongst creoles and negroes. Dr. Bouyun refers it to some derangement of the assimilative functions; and he has been successful in curing it by the free administration of a decoction of the mangrove bark (Rhizophora Racemosa), which acts freely on the skin, alters the character and increases the quantity of the urine, and improves the general health.

Examples of chylous urine are rarely met with in Europe; more than half of the instances recorded having occurred in individuals resident in hot climates, or in the natives of the East and West Indies, Mauritius, Brazil, &c. Astringents are the only remedies which seem to exert any influence upon the progress of the disorder; and of these gallic acid is, as a rule, the best. To show the progress, symptoms, and duration of this disease I shall conclude this section by relating the chief features of the only two cases which have fallen under my observation. The history of the *first* case is as follows:

Mr. J. G., ætat. 44. Married. Is a saddler. Applied to me on the 7th May, 1862, at the wish of his medical adviser Mr. James Wilson. He was born in the West Indies, and lived at Trinidad until he was seven years old. Was then brought up in Scotland. For the last twenty-two years has resided in London; with the exception of ten months, ten years ago, which he spent in Trinidad. In 1848 he began to notice that his urine was thick and milky, that he was losing strength, and that he had pains in his loins: he consulted Dr. Prout. He at first improved under the influence of steel; but his water continued white, and at times deposited a pink sediment. In October, 1849, he placed himself under the care of Dr. Bence Jones. This gentleman's excellent reports of the case in volumes 33 and 36 of the "Medico-Chirurgical Transactions," as well as in the "Transactions of the Royal Society,"

for 1850, are well known to the profession. Dr. Bence Jones twice analyzed the urine, with the following result:

	19th Oct., 1849.	20th Oct., 1849.
Water,	955.58	943.13
Solid matter,	44.42	56.87
Albumen,	14.03	13.95
Fat,	8.37	7.46
Urea,	13.26	24.06
Saline ash,	8.01	10.80
Loss,	.75	.60

On the day of the last analysis, before reserving the urine for examination, Mr. G. was bled. The serum of the blood was opalescent, but not at all milky. The blood contained in 1000 parts 240.03 of solid residue,—viz., fibrin,2. 63 ; blood-globules, 159.3; and solids of serum, 78.1. The fat amounted to 0.62.

The urine continued chylous until the 14th February, 1850, when it became healthy and continued so until the 5th October. On this day there was a relapse; but as the use of gallic acid was recommenced, the restoration to health seemed complete in about forty-eight hours. On the 26th December, there was a second relapse: gallic acid was given, and on some days the urine was healthy, on others chylous, until the 7th February, 1851, when it became natural. On the 10th September there was a third relapse, but he got better in a few days. The fourth relapse occurred on the 28th September; and in spite of gallic acid, acetate of lead, and nitrate of silver, it lasted until the 1st February, 1852, when the urine was free from chyle or albumen. He continued well, sailed for the West Indies on the 30th September, and returned in ten months. There was no relapse, and Dr. Bence Jones found the urine healthy on the 20th July, 1853. Up to the day of recovery from the fourth relapse he had taken, in the whole, very nearly forty ounces of gallic acid. Mr. G. tells me that on leaving for the West Indies his weight was a little over 9 st., whilst at his return it was 12 st. 7 lbs.

From this time he seems to have remained well for some years. But hard work at an army clothier's gradually told upon him; and when he applied to me, in 1862, his general health had been bad and his urine very chylous for several months. The specimens which he brought with him were of different characters. In one bottle the secretion was natural in color, but had coagulated so that it looked like size: the other bottles were filled with fluid exactly resembling milk. The urine passed in the morning fasting, was always the most natural. He was ordered gallic acid (gr. 30) thrice daily, an occasional Turkish bath, and opium at night.—Without making much progress he continued under treatment for some time; occasionally having quinine and steel, but always soon returning to the gallic acid in forty-grain doses. Cod-liver oil was also taken. On many occasions the urine was white and solid, like blanc-mange; on others, of a natural color but firm, like calf's-foot jelly. Frequently it became partially solid in the bladder, and long strings of coagulum were passed by the urethra. The liquid milky urine could always be cleared by an excess of ether. It contained a quantity of albumen, but no sugar. The secretion passed fasting in the morning was natural and free from albumen. At times, and for many days in

succession, he would be much better; and then the symptoms returned. But on the 31st December, 1863, he seemed quite well, the urine having continued healthy for several weeks.

17th January, 1865. Mr. G. has remained well since the last report. Recently, the secretion voided after taking food has become chylous, but never solid. The early morning urine is healthy. His general condition is favorable.

The chief features of the *second* case are these: Dr. Edward G., ætat. 58. A widower. Applied to me on the 16th August, 1862. Has resided in Calcutta for many years. Was in England for a short time nine years ago; and has been here now for eighteen months. He returns to India in a few days, as his leave expires shortly. Has usually been strong and well, with the exception of occasional attacks of hepatic congestion.—About twelve years ago he first noticed that his urine was milky, but it only remained so for a short time. Six years back had a second attack, which lasted for eight or nine months; but as the cold season set in, he almost "insensibly got well." Since then has had two or three slight relapses. Two months ago he noticed that the chylous condition of his urine was returning, and for the last three weeks the secretion has been persistently milky. Sometimes it becomes solid after being passed. Part of the specimen brought to me was as firm as blanc-mange; the fluid portion looking like milk, until it was cleared by the addition of ether. He thinks he has derived most benefit from the tincture of perchloride of iron, the compound jalap powder, and from drinking freely of cold water. I recommended ten-grain doses of gallic acid, thrice daily.—On the 19th August Dr. G. sailed for Calcutta, determined to give the gallic acid a fair trial: it was also suggested that he should have a sea-water sponge bath every morning, and should take a little ammonio-citrate of iron every day with his dinner and supper.—8th May, 1863. In a letter from Calcutta of this date, Dr. G. says: "I recovered from my complaint suddenly on the 1st November, when the weather became cold and bracing, and I continued well for nearly three and a half months." Then the complaint returned; "and I have been ill ever since. The climate of India certainly does not agree with me, and I must try and get back to Old England."—After this, Dr. G. again recovered; and on the 24th June, 1864, Mr. G. informed me that his father was quite well.

VIII. RENAL CALCULI.

Urinary calculi are found either in the kidneys, or in the bladder, or in the follicles of the prostate gland. In very rare cases one or more of the urinary salts become deposited in the ureters, or in the urethra; but usually the calculi found in these situations have travelled there from the kidneys or bladder. Urinary calculi are not peculiar to man; being also found in oxen, horses, sheep, pigs, and very frequently in rats. These concretions are formed of concentric layers of crystalline or amorphous matter. Many are composed of only one constituent: others are of a composite nature, the composition of the different layers

alternating. Thus urate of ammonia and oxalate of lime are frequently associated in the same stone.

The chief *varieties* of calculi are the Uric acid; Urate of Ammonia; Fusible calculus,—Phosphate of Lime, with Phosphate of Magnesia and Ammonia; Mulberry calculus,—Oxalate of Lime; Carbonate of Lime; and those very uncommon forms, the Cystic and Xanthic Oxides. Pseudo-calculi of fibrin or blood-coagula, or of urostealith (a resinous or fatty substance) are exceedingly rare.—Urinary concretions, whatever may be their composition, vary very much in size. Thus, they occasionally merely resemble grains of sand, being so small as to pass readily with the urine. Particles of gravel thus voided may be found made up of aggregated crystals of the urinary salts, so that they are really microscopic calculi. In other instances, however, they are discovered as large as a small orange. When a stone has formed in the pelvis of the kidney, it may, while of moderate size, enter the ureter and gradually be forced onwards towards the bladder. The suffering which takes place during the transit is very great, and is popularly known as "a fit of the gravel." But as soon as the calculus reaches the bladder, all pain is over for a time; and if it be true, as some philosopher has remarked, that the height of happiness is sudden relief from great suffering, the patient is indeed a happy man.

One or more calculi may, however, not only form in the kidney but remain there. Under these circumstances they produce, by their mechanical action, well-marked *symptoms;* the chief of which are almost constant backache, bloody urine, and reflex irritation of distant organs. After a time the general health suffers to a considerable extent; while as the foreign body increases in size so it encroaches on the true structure of the kidney, and either converts the gland into a large cyst, or perhaps sets up suppurative inflammation. The following case may be regarded as a good example of the suffering which is induced by renal calculi, and of the time which may elapse from the commencement of the symptoms until a fatal result ensues. The principal points in the patient's history are as follows:

On the 24th April, 1862, I was consulted by Mr. R., ætat. 53, one of the head clerks at a large insurance office. Both his grandfathers died from stone in the bladder. His father was a great drinker of port wine; he never had gout, lived to be 80, and for several years very rarely went to bed sober. None of Mr. R.'s numerous brothers and sisters ever had stone. Mr. R. first complained of pain in the back, for which he was cupped, in 1838. He resided in York from 1839 to 1843: had frequent attacks of backache, and occasionally passed bloody urine. In 1843 he came to London: had advice, and used baths and plasters. One day in 1846, after great suffering which had continued all the previous night, he passed three small stones by the urethra. There was always bloody urine subsequently; and occasionally great pain until 1852, when after some days of agony he got rid of five small calculi. They were analyzed, and found to consist of oxalate of lime. In 1853 he again passed three stones, none coming away after this time. When I first saw him he told me that he was never free from severe pain in the loins. He appeared thin, weak, nervous, and irritable. His urine was very bloody, acid, sp. gr. 1010, and loaded with albumen: a microscopic examination detected pus and blood corpuscles,

with crystals of the triple phosphate. In spite of his suffering he was able to go from Chelsea to the City, and back again, every day. Experience led him to travel by the steamboat when possible: the jolting of an omnibus was often unbearable. All alcoholic drinks increased his misery. Most benefit was derived from the tincture of perchloride of iron. On the 20th October, 1862, he caught typhoid fever while nursing a relative. Uræmic symptoms set in, and he died on the 10th November. On the following day I examined the body, assisted by Mr. Smith, of King's Road, Chelsea. The abdominal viscera and the bladder were healthy, with the exception of the kidneys. The left kidney consisted merely of a large cyst: it contained one stone the size of a potato weighing 36 drs., another weighing 16 drs., and a third of the weight of 2 drs. The right kidney was enlarged, but there was a considerable portion of healthy structure. In the dilated pelvis were several calculi; the three largest weighing respectively 14, 9, and 3 drs. An analysis of these stones, kindly made for me by Mr. Hadow in the laboratory at King's College, showed that they consisted of Phosphate of Lime, with layers of fusible Phosphate (a mixture of Phosphate of Lime with Ammonio-Phosphate of Magnesia). There was neither lithic acid, urate of ammonia, nor oxalate of lime. Many of the stones presented a kind of mushroom shape, having been moulded in the calyces, infundibula, and pelvis of the kidney. In estimating the size of the calculi from their weight, it must be remembered that the phosphatic concretions are very light.

In the *treatment* of cases of renal calculi we have, first, to relieve the general symptoms; secondly, to endeavor to prevent the formation of fresh stones, as well as to check the further increase in size of such as already exist; and, thirdly, when a calculus enters the ureter we must facilitate its passage to the bladder.

The *first* indication is to be accomplished by supporting the health with a plain diet. Milk, cream, animal food, and raw eggs are beneficial; while usually there is no objection to small quantities of brandy or whiskey well-diluted. All kinds of beer and wine had better be avoided. Cod-liver oil will often be useful.—The pain in the back will be best relieved by the application of belladonna plasters, and by wearing thick flannel or chamois leather jackets next the skin.—To check the hemorrhage we may order either the tincture of perchloride of iron (F. 101, 392), or the iron alum (F. 116); but at times, when the loss of blood is greater than usual, no remedy will answer better than gallic acid (F. 103).

The plan to be pursued under the *second* head, will vary with the supposed nature of the calculus. In the *uric acid* diathesis, a vegetable diet, avoidance of alcoholic drinks, the free use of simple diluents or of mucilaginous drinks, gentle exercise, attention to the bowels, and the employment of alkaline aerated waters—as those of Vichy or Carlsbad—will be beneficial. Alkalies often give relief, and none can be employed so advantageously as the salts of potass; since soda often combines with the uric acid, forming a hard and insoluble salt, while magnesia in large doses is very apt to cause intestinal concretions. The bicarbonate of potass may be freely given, without any of these disadvantages: the liquor potassæ in large doses (min. xxx in water fl. oz. ij) is also an agent possessing valuable properties, which appear to have been generally overlooked.—In the *phosphatic* diathesis

a directly opposite course of treatment will be necessary. The diet ought to be generous, a moderate allowance of whiskey or brandy may perhaps be allowed, and tonics—such as bark, iron, and the mineral acids, especially the nitro-muriatic—should be administered. Opium is also a valuable drug in these cases; and complete mental relaxation must be insisted on.—In the *oxalic-acid* diathesis, all articles of food containing this agent—such as the common garden rhubarb—must be avoided: saccharine substances also ought to be disallowed. The nitro-muriatic acid will generally prove useful (F. 378); and tepid or cold bathing, change of air, &c., should be recommended.

In the *third* place, we may be called upon to relieve the great suffering caused by the passage of a calculus down the ureter. This will perhaps be most readily effected by the prolonged use of the warm bath; by the free use of emollient diluents—especially by barley-water containing a couple of fluidrachms of the spirit of nitrous ether; as well as by putting the patient under the influence of chloroform, or else by the administration of full doses of opium. The subsequent passage of the stone from the bladder will be facilitated by the patient allowing the urine to accumulate, and then getting him to discharge it with force while he is in a hot bath; or by introducing a large silver catheter with an open extremity, and washing out the bladder with warm water. When too large to be thus got rid of, surgical interference—lithotrity or lithotomy—will subsequently be required; no satisfactory plan for producing the solution of a calculus having yet been discovered.

IX. CANCER OF THE KIDNEY.

Cancer is probably the rarest form of renal disease. Dr. Walshe has collected forty cases of cancer of the kidney from different sources. In thirty-one of these, pure encephaloid—or one of its varieties—was the species of cancer observed, while there were only five cases of scirrhus. The disease affected both organs sixteen times, the right alone thirteen times, the left alone six. Cancerous degeneration, like many other forms of renal disease, commences usually in the cortical substance, and thence extends to the medullary cones and to the walls of the pelvis and ureters.

In once instance of renal cancer about which I was consulted by Dr. Greenhalgh (in 1849 and 1851), the gland was enlarged to such an extent that it simulated in many respects a solid ovarian tumor, and had indeed been diagnosed as such. On two occasions when I saw the patient she was pregnant; consequently—as only an incomplete examination could be made—no positive opinion was given, though I was certainly inclined to regard the tumor as ovarian. After death the right kidney was found to be the seat of disease, and was enlarged at least to the extent of two adult heads.—I am acquainted also with the particulars of a similar case where the tumor was diagnosed as ovarian, and where tapping was had recourse to (in 1864). But although only a little blood came away through the canula, the true nature of the affection was not suspected by the operator until an examination after death revealed it.—And I have heard of a third instance, in which the abdomen

was opened (in 1865) for the removal of a supposed ovarian tumor. The patient died; and at the autopsy the disease was found to consist of an encephaloid kidney.

Dr. Owen Rees states that the following are the chief points to be noticed in the *diagnosis* of malignant disease of the kidney from calculus: 1. In malignant disease the blood is generally passed in larger quantity than in calculus of the kidney. 2. There is more frequent tendency to nausea *on slight occasion* than in calculous disease. 3. Microscopical examination of the urine will frequently show pus or mucus in excess, if there be calculus; whereas in malignant disease this sign does not so frequently exist. 4. The appearance of those suffering from malignant disease of the kidney is nearly always indicative of a state of anæmia more or less advanced. 5. In calculus, hæmaturia generally follows upon some unwonted exertion. 6. Careful examination of the abdomen will frequently lead to a detection of tumor, if there be malignant disease of the kidney.

It is not always an easy matter to distinguish tubercular disease of the kidney from cancer. But a consideration of the chief features presented by the former may be of some assistance, and I would therefore recommend the following points to be borne in mind: The gland may be much enlarged; owing either to the confluence of softened tubercular deposits, or to the gradual distension of the pelvis by retained urine and pus. There are night-sweats, rapid emaciation, and attacks of diarrhœa; with occasionally, burning pain in the loin corresponding to the seat of disease. The urine contains pus and blood; sometimes there are small cheesy-looking masses, visible to the naked eye; while a minute examination may perhaps detect tubercular matter, granular débris, elastic fibres, and epithelial casts of the tubes. Moreover, renal tuberculosis is very rarely a primary disease, being generally secondary to pulmonary phthisis. Death usually occurs in from twelve to eighteen months after the commencement of the symptoms indicative of kidney affection; while the fatal result may be due to exhaustion, or more rarely to uræmia or ichoræmia.

If the urine be microscopically examined either in malignant disease of the kidney or bladder, it will generally be found to contain cancer-cells; together with fibres of connective tissue, blood-corpuscles, &c. In renal calculus, the epithelium of the pelvis of the kidney is sometimes rapidly exfoliated; while as these cells are of a caudate and irregular form they are very likely to be mistaken for cancer-cells. The spindle-shaped epithelial cells of the ureter also bear a close resemblance to the cells of scirrhus. The general symptoms will, however, aid the diagnosis; for in advanced renal cancer there is usually pain in one or both loins, attacks of nausea and vomiting are very frequent, the malignant cachexia is present, the loss of flesh and strength increases daily, and the enlarged gland can be felt.

In the *treatment* we can only do good by supporting the patient's strength; while every endeavor is made to relieve the suffering with subcutaneous injections of morphia, opiate suppositories, &c.

X. SPERMATORRHŒA.

The consideration of the subject-matter of this section can hardly be approached without a feeling of misgiving, if not of repugnance. The term "spermatorrhœa" (*Σπέρμα*, seed; *ῥέω*, to flow) has been so grossly abused, and is so constantly employed by the vilest charlatans to intimidate their unfortunate dupes, that many practitioners would perhaps wish to ignore the topic altogether. But it seems to me that to do this is merely to rush from one extreme to the other. For it cannot be denied that a morbid condition may be induced, the chief feature of which is the involuntary escape of seminal fluid; while it is as certain that the consequences of such losses, if oft repeated, are most injurious to the mental and bodily health. The victims of this disorder, however it may have been brought about, are as much entitled to our care and consideration as those afflicted by other diseases. The physician who is familiar with the many varieties of human suffering and human weakness should be the last to acknowledge any bound to his ministrations. It is happily no part of his duty to inquire whether the calamity be a just retribution. Suffice it that it is the obligation, perhaps rather the privilege, of his noble art to give all the relief in his power to a fellow-creature struck down by pain and sickness; whether the suppliant be the inmate of an hospital or a prison, of a palace or a hovel.

The most frequent *cause* of spermatorrhœa is self-abuse. Youths who have never received a kindly warning, and who have been allowed to grow up without being taught even the rudiments of physiology, or the necessity for moral control, contract pernicious habits before they are aware of the mischief they are inflicting upon themselves. Exciting conversations, with the perusal of "sensation" novels and newspaper reports of the proceedings in the Divorce Court, early arouse the passions and are productive of the most pernicious effects. To deny this is simply to shut one's eyes to a grave evil; an evil which is so patent to those who have the control of young men, that only a short time since (I believe it was in the year 1864) an eloquent preacher delivered a sermon on this subject at one of our universities. But to students at college the warning often comes too late; for this bad habit is not unfrequently early and easily acquired, though it can be broken only with the greatest difficulty.

It is a common mistake to suppose that the functions of the testicles must necessarily be performed after the time of puberty. These glands may be perfectly healthy and yet quiescent; just as is the case with the mammary glands until their powers are brought into play. But when the secretion of seminal fluid has been repeatedly encouraged, a hard struggle will alone stop the continued formation of this fluid. It may be doubted whether the serious symptoms which occur in spermatorrhœa are directly due to the loss of seminal fluid, or only to the effect of the cause of this loss upon the nervous system. Seeing what occurs in women, where no discharge follows upon masturbation, I am rather inclined to adopt the second view.

The seminal fluid is composed of a semi-transparent and glutinous and alkaline fluid, called liquor seminis; of granular corpuscles, each about the $\frac{1}{4000}$th of an inch in diameter, and sometimes termed "spermato-

phori;" and of spermatic filaments or spermatozoa, easily recognized by a magnifying power of some 400 diameters, owing to their tadpole-like form and rapid vibratile movements. To detect these bodies in urine, this secretion should be allowed to repose in a conical glass, the lower part of the sediment being afterwards removed to a glass slide with a pipette. When the seminal fluid is abundant it may render the urine slightly albuminous. In spermatorrhœa there may be simply a repeated escape of seminal fluid; or this may be associated with morbid changes in the vesiculæ seminales, ejaculatory ducts, bulbous portion of the urethra, and prostate gland. The coexistence of the latter occurs more frequently where the disease is due to gonorrhœa, than where it has its origin in self-abuse. The mere occasional presence of spermatozoa in the urine is, of course, of no consequence. But in the cases under consideration there are repeated escapes of semen, often by day as well as by night; while the passage of the urine, or the straining to empty the rectum, may produce a flow. Where this occurs, the secretion often consists of an imperfectly elaborated fluid,—one loaded with epithelial débris, and defective in true spermatic elements.

The *consequences* of spermatorrhœa are general weakness, with nervous irritability. There is mental depression; a desire for a dreamy kind of existence, rather than a wish to follow any active occupation; the digestive organs frequently get disordered, as is indicated by flatulence and constipation; the sense of hearing, as well as of sight, becomes dulled; there is loss of memory, and an inability to fix the attention; while attacks of palpitation, giddiness, shortness of breath, headache, and neuralgia, are far from uncommon. In extreme instances I believe the final result may be epilepsy, phthisis, insanity, or impotence. That these views are not imaginary I could prove by the recital of cases which have fallen under my observation. But I have met with none where there has been a more striking appearance of cause and effect than in the following: For several years I have attended a family of four persons,—two brothers, and two sisters; all were single, and would now (1865) be above thirty-five years of age. Both the brothers were brought up to the church: one died a few months ago from phthisis, the other is an inmate of a private lunatic asylum. One of the sisters is a confirmed invalid, always suffering from some form of hysteria, or from neuralgia, or from great mental and physical prostration. She lives alone, and persists in doing so. These three members of this family have not only confessed to practising masturbation, but have regarded it as the origin of all their troubles. The second sister enjoys tolerably good health, though she has a fibrous tumor of considerable size of the uterus. With regard to the cause of the latter I can say nothing. Nevertheless, it is probably true that frequent sexual excitement, without impregnation, is a cause of chronic uterine and ovarian congestion, which may go on to the production of either uterine or ovarian tumors; though I am not prepared to say that such a cause has been brought into play in this instance.

As typical of another class of cases, which are of comparatively frequent occurrence, I would give such a sketch as this: A young man, about 25 years of age, has never had sexual intercourse, but he confesses to having occasionally practised masturbation since he was thirteen or fourteen years of age. His penis is normal; both testicles are

of a proper size, and situated in the scrotum. He enters into a matrimonial engagement; but unfortunately a period of eighteen months or two years must elapse before he can fulfil his contract. During this interval he sees his future wife daily, and in spite of his resolve not to encourage any feeling of excitement yet repeatedly he suffers from seminal emissions. At the time of marriage he is nervous, weak, and has fits of mental depression; while his wedding trip is rendered perfectly miserable on finding that immediately he attempts to have connection an emission takes place and the erection ceases. Night after night his efforts prove unavailing; until at the end of two or three weeks he becomes thoroughly ashamed of himself, afraid of his wife's female relations, and terribly depressed. It is absurd to tell such an individual that he has nothing the matter with him; that he is hypochondriacal; and that such a disease as spermatorrhœa has no existence. To do so is merely to send him to some rogue who will draw a terrible picture of the result of his weakness, and rob him to the utmost possible extent. The truth is that the patient has not the power he needs; and this power can only be given to him by well-directed medical treatment.

In the *treatment* of spermatorrhœa it is necessary to obtain the confidence of the patient; so that while we calm his excessive anxiety, we may also impress him with a belief in our power to effect a cure if he will but carry out the directions which are given. He ought to be urged to read no books on the subject of his disorder, to work earnestly but not immoderately at his occupation, to seek cheerful society in the evening, to take a proper amount of exercise, to sleep upon a mattress and not to remain in bed for more than eight hours, not to indulge in heavy meals, and (as a rule) to avoid smoking and the use of alcoholic drinks. If the emissions take place when he lies upon his back, as they often do, he should tie a cotton-reel over the middle of the spine, so that he may awake directly he assumes this unfavorable position. The bowels must be regulated by the exhibition of simple aperients (F. 165, 169, 194), provided attention to the diet and the use of fruit fail to procure an easy evacuation every day. If there are prominent symptoms of nervous depression, a mixture of phosphoric acid, tincture of nux vomica, and bark (F. 376) will prove very serviceable; or a pill of sulphate of zinc and extract of nux vomica (F. 409) may be ordered. When the patient is unmarried I generally avoid giving steel in any form; as this medicine often produces congestion of the sexual organs, and so keeps up the irritation which it is our object to subdue. But where the man is married, and is unable to have intercourse, a mixture of quinine and iron (F. 380) will be unobjectionable. A tepid salt water sponge-bath may be taken every morning; while the glans penis is to be washed so as to remove the secretions of the sebaceous glands. The use of a suspensory bandage is often beneficial. Where the emissions are not very frequent, this plan of treatment will suffice; but in the more severe forms of spermatorrhœa we may have to prescribe, in addition, cod-liver oil, a moderate allowance of wine or bitter ale, the use of milk instead of tea or coffee, and to recommend a holiday, with residence at the sea-side. If any sedative be needed, a pill containing camphor with small doses of conium and belladonna (F. 326) will often exert a favorable influence. And then, if there be any disease about

the rectum, or if there be indications of the presence of oxyurides, or if there be irritability of the bladder, or if the urine be excessively acid, the necessary steps for effecting a cure of these affections must be taken.

With regard to local treatment I can only say that I believe the instances in which it is called for are very exceptional. At the same time, I have seen cases where a good effect seems to have been produced by the introduction of a metallic sound into the bladder, once or twice a week. The application of nitrate of silver to the prostatic portion of the urethra, by means of Lallemand's porte-caustique, has been highly spoken of by gentlemen of great experience; but if it be used, the patient should remain quiet for a day or two after the application, should be kept on a milk diet, and should be told that it will give rise to considerable irritation with the passage of bloody urine. Where there is extreme relaxation, galvanism deserves a fair trial. And lastly, it must be remembered, that when a cure has been effected, moderate sexual intercourse tends to maintain the general health; although, if the practitioner feels it his duty to recommend marriage, he should give a warning as to the mischief which will inevitably result from "a long engagement."

XI. DISEASE OF THE SUPRA-RENAL CAPSULES.

The supra-renal capsules have long been objects of great interest to the anatomist and physiologist; for though they probably perform some important office in the animal economy, yet at present that office has been but vaguely guessed at. Hence we must be content for the time with believing that they serve in some way to minister to the elaboration of the blood, in common probably with the other ductless glands—the spleen, thymus, and thyroid bodies; though the exact nature of their functions, or the manner in which they perform them, cannot even be surmised. All that we know is, that the comparative size of the capsules depends upon the age: since they are larger than the kidneys in the embryo, about an equal size in very young children, and only about the twentieth part as large in the adult. Indeed, in the latter, they are sometimes so small that they can hardly be found. When healthy, they have a yellowish-red color, are from one and a half to two inches in length, rather more than an inch in breadth, and weigh between sixty and one hundred and twenty grains. They have an outer, or cortical substance, made up of elongated vesicles imbedded in a fibrous matrix; and an inner, or soft medullary structure, described by Dr. Harley as consisting of fibrous tissue, arranged in a reticulated manner, and having its meshes occupied by a number of large pale-colored cells with round nuclei.—The arteries supplying the supra-renal glands are of considerable size; while the nerves are numerous, and chiefly derived from the solar and renal plexuses.

The obscurity which surrounds these organs has not been dispelled by the discovery of Dr. Addison, that certain examples of severe anæmia, with a peculiar discoloration of the skin, are due to—or at least accom-

panied by—disease of these capsules.* Dr. Addison having observed that cases of anæmia occasionally came under his care, generally terminating fatally, and presenting certain prominent characteristics, such as excessive and progressive weakness, a feeble and perhaps rapid pulse, faintness on the least exertion, pain in the epigastrium shooting through to the space between the scapulæ, a pearly white appearance of the conjunctivæ, loss of appetite, sickness, emaciation, with a peculiar discoloration of the whole surface of the body; and finding that no adequate cause—as, *e.g.*, loss of blood, diarrhœa, chlorosis, purpura, or renal, splenic, strumous, or malignant disease—could be discovered, for these important symptoms, he gradually seems to have imagined that the fault existed in the supra-renal capsules; and the more numerous the cases he examined, the stronger his convictions grew.

As in most cases of anæmia, so in the present form, the disorder commences almost imperceptibly with symptoms of failing health and debility. The patient becomes languid and weak, the pulse gets feeble, the appetite impaired, the stomach irritable, the whites of the eyes pearly, and the body emaciated; while occasionally there is urgent gastric disturbance with vomiting, and sometimes indications of disturbed cerebral circulation. With all or most of these symptoms, for which no adequate cause can be found, Dr. Addison thought that a gradual discoloration took place in the skin; most marked usually about the face, neck, superior extremities, penis, scrotum, the flexures of the axillæ, and around the navel. The skin, in the cases which formed the basis of the observations, was seen to be of a dingy or smoky hue, the depth of color being variable; sometimes slightly marked, and occasionally —as in one instance—"so universally and so deeply darkened, that, but for the features, the patient might have been mistaken for a mulatto." —(p. 5). It is worthy of remark that the discoloration gradually appeared to increase; becoming more marked as the other symptoms acquired greater prominence, and as the disorder approached to its fatal termination. In only one of Dr. Addison's recorded cases does the blood seem to have been examined microscopically; on which occasion a considerable excess of white corpuscles—leucocythemia—was found to exist.

Since the publication of Dr. Addison's researches, cases of renal-capsular disease have been recorded where there has not existed any discoloration of the skin during life. It is now said, therefore, that the discoloration is not a necessary element of the affection; for it appears to occur only when the case has been of long duration; while when present, it implicates the entire surface of the body, though it commences in the parts most exposed—as the face and hands—and is more marked in the axillæ, over the pubes, &c., than elsewhere. But again, it is certain that there may be the most extensive pigment-deposit in the rete mucosum of the skin, without the slightest trace of disease being found after death in the supra-renal capsules. A man died in University College Hospital in the winter of 1858, whose skin had been gradually darkening for a few months previously; the "bronzed" condition being most marked on his admission. It was supposed to be an

* On Disease of the Supra-Renal Capsules. By Thomas Addison, M.D., &c. London, 1855.

excellent example of morbus Addisonii; till the scalpel and microscope proved that there was no trace of disease in either capsule. Blumenbach has quoted from Bomare the case of a French peasant, whose abdomen became entirely black during each pregnancy; while Camper mentions the case of a lady who began to get brown as soon as she became pregnant, and before the termination was as black as a negress. After delivery the color gradually disappeared. I have also a patient whose skin becomes of a notably darker color during each menstrual period; though at other times it is darker than it was a few years ago, since which time she has gradually been becoming anæmic.

In the present state of our knowledge, it seems to me that we are far from justified in giving an unqualified assent to Dr. Addison's views. And the difficulty has been increased by the opinion which has been advanced by Dr. Wilks, that supra-renal melasma is due only to one form of disease affecting these organs; for if this hypothesis be true, not a few of the cases which have been recorded by independent observers as corroborative of Dr. Addison's statements cease to have any value. Although, therefore, very plausible arguments can be advanced in favor of the main facts insisted upon by Addison, yet further evidence is required before it can be positively affirmed that the association between a certain set of symptoms and a certain variety of supra-renal capsular disease is not accidental.

The supra-renal capsules may suffer from many forms of disease. Thus occasionally these glands are destroyed by some adventitious deposit, the nature of which can hardly be made out: sometimes there is complete atrophy of one organ, with enlargement and softening of the other: sometimes there has been a deposit of tubercle in one, with a collection of pus in the other: while in other instances there has been fatty degeneration of both glands, or sanguineous engorgement, or apoplexy with one or more centres of extravasation. And, again, one or both of these bodies have been found infiltrated with cancer. But according to Dr. Wilks,* it is important to remember, that in true morbus Addisonii the organs get enlarged, and changed into a semi-translucent, gray-colored, soft, and homogeneous material; which afterwards degenerates into a yellowish-white opaque matter, and subsequently softens into a putty-like matter, or dries up into a chalky mass. The other diseases of the capsules do not produce morbus Addisonii: though it is rather difficult to understand how they can fail to do so, if—as Drs. Addison and Wilks have tried to prove—the symptoms of melasma supra-renale are to be referred to some failure of nervous force acting on the heart, induced by the injury to the ganglionic system of nerves. —The duration of life, after the first appearance of the symptoms, has varied in the recorded cases from six months to five years; but according to Dr. Wilks the average is about eighteen months.

The *treatment* of this affection—whatever its true nature may be—is particularly unsatisfactory, almost all the examples having terminated fatally. Until our pathology becomes more perfect, we can do little more than attempt to remedy the prominent symptom—prostration; for which purpose the various preparations of steel should be tried, combined with the most nourishing kinds of food.

* On Disease of the Supra-Renal Capsules; or, Morbus Addisonii.—Guy's Hospital Reports. Third Series, vol. viii, p. 1. London, 1862.

XII. IRRITABILITY OF THE BLADDER.

Irritability of the bladder is said to exist when an individual is troubled with a frequent desire to pass urine. It may arise from organic disease of the kidneys, bladder, prostate gland, or urethra; or it may be due to the pressure of the uterus when misplaced (as in anteflexion), or when enlarged from pregnancy or the growth of a fibrous tumor; or it may be connected with the presence of a tumor or a calculus in the bladder, or to the irritation of hemorrhoids; or it may be—as it generally is—merely functional, *i. e.*, dependent on some temporary derangement of the digestive organs, kidneys, or bladder, or on some constitutional nervous affection.

Symptoms.—The desire to micturate comes on suddenly and very frequently, so that in many cases a patient has to pass urine every thirty or forty minutes. There is generally an inability to resist the desire; but if this can be checked, uneasiness and pain are induced by doing so. The urine is seldom increased in quantity, except in hysterical subjects: in the latter the increase is often considerable, and the secretion is pale and very watery, the proportion of solid constituents remaining as in health. After this affection has lasted some time, the bladder often diminishes very much in size: so that instead of being able to contain from fifteen to twenty ounces of urine, as in health, it cannot hold more than two or three ounces.

In all cases the urine should be examined. When it is found preternaturally acid or alkaline; loaded with urates, or phosphates, or oxalates; or when it contains pus, albumen, sugar, or any other morbid secretion, we must trace the disease to its origin. For under these circumstances, the irritability of the bladder is a mere symptom of some severe constitutional derangement, or of dangerous organic disease.

Incontinence of urine in children, occurring at night, may be due to irritability of the bladder, or to the presence of worms in the rectum; or it may be only the natural consequence of the child being put to bed for twelve hours and not being roused at proper intervals to pass water. When there is an involuntary flow of urine in the adult, it is almost always indicative of an overloaded bladder. (See p. 555.)

Treatment.—In simple irritability of the bladder, not of long duration, attention to regimen generally, the avoidance of all stimulating drinks, the substitution of cocoa or chocolate made with milk for tea and coffee, the free employment of mucilaginous diluents, and the use of warm or tepid salt-water baths, will often effect a cure. The dilute nitro-hydrochloric acid in decoction of pareira, with or without the tincture of belladonna (F. 378), is very efficacious when the urine is alkaline or only slightly acid: when the secretion is abnormally acid, small doses of liquor potassæ in infusion of buchu (F. 69) do great good. Mr. Henry Thompson has also recommended a decoction of the triticum repens or couch-grass; made with one ounce of the underground stem to a pint of water, the whole of which is to be taken in the twenty-four hours. Opiate suppositories at bedtime, or five or ten grains of the extract of henbane in a pill, will lessen the irritability, and allow of a good night's rest.

Ferruginous tonics should be ordered where there is general debility,

or when the irritability comes on in young females at the catamenial periods. In a few obstinate cases the tincture of cantharides, with or without the tincture of the perchloride of iron, has relieved all the symptoms after other means have failed. Moreover, in women, the employment of vaginal pessaries of belladonna and oxide of zinc (F. 423) will frequently prove most serviceable.

For the nocturnal incontinence of urine which occurs in childhood, small doses of steel and tincture of belladonna can be strongly recommended. A tepid salt-water bath every morning, with the administration of cod-liver oil, may also help to effect a speedy cure. If there be any intestinal irritation, it must be removed; while any errors of diet or mal-assimilation of food ought to be rectified. A common cause of irritability of the bladder in young boys, is the presence of a long prepuce with a very small orifice. Sometimes the symptoms produced by this condition are so severe as to give rise to the suspicion of calculus. In such cases, the most marked and effectual relief will be afforded by resorting to circumcision. Drugs are certainly quite useless.

XIII. SPASM OF THE BLADDER.

Like other muscular organs, the bladder is subject to spasmodic attacks of pain.

Symptoms.—The patient complains of severe pain at the lower part of the abdomen, and along the urethra to the extremity of the penis. The urine may be passed involuntarily, but generally it is retained; there being a constant desire to micturate without the power to do so. Frequently, also, there is tenesmus.

When the spasm has been of long continuance, death has resulted, with all the symptoms of suppression of the urine. In these cases the vesical extremities of the ureters have been found spasmodically closed; while the tubes themselves have been dilated by the accumulated urine, the increased dilatation sometimes extending to the pelvis of each kidney. Care must be taken not to confound spasm with inflammation of the bladder: in the latter the pain is constant, lancinating, and throbbing; while there is also general fever, and great disturbance.

Causes.—Stone in the bladder is one of the most frequent causes of violent paroxysms of spasm; malignant vesical tumors also produce them; and they are not uncommon in diseases of the rectum and uterus. Dr. Prout says that spasm of the bladder may arise from the presence of abnormally acid urine, as in gout; or from an abscess of the kidney; or from ulceration or other organic diseases of the bladder, prostate gland, &c.; or from the use of irritating diuretics, as cantharides; from excessive venery; from hysteria; and from disorders of the intestinal canal, especially, perhaps, from the irritation of oxyurides.

Treatment.—Two indications present themselves—viz., the immediate relief of the spasm, and the removal of the cause. The first will be best accomplished by the hot bath, or by fomentations until a bath can be obtained, and by the administration of a full dose of some narcotic either by the mouth or by the rectum. The removal of the cause

is more difficult. Where the patient is gouty and the urine loaded with urates, colchicum will do much good; and at the same time attempts may be made to induce an attack of gout in the foot, by the application of sinapisms, or by the use of stimulating pediluvia. In abscess of the kidney, the symptoms must be palliated as they arise, while the strength is kept up by mild nourishing food, change of air, &c. When a calculus is present, the physician can only give temporary relief until a surgeon takes the necessary steps to crush or extract the stone. Supposing the spasms to be due to sympathy with a contiguous organ the disease of which cannot be removed, frequently repeated doses of the tincture of perchloride of iron often prove of great service. Camphor mixed with a linseed poultice and applied to the perineum, is also said to be frequently serviceable; or a hemlock poultice may be tried; but the quickest relief will be obtained from a mixture containing ether and morphia and belladonna (F. 315), or from an opiate and belladonna suppository (F. 340).

In every case the diet is to be regulated. Simple nourishing food, an avoidance of all stimulants, and a free supply of mucilaginous drinks should be ordered. The patient also ought to wear flannel next to the skin, to protect himself from sudden changes of temperature; while he must avoid sexual intercourse, and all violent exercise.

XIV. PARALYSIS OF THE BLADDER.

The muscular coat of the bladder may become paralyzed from some influence confined to the viscus; or from disease of the nervous centres, inducing loss of muscular power in other parts of the body; or from constitutional debility arising from any cause.

Symptoms.—Unlike the rectum, the bladder retains its contents when paralyzed; this phenomenon being due to some peculiarity in the neck of the bladder not possessed by the bowel. The sphincter vesicæ consists only of pale muscular fibres mixed with elastic tissue placed round the neck of the bladder; the elastic tissue modifying materially the action of the muscle. "The same loss of power," says Mr. Coulson, "which allows the escape of fecal matter through the paralyzed sphincter ani, does not affect to a similar degree the sphincter vesicæ, whose elasticity, inherent in the tissue itself and not dependent upon nervous influence, retains closed the vesical orifice when the rest of the organ is paralyzed."*

When the bladder gets over-distended, the urine dribbles away by the urethra; the resistance to its escape at the neck of the bladder being overcome when the walls are incapable of further dilatation. Hence incontinence of urine is often the prominent symptom of retention, of which fact the following is a good illustration: Mr. Lawrence was one day sent for to see a case of supposed irritability of the bladder. The medical practitioner in attendance stated that he had been doing all in his power to allay the irritability, but that his efforts were unavailing;

* On Diseases of the Bladder and Prostate Gland. Fifth Edition, p. 98, London, 1857.

for the urine passed off as quickly as it entered the bladder. On examination Mr. Lawrence felt the fundus of the bladder forced up some way above the umbilicus: he introduced a catheter, and five pints of urine were withdrawn. The truth was that the bladder had been allowed to become distended for about five days; and in consequence of this, unfortunately, the patient never afterwards recovered the natural power of emptying this viscus.—I have several times seen cases where alarming symptoms have set in about the third day after parturition, owing to the excessive accumulation of urine; the practitioner in attendance having failed to perceive the true nature of the case, because the patient was complaining of constantly passing water. The introduction of a catheter, however, has speedily removed all doubt, as tumblerful after tumblerful of urine has been drawn off. The paralysis seldom lasts for more than two or three days subsequent to the proper treatment being resorted to; but the catheter should be used every eight or twelve hours until it is certain that the patient completely empties the bladder upon each attempt at micturition.

In most cases of paralysis of the bladder, the urine is found loaded with mucus, of a highly offensive ammoniacal odor, of an alkaline reaction, and having an excess of phosphates—the neutral triple phosphate of magnesia and ammonia. It is highly probable that the urine when secreted is of acid reaction; but on flowing into the bladder it becomes mixed with a greater or smaller quantity of fluid which has been retained a sufficient time to become decomposed, and hence the fresh secretion gets contaminated. In injuries of the spinal cord the vital power of the walls of the bladder is so lowered that the urine readily becomes decomposed. The urea is converted into carbonate of ammonia: while the ammoniacal urine inflames the vesical mucous membrane, so that the latter secretes a quantity of viscid ropy mucus. If the patient survive, the inflammation may extend to all the coats of the bladder.

One of the earliest symptoms of paralysis of the bladder is pain at the neck of this viscus and in the glans penis; but after a time, little or no uneasiness is complained of, and as the bladder loses its sensibility even the desire to void urine is not experienced. The constutional disturbance is usually severe; the pulse is rendered quick and feeble, the tongue gets furred, the appetite fails, the nights are restless, there is great mental depression, and the vital powers become greatly lowered. Frequently the patient sinks into a state of stupor, and dies from exhaustion.

Causes.—The paralysis may be due to over-dilatation of the muscular coat of the bladder. Thus, a person from some cause—as being in the company of the opposite sex, or from being shut up in a railway carriage—is unable to micturate when the desire is felt; and then, on afterwards attempting to do so, it is found that the power is completely lost.

It may also be a consequence of apoplexy, or of injuries to the head, or of injuries or diseases of the spine.

It is, generally speaking, a disorder of old age, and seems particularly to attack gouty and rheumatic persons. Not uncommonly it is connected with disease of the neck of the bladder; or with enlargement of the middle lobe of the prostate gland.

Women who have had large families, and especially such as have experienced severe labors, sometimes suffer from paralysis of the neck of

the bladder; so that they are either unable to retain the urine at all, or it comes away involuntarily on laughing, coughing, or on making any sudden exertion. Time, astringent vaginal injections, cold hip-baths, and ferruginous tonics often effect a cure.

Treatment.—Where the paralysis depends upon over-distension of the bladder the catheter must be introduced; although it is sometimes advisable to be careful not to withdraw the fluid too rapidly, since rapid collapse, followed by death, has occurred from the sudden abstraction of a large quantity of urine. When the paralysis continues, the patient should be taught to introduce the catheter for himself, using as large a one as the passage will allow; and especially should he be cautioned always to withdraw every drop of urine, inasmuch as that which is retained may, after a time, become decomposed, and not only contaminate the fresh secretion as it flows from the ureters, but also give rise to most serious changes in the mucous and other coats of the bladder. The instrument should be passed about every six hours.—To restore the contractile power of the bladder various remedies have been recommended. In recent cases the use of the catheter occasionally suffices to give tone to the vesical walls; sometimes cold-water injections—as recommended by M. Civiale—prove beneficial; and good results are, in many instances, to be obtained from small doses—the one-twelfth of a grain twice daily—of strychnine, or from the use of the ergot of rye. Galvanism, cold douche and hip-baths, blisters over the lower part of the spine, and aloetic purgatives, are also remedies that may be often resorted to with advantage.

When there is disease of the brain or spinal cord, we can seldom hope to do much good beyond taking care that the bladder does not become distended; at the same time attempting, as far as possible, to combat the symptoms as they arise.

XV. INFLAMMATION OF THE BLADDER.

1. Acute Cystitis.—Acute inflammation of the bladder, or cystitis (*Κύστις*, a bladder; terminal *-itis*), is a severe disease which occurs under a variety of circumstances. The morbid action is generally confined to a portion of the mucous surface, the neck and bas-fond being the parts most frequently affected; but in severe cases the whole bladder and all its coats are attacked. It may arise as an idiopathic affection: in the great majority of cases, however, it supervenes on long existing chronic inflammation; or it is caused by the extension of inflammation from the urethra, or from some of the pelvic viscera; or it is produced by external violence, as by wounds, the pressure of the child's head in a lingering labor, &c.; or it is due to the irritation of some foreign body, as a calculus, or to the abuse of diuretics, cantharides, &c.

Symptoms.—The symptoms of acute cystitis are the following; shivering, considerable pain over the bladder, heat of the urethra, a constant desire to pass urine, which is voided in very small quantities, high fever, nausea, mental depression, and general constitutional disturbance. The bladder can often be felt on making pressure over the lower part of the

abdomen, as a small, rounded tender tumor. The pain is usually very severe, extending along the perineum and urethra, as well as down the thighs; while it is much increased by pressure upon the lower part of the abdomen, or by examining the posterior wall of the bladder through the rectum. Moreover, it diminishes in severity directly the bladder is emptied; but as soon as a small quantity of urine collects, the suffering recommences, becoming more and more severe, until the desire to micturate is rendered so irresistible, that the patient feels compelled to respond to it. Frequently, the irritation extends to the rectum, and the sufferer is annoyed with tenesmus.

Unless the progress of the inflammation be controlled in the course of two or three days, the pain becomes unbearable, the calls to micturate are constant, the urine is expelled in drops, and the walls of the bladder lose their power, so that an accumulation of urine takes place. This secretion is found high-colored, perhaps fetid and alkaline, and sometimes loaded with shreds of fibrin entangling pus and blood-corpuscles. As the morbid action continues, the constitutional disturbance rapidly increases, considerable prostration ensues, cold clammy sweats cover the body, the pulse becomes very feeble, low muttering delirium sets in, and death relieves the sufferings about the seventh or eighth day. In less violent cases resolution sometimes takes place, and the patient recovers; or the inflammation—if limited in extent—ends in softening of the mucous membrane and ulceration, and gives rise to much pain and disturbance subsequently.

A few curious cases have been recorded, where the whole mucous lining of the bladder has been thrown off in one piece. In the Museum of the Royal College of Surgeons there is a preparation (Pathological Specimens, No. 1993) which illustrates the correctness of this remark. The history of the patient, communicated to me by my kind old friend, the late Dr. Knox, was as follows: A man, seventy years of age, living in Edinburgh, fell from a scaffold, and, in consequence of the injuries received, suffered from retention of urine. The catheter was introduced frequently, and a thick, puriform fluid drawn off by it. At the end of the third week, however, nothing would pass through the iustrument, while the point of it could be felt to impinge upon a membrane. To relieve the man's sufferings, the late Mr. Liston, assisted by Dr. Knox, cut into the bladder from above the pubes, and thus allowed a large quantity of purulent fluid and a membrane to escape. The patient lived for three months afterwards, discharging his urine partly through the wound and partly through the urethra: at the end of this time he died from exhaustion. On examining the layer of membrane, as it is found in the Museum, it is seen to be of saccular form, about six inches in its longer and four inches in its shorter diameter. Its shape indicates that it lined the whole interior of the bladder, and was thrown off from it in one piece. The outer surface is flocculent, and in parts distinctly fibrous; the inner surface is granular and reticulated, like superficially ulcerated mucous membrane. In fact, as the College Catalogue states, it exactly resembles the mucous membrane of a bladder, separated as a slough in one piece.

Treatment.—The remedies mainly to be relied upon are those which have been recommended in the inflammatory affections of other organs; especially opium with belladonna, hot fomentations, and often repeated

hot hip-baths. The mildest aperients (such as castor oil) ought to be employed to keep the bowels gently open: a catheter must be used frequently, if there are any symptoms of retention of urine, but not without; and the diet should be very light, with a moderate quantity of mucilaginous fluids. In short, our object must be to keep the bladder as quiet as possible; while we take care to combat any symptoms of exhaustion, directly they set in.

2. Chronic Cystitis.—This form of inflammation is very common, inasmuch as it is readily excited by numerous causes. It is sometimes the sequel of an acute attack; it may result from some poison in the system, as that of gout; or it is not unfrequently due to the retention of decomposing urine (perhaps the consequence of spinal paralysis), or to the irritation of urine charged with saline diuretics; or it may have its origin in disease of some neighboring viscus,—as the rectum, or uterus, or vagina; or it may be caused by any foreign substance in the bladder—as tumor or calculus.

In simple cases, there will be merely a general sense of indisposition, an increased sensibility of the walls of the bladder, and a frequent desire to pass urine; the latter being generally scanty, and containing a small quantity of mucus or pus. But sometimes the secretion of the lining membrane becomes very greatly increased (catarrh of the bladder); and then the urine deposits a large amount of semi-transparent, viscid, and ropy matter. This adheres to the sides of the vessel containing it, and on being poured out falls away like a gelatinous mass; while it consists either of mucus, or of pus which has been modified by the admixture of an alkali.

In attempting to cure these cases, it is of the first importance to remove the cause if possible. Then, care must be taken to prevent further irritation of the mucous membrane by allowing urine to be retained which very soon becomes alkaline; with which object the bladder should be frequently emptied by the catheter. Great relief is often derived from washing out this viscus with three or four ounces of warm water; or with six or eight ounces of water containing ten grains of extract of henbane with one or two of extract of opium, allowing about one-half of the fluid so medicated to come away; or, where an astringent seems needed, with a mixture of two minims of nitric acid to the fourteen ounces of water, permitting none to remain.

Amongst the general remedies which may be administered, are the infusions of bearberry (infusum uvæ ursi), and buchu; or the decoctions of pareira, and couch-grass. Demulcent drinks are also serviceable; especially the decoction of Iceland moss, or of barley, or the infusion of linseed. A suppository of opium and belladonna (F. 340) at night, will often procure refreshing sleep; but in women, a medicated pessary containing the iodide of lead, or the oxide of zinc, with belladonna (F. 423), has seemed to me to act more favorably. Moreover, the application of a belladonna plaster, over the sacrum, is sometimes the source of considerable relief; or if we wish to produce counter-irritation, we can employ the croton oil, or the iodine liniment. In all cases nourishment must be given freely; animal food, raw eggs, milk, and even alcoholic stimulants being needed. If the digestive organs are weak, the

administration of pepsine with the chief meals will be necessary; and as exercise must generally be forbidden, one of the preparations of this substance will very commonly be required.

XVI. TUMORS OF THE BLADDER.

The tumors which may be developed in the bladder are of the following kinds: Warty or polypoid fibrous bodies; villous or vascular growths; and malignant tumors.

Whatever the nature of the tumor may be, it gives rise to symptoms very much resembling those caused by a stone in the bladder. There is frequent micturition; a painful feeling of inability to empty the bladder is complained of; while occasionally the urine is bloody, or purulent, or ammoniacal and loaded with mucus. Malignant tumors—either scirrhus, or more commonly medullary, or epithelioma—are of greater frequency than the innocent varieties; and though the cancerous deposit is generally primary, yet it may occasionally be the result of the extension and infiltration of disease from the vagina, uterus, prostate, or rectum. The suffering is always very great; the pain at the lowest part of the abdomen, in the loins, and about the thighs being constant. The urine is bloody, and often contains shreds of tissue; while perhaps the diagnosis may be facilitated by the presence of cancer-cells. Until the constitutional cachexia becomes marked, the symptoms are apt to be mistaken for those produced by a calculus; and though perhaps it may be unavoidable, yet considerable mischief is sometimes caused by the use of the sound. I well remember finding an eminent medical friend, now dead, suffering the greatest agony after a mass of medullary cancer at the base of his bladder had been roughly treated in the futile attempt to detect a stone.

In the treatment of these cases we can do little more than relieve the prominent symptoms. Our chief reliance must therefore be placed on narcotics, in sufficient doses to give repose; or on astringents, where there is hemorrhage; and on a nutritious diet. The polypoid fibrous, and the pendulous villous, growths, may occasionally be removed by ligature, from the female bladder, owing to the ease with which the urethra can be dilated. But success has seldom attended these operations; partly, perhaps, for the reason that patients are often unwilling to submit to the necessary proceedings until great constitutional disturbance has set in. And then, by the time that this has occurred, the ureters and pelves of the kidneys have generally undergone considerable dilatation, or have even become the seats of suppurative inflammation.

PART XII.

DISEASES OF THE FEMALE ORGANS OF GENERATION.

I. DISEASES OF THE VULVA.

The parts included under the term "vulva" (probably as if *Valva*, pl. *valvæ*, folding doors) consist of the external organs of generation. The diseases of these parts are of considerable importance. They can seldom be correctly diagnosed without an ocular inspection; for making which it generally suffices to place the patient upon her left side, in the ordinary position for labor. Some practitioners prefer to have the woman upon her back, with the knees drawn up; but as an examination so conducted is revolting to a woman's feelings, it should only be resorted to in exceptional cases.

1. Pruritus of the Vulva.—Pruritus (*Prurio*, to itch) may be only a symptom of some disease, or it may occur as the sole local affection. It is much more frequently met with in old age than in the earlier periods of life; and I do not know that it is more common in married women than in those who have never had intercourse.

Causes.—When pruritus occurs as an idiopathic disorder it will frequently be found that the general health is far from good. The patient is pallid, complains of debility and lowness of spirits, and perhaps has been losing flesh. The appetite is bad; while the digestive organs act imperfectly, there is acidity and flatulence, the liver is torpid, and the bowels are apt to be confined.—Not uncommonly, the irritation is merely the symptom of some uterine disease, especially of excoriation about the os uteri, or of the early stage of carcinoma.—A vascular tumor at the orifice of the urethra will give rise to almost intolerable attacks of itching about the vulva, and so will chronic inflammatory affections of the vagina, or a dilated condition of the veins of the labia.—Hemorrhoids not unfrequently produce it.—In the early stages of pregnancy it may prove very annoying; sometimes the irritation continuing until after labor, and even until the complete cessation of the lochia.—The commencement of each menstrual period, in many sensitive women, is attended with itching about the pudenda, especially if the flow be scanty; while it is a common symptom at the climacteric period, when the catamenia appear irregularly before their final cessation.

Symptoms.—The sensation experienced is not always that of intense itching. Sometimes it is described as a tingling or smarting, with a feeling of heat about the parts; these symptoms being aggravated by

food, especially by alcoholic drinks, and by warmth. In other instances it is spoken of as a sense of creeping or formication, so that the patient will hardly believe that the parts are not infested with some disgusting insects. In all instances the irritation is so insupportable at times that the patient cannot refrain from scratching herself. Hence the vaginal labia, and the tissues about the perineum, vestibule, and mons Veneris get red and excoriated; small scabs forming and increasing the evil. In other cases the parts are dry and angry-looking, while there are marks of the scratching produced by the nails. As the irritation is always increased by warmth, the patient is unable to sit near a fire; but especially is she tormented at night, so that even in winter she may be obliged to have no covering beyond a sheet, or else to keep cold applications constantly over the parts. The want of rest, the loss of appetite, and the almost constant annoyance greatly depress the general powers; while the desire to resort to friction, though it affords only temporary relief, is so great that the sufferer cannot bear to be long in the company of even her own family.

Diagnosis.—The itching of prurigo may be mistaken for that of pruritus. But the former disorder is more rarely met with than the latter; while the papular eruption of prurigo, seldom confined to the genital organs, is very characteristic.—The irritation produced by lice resembles that of pruritus; so that we ought to make certain that these insects are not the source of the annoyance.—In follicular inflammation of the vagina a sense of smarting, rather than of itching, is complained of; though the latter, as will presently be shown, may also prove troublesome.—Chronic eczema of the vulva is attended with distressing irritation, which the patient vainly attempts to relieve by scratching off the dry scales of epidermis, or by the free use of some unctuous substance.—Herpetic eruptions also produce itching, but it is seldom of long duration, and is confined to the neighborhood of the rash. And, lastly, crops of small boils are apt to appear upon the outer surface of the large vaginal labia, especially about the time of the change of life; at first producing considerable itching and smarting and heat, with subsequently swelling and pain as the little tumors slowly suppurate.

Treatment.—The remedies for idiopathic pruritus must be general and local. As regards the first, we shall generally find that mild aperients are needed; such as the sulphate of soda with sulphur (F. 148), or sulphur and magnesia (F. 153), or rhubarb and blue pill (F. 171), or if steel be unobjectionable it may be given with Glauber's salts (F. 180, 181). The assimilation of food is to be assisted by the use of pepsine (F. 420), by small doses of steel with citrate of potash (F. 403), or by the nitro-hydrochloric acid in some bitter infusion (F. 378); while the diet is to consist of milk, eggs, and animal food plainly cooked. As a rule, alcoholic drinks, tea and coffee, with all highly seasoned dishes, should be avoided. With regard to any special drugs little can be said. Yet occasionally it has seemed to me that quinine (F. 379) has been useful, or a pill of quinine and belladonna (F. 45), or tar capsules (F. 36); while sometimes small doses of arsenic (F. 52) have acted beneficially.—The best local applications are those of an anodyne nature. Painting the parts, twice or thrice daily, with a mixture of equal parts of the chloroform and belladonna liniments, often affords considerable

relief; as does the frequent application of a lotion containing the acetate of lead and hydrocyanic acid (F. 263), or of morphia and liquor potassæ (F. 266), or of borax and morphia and glycerine (F. 268), or especially of a weak infusion of tobacco (F. 265). Some practitioners use cod-liver oil, or a mixture of one part of glycerine to eight of rose-water, or the officinal calomel ointment, or a combination of equal parts of the red oxide of mercury ointment and cod-liver oil. But whatever remedy be employed, free ablution will also be necessary; which can be best practised by daily using the hip-bath, and injecting plenty of the water up the vagina with a syphon syringe.

For the relief of secondary pruritus it is necessary that the cause be removed, when this is possible. The cure of an excoriated patch upon the lips of the uterus will take away the irritation; and the latter may even be thoroughly relieved by proper remedies applied to the former, before the surface heals. In such incurable affections as carcinoma of the cervix we may still succeed in checking the itching by the use of medicated pessaries, particularly of such as contain belladonna (F. 423). If the patient be gouty or rheumatic, the remedies necessary for these states are indicated; while if there be eczema, lice, oxyurides in the rectum, hemorrhoids, &c., the treatment proper for these affections will have to be adopted. I have but one or two hints to give with regard to the treatment of the crops of boils which have already been spoken of. One suggestion is to avoid the use of poultices, unless the little tumors be actually suppurating. The formation of pus may, however, often be prevented, by just touching the apex of each elevation with a small drop of the acid solution of nitrate of mercury. I generally find that this caustic is best applied by means of a fine-pointed pipette, such as is made for taking up urinary deposits for microscopic examination; removing any surplus acid from the boil with blotting-paper. Another important point is, that if we would prevent the formation of further crops, the general health must be attended to.

2. Tumors of the Vaginal Labia.—Several varieties of tumors may be met with on or about the vaginal labia. The principal are the following:

Encysted tumors of the labia either have their origin in the connective tissue; or they may arise in one of the lobules of the vulvo-vaginal gland, the communication of which with the excretory ducts has become obstructed; or the entire gland of one or the other side may be involved, owing to obliteration of its duct. The cyst is generally of slow growth, and at first hardly attracts the patient's attention; but as it attains the size of a walnut there is discomfort on walking, uneasiness after sexual intercourse, sometimes irritability of the bladder, and occasionally pain, especially about the time of the catamenial periods. If inflammation set in, the cyst-walls secrete pus, and the tumor becomes an encysted abscess. The cause of these tumors can seldom be made out; but I believe they may result from violence, or from the irritation set up by a want of cleanliness. The contents of the cyst may be of the nature of a glairy white-of-egg-like fluid, or of an offensive dark-colored matter, or of pus. The evacuation of the contents by a simple incision through the inner wall of the labium gives immediate relief; but generally such

an operation is insufficient to effect a permanent cure. To insure this, either a portion of the cyst-wall must be excised, a proceeding, however, which is not always successful; or the interior of the cyst may be rubbed over with a stick of nitrate of silver, or with a brush dipped in the iodine liniment; or a seton may be passed through the centre of the swelling, so as to excite suppuration and obliteration of the secreting membrane; or the entire cyst may be dissected out, without puncturing it. As this latter proceeding is the most certain, so it is often the best plan to adopt.

Fibrous tumors are occasionally developed in one of the labia majora, or more rarely about the perineum. They may vary in size from that of a hazel-nut to that of an orange; while sometimes they are found to contain cysts in their centres, filled either with sanguineous serum, or with a limpid watery fluid. *Fatty* tumors are also sometimes met with in the same situations. The growth of either variety is usually slow, and is not accompanied by any marked symptoms. Not uncommonly they gradually become pediculated; so that a tumor the size almost of a fowl's egg may be connected with one of the labia by a stalk no larger than an ordinary quill. Frictions with ointments of mercury or iodine are quite powerless to produce the absorption of these bodies. The only remedy is excision, a very simple proceeding when the attachment is formed by a pedicle. But when the tumor is imbedded in the tissue of the lip, there is seldom any difficulty in enucleating it with the handle of the scalpel, after making a free incision through the internal surface.

Warty growths are apt to form about the vulva, sometimes appearing in such large clusters as apparently to involve the whole of the external genitals. Usually, however, they are scattered about the labia, nymphæ, vestibule, and perineum; varying in size from a pea to an orange, while each is found growing from a broad base, or by a pedicle which sometimes gets greatly elongated. These excrescences are sometimes very vascular, so that they bleed readily; they always give rise to a fetid discharge, with vaginal leucorrhœa; and they may be due to some venereal taint, or simply to want of cleanliness. The only effectual treatment consists of removal with the scissors or bistoury, applying some styptic to control the hemorrhage. The application of escharotics without excision is seldom successful; while it is as painful as the use of the knife.

Hypertrophy of the labia may occur, and sometimes to an enormous extent. The skin and areolar tissue of the labia majora are now and then alone affected; though more frequently the nymphæ are also involved. The enlargement usually commences on one side, but probably before advice is sought it has crept round so that both lips are affected. In very rare instances the hypertrophy has advanced to such a degree as to constitute a form of elephantiasis. An instance has been recorded by Kiwisch, in which a girl, seventeen years of age, had such hypertrophy of both labia, that they hung down as two large masses below the middle of the thighs. Elephantiasis of the labia is not an uncommon disease in Barbadoes. In the cases of hypertrophy which have come under my notice, the enlargement has been due to a syphilitic taint.

The treatment of such cases is generally unsatisfactory. Sometimes their progress can be checked by the administration of the red iodide of mercury (F. 54), together with the use of the mercurial vapor bath (F. 131). But generally it is necessary to remove the growths with the knife; although a permanent cure is seldom produced by this operation, inasmuch as it is difficult to make the incisions quite free from the diseased structure. Excision is always attended with considerable hemorrhage; so that not only will several vessels require the ligature, but the actual cautery will have to be applied to spots from which the blood will otherwise freely ooze when reaction occurs after the operation. When it is clear that all the disease cannot be removed by the knife, it will be better to restrict the treatment to the use of astringent lotions, and perhaps of occasional scarifications to relieve the œdema.

Abscess of the labia may result from the inflammation set up by a blow, by forcible or perhaps excessive sexual intercourse, or by a gonorrhœal or acrid leucorrhœal discharge. The part affected becomes the seat of a throbbing pain, which prevents the patient from walking or sitting without much suffering; while there is also considerable heat and swelling, with a variable amount of constitutional disturbance. Sometimes the inflammation commences in the vulvo-vaginal glands, the tissues of the labium becoming involved as the morbid action progresses to suppuration. Patients seldom apply for relief until there is no difficulty in diagnosing the presence of pus; which must then be evacuated by an incision sufficiently free to prevent its too early closure. The application of poultices, a nourishing diet, and two or three days' rest, will complete the cure. Where the practitioner is consulted before suppuration has occurred the disease may be checked by rest in bed, the application of a small bladder or gutta-percha bag of ice, and attention to the general health. Aperients are only to be given, if required; while if there be any debility, ammonia and bark (F. 371), cod-liver oil, and animal food, will prove very useful.

The extravasation of blood into the areolar tissue of one of the labia majora, or of the nymphæ, or of the vaginal walls, is an accident of very uncommon occurrence just before, or during, or immediately after, labor. The swelling which results is known as a *pudendal hæmatocele*, or a *labial thrombus*, or a *sanguineous tumor of the vulva*. I have never met with such an occurrence as the consequence of disease in an unimpregnated woman; but two cases have fallen under my observation where it has happened as the result of a blow. In one of these, a young single girl, fell upon the projecting corner of the upper rail of a kitchen chair, upon which she had climbed to reach the top of a wardrobe. The other patient was a married woman, but not pregnant: the hæmatocele resulting from a kick. In both instances, the pain was so great that I punctured the tumors, let out a quantity of blood, and then by rest with the pressure of pads and a T-bandage prevented any further hemorrhage. When these tumors are left untouched they not uncommonly burst; or where the clot is not very large it may become absorbed. With regard to the treatment of this accident during labor it need only be said that delivery should be hastened, but the tumor ought not to be opened unless from its size the passage of the child be impeded. If, however, the bistoury be used, a saturated solution of perchloride of iron will pro-

bably have to be applied to control the bleeding which is sure to ensue from the dilated vessels of the vagina.

3. Inflammation of the Vulva.—The different forms of inflammation which may attack the vulva are as follows:

Simple vulvitis is not a very uncommon affection of women who neglect to wash themselves, or who indulge in excessive sexual intercourse. It may also arise from a venereal taint, or from irritation about some adjacent organ,—as the rectum, or uterus. The symptoms consist of great pain and tenderness, a mucous discharge, a sense of scalding during micturition, and of a constant aching about the loins and thighs. The parts look swollen and inflamed, and they are covered with mucus; while in neglected cases they may be found much excoriated. A few doses of a saline aperient, rest, hip-baths, and the use of a wash containing a little alum or subacetate of lead, will soon remove the disorder.

Under certain circumstances, inflammation of a much more intense and serious nature occurs. Thus, M. Chavanne has given an account* of an epidemic of *gangrenous vulvitis* which attacked several puerperal women during January, 1850, in La Charité of Lyons. The disease commenced three or four days after delivery with vomiting and diarrhœa, or with fever and abdominal pains, or with slight hemorrhage. These symptoms were followed by prostration, anxiety, and an œdematous redness of the vulva. An active febrile stage then set in; which, in a few of the twenty-six cases, subsided without further mischief. In the greater number, however, pultaceous plates formed on the anterior of the vulva and vagina, adhering closely to the mucous membrane. Although this extension became arrested in a day or two, these plates were not separated by the inflammatory process until the end of the first week, or during the second; small suppurating wounds being left, which usually soon healed, though occasionally they again became covered with a similar pultaceous mass. In four of the twenty-six cases, the disease extended to the uterus; a gangrenous condition of this organ, complicated with peritonitis, setting in. Three others also died from metro-peritonitis, without extension of the gangrene. The remaining nineteen recovered; the gangrene yielding to tonic regimen, and the local use of the strong hydrochloric acid. No cause could be assigned for the outbreak of this epidemic, which seemed to resemble one which occurred a short time previously in Paris, as well as one which was observed at Lyons in 1815.

Follicular inflammation of the vulva is an obstinate and painful disease, which has been well described by Dr. Oldham.† The morbid action has its seat in the numerous sebaceous follicles scattered over the mucous membrane of the vulva; and it generally affects both sides of the vaginal entrance, with the tissues within the nymphæ and at the base of the clitoris. According to M. Huguier, the sebaceous matter sometimes accumulates in these follicles, without inducing inflammation; a condition resulting analogous to that of acne of the face. On making an examination in a case of vulvar folliculitis, the parts are found more

* Gazette Médicale de Paris for 1852. Quoted from the Association Medical Journal, p. 216. 11th March, 1853.

† London Médical Gazette. New Series, vol. ii, p. 845. 15th May, 1846.

or less generally inflamed; while they are seen to be studded with a number of raised vascular points, sometimes having specks of ulceration on their summits. After a time the points coalesce, so that a strip of highly injected mucous membrane is formed; while at a later period this vascularity disappears, and the tissues look as if they were covered with white paint. The disease causes considerable disturbance of the general health, with loss of appetite and mental depression; there is constriction of the sphincter vaginæ; leucorrhœa is troublesome, with irritation of the genitals and smarting; sexual intercourse becomes so painful that it has to be avoided; and there are pains in the back and thighs. It is sometimes complicated with prurigo: and it may occur at any time after puberty, though perhaps it is most common during pregnancy, as well as about the time of the cessation of the catamenia. This disorder is of a very intractable nature, and is not easy to treat. The application of astringents always proves injurious; for these agents produce very great pain at the time they are used, while they set up an increased tenderness of the parts which may last for many weeks. The best local remedies are those which exert a soothing influence; and no lotions are therefore more valuable than such as contain morphia and hydrocyanic acid (F. 266), or tobacco (F. 265), or glycerine and lime-water (F. 286). If ointments be preferred, one of iodide of lead and belladonna (F. 293), or of aconitine and calomel (F. 296), or of hydrocyanic acid and atropia (F. 306) may be prescribed. A warm hip-bath, containing some extract of poppies and soda, will afford considerable relief: it should be employed night and morning, for fifteen or twenty minutes each time. The general health must be looked to. The diet ought to be plain, nourishing, and free from seasoned dishes. Tea, coffee, wine, and beer are to be forbidden; a little brandy in soda water being allowed where a stimulant is required, though this may often be dispensed with if the patient can take plenty of milk. Small doses of arsenic with bark (F. 52) have sometimes seemed efficacious, so has some bitter tincture with the mineral acids (F. 378), and so has quinine with aconite (F. 379). In very chronic cases, a cure will now and then be effected by corrosive sublimate and sarsaparilla (F. 27), cod-liver oil, and change of air.

The external surface of the labia majora sometimes becomes the seat of *erythema*, generally in consequence of a neglect of cleanliness. The eruption is of a bright red color, and gives rise to a sensation of heat and discomfort; while it soon spreads along the integuments to the upper and inner surfaces of the thighs. This disease is most common in stout middle-aged women; and, unless they abandon their dirty habits, the moisture which is exhaled from the almost raw surface becomes very offensive. Indeed, if the discharge be allowed to irritate the parts for any length of time *erysipelas* may set in; a disease which may also attack the vulva from other causes, and which requires the same treatment as when it affects other tissues. In erythema, a cure may generally be brought about by removing any disordered state of the health, by ordering an unstimulating diet, and by having the affected parts well bathed every few hours with the dilute solution of subacetate of lead. Women are fond of applying Fuller's earth (consisting of silica, alumina, oxide of iron, magnesia, and water, with traces

of lime and chloride of sodium and potash) to the irritable surface; and as this substance is astringent it can do no harm, provided the parts are also often washed.

Children of all ages are liable to become affected with a discharge from the mucous glands of the vulva, constituting *infantile leucorrhœa*. Occasionally the disease spreads up the vaginal canal; giving rise to a profuse purulent or muco-purulent fetid discharge, with heat and pain during micturition, and excoriation of the surrounding parts. The practitioner must be on his guard lest he compromise some innocent individual by attributing the discharge to gonorrhœal infection, or to violence in attempting a rape. A few years ago, I saw in consultation with Dr. S. C. Reed and Mr. Brooks of Fleet Street, a strumous little girl seven or eight years of age, with an abundant leucorrhœal discharge. There were no marks of contusion or violence about the pudenda, and the symptoms seemed clearly due to natural causes. The parents, however, had made up their minds that a young man who lodged in the same house, had tried to have intercourse with the girl; and I believe they had given him into custody on this supposition, and were to proceed to the police court from my house. It required considerable persuasion to make the parents believe that there were no grounds whatever for their suspicions. Dr. Taylor* has collected the histories of several cases where men have narrowly escaped conviction for crimes which were never committed. This gentleman shows that a purulent discharge with aphthous ulceration may take place as a result of vaginitis; the inflammation occurring in scrofulous children, or in others as the result of dentition, intestinal worms, a want of cleanliness, &c. Children thus affected have been taught to extort money, by making imputations against innocent persons; or the parents may have unwittingly led a mischievous girl to make such a charge, by first threatening and then suggesting their own convictions to her. With regard to those fatal sloughing or gangrenous ulcerations of the vulva described by Mr. Kinder Wood† I can say nothing from my own experience. They must be very rare in this metropolis; for with all the opportunities afforded by a large hospital and dispensary practice I have never met with one example. No medical man, however, should venture to give evidence at a trial for rape upon a child, without making himself acquainted with Mr. Wood's paper; for the prisoner's counsel will very properly have "got up" all its details.

The symptoms of infantile leucorrhœa consist of itching, tenderness, and sometimes pain on passing water. There is a mucous discharge, which becomes more copious and acrid the longer it is allowed to continue. Frequently, the parts about the vulva have an erythematous blush. The irritation produced by this eruption, as well as by the discharge, causes the child to frequently rub or scatch herself, and thus excoriations are produced. In rare cases an ulcer may be found just within the vagina. The general health is depressed; the child is either

* Medical Jurisprudence. Seventh Edition, p. 692, et seq. London, 1861. Dr. Guy (Principles of Forensic Medicine. Second Edition, p. 38. London, 1861) also shows very clearly, how appearances on the parts of generation, resembling those due to violence, may be caused by disease.

† Medico-Chirurgical Transactions, vol. vii, p. 84. London, 1816.

badly fed, or does not properly assimilate its food; the nights are restless; and often some of the cervical glands are swollen, or there are other marks of the strumous constitution. In that form of inflammation which is described as *diphtheritic vulvitis*, tough false membranes are formed upon the inner surface of the labia; such membranes being reproduced after forcible removal. These exudations resemble those thrown out about the fauces in true diphtheria. The effects of the diphtheritic poison are very rarely, if ever, confined to the vulva in these cases. Somewhat analogous to them are those instances of scarlatinal vaginitis which have been already referred to (p. 187).

The treatment of infantile leucorrhœa must be perseveringly carried out, or the disease will last for many weeks. Attention to cleanliness, frequent sponging or syringing with an astringent lotion, the use of tepid hip baths containing a little alum, and the occasional exhibition of mild alteratives or laxatives, will be needed. Where there is much tenderness, the parts ought to be fomented with a decoction of poppies for two or three days before using the astringent applications. The diet should be plain but nourishing, with plenty of milk; and tonics—especially quinine and steel—will always be useful. Cod-liver oil is often very serviceable. If the discharge proves obstinate, a short residence at the sea-side, with sea-bathing, will generally cure it.

4. Corroding Ulcer.—This remarkable disease is probably of the same nature as Rodent ulcer. It consists of an intractable ulceration, which commences on some part of the external genitals, and gradually creeps over the vulvo-anal region; the surrounding structures having a tendency to become hypertrophied. As the ulcer heals in one direction, it extends in another; while the process of repair seems to be accompanied by the formation of a firm burn-like cicatrix, which has a great tendency to cause contraction of the vaginal or anal orifice. And yet so slight is the suffering, that until the orifice of the vagina becomes fissured by it, or the mouth of the urethra gets involved, there is no pain during sexual intercourse or micturition. For a long time the general health does not appear to be affected, menstruation occurs regularly, and there is neither loss of strength nor flesh; but unless a cure be effected the profuse discharge proves very weakening, the appetite ultimately fails, there is dyspepsia, attacks of colliquative diarrhœa set in, and sometimes there is hemorrhage. The patient may die either from peritonitis, or from erysipelas, or from stricture of the rectum, or from fatal exhaustion. Death, however, seldom takes place until after the lapse of some eight or ten years from the commencement of the disease.

This affection has been particularly described by M. Huguier, in his "Mémoire sur l'Esthiomène, ou Dartre Rongeante de la Région vulvo-anale,"* in which he draws a parallel between the eruptions of the face and those of the vulvo-anal region. The ulceration occurs for the most part in women between the ages of 20 and 50, who are either married or have led irregular lives. Nothing positive is known as to its cause, though it has seemed to depend upon some strumous condition of the

* Mémoires de l'Académie Nationale de Médecine, tome xiv, pp. 501-596. Paris, 1849.

system, or upon a degenerated syphilitic virus affecting the fluids. M. Huguier treats of the disease as it occurs in three stages: (1) The *superficial, creeping*, or *serpiginous* form, of which there are two varieties—the *erythematous* and the *tubercular esthiomenos* (*Ἐσθίω*, to corrode or eat away). (2) The *perforating*, which slowly and steadily advances until the ulceration produces the most frightful ravages. And (3) the *hypertrophic*, in which, as one portion of the affected tissue is being destroyed, another part is undergoing abnormal development. Of this kind there are also two varieties: The *vegetating hypertrophic*, where small vegetations or excrescences appear upon the ulcerated surface or on the surrounding indurated integument. The other form of hypertrophic esthiomenos is the *œdematous* or *elephantiasic* kind; in which inflammation of the lymphatics, with venous obstruction, leads to excessive infiltration and induration of the tissues, large masses being produced that obstruct the vaginal and anal outlets, and give rise to the most repulsive disfigurement.

The general treatment of vulvar corroding ulcer or esthiomenos is the same as that required in rodent ulcer of the face; though there is more difficulty in effecting a cure, because of the irritation which is kept up by the acrid discharges. Good diet, cod-liver oil, rest, daily hip-baths, and anodyne lotions are to be employed perseveringly; while sometimes benefit may be expected from the administration of iodide of potassium (F. 31), the green or the red iodide of mercury (F. 53, 54), or from Donovan's triple solution (F. 51). The efficacy of potential caustics is very doubtful. But if the disease be limited, so that the whole of it can be removed, excision should be practised; the operator taking care to extirpate any tubercular excrescences which may be present. As the parts heal, tents or bougies must repeatedly be employed to prevent undue contraction of the vaginal and anal openings.

5. Cancer of the Vulva.—Any part of the external genitals or of the vaginal walls is apt to become the seat of malignant disease. It may occur primarily; or it is often secondary,—*i. e.*, the cancerous infiltration extends to the vulva from the uterus, rectum, &c. Epithelial cancer of the external genital organs is more common than any other variety, but occasionally the affection is of the scirrhous or of the medullary form. The latter, however, is very rare, only one example having fallen under my observation. In this case, a married lady, 59 years of age, the mother of six children, suffered from medullary cancer confined to the vagina and external labia; and when I saw her in July, 1861, in consultation with Dr. Ellison of Windsor, she was dying from exhaustion, the disease having only existed for fourteen months.

Epithelial cancer is the most amenable to treatment. Where the disease is confined to the external labia considerable relief may be given by excision, provided care be taken to remove every trace of unhealthy tissue. By such an operation, a patient may have one or two or even more years of comparative health and happiness granted to her; though in the end the affection will return, and ultimately destroy life. In those cases where surgical interference is out of the question, attempts must be made to give relief according to the principles already inculcated (p. 98). The disease often quickly extends in all directions, in spite of remedies; the integuments over the pubes, or in one or both

groins, becoming the seat of ragged excavated ulcerations. Frequently, too, the patient's sufferings are considerably increased by the destruction of the recto-vaginal septum, or by the perforation of the walls of the bladder; or we may have to draw off the contents of the bladder every few hours, owing to the almost complete obliteration of the orifice of the urethra. The difficulty of passing the catheter is often so great in these cases, and the pain is so intense, that it is necessary to put the poor woman under the influence of ether or chloroform before using the instrument.

6. Enlargement of the Clitoris.—Excessive development of the clitoris may exist as a congenital malformation, though it seldom does so, save in connection with some arrest of development about the uterus, vagina, or labia. This organ may also acquire an abnormal size in after life; either owing to simple hypertrophy of its tissues, or to its becoming the seat of an innocent or malignant deposit, or to its giving origin to some cystic formation.

A very remarkable case in which the clitoris was converted into a cyst, has been recorded by Dr. Meigs.* The tumor commenced after a blow, and in fourteen years acquired the size of an infant's head, to judge from the sketch which is given. It was punctured; about twenty-two ounces of black blood, of the consistence of tar, being evacuated. Four months afterwards, the fluid was again collecting.—The history of a case of enormous enlargement of the clitoris and nymphæ, has been published by Dr. McClintock.† When the patient was admitted into the Dublin Lying-in Hospital, in the seventh month of her second pregnancy, the nymphæ hung down in the form of tuberculated tumors, with the clitoris between them as large as a turkey's egg. Nine years previously she had suffered from syphilis; but the enlargement had only commenced two years prior to her admission into the hospital. The clitoris was removed by ligature, as it was feared it might interfere with parturition. Some weeks after her labor, the nymphæ were also removed by ligatures and the scalpel.—In another instance, related by the same physician, a single lady, 20 years of age, had enlargement of the nymphæ, while the prepuce of the clitoris was of the size of a Spanish chestnut. Local and general treatment proving useless, the diseased parts were successfully amputated with the écraseur.—The clitoris may be injured by violence. The particulars of an instance in which this organ was ruptured by a kick, have been given by Mr. Gutteridge.‡ On inspecting the vulva a wound was seen just within the vagina on the left side, extending from the pubes along the ramus of this bone, to the extent of an inch, and having a depth of about three-quarters of an inch. The left crus clitoridis was crushed throughout its length, so as to show its cavernous structure. From this part hemorrhage had ensued, which proved fatal in about an hour from the receipt of the injury.

The clitoris is sometimes found indurated with only slight, if any, enlargement. Mr. Baker Brown considers that this condition is due to

* A Treatise on the Diseases and Special Hygiène of Females. By Colombat de l'Isère. Translated from the French by Charles D. Meigs, M.D., &c., p. 85. Philadelphia, 1850.

† Clinical Memoirs on Diseases of Women, p. 224. Dublin, 1863.

‡ Lancet, p. 478. 31st October, 1846.

self-abuse; and when the latter is affecting the general health, and the patient is unable to give up the degrading practice, he recommends that the clitoris should be excised. I think I am right in saying that Mr. Brown believes he has cured many diseases, originating in improper excitation of the sexual organs, by this operation. But if we allow that some cases of paralysis, epilepsy, insanity, and hysteria are caused by the injurious physical and moral effects which result from masturbation, it does not follow that clitorotomy can effect a cure. My own belief is that very little benefit will result from the proceeding; though Mr. Baker Brown may be in possession of facts which will show that this opinion is erroneous.

When amputation of the clitoris is required, it is better, as a rule, to use the knife or scissors in preference to the ligature. The patient ought to be placed in the same position as for lithotomy, after anæsthesia has been induced; and the organ being drawn well forward with a pair of hooked forceps, it should be excised by cutting through the crura on each side. The free hemorrhage which results is easily checked by the use of pads of lint and a T-bandage, so applied as to exert sufficient pressure upon the symphysis pubis. The catheter will afterwards be required for two or three days; and the patient must remain in bed until cicatrization is complete.

II. DISEASES OF THE URETHRA.

1. Tumors at the Orifice of the Urethra.—The meatus urinarius is not uncommonly the seat of a *vascular tumor*. There may be only a single growth, or two or three: generally they are attached by broad bases, but sometimes they are found pediculated. Although the external orifice of the urethra is their most frequent seat, yet they may grow from any portion of this canal. In some rare instances, similar growths have been found at the orifice of the male urethra.

Each excrescence consists of several hypertrophied papillæ, invested by a thick layer of tessellated epithelium; and while the growth is certainly very vascular, it is also probable that it is freely supplied with nerves. In the cases which have come under my notice, the tumor has varied in size from a florid elevation the size of a pin's head, to a growth as large as a date-stone; but instances have been recorded where the tumor has equalled a pigeon's egg in its measurements. Moreover, as far as my experience goes, I should say that the larger the tumor the less severe is the suffering occasioned by it. In examining women rather far advanced in life, the subjects of uterine disease, I have on several occasions found these tumors as large as peas, while no sense even of discomfort has been experienced.

Generally speaking the symptoms consist of irritability of the bladder, a sanious or slight muco-purulent discharge, great pain on passing urine, and tenderness on pressing the urethra. In one woman under my care, the bladder was so irritable that there was not merely frequent micturition, but complete incontinence of urine. As these tumors are liable to bleed at times, a little blood often comes away with the urine; so that

until an examination of the parts be made, the practitioner may be led to imagine that there is a stone in the bladder.

These tumors are readily removed, but it is not as easy to prevent their return. The treatment which I have found answer the best consists in excising them with a pair of sharp-pointed scissors, and in then applying the actual cautery so as to destroy the submucous base. An excellent instrument for this purpose may be made by fixing a piece of thick bell-wire into part of the stem of a common clay pipe; the flame of a spirit lamp being sufficient to heat it. The cautery, moreover, not only destroys the base of the growth, but stops the hemorrhage which follows simple excision. The use of the acid solution of nitrate of mercury, or of potassa fusa, is not as effectual in the latter respect, nor can the action of these caustics be readily limited to the desired spot. Following the advice of some authorities, I at one time employed the ligature; but it has seemed to me to be a clumsy and slow method of doing that which can be accomplished with less pain by the scissors in a few seconds. Whatever plan be adopted, however, the practitioner should take care to get a good view of the growth; which may be best obtained by an assistant separating the lips of the urethra rather widely with a couple of bent probes, while the patient is in the ordinary position for lithotomy.

In some very rare instances, a tumor has been found at the orifice of the urethra consisting of the *inverted bladder*. Dr. John Green Crosse, of Norwich, met with an example of this in 1829: A healthy girl, between two and three years of age, had a tumor about the size of a walnut, projecting between the external labia. It was of a florid red color, resembling a large strawberry; and the surgeon who consulted Dr. Crosse about its nature believed it was a vascular tumor, which might be removed by ligature. Indeed, a few days afterwards a ligature was just about to be applied, when Dr. Crosse accidentally went to the patient's bedside; but fortunately this gentleman begged for a few minutes' grace while he gently pressed the swelling, as if to reduce a hernia, and found that the whole disappeared through the urethra. This canal was so dilated that Dr. Crosse was then able to fairly introduce his finger into the cavity of the replaced viscus. Had a ligature been applied, "the bladder would have been removed, including all its coverings, the ureters cut through just above their terminal orifices, and the peritoneal cavity largely opened." For sixteen years after the replacement there had been no relapse, but the patient was troubled with incontinence of urine.* A similar case was under the observation of Dr. Murphy: Jane R., ætat. 4, was admitted into the Meath Infirmary, July 9, 1829. A pyriform tumor about the size of a small hen's egg, and the color of dark mahogany, was seen between the labia. It had been mistaken for prolapsus ani by the gentleman who first made an examination. On drawing the tumor downwards, the orifices of the ureters were seen, and a small silver probe was passed up each. The bladder was easily replaced, and after a few inflammatory symptoms had subsided, she was discharged cured.†—A third instance, in which the inversion was congenital, has

* Transactions of the Provincial Medical and Surgical Association, vol. xiv, p. 185. London, 1846.

† London Medical Gazette, p. 525. 19th January, 1833.

been reported by Dr. Lowe, of the West Norfolk and Lynn Hospital. The patient was two years and a half old, and the bladder was seen between the labia like a vascular tumor, the size of a large Italian walnut. After replacement, a natural condition of the urethra was induced by the application of the actual cautery, on five separate occasions.*—And lastly, a fourth case has been published by Dr. Beatty, in which the child was nearly two years old, and had suffered from the inversion for eleven months. There was also prolapsus of the rectum. The bladder was easily pushed back through the urethra; but while under treatment the girl died of croup.†—The foregoing constitute all the reported cases of inversion of the bladder through the urethra, with which I am acquainted, so far as the literature of this country is concerned. Examples of inversion of this viscus through vesico-vaginal fistulæ are more frequently met with; but such cases have nothing in common with those which have now been considered.

A *cancerous tumor* has been met with at the orifice of the female urethra as a primary growth,—*i. e.*, independently of the extension of adjacent malignant disease. According to some authorities, a simple vascular tumor may acquire a carcinomatous nature; but I have never met with an instance corroborative of this opinion. The treatment of cancer in this situation must be conducted on the principles which have already been laid down in speaking of the disease generally.

2. Inflammation of the Urethra.—Acute or chronic urethritis may occur independently of gonorrhœa, or of inflammation set up by irritating uterine discharges.

The *symptoms* consist chiefly of a feeling of heat along the urethra, great pain on passing water, a muco-purulent discharge and irritability of the bladder. The urine may be found loaded with lithic acid, or it may be albuminous or bloody, or it may contain pus or ropy mucus. On examination, the lips of the meatus can be seen to be morbidly vascular and swollen; while sometimes the mucous lining is everted, and highly sensitive. The inflammation will possibly cause retention of urine from spasmodic stricture; which, however, should be relieved by a hot hip-bath, rather than by the use of the catheter, as the passage of this instrument causes most acute pain. There is usually considerable constitutional disturbance, with nervous irritability.

Simple *treatment* commonly suffices to remove this disease. Hot hip-baths, fomentations, rest in bed, an unstimulating diet, and a free supply of demulcent drinks, are the principal remedies. Opium in combination with belladonna (F. 344) may also be given; or a pessary of belladonna and bismuth (F. 423), introduced nightly into the vagina, will give great relief. In chronic cases, a cure can often be effected by passing the solid nitrate of silver into the canal for a few seconds; or this failing, a capsule of balsam of copaiba may be administered three or four times a day.

3. Stricture of the Urethra.—This is not a frequent affection in women. Two cases only have come under my care; and as they illus-

* Lancet, p. 250. 8th March, 1862.
† Dublin Quarterly Journal of Medical Science, vol. xxxiv, p. 189. 1862.

trate the symptoms and treatment of organic contraction of this canal, a short notice of them may be useful. The first example met with was the following: Mrs. S., thirty-six years of age, applied to me in May, 1859. Has never been pregnant; the catamenia are regular, but very abundant; and the general health is bad. Has suffered from stricture of the urethra for some years, with occasional attacks of retention of urine. She has to pass water very frequently, being obliged to rise five or six times every night to do so. Was under the care of Mr. Travers until death: this gentleman attempted to effect a cure by the use of caustic. On examination by the vagina, I found the urethra hard like a cord, but not over-sensitive on pressure. A No. 1 male catheter was introduced into the bladder with great difficulty: the stricture seemed quite cartilaginous. Day by day, however, a larger instrument was passed, until a No. 12 entered easily. The menorrhagia was due to a large fibrous tumor in the cavity of the uterus; which tumor was subsequently removed, after dilating the os uteri. This patient has seen me occasionally up to the present time (February, 1865). There has been no return of the stricture, or of the irritability of the bladder; but she passes a large-sized gum elastic catheter about every fortnight, and finds some slight difficulty in doing so, if the use of the instrument be omitted for three or four weeks.—The second patient, sent to me by the previous one in May, 1860, gave this account of her sufferings: "I have suffered from stricture of the urethra for three years, and have had advice without any relief. The two surgeons I have consulted believe that there is some tumor in the bladder, as well as a stricture of the water passage. I have to pass my water almost constantly, unless it dribbles away, as it often does. I always take the bed-pan into bed with me at night, and generally sleep on my back with the pan underneath me." There was much difficulty in introducing a No. 1 silver catheter, which was retained in the urethra for some hours. In a few days a large-sized instrument entered easily; and soon No. 12 could be used. She was directed to pass an elastic catheter every week. On the 17th October, 1861, I heard that there had been no relapse. The cure was complete; the mischief being all in the urethra, without any vesical tumor.

With a hint or two on *female catheterism* the subject of urethral diseases may be dismissed. Where the practitioner is only occasionally called upon to introduce the catheter, he finds that this proceeding is not so easily accomplished as many authors assert. The simplest plan is to make the patient lie upon her back, with the thighs separated and slightly drawn up; taking care that there is no exposure. The surgeon should then separate the labia and introduce the second finger of his right hand into the vagina, with the palmar surface upwards; along which, as on a director, he slips the instrument held lightly in the left hand. Thus, the catheter cannot enter the vagina, while it will almost certainly slip into the orifice of the meatus urinarius. It should be remembered that in elderly women who have had children, as well as in pregnant females, the meatus is often drawn into the vagina somewhat under the symphysis pubis.

III. STONE IN THE BLADDER.

In whatever way the fact may be accounted for, it is certain that stone in the bladder is a very rare disease in women. This is well shown in a paper by Mr. Smith,* surgeon to the Bristol Infirmary; from which essay we learn that out of 354 cases of vesical calculus, operated upon in that institution during 83 years, there were only 7 females, and all of these were under 35 years of age. Mr. Coulson also remarks that out of 2238 patients, 111 were females, making a proportion of 1 female to 20 males: while by the estimate of Dr. Prout, the numbers are as 1 to 23.† According to some authorities, the comparative exemption of women from this disease is principally due to the facility with which calculi can spontaneously pass through the short and dilatable urethra. But this explanation is probably more specious than true; for numerous inquiries amongst gentlemen of experience have led me to believe, that renal calculi are much more commonly found in male than female subjects, and certainly cases of calculous nephralgia are very seldom met with in the latter.

The *symptoms* of stone in the female bladder resemble those presented in the other sex; with this exception, that the suffering is commonly more intense. There is pain in the urethra, back, and upper part of the thighs, generally increased by sexual intercourse and by walking; a sense of forcing down, like that which occurs in labor, is experienced; there is often vaginal cystocele, procidentia uteri, and sometimes prolapsus ani; while there is either incontinence of urine, or very frequent calls to micturate. In one instance where I removed a phosphatic calculus nearly two inches long, one inch and a quarter broad, and 331 grains in weight, the patient had experienced the greatest pain in passing water, and yet had been obliged to do so every twenty minutes through the night and day. Moreover, in these cases, immediately after micturition, the patient feels that she has not emptied her bladder, and therefore strains to do so. The urine generally contains a quantity of ropy mucus; it may be loaded with urates, phosphates, or oxalic acid; while it is frequently bloody, and occasionally so to a marked degree. To examine the bladder, the patient should lie on her back, with the knees drawn up; and then there will be no difficulty in detecting the stone with the sound or silver catheter. Often, too, the calculus can be felt through the vesico-vaginal septum; and it is said that ballottement may be obtained, which might be mistaken for the motion imparted to a fœtus by the finger. The nature of the various forms of renal calculi having been already noticed (p. 543), it is only necessary to say that these concretions in women often have very extraordinary nuclei. Young girls occasionally introduce foreign bodies—such as hair pins, short sticks of pencil, pieces of quill, fruit-stones, ear-picks, &c.—into the bladder; and these, if allowed to remain, soon become coated with the urinary salts.

The *treatment* consists in extracting the stone by the method least liable to lead to subsequent incontinence of urine. There are four

* Medico-Chirurgical Transactions, vol. xi, p. 1. London, 1821.

† The Diseases of the Bladder and Prostate Gland. Fifth Edition, p. 405. London, 1857.

methods by which the removal may be accomplished. (1). Dilatation of the urethra by sponge tents, or by Weiss' three-bladed instrument, or by india-rubber bags which can be inflated after introduction, has often been resorted to; and by this practice large stones can be seized and extracted without risk to life. But whether the dilatation be produced slowly or rapidly, or while the patient is conscious or insensible from the inhalation of chloroform, it is very apt to be followed by permanent inability to retain the urine. My own view of this operation is so unfavorable, that I shall not again resort to it, unless there is some peculiarity in the case specially requiring such a proceeding. Yet if it is practised, I believe that there is more hope of preventing incontinence by rapid dilatation while the patient is under the influence of chloroform, than by slowly stretching the urethra with sponge tents, &c. (2). Incision with dilatation has been advocated. This operation consists in incising or notching the external orifice of the urethra, either upwards towards the pubes, downwards, or laterally; and then stretching the canal with Weiss' dilator, until the finger can pass into the bladder. The same objection, however, applies to this method as to the former one; and hence it is not to be recommended. (3). Incision of the bladder (vaginal lithotomy) has been recommended by Dr. Marion Sims. The surgeon cuts through the vagina, low enough down to avoid the peritoneum, into the bladder upon a staff introduced through the urethra. The stone is seized by the forceps and removed; the edges of the wound being then brought together by metallic sutures, and the same treatment pursued as after the operation for vesico-vaginal fistula. In a few cases, when the stone is of large size and the bladder very irritable, this method will prove useful; but it ought only to be practised by a surgeon who feels thoroughly confident of being able to cure the vaginal fistula. (4). Lithotrity remains to be considered; and though mentioned last, yet I believe that in forty-nine cases out of fifty it is the only operation which should be resorted to for the removal of a stone from the female bladder. It is practised without much difficulty, is attended with so little pain that chloroform is not required, and unless the stone be large may often be completed at one or two sittings. The patient must be directed to hold her water for about an hour before the operation. To allow of this being done without any inconvenience, it may often be advisable to administer the decoction of triticum repens (p. 553) for a few days previously; or the practitioner can trust to the use of the belladonna pessaries (F. 423), or of an enema containing about twenty drops of the fluid extract of opium and the same quantity of tincture of belladonna, in an ounce and a half of fluid starch. If, in spite of these sedatives, the urine come away, two or three ounces of tepid water ought to be injected just before introducing the lithotrite. On the day after the calculus has been well crushed, a short tube, having a diameter rather exceeding that of a No. 12 catheter, may be introduced into the urethra, and the fragments of stone removed by washing out the bladder with warm water.

IV. DISEASES OF THE VAGINA.

1. Occlusion of the Vagina.—Putting aside those cases where the vagina is entirely absent, or is considerably malformed, from some arrest of development, it will be found that the examples of occlusion met with in practice may be arranged under one of three heads: (1). Those where the hymen is morbidly tough and persistent. (2). Instances of imperforate hymen, in which the vaginal orifice is completely closed. And (3), cases of imperforate vagina; whether this be due to congenital adhesions between the opposite walls, or to stricture in consequence of inflammation, or to cicatrices the result of injury.

A tough and persistent hymen gives rise to no inconvenience until sexual intercourse is attempted; for it does not interfere with the escape of the catamenia, or of vaginal discharges. The practitioner is therefore only consulted when the rigidity of the membrane is such that it prevents intromission of the male organ. In this way, the hymen may be a cause of sterility; although many cases are on record where fecundation has occurred while perfect connection must have been impossible. Some years since, a medical man, now dead, consulted me, two months after marriage, as to the propriety of his dividing the hymen with the bistoury; as he found this structure so unyielding that he had been unable to break it down. And yet, at this time, the lady was three or four weeks advanced in pregnancy, and had just missed her catamenial period. The operation, however, was performed, and all further inconvenience obviated. In another patient, I found at the time of labor that the hymen had simply been perforated through its centre, the upper portion forming a band which only yielded to the use of the knife. The treatment of persistent hymen is very simple. If the membrane cannot be ruptured with the finger, it should be divided; reunion being prevented by the careful use of oiled lint. Where the vaginal orifice remains preternaturally small after this operation, dilatation ought to be effected by the use of bougies.

Naturally, the hymen consists of a delicate semilunar fold of mucous membrane, stretched across the lower half of the vaginal orifice. But occasionally cases are met with where the canal is completely closed from the urethra to the fourchette by a firm membrane. In these examples of *imperforate hymen*, it is most important that a cure be effected before the patient reaches the age of puberty. It is fortunate therefore that the presence of this membrane is generally discovered by the child's mother, while the girl is quite young; and then there is neither difficulty or danger in the surgeon breaking through the structure with a probe or director, or in cautiously dividing it with a bistoury. The edges of the wound must be kept apart by the introduction of small pledgets of oiled lint, until cicatrization is complete.

Supposing, however, that the malformation is not remedied, important symptoms will be produced at the time of menstruation. For as the membrane may present no orifice whatever, or, as most commonly happens, only a very small oblique one just below the urethra, so the proper escape of the catamenia must be prevented. The patient will experience all the general feelings which accompany the early monthly

periods, but there will be no external discharge. As each time comes round, the constitutional disturbance, backache, sense of bearing-down, and feeling of weight about the pelvis, will increase; and yet the cause of the loss of health, languor, sallowness of complexion, &c., may be unsuspected by the parents. The girl probably holds her tongue; partly because she is ignorant of what should occur, and partly because she is afraid and ashamed to make any complaint. In this way it sometimes happens that the vaginal canal and the uterine cavity become greatly dilated, while in a few instances the Fallopian tubes have also been considerably enlarged; for the retained menses may amount to some four or five pints, or even more. If, in addition to the presence of this membrane, there be also occlusion of the os uteri, the catamenia will of course only accumulate in the cavity of the womb, until perhaps this viscus can be felt through the abdominal walls as large as at the sixth or seventh month of pregnancy.

Now it is a curious fact, and one difficult of explanation, that where the menses have been retained owing to this imperforate condition of the hymen, the operation required is a very fatal one. On examining a woman so affected, the practitioner readily detects the bulging obstructing membrane at the orifice of the vagina; and it would seem a very simple proceeding to divide this, and permit of the escape of the distending treacle-like and fetid fluid. But, however easy it may be to do this, it is well known that many of the cases which have been so operated upon have terminated fatally from peritonitis. Nevertheless, in order to avoid ulceration and rupture of the walls of the uterus or Fallopian tubes, the obstruction must be removed, either by a longitudinal or a crucial incision through the thickened hymen; though instead of looking on this proceeding lightly, every precaution ought to be taken to prevent inflammation subsequently. The patient must be kept very quiet in bed, her diet should be plain without being too low, and if there be pain it ought to be relieved by sufficient doses of opium. The bowels should be freely opened just before the operation, and then left quiet for some days. A bandage had better also be placed round the lower part of the abdomen so as to facilitate the flow of the discharge. Whether it would be safer, at first, to draw off part of the fluid, with a trocar and canula introduced under water—while the patient is in a warm hip-bath—I cannot say; but it is not improbable that the effect of the air upon the retained secretion is to set up decomposition, and in this way perhaps ichorhæmia, or endometritis, may result. Mr. Baker Brown has recommended that instead of a simple cut or puncture, the hymen should be removed entire by a circular incision at the point of its junction with the labia; but in addition to the unnecessary severity of this proceeding, it would also seem probable that the larger the wound is made in these cases, the greater fear there is of absorption of fetid matters taking place. Whether the practitioner resorts to an incision or complete excision, careful dressing with oiled lint must be had recourse to, so as to prevent adhesions forming between the labia; while even for some months afterwards, examination ought to be often made, lest the vaginal orifice should be getting constricted.

The vaginal opening may be normal, and yet the passage may be more or less completely closed at some part of its course. *Imperforate*

vagina from the presence of a thin transverse membrane, is the most simple congenital malformation of this description; and if this structure present an opening sufficiently free to allow of the escape of the catamenia, no inconvenience will result until the time of marriage. Comparatively harmless also is the division of the vagina, from the entrance to the os uteri, by a longitudinal partition. In these cases there is always a double uterus as well as the double vagina; and though generally one division of the latter canal is larger than the other, and is the only one which is used in coitus, yet cases have occurred where either portion has been used indifferently, and where pregnancy has taken place in both halves of the uterus at the same time. A much more serious condition is the conversion of a portion of the canal into a solid cord, owing to firm adhesions between the walls; so that on introducing the finger into the short vagina, this tube is found to end in a cul-de-sac. In these instances, the uterus and ovaries may be either absent, or they may exist in only a rudimentary state, so that there may be no secretion of menstrual fluid. But if these organs be present and healthy, the catamenia will be retained, and gradually produce a tumor as in the case of imperforate hymen. Stricture of the vagina may result from inflammation set up by disease, or it may be a consequence of the healing of cicatrices after injury inflicted by the use of instruments in a difficult labor. An interesting example of the first form has been reported by Mr. Hancock. In this case, the external organs of generation appeared healthy, but the vagina terminated about an inch from the orifice. The patient stated that she had menstruated regularly for two years: she then had an attack of fever, and the discharge never returned. Mr. Hancock dissected the tissues upwards for three inches, and afterwards dilated the canal by bougies; but no uterus could be discovered. There was no evidence of the existence of any collection of menstrual fluid.* Examples of stricture from the healing of cicatrices are not so very uncommon. I have seen a woman in strong labor, with almost complete obliteration of the vagina, the consequence of ulceration and sloughing produced by the prolonged pressure of the head in the previous confinement. In April, 1851, I was consulted by Dr. Greenhalgh as to the best mode of effecting delivery in a woman slightly advanced beyond the eighth month of her fourth pregnancy; craniotomy having been required in the third labor. On examination, the canal of the vagina appeared to be one firm contracted cicatrix; although, after some perseverance, the finger could be insinuated between three or four small rings of cartilaginous toughness, with sharp edges. In this instance, labor was brought on; the woman being safely delivered after the free division of the rings, and the perforation of the child's head; but I found it impossible to avoid wounding the rectum, the fistulous opening which formed necessitating subsequent treatment. Moreover, the strictured tissues were not incised, nor was the fœtal skull opened, until it was proved that the parts showed not the least disposition to yield, although the labor pains were violent.

In attempting to remedy these cases of imperforate vagina, it should be remembered that all operations upon this canal are attended with considerable risk. Consequently, it will be better to refuse to interfere

* Lancet, p. 470. 21st May, 1853.

where the woman is single, and the catamenial flow is not obstructed. Moreover, it will be useless to attempt any surgical proceeding where the patient, being an adult, experiences no menstrual molimen, and has no sexual desire; for we may be sure that the malformation is not confined to the vagina, but that the uterus and ovaries are also entirely absent, or at least in a very rudimentary condition. When the obstruction consists of transverse membranes, we shall often succeed in breaking them down with the finger, or in dilating them with bougies and sponge tents. But if it be necessary, on account of their thickness, to use the knife, great caution must be exercised to avoid wounding the bladder or rectum, and to prevent the sharp point of the scalpel from entering the cavity of the peritoneum above. To evade these accidents the patient should be placed in the ordinary position for lithotomy; a sound should be introduced into the empty bladder, while sometimes it is advisable for the surgeon to keep the forefinger of his left hand in the rectum; the edges of the vaginal orifice are to be held widely apart by the hands of an assistant, or by Bozeman's duck-bill speculum, as in the operation for vesico-vaginal fistula; and then the septum should be cautiously dissected through from side to side, until there is a gush of thick treacle-like fluid—the retained catamenia. Where this operation has been safely accomplished, care is to be taken to prevent any subsequent contraction; inasmuch as, by inattention to this rule, interference has been required on a second occasion. With regard to those rare cases where the vagina ends in a cul-de-sac, a thorough investigation should be made so as to detect the smallest opening, which may be dilated by bougies and tents. Supposing there is no orifice, and no depression showing where there might be one, and if it be certain that there is an accumulation of the menses in the uterine cavity, it then becomes a question whether a dissection should be made in the manner already described, or whether the uterus had better be punctured through the rectum so as to permit of the evacuation of its contents. The latter proceeding, though only justifiable where the former seems impracticable, has been successfully adopted in several instances. It is, however, always difficult to keep the artificial opening sufficiently patulous to allow of the woman menstruating for the future through the rectum; though this may be accomplished by, in the first instance, making the puncture sufficiently free to admit the point of the finger, and then by daily examinations preventing closure until the healing process at the edges of the wound is completed.

2. Vaginismus.—By this term Dr. Marion Sims has proposed to designate "an involuntary spasmodic closure of the mouth of the vagina, attended with such excessive supersensitiveness as to form a complete barrier to coition."* This affection must occasionally have been recognized by all practitioners who have had much experience in the treatment of the diseases of women; but to Dr. Sims is due the great credit of specially directing attention to it, of clearly describing its symptoms, and of suggesting the means of cure.

From the cases which have been under my own care, I believe that

* Transactions of the Obstetrical Society of London, vol. iii, p. 362. London, 1862.

vaginismus may exist as a simple or as a complicated condition. In other words, there may be no local mischief beyond excessive tenderness of the orifice of the vagina and hymeneal membrane; so that almost the slightest touch, certainly any attempt to introduce the finger into the canal, produces the greatest agony. Or, in addition to this characteristic symptom, there may be indications of inflammation of the follicles about the vulva, or of a painful fissure of the fourchette, or of hyperæsthesia of the whole vaginal mucous membrane, or of some uterine displacement, or of a contracted state of the os uteri and cervical canal. But whether the disease exist in a complicated form or not, it is equally the bane of early married life. In some instances the woman may at first submit to intercourse, bearing the great suffering under the idea that it is not unusual; but after a night or two her courage fails, her nervous system begins to give way, she shivers with terror at the approach of her husband, and consequently all attempts at connection have to be abandoned. In another class of cases it is found that the marriage has never been consummated; or intercourse may have been imperfectly accomplished, but only with the result of setting up inflammation and excoriation about the vulva. The seat of this excessive sensitiveness is the vaginal outlet, and especially the external surface of the hymen, whether this membrane be entire or partially broken down. The gentlest application to this structure produces spasm of the sphincter vaginæ, so that even a probe can scarcely be introduced beyond it. The influence of this condition upon the general health can readily be imagined. The mental distress, the imperfect sleep, the loss of appetite, and perhaps the pain on walking, irritability of the bladder, backache, &c., all tend to render the sufferer an unhappy invalid. She looks careworn, her strength gradually fails, and she gets thin; and if there be any unkindness on the part of the husband the misery becomes intense.

Fortunately, if the suffering be great, the cure is not difficult. In cases of true vaginismus it seems to me worse than useless, since it increases the despair, to temporize with inefficient remedies. The use of bougies, caustics, injections, &c., merely inflicts the greatest pain, without producing the slightest good. The treatment consists, as Dr. Sims very properly insists, in the removal of the hymen, the incision of the vaginal orifice, and in subsequent dilatation; and these proceedings should all be promptly and efficiently carried out. The bowels are to be thoroughly cleared out on the morning of the operation. Then the patient being placed on her left side, or upon her back, and being fully under the influence of chloroform, the sensitive and probably thickened hymen is to be seized with the forceps and completely dissected off. If there be much bleeding it may be checked by the application of a concentrated solution of perchloride of iron; though I think that the after-treatment is rendered more easy by plugging the vagina with cotton-wool, laying pledgets of lint over the lower part of the orifice, and then keeping the whole in apposition by a T-bandage. The chief inconvenience attendant upon this latter measure is, that the catheter will have to be used every eight or twelve hours. The dressings ought not to be disturbed for forty-eight hours, during which time freedom from pain must be insured by the use of opium, with perfect quietude. At the end of this time, chloroform is to be again administered, and the wool

and lint removed; and then the operator, stretching the vaginal opening with two of the fingers of his left hand, makes an incision, about half an inch deep, through the fibres of the sphincter vaginæ at the lower part of the fourchette. Oiled lint is to be applied; and after careful dressing for two or three days, so as to prevent the edges of the wound from reuniting, dilatation should be commenced by the introduction of bougies. The smarting caused by these instruments is nothing as compared with the pain which has been experienced prior to any treatment. This procedure is rather different to that recommended by Dr. Sims; but it has the advantage of being less severe, while I believe it is quite as efficient. I have said nothing about the management of the complications, because they will have to be remedied subsequently according to the rules laid down in speaking of each affection separately.

3. Acute Vaginitis.—This form of inflammation is much more rarely met with than the chronic variety; from which it differs not only in its greater severity and more rapid progress, but also in its usually involving the whole tract of mucous membrane lining the vaginal canal, instead of being limited to one portion. Moreover, in acute vaginitis the morbid action is not always confined to the mucous membrane; the tissues beneath sometimes becoming involved, producing a very distressing affection. It is seldom observed in women who have not had intercourse.

Causes.—This disease, unless due to some specific poison, rarely occurs save in those who are in a depressed state of health. When the vital power is low from bad living, or from excessive use of alcoholic drinks, the inflammation may be excited by exposure to cold and wet, and perhaps by inattention to cleanliness. Hence it is more frequently met with in hospital than in private practice. Excessive sexual intercourse can, however, give rise to it; and so will the use of force—as in rape. The prolonged pressure of the child's head in tedious labors, as well as mischief inflicted by craniotomy instruments or the forceps, must also be remembered as causes. I have never seen it produced by rising too soon after parturition, and cannot believe in such a proceeding having any effect in inducing this form of inflammation.

Symptoms.—The chief symptoms consist of itching about the vulva, irritability of the bladder, with pain and a sense of heat extending up the vagina. At first, the secretion of vaginal mucus is checked; so that on examination the mucous membrane of the canal is found somewhat dry and swollen. There may be no alteration in color from the natural appearance: more often the whole tissue is seen of a scarlet tint, or it is marked with red patches. Then, shortly, a creamy mucus, or mucopurulent, or purulent discharge takes place; the pain lessening as the fluid poured out becomes abundant. This discharge, like the healthy vaginal mucus, is of acid reaction; while a minute examination shows that it contains pus corpuscles, with an abundance of squamous epithelium and epithelial debris. The constitutional disturbance is usually slight; but there may be more or less backache, pains about the hips and upper part of the thighs, a sense of weight or bearing-down on standing, smarting and tenderness on sitting down or on passing a motion, with a frequent desire to empty the bladder. The disease commonly runs its entire course, or passes into the chronic form, in from

seven to thirty days; the duration partly depending upon whether a cure can be effected before the return of a catamenial period, as otherwise the symptoms are sure to be aggravated by the menstrual molimen.

Sometimes, owing to neglect or to the severity of the attack, the progress towards recovery gets interrupted. Thus, supposing there occur rigors, severe frontal headache, thirst, a loaded tongue, a quick pulse, with great local soreness and throbbing pains, we may be tolerably certain that the morbid action has extended to the structures beneath the mucous lining, and that it is advancing to suppuration. In this way, a troublesome and very painful affection may be set up which will continue for many weeks, to the marked injury of the general health. The abscesses which form generally burst into the vagina; though the pus may burrow and make its way externally, either at the sides of the labia or about the perineum, probably leaving long and tortuous fistulæ.

Diagnosis.—Acute vaginitis can scarcely be confounded with acute inflammation of the cervix uteri. The appearances on examination and the nature of the discharge will serve to prevent any error. The mucus of the cervical canal is always alkaline; and though the acidity of the vaginal secretion will neutralize a moderate quantity of uterine discharge, yet it will not suffice to do so when the latter is abundant. Moreover, the menstrual functions are probably never interfered with when the disease is confined to the vagina; though this secretion commonly appears too frequently, too abundantly, and is accompanied with much pain, when the uterus is affected.—The difficulty of distinguishing between non-specific vaginitis and gonorrhœa has already been noticed (p. 199). The application of the discharge poured out in acute vaginitis to the male urethra, will produce a disease resembling true gonorrhœa.

Treatment.—When the case is seen early, no remedy gives so much relief as the use of the hot hip-bath, night and morning. The bowels, which may be obstinately confined, should be unloaded by a full dose of castor oil, or of calomel and jalap (F. 140), or of jalap and senna (F. 151); after which it is unadvisable to irritate them further by purgatives. Vaginal injections of warm water prove serviceable; but instead of sedative or astringent injections, pessaries of oxide of zinc and belladonna, or of acetate of lead and opium (F. 423) will be found most efficacious. The patient should be confined to the sofa, or even to the bed, at the commencement; the diet is to consist of white fish, lightly-cooked eggs, tea and milk, with demulcent drinks; and all stimulants are to be forbidden. Where there is evidence of the occurrence of suppuration, opium and henbane (F. 343, 345), with ammonia and bark (F. 371), will be needed; while nourishing animal food and wine ought to be allowed. Hot fomentations, or large linseed poultices, to the lower part of the abdomen as well as to the vulva, should be employed. When the abscesses begin to "point," they had better be opened.

4. Chronic Vaginitis and Leucorrhœa.—Chronic inflammation of the vagina may occur primarily and singly, or it may happen as an accompaniment of most uterine diseases, or it may be the sequel of acute vaginitis. Probably chronic vaginitis or vaginal leucorrhœa—for

the terms may be regarded as synonymous—is the most common disorder to which women are liable. There are indeed few who do not more or less suffer from it during the child-bearing period of life,—so numerous and even slight are the causes which will induce it.

Symptoms.—The prominent symptom is a constant or frequent leucorrhœal (*Λευκὸς*, white, and *ῥέω*, to flow) discharge—"the whites." Advice is seldom sought until this discharge has become profuse, or has continued some time; and then, in addition to speaking of it, complaint is made of backache, a sense of weariness after slight exertion, loss of appetite, lowness of spirits, and frequently of constipation. This low form of inflammation is often confined to the upper part of the vagina, and to the external portion of the cervix uteri; in which districts the mucous membrane may perhaps be found on examination congested and of a purple tint, though more commonly there is no perceptible change. The disease is always obstinate, partly because it gets aggravated at the return of each monthly period.

Under the influence of inflammation the epithelial covering of the mucous membrane of the vagina may be exfoliated. Sometimes this epithelium mixed with mucus comes away in flakes, or it may be passed in masses which form complete casts of the vaginal canal. By the microscope these pseudo-membranous, parchment-like laminæ can be seen to be composed of large epithelial cells of the tessellated variety; and they are generally sufficiently strong and firm to bear free handling. They are not unfrequently expelled when slight inflammatory action has been set up by the use of strong astringent injections. So again, in the vaginitis which occurs after scarlet fever, detached fragments of epithelium will commonly be discovered in the discharge. The symptoms attendant upon this exfoliation are slight or well-marked, according as a new and sufficiently dense layer of cells is slowly or rapidly formed. In the latter case, there may be merely slight heat and irritation; in the former, the raw surface is very sensitive, and there will be much pain and smarting. In either instance, as the membrane is becoming detached, a peculiarly unpleasant crawling sensation has been complained of. Care must be taken not to confound these vaginal membranes with those uterine structures which are not unfrequently thrown off in one form of dysmenorrhœa.

Diagnosis.—In a state of perfect health only sufficient mucus is secreted to lubricate the flattened vaginal canal, and so prevent irritation from the friction which necessarily occurs between the apposed anterior and posterior walls. But under the influence of many morbid conditions, a more or less abundant discharge comes away; and the important question which generally arises is as to the seat of this flow. In other words, is the case one of vaginal or of uterine leucorrhœa? The distinction can generally be drawn from an examination of the discharges. Thus, the vaginal mucus, whether scanty or abundant, is universally acid; and it is owing to this reaction that the secretion is found opaque and curdy. The mucus of the cervical canal is always alkaline; so that if a piece of litmus paper be reddened by application to the vaginal portion of the cervix, the blue color will be restored on passing the test-paper within the cavity. Moreover, the mucus as it is seen by the speculum escaping through the os from the interior of the cervix is viscid and transparent, so that it resembles the white of egg;

though it becomes opaque as it passes through the vagina owing to the action of the acid reaction. A minute examination shows that the discharge from both parts consists of epithelium, mucus or pus corpuscles, and a plastic liquid; but the vaginal epithelium is of the pavement or tessellated variety, while the cervical is of the cylindrical kind. Of course, where there is chronic vaginitis in conjunction with disease of the interior of the cervix, the discharge will partake of the nature of both secretions. Moreover, when there is an abundant secretion of pus from the vaginal mucous membrane this fluid may be found alkaline. Unless the bodily strength becomes much depressed, the menstrual functions are not interfered with in cases of vaginal leucorrhœa.

Treatment.—As in other disorders, the first point is to remove the cause. The general health must be attended to, one of the mineral acids with bark or quinine being administered if necessary: the digestive organs should be made to do their work efficiently, pepsine sometimes proving useful; the frequency of sexual intercourse ought at least to be limited; and any disease of the urethra, vulva, or rectum, which may be present, is to be cured. Then, cold salt-water hip baths, and astringent vaginal injections (F. 425) are to be employed; the latter being used in quantities of not less than a pint at a time, while they are to be thrown up slowly and deliberately with a syphon syringe. It is rather remarkable that the small old-fashioned glass and metal female syringes are still to be found in every druggist's shop, and yet more useless instruments could scarcely be manufactured. After a cure has been effected, the woman who desires to remain well will inject up the vagina a pint of cold or tepid water every morning, while using the bidet for the external organs. Where injections fail to give relief, pessaries containing sulphate of zinc or tannin (from ten to fifteen grains of either with sixty grains of cocoa butter) may be substituted; if the pain in the back continue bad, a belladonna plaster had better be applied; while the system is to be strengthened by tonics, sea-air, &c. As a rule, in all cases, the diet should be nourishing; while if any stimulant be needed, weak brandy and water may be allowed in preference to wine or beer.

In not a few instances I have found that a low form of inflammation has been kept up by the irritation of a painful *fissure*, or *ulcer* at the fourchette. Although this may sometimes be cured by two or three days' rest in bed, and the application of the dilute solution of subacetate of lead, or of zinc ointment, yet this plan often fails. The most certain and efficacious proceeding is to make a longitudinal incision, the eighth of an inch in depth, through the ulcer, so as to divide the fibres of the sphincter vaginæ muscle. The patient ought to remain in bed until the wound has healed; and if cicatrization proceed too slowly the red lotion (F. 264) may be used as an efficient dressing.

The foregoing remedies will have but little influence in removing uterine leucorrhœa. In such cases, therefore, the treatment described in a subsequent page will have to be adopted.

5. Tumors of the Vagina.—A physician may be engaged for many years in treating the diseases peculiar to women before he meets with a case of *polypus of the vagina*. Tumors so designated, having a firm fibrous structure, do occasionally grow, however, from one of the

vaginal walls. In the only instance which has fallen under my observation, advice was sought for a "falling of the womb." On examination, a firm growth was seen presenting at the orifice of the vagina. By gently drawing the tumor downwards it was seen to be as large as a small orange, having an attachment to the middle of the posterior wall of the vagina by a pedicle equal in circumference to that of the little finger. The chief inconvenience which resulted from this body consisted of an abundant leucorrhœal discharge, a constant bearing-down, and some irritability of the bladder. As a vessel could be felt pulsating in the pedicle, a ligature was placed around it, and then the growth was cut off just below the constricted part. The ligature came away on the fifth day, and the patient has since remained well.

More rare even than the foregoing are *fibrous tumors imbedded in the submucous tissue of the vaginal wall.* When a growth of this description exists, it may produce very slight local or general derangement; though in a case which was under the care of Mr. Paget the tumor gave rise to repeated attacks of vaginal hemorrhage. Whether troublesome or not, however, a cure should be effected, if possible; for such a body would at least interfere with any subsequent parturition. The removal may probably be safely accomplished by seizing the growth with a pair of vulsellum forceps, drawing it downwards, dividing the mucous membrane covering it, and then shelling it out with the fingers or handle of the scalpel. If there be any free bleeding, the vagina should be firmly plugged with cotton-wool.

Mucous follicular cysts are occasionally found about the walls of the vagina. When *superficial*, the cyst is formed by a dilated follicle, the excretory orifice of which has become closed: it seldom attains a larger size than a pea, since its thin coats are easily ruptured: often there is only a simple round cyst, though two or three may be met with, their walls being transparent; and they are most commonly situated about the vestibule, or at the sides of the lower part of the vaginal opening. The *deep-seated* cysts are produced by the accumulation of the contents of the interstitial or closed follicles; and one or more of this variety may exist alone, or in combination with the superficial kind. Usually solitary, these cysts may vary in size from a hazel-nut to a fowl's egg; they are painless, but produce an unpleasant sense of fulness; they may become pediculated; they seldom rupture spontaneously, owing to the firmness of their smooth and shining coats; and they are almost invariably situated at the upper part of the vagina, near the cervix uteri. To cure either the superficial or deep cysts it is necessary to puncture them, and then to apply the nitrate of silver to their internal surfaces. When pediculated, it is better to snip them off with a pair of curved scissors. In operating upon the deep kind, care must be taken to avoid wounding the bladder when the tumor is in the anterior walls of the vagina, or the rectum when the posterior wall is the affected part.

6. Prolapsus of the Vaginal Walls.—The descent of the vagina is generally accompanied by prolapsus of the uterus, although occasionally it occurs alone. I have never met with an example of complete and uncomplicated vaginal prolapsus in a single woman; the cause, in those cases which have come under my care, having been either a failure in the walls of this canal to recover their tone after several

pregnancies and labors, or a withdrawal of their support in consequence of a laceration of the perineum.—When the whole circumference of the vaginal mucous membrane is prolapsed we find at the vulva a projecting tumor, the surface of which, if the descent be of long standing, is generally inflamed and indurated and more or less excoriated. As the fall of the anterior wall is usually the most complete, the opening leading up to the uterus is somewhat concealed at the lower and posterior part of the projecting mass: on passing the finger up the passage, the os uteri is met with drawn more or less downwards. The functions of the bladder and rectum may be uninterfered with; but frequently complaint is made of some irritability of the former viscus.

Much more common than these cases of complete, are those of partial, prolapsus,—where either the anterior or the posterior wall of the vagina descends. When the anterior wall is long affected, this portion in its fall draws down the posterior wall of the bladder; giving rise to a condition which is generally known as *vaginal cystocele*. The result of this is the formation of a vesical pouch; in extreme examples of which condition the urine may accumulate and decompose, since there is a difficulty in completely emptying the bladder. Patients sometimes remove this difficulty by pressing the vaginal protrusion upwards during each attempt at micturition. If a catheter be passed into the bladder, the end of the instrument can be felt in the pouch through the vaginal wall. On passing the finger along the upper surface of the protrusion its progress is stopped under the pubic arch; but below the tumor it can be made to enter the vagina up to the os uteri.

The lower part of the anterior wall of the rectum is apt to become dilated; a pocket being formed which pushes forward the posterior wall of the vagina, and ultimately causes a protrusion at the vulva. This displacement—spoken of as *vaginal rectocele*—is the consequence of habitual constipation, and of excessive straining to pass the accumulated fæces. It may produce but slight inconvenience at first; but after a time, as the rectal pouch increases in size and becomes loaded with dry and hard fecal masses, so that the external tumor may acquire the size of a fist, troublesome consequences ensue. The chief of these are,—a sense of weight and bearing-down, pain on walking, a mucous discharge from the irritated mucous lining of the rectum, as well as a varicose condition of the hemorrhoidal veins. On introducing the finger into the rectum it will readily enter the diverticulum when this is empty; or it will come upon the firmly lodged stercoraceous mass.

In attempting to cure either complete or partial prolapsus of the vagina it will be necessary to improve the general health, while such remedies are administered as provoke muscular contraction. A nourishing diet, the daily use of cold salt-water hip-baths, with such tonics as quinine and steel and strychnia (F. 380), or phosphoric acid and nux vomica and bark (F. 376, 414) will always prove useful. The tissues of the vagina may also be strengthened by the proper employment of astringent injections (F. 425), or of pessaries containing tannin and catechu (F. 423). Where there is prolapsus of the posterior wall of the bladder, care must be taken to prevent the undue accumulation of urine. The patient should be recommended to pass water every three or four hours, and before doing so to try and push up the protrusion. The catheter, however, must be employed, rather than allow of any decomposition of

the retained secretion. Similarly, in cases of rectocele, the bowel ought to be carefully emptied at least once a day; a full evacuation being obtained by the administration of pills of colocynth or aloes and nux vomica (F. 175), or ofttimes preferably by stimulating enemata (F. 190). If the practitioner detect any excessive fecal accumulation, it may be necessary, in the first instance, to remove it with the scoop.

Where there is any rupture of the perineum, the edges of the torn structure will have to be pared and kept in firm apposition by the clamp or quill suture; the bladder being emptied by the catheter until union has taken place, so as to prevent the urine from penetrating between the raw surfaces. In severe cases of prolapsus, without any rupture of the perineum, an operation is often practised to diminish the size of the vaginal outlet. As this subject is referred to in the section on procidentia uteri, I need only here say that I have but little confidence in its efficacy. Moreover, I do not recollect having seen any instance where it has appeared necessary to lessen the calibre of the vaginal canal by dissecting off one or more strips of the mucous membrane, and bringing the edges together with interrupted sutures; although in any exceptional instance, when other remedies failed, this proceeding might doubtless be resorted to with advantage.

V. PELVIC CELLULITIS.

Inflammation of the cellular or areolar tissue of the pelvis occurs most frequently in connection with abortion, or with labor at the full term; though it is occasionally met with, independently of pregnancy, either as a consequence of external violence, uterine disease, or of some morbid (strumous?) state of the constitution.

Pathology.—Puerperal pelvic cellulitis is much more common in primiparæ than in multiparæ; and the longer the duration of labor, the greater is the liability to it. A depressed state of health prior to parturition, and the occurrence of hemorrhage during this process, also predispose to it. In some epidemics of puerperal fever there has appeared to be an unusual tendency to inflammation and abscess of the uterine appendages; though it must be remembered that the form of inflammation under consideration may happen quite independently of puerperal peritonitis or metro-peritonitis. There is no essential difference between puerperal and non-puerperal cellulitis; the morbid action, however, runs a more rapid course in the former than in the latter, perhaps owing to the effect of that remarkable series of changes in the uterus which commences directly after parturition.

The inflammation may be extensive or very partial. Thus, the whole of the cellular tissue and peritoneal lining of the pelvis is sometimes involved; or only the connective tissue between the folds of one or both broad ligaments will be affected; or the disease may be limited to the tissues between the uterus and bladder, or to those between the uterus and rectum.—The disease may end in resolution, and leave no trace of its having been present; or it may subside favorably, though it causes persistent thickening and induration of the affected tissue; and it may

terminate in suppuration,—pelvic abscess. Except where the inflammation is connected with puerperal fever, the great majority of the cases recover; although where suppuration takes place, the restoration to health will be very slow.

Symptoms.—Occasionally, this disorder comes on insidiously; so that its existence is not suspected, until there is found considerable swelling about the pelvis or the lower part of the abdomen. But much more commonly there is marked constitutional disturbance at the onset; the pulse rises in frequency, and the countenance becomes anxious; while there is more or less fever, headache, loss of appetite, restlessness at night, with local pain and throbbing and tenderness. An aching of the limbs is often complained of; there may be frequent or difficult micturition, or attacks of tenesmus, according as the tissue in front of or behind the vagina is involved; and in some of the instances which have been under my care there has been very troublesome irritability of the stomach, inducing frequent vomitings of fluid or mucus tinged with bile. At the end of about forty-eight hours, a proper examination will almost always detect the presence of some painful swelling. If the tissue of the broad ligaments be the part inflamed, this swelling may be perceptible at the lower region of the abdomen; but if the morbid action be confined to the vesico-vaginal, or to the recto-vaginal septum, an internal examination must be made to discover it. This tumefaction is probably the result of œdema of the areolar tissue.

Supposing that the inflammation runs on to suppuration, the general symptoms will be found to increase in severity; there will be one or more rigors, often slight; the throbbing and tenderness become very great; neuralgic pains extending down the thigh of the affected side are complained of; and fluctuation will perhaps be detected in the tumor. After a time, the wall of the abscess may often be felt to be getting thin at one point; indicating the situation at which the contents will probably be evacuated. Although the pus is generally discharged into the upper part of the vagina or into the colon or rectum, yet very rarely it makes its exit into the peritoneal cavity (setting up severe, but not necessarily fatal, peritonitis), or it is discharged into the bladder, or it burrows and makes its escape externally. Where the abscess opens into the vagina or rectum, the sac may become obliterated and the patient soon get well. But, unfortunately, in not a few instances the matter is re-secreted, to be once more discharged at the same spot as before; this process being repeated again and again, until the health becomes much reduced. Nevertheless, steady perseverance with proper remedies may at last effect a cure; so that in no instance of this kind should the patient or the practitioner despair. The most troublesome cases to manage are those where the pus burrows, and escapes at different times by different openings. In such, very obstinate sinuses remain, which are healed with great difficulty; while if they communicate, as they ultimately may, with the bladder and rectum, a distressing state of disease will result. In this way there may be fistulous openings about the anus, vulva, groins, or lower part of the abdomen; through all of which offensive pus and urine and fluid fæces will be discharged. If one or two of the wounds close, they generally only do so for a time; or if we succeed in firmly healing some of the sinuses, it will probably be at the expense of aggravating the others. A lady who was under my care for

nearly two years with small abscesses which burst into the rectum every six or eight weeks, unfortunately became pregnant before a thorough cure could be effected. The consequence was the formation of a large quantity of pus, which burrowed about the loose areolar tissue in all directions; while her sufferings became so great that it became necessary to induce premature labor at the seventh month. Great relief followed the birth of the child, and under the influence of sea-air and tonics, &c., the health improved considerably; but the sinuses never showed any disposition to heal, while the abundant irritating discharges which were poured from them, produced, at length, fatal exhaustion.

Diagnosis.—Pelvic cellulitis is only likely to be confounded with ovaritis, extra-uterine pregnancy, and pelvic hæmatocele. From the first it may be distinguished by remembering that in cellulitis the swelling is more extensive, and the pain much less: there is great difference between the loose areolar tissue, and the unyielding and firm fibrous capsule of the ovary. Ovaritis, moreover, very rarely ends in suppuration.—In extra-uterine fœtation the symptoms come on very gradually, the catamenia are usually suspended, the breasts enlarge and the areolæ darken, while if the gestation be advanced the fœtal heart will be heard. The abdominal pains are severe, but they come on irregularly, continue only a short time, and then temporarily cease.—Pelvic hæmatocele produces suddenly a soft and comparatively painless tumor, without fever, and without heat and swelling of the vaginal walls. Local peritonitis sets in subsequently. The hemorrhage often occurs at a catamenial period. The symptoms generally point to depression from loss of blood, rather than to inflammatory excitement. Sometimes the blood which is poured out undergoes a kind of suppuration, and then there will be all the indications of a pelvic abscess.

Treatment.—In the early stages, when there is a hope that the inflammation may end in resolution, the practitioner should beware of resorting to very active treatment. The mischief will probably be increased by the use of general bleeding, or strong purgatives. But if the pain and throbbing be very distressing, a few leeches may be applied to the lower part of the abdomen, or around the anus, or even to the seat of fulness in the vaginal wall; while a dose of some mild aperient may be administered if the bowels have become confined. The remedies, however, in which I have the most confidence are,—the application of linseed poultices or fomentations, the use of vaginal pessaries containing mercurial ointment and extract of belladonna (F. 423), with the employment every eight or twelve hours of the officinal opiate enemata. If there be much abdominal tenderness, relief will be more effectually given by covering the part with a mixture of the extracts of belladonna and poppies (F. 297) and a linseed poultice, than by simple fomentations. Hot hip baths, with hot water vaginal injections, are very soothing and agreeable; but the patient should keep as quiet as possible in the recumbent posture, while the bath and injection require more exertion than can well be borne during the acute stage of the inflammation. Support must be given in the shape of milk, eggs, arrowroot, beef-tea, &c.; while any irritability of stomach which may be present will be best relieved by the application of a sinapism over the epigastrium, and by allowing a free supply of Wenham Lake ice.

Where the disease advances to suppuration, wine and tonics will be

required in addition to the foregoing. No remedy is better than ammonia and bark (F. 371), for which quinine and one of the mineral acids (F. 379) may subsequently be substituted. Directly the stomach appears strong enough to digest animal food, we should allow mutton, poultry, or game. Some authorities assert that the abscess is never to be opened, but that it is to be allowed to burst spontaneously. My own experience leads me to acquiesce in the soundness of this principle, unless the pus is evidently near the external surface,—as when there is pointing in one or other groin, &c. There are also many arguments which can be adduced in favor of the practice of non-interference. Especially it may be mentioned that in these cases the mutual relation of the pelvic viscera gets altered in proportion to the amount of swelling; the abscess may seem to point, and yet an incision at this site may fail to reach the matter; while even by a successful puncture, we cannot always prevent the formation of a counter opening into the peritoneum or bladder. Moreover, when a part of the wall of the abscess has thinned to such an extent that an opening may safely be made, it is still probable that Nature will complete her work in a more satisfactory manner than we can accomplish with the bistoury or trocar; while when the opening forms deliberately it will be less likely to heal too rapidly than an incision or puncture.—With the object of preventing the reformation of the pus, after the contents of the abscess have been evacuated it would seem advantageous, theoretically, to resort to pressure. To apply this efficiently, however, is by no means an easy task; while frequently there is so much tenderness that no pad and bandage can be borne. I have tried more than once to fit an India-rubber bag, filled with air, just above the pubes, maintaining pressure by means of a kind of truss-spring; but the apparatus could only be worn for a few hours at a time, and no benefit resulted.

VI. PELVIC HÆMATOCELE.

Within the last few years, the fact that an effusion of blood may take place into or beneath the peritoneum in the immediate neighborhood of the uterus has attracted much attention; the tumor so produced being spoken of as *retro-uterine*, *peri-uterine*, or *pelvic hæmatocele* (*Αἷμα*, blood; *κήλη*, a swelling). In France, especially, many valuable essays have been published on this disease since the year 1850; while to Dr. Tilt we are indebted for having, towards the end of 1852, first brought the subject before the profession in this country.

Causes.—Any condition which interferes with the normal performance of the menstrual function, and especially such as impedes the due discharge of this secretion, must be regarded as a prominent cause of pelvic hæmatocele. Hence this accident almost always occurs at a catamenial period; while it is most common about the age of 30, when the sexual organs are in their greatest vigor. The sudden suppression of the monthly flow, excessive mental excitement or bodily exertion during the period, and external injuries, are likely to induce the form of hemorrhage under consideration. Dr. J. Byrne, of New York, believes that

in 80 per cent. of the cases there will be found unmistakable evidence of ovaritis; which in time produces a varicose condition of the vessels, possibly softening of the tissues, a modification of the nervous stimulus, and ultimately rupture with extravasation.

Pathology.—The disease consists of an effusion of blood into the peritoneal pouch between the uterus and rectum, or into the sub-peritoneal tissue behind and around the uterus. The latter is the least dangerous form, as the effusion is generally small; and therefore it may be wrong to infer that it is by no means of such frequent occurrence as the first kind, because post-mortem examinations rarely show its presence. According to M. Bernutz it is only met with during pregnancy, or the puerperal state; but this opinion has not been confirmed by other observers. In the former or intra-peritoneal variety, the blood has been discharged so abundantly as to fill the entire abdominal cavity; or it may be limited to the recto-uterine cul-de-sac, being generally confined there by the effusion of coagulable lymph with the formation of adhesions. Hence the danger is greater in the non-encysted than in the encysted cases.

The blood may be poured out from various parts. Thus, it may escape from the ovary at the time of menstruation if this organ be diseased, or if it be the seat of inordinate congestion. It may come from one of the Fallopian tubes owing to rupture of its wall, or in consequence of a so-called sanguineous exhalation from its mucous lining, or as the result of a retrograde flow from the interior of the uterus when the os uteri is obstructed. Rupture of one or more of the vessels of the utero-ovarian venous plexus has been its source. Hemorrhagic peritonitis will perhaps produce it. And, lastly, the effusion may be one of the effects of a general and excessive congestion of the reproductive organs, such as is the cause of some forms of menorrhagia.

Symptoms.—The symptoms will vary according as the escape of blood is large or small.—If the flow be excessive, there will be indications of nervous shock, as well as of exhaustion from internal hemorrhage. The patient is suddenly seized with acute pain in the lower part of the abdomen; while there is chilliness or shivering, coldness of the extremities, vomiting, increasing feebleness of the circulation, and a ghastly expression of the countenance. The suffering resembles that produced by rupture of one of the abdominal viscera. Death usually occurs in the course of two or three hours.

In a second set of cases the loss is great but not inordinate. There is violent abdominal pain, sickness, and chilliness followed by fever. The face becomes pinched and pale, and the countenance anxious; while sometimes, but by no means always, there is either difficult micturition with a frequent desire to empty the bladder, or a painful irritability of the rectum. If the catamenia be present at the time of attack they may suddenly cease, or the flow may continue unaltered. On examining the lower part of the abdomen, a smooth and elastic swelling will be found in the hypogastric or iliac regions; while on introducing the finger into the vagina, a large tumor will be felt projecting into this canal. If the finger be passed onwards, the cervix will be discovered drawn upwards behind the symphysis pubis; but we shall not be able to trace the body of the uterus, stretching backwards, as in cases of retroversion. On examining per rectum, the passage of the gut will be

found more or less obstructed by the swelling which has been previously detected in the vagina.

The symptoms presented by a third class of cases resemble the foregoing, save that they are less acute. No tumor may be detected, however, by an abdominal examination, though a well-marked vaginal swelling will be present. Most of these cases do well; although there is a fear of the peritonitis which ensues extending upwards, or of a second attack of hemorrhage setting in just as recovery is taking place from the first seizure.

Diagnosis.—As the recognition of this disease is a matter of recent date, it follows that the symptoms it produces must formerly have been erroneously attributed to other disorders. Cases illustrative of such mistakes, occurring since 1850, have been recorded: while probably before this time practitioners prided themselves on the correctness of their diagnosis when they classed examples of this affection under the heads of dysmenorrhœa, or of anæmia, or perhaps of those convenient refuges for the destitute—spinal irritation and hysteria.—The chief diseases with which pelvic hæmatocele may be confounded are,—pelvic abscess, extra-uterine fœtation, retroversion of the gravid uterus, fibroid tumors of the uterus, and ovarian cysts.

Considerable difficulty will often be experienced by the most painstaking physician in distinguishing between pelvic abscess and an effusion of blood; for in each there may be local peritonitis, constitutional disturbance, and a pelvic tumor. But the peritonitis sets in after the formation of the tumor in hemorrhage, instead of preceding the suppuration; while the heat and tenderness about the vaginal walls are much less in the former than in the latter. Nevertheless, where the history of the case fails to throw light upon its nature, and it seems necessary to be exact, the diagnosis must be established by the use of a fine trocar and canula; just as we employ the exploring needle in doubtful growths at the surface of the body.

In extra-uterine fœtation the practitioner is seldom consulted until the fœtus has acquired such a size that its presence can be determined; unless indeed rupture of the cyst takes place, when hemorrhage occurs, and the case as regards treatment may be mistaken for hæmatocele without any injury to the patient.

In retroversion of the uterus, the position of the os uteri under the pubes, and the possibility of tracing the body of the uterus thrown backwards, point to the nature of the accident.—It would seem impossible to mistake a solid fibroid tumor of the posterior wall of the uterus for a blood-coagulum, did we not know that in one instance an eminent surgeon made free incisions to enucleate a supposed fibroid, and only discovered his mistake too late; while on another occasion, the autopsy disclosed the hæmatocele, though the case had been lectured upon as affording a good example of a common uterine tumor. An ovarian cyst could only be mistaken for a blood-swelling, if the former were small and were confined by adhesions to the peritoneal pouch between the uterus and rectum. An exploring needle would remove all difficulty, if interference were demanded.

Terminations.—The patient may die from nervous shock, or from the loss of blood, where the hemorrhage is great, or where one attack of bleeding is followed by a second.—The effused blood may become ab-

sorbed, and complete recovery follow.—The blood may fortunately be discharged into the bowel, and escape per anum.—It has been suggested by Dr. Willoughby F. Wade, of Birmingham, that a cure is sometimes effected by the effused blood finding its way through the Fallopian tubes into the uterus, and so into the vagina; and he thinks that in those cases where it has been supposed that the escape has been by a rupture of the vaginal wall, that in reality the blood has passed along the oviduct.—The blood-cyst and its contents may undergo suppuration; recovery perhaps ensuing after protracted suffering and the discharge of sanious pus by the rectum, or death taking place from exhaustion.—And, lastly, the patient may die from the peritonitis which is set up by the effusion, especially where the inflammation spreads and involves the whole serous membrane.

Treatment.—In those formidable instances where the patient is apparently dying from the loss of blood, the only hope of success is from the free exhibition of stimulants, full doses of opium,* the use of sinapisms to the extremities, and the application of bladders of ice to the lower part of the abdomen and the vulva.

But fortunately these terrible cases are comparatively rare, and there is time to give the patient the benefit of a well-directed line of treatment. The most perfect repose in the recumbent posture must be enjoined, however slight the effusion may at first appear; opium is to be administered, in doses sufficient to prevent faintness, as well as to relieve the pain; ice should be continuously sucked to stop the vomiting, while a sinapism may be laid over the epigastrium; and if we fear that the bleeding is continuing, cloths wrung out of cold water are to be laid over the lower part of the abdomen. If there be any difficulty in emptying the bladder, the catheter is to be employed; but unless the rectum be blocked up with fecal matter it will be better not to administer any aperient. With regard to the necessity for surgical interference, opinions differ widely. It seems to me, however, quite certain that if the case be progressing favorably, it will be wise to leave well alone; for it is safer, by gentle means, to do all that can conduce to a sure though slow recovery, rather than to risk the patient's life by any attempt at a rapid and brilliant cure. The effused blood will in most instances gradually be absorbed, just as certainly as we find those sanguineous tumors disappear which are occasionally developed between the bones of the skull and the pericranium in new-born infants. At the same time, if the

* The influence of opium in arresting hemorrhage and in sustaining life, when death seems imminent from loss of blood, is admirably described in an essay by Dr. W. Griffin (Medical and Physiological Problems, &c., p. 201. London, 1845). The writer shows that after severe uterine hemorrhage, when the countenance is sunk, the eye hollow and glassy, the lips blanched, the skin cold, the heart-beat scarcely perceptible, and the whole person corpse-like, when brandy or rectified spirits are vomited or have no influence, there is still one remedy capable of restoring life, and that is opium. Death from hemorrhage is not so much owing to mere debility of the heart's action, as to loss of nervous power in the brain consequent to it. The opium stimulates the heart, while it restores a sufficient degree of tension in the vessels of the brain to prevent faintness. But this drug must be given fearlessly, and in conjunction with warm wine or brandy. In extreme danger five grains of opium should form the first dose; while two or three grains may be repeated in an hour, and again as necessity arises, until the pulse becomes distinct, the breathing easier, and the tossing or flinging about in bed is allayed.—It is a singular fact that in similar states of debility, induced by acute or chronic disease, or by other causes than hemorrhage, opium is useless.

symptoms produced by the pressure of the blood are very distressing, and are causing increasing prostration, it may be advisable to puncture with a trocar the most prominent part of the tumor, either through the vagina or rectum. Sometimes it has been of advantage to leave the canula in the wound, or to introduce a gum-elastic catheter, so as to prevent too early cicatrization; while several authorities recommend the frequent injection of small quantities of tepid water to prevent putrefaction of the retained clots,—a proceeding, however, which I should be loath to adopt. But whether an operation be performed or not, the treatment of pelvic hæmatocele, after the subsidence of the acute symptoms, ought to consist in the administration of bark with one of the mineral acids, in carefully avoiding exercise or excitement at too early a period, and in the use of a very nourishing diet. Especially should the patient's condition be watched at the two or three succeeding monthly periods, so as to guard against any undue congestion of the sexual organs.

VII. DISEASES OF THE UTERUS.

In this country, the great majority of women begin to menstruate between the 14th and 16th year, the time at which this phenomenon is manifested being spoken of as the age of puberty. For rather more than thirty years the flow recurs every twenty-eight days, calculating from the beginning of one period to the commencement of the next; while the duration of each period varies from three or four to seven days. Between the age of 45 and 48 years, the discharge finally ceases, —known as the last menstrual climacteric, or the change of life. Now during these years which intervene between the age of puberty and the change of life, there are few diseases of the generative system which are not attended with more or less disturbance of the catamenial functions; and hence either deficient, or painful, or profuse menstruation may become an important symptom of local change of structure. Independently of this, however, disordered menstruation may depend entirely upon a constitutional disease, the generative organs being healthy; while again, some cases are met with where the uterine organs appear healthy and the general health good, and yet there is some imperfection in the manner in which the menstrual functions are performed.

As just mentioned, the period of sexual vigor—that in which woman may be said to be in a fit condition for childbearing—lasts for some thirty years. During this term, the female system, both in health and disease, becomes considerably modified by the performance of the function of menstruation; and therefore in treating either the general or the peculiar disorders of women this circumstance should be borne in mind. And it can easily be understood, that if this is the case when the catamenia appear naturally and regularly, how any disturbance of this process will probably give rise to a troublesome complication. The effect of the menstrual molimen is felt by the whole system; but especially does it influence the uterine and ovarian organs when diseased, often proving a source of trouble in attempting to cure these affections and rendering them tedious.

1. Amenorrhœa.—Three distinct classes of amenorrhœa (Ἀ, priv.; μήν, a month; ῥέω, to flow) may be described: (1) The cases where no menstrual fluid has ever been secreted. (2) Those where there has been a secretion of the menses, without any evacuation of them. And (3), the menses having appeared naturally, their return has become interrupted; or they have been prematurely suppressed.

The *first* form of amenorrhœa is not very often met with. In some cases there has been no menstrual secretion because the patient has not reached the age at which the discharge will appear with her. For although the age of puberty mostly occurs between the 14th and 16th year, yet in many instances this does not happen until two, three, or four years later. Of course such cases are no more to be considered as examples of absent menstruation, than is the occurrence of late dentition in infants to be regaded as a disease.

But when a female has reached adult life, when her frame has assumed the character of womanhood, when she is not chlorotic, and when all her organs (save the sexual) perform their functions naturally, then a cause for the absence of the flux should be looked for. Most frequently there will be found some congenital malformation. The ovaries are perhaps absent; or, as more frequently happens, they retain their rudimentary condition,—that is to say, they would be found, if they could be seen, to present scarcely a trace of Graafian vesicles. Or these glands may exist and the uterus be absent, or so imperfectly developed as to be useless.

Occasionally the most complete examination may fail to detect anything wrong with the uterus or ovaries. This is the case in a patient who has been under my care since February, 1855. At the present time (February, 1865), she is thirty-six years of age, robust, and apparently healthy, and has been married thirteen years. The catamenia have never appeared; there is no sexual appetite; and there has never been any pregnancy. Yet the external organs of generation are fully developed, the vaginal canal is healthy, while the uterus is of normal size and movable and naturally placed. The uterine sound passes readily for 2½ inches; and I have attended her for attacks of ovaritis, in which the enlarged glands could be distinctly felt through the vagina. About every six or eight weeks—less frequently now than formerly—there is a menstrual effort; severe pelvic and abdominal pains setting in, with considerable gastric irritability, and continuing in spite of narcotics for three or four days. Sometimes, but not always, these attacks are followed by a leucorrhœal discharge;—a discharge which many might term a vicarious menstruation.

Although it is most important for the well-being of women that menstruation should take place naturally, yet it must not be forgotten that the sanguineous discharge constitutes only a part of the process. It cannot be doubted that the uterus and ovaries may be healthy, that a mature ovule may be discharged monthly from a Graafian vesicle, and that the ovule may enter the uterus, while yet there may be no flow of blood from the uterine mucous membrane. The fact of pregnancy occurring in cases where there has never been any sanguineous loss, must be regarded as a proof that this latter part of the menstrual phenomena is not indispensable to the regular accomplishment of the generative

functions. Equally true is it, that an excessive flow of blood towards the sexual organs may produce hemorrhage, without the occurrence of ovulation. I believe that not a few of the examples of very early menstruation which have been recorded, have been nothing more than cases of uterine hemorrhage; the discharge having had no more connection with menstruation, properly so called, than if the bleeding had taken place from the nose.

In the *second* variety of amenorrhœa there has been a secretion of the menses, but no evacuation of them. Cases of this kind have already been spoken of in the section on occlusion of the vagina. But this canal may be healthy while the os uteri is imperforate; owing to which condition the menses will accumulate in the uterine cavity, the latter gradually enlarging as in pregnancy. Now in examining these cases, care must first be taken to ascertain that the patient is not really pregnant; for the uterine orifice may have become closed from the occurrence of inflammation and ulceration after fecundation has occurred. Several examples of complete occlusion from this cause have been recorded; the inflammation having been sometimes excited by attempts on the part of ignorant persons to produce abortion, or by the use of caustics to heal ulcerations upon the labia. Moreover, disease may be set up in the cervix by a difficult labor; and then intercourse taking place before cohesion of the sides of the os uteri has happened, pregnancy has followed while the disease has also progressed.

Supposing, however, that the diagnosis is clear, and that there is a menstrual accumulation, an outlet for the latter must be made. When the os is merely closed by a membrane, this structure may be incised with the bistoury, or it can perhaps be ruptured by the uterine sound. Generally, the occlusion is more perfect; and then, if it be possible to detect any spot or dimple, where the orifice should naturally exist, it will be advisable to carefully perforate this part with a proper trocar and canula. As the menses drain away, and for some time subsequently, care must be taken to prevent the opening thus made from closing; and this is to be done by daily using a bougie, or by occasionally introducing a small sponge or sea-tangle tent (F. 426). Moreover, if the uterus be large, a compress and binder should be applied to the abdomen directly after the operation. On the other hand, a puncture may be made and yet the fluid may not be reached, or the case may not appear a proper one for such a line of practice. Under these circumstances, in order to prevent rupture of the uterus, this organ will have to be opened through the rectum, with the precautions already (p. 581) noticed.

There remains to be considered the *third* and by far the most common form of amenorrhœa; viz., that in which the flux having been properly established, and having appeared regularly for a longer or shorter time, becomes prematurely arrested.

This form of suppression may occur suddenly, while the discharge is on, owing to some mental shock, or to the setting in of some fever or other acute disease, or exposure to damp or cold. On the other hand, it may take place gradually,—that is to say, without any apparent cause, the menses may not come on at the expected time, though they were natural at the previous period; or the flow may become less and less for several periods, and then entirely stop. There is usually more con-

stitutional disturbance in cases of abrupt or acute, than of chronic suppression; but the latter is most to be feared, as it is generally indicative of a more serious cause. In almost all cases of phthisis, occurring in women during the period of sexual vigor, there is disturbed menstruation. Sometimes, as the disease is setting in, I have had to use astringents to check an excessive flow; but as a rule, the history is that of a gradual lessening of the secretion, until by the time that the tubercular deposit has begun to soften there is complete amenorrhœa. The same course of events may be noticed, though less constantly, in affections of the kidney producing albuminuria, and in many other diseases which tend to induce anæmia. Moreover, inflammation of the ovaries or uterus may inflict so much structural mischief as to stop menstruation. And lastly, the occurrence of suppression in consequence of pregnancy must not be forgotten; nor should we overlook that temporary cessation which sometimes occurs for the two or three periods following upon marriage, and which leads the woman to suppose herself pregnant when the amenorrhœa is only due to excessive excitement.

In the treatment of suppressed menstruation, the mitigation or removal of the cause should be the practitioner's first aim. Then if there be any menstrual effort, this should be encouraged, and if not, attempts ought usually to be made to induce it. Where the prominent symptoms are those of general plethora, much good may be done by administering purgatives, selecting such as will unload the congested liver while they excite the uterine organs. A mixture of nitric acid and taraxacum and senna (F. 147), or of aloes and senna and sulphate of magnesia (F. 150), or of gamboge and aloes and blue pill (F. 174), or of podophyllin and aloes (F. 422), will often serve this double purpose. These medicines should be particularly given as the time for the period approaches; and then if there be no flow, from three to six leeches may be applied to the lips of the uterus by means of the speculum. Hot hip baths, or mustard pediluvia will also deserve trial; while a light and unstimulating diet had better be ordered.

Instead of the system appearing plethoric, however, the indications are much more frequently those of anæmia. Under these circumstances, the general health is to be improved; and no drugs are generally more useful than those which contain some preparation of steel. The patient is on no account to be purged; but if there be constipation a daily evacuation may be procured by giving steel in combination with aloes (F. 154, 393, 404). Stimulating diuretics sometimes prove serviceable,—particularly the spirit of nitrous ether, and the spirit of juniper or common gin. The other remedies deserving of recollection are the iodide of iron (F. 32), savin and steel (F. 421), oil of rue and ergot (F. 422), stimulating foot-baths, galvanism, &c. The use of the waters at Spa (F. 467), Ems (F. 486), Schwalbach (F. 488), Eger (F. 498), &c., may also be recommended under certain circumstances. The diet ought to be nourishing, care is to be taken that the food is properly assimilated, and wine or beer must often be allowed.

With regard to those cases where the suppression is a part only of some severe disease—*e. g.* phthisis—attempts to bring back the discharge will only prove injurious. It has always seemed to me that the cessation of the flow in such cases is really conservative; while its spon-

taneous return may be taken as evidence of a general tendency towards improvement.

2. Dysmenorrhœa.—The woman who enjoys perfect health not only menstruates regularly, but she does so free from any suffering. There are very few, however, who pass through the whole period of sexual vigor without more or less frequently having to endure an attack of dysmenorrhœa (*Δυς*, difficulty; *μὴν*, a month; *ῥέω*, to flow). Some few females experience great pain with each flow, from the commencement of puberty until the change of life; while in others, pain is only an exceptional accompaniment. Three distinct varieties of dysmenorrhœa have to be considered,—viz., the neuralgic, the congestive, and the mechanical.

1. *Neuralgic dysmenorrhœa* seems most frequently to afflict young nervous women, in delicate health at the time of puberty; or it comes on after some ten or twelve years of painless menstruation, especially in those who have never been pregnant.

The suffering usually commences a day or two before the period, with a feeling of malaise, headache, and pain about the sacrum and lower region of the abdomen. The upper and inner parts of the thighs become tender, the surface of the abdomen feels sore, and a sense of weight or bearing down about the pelvis is complained of. If the discharge then comes on at all freely, relief is generally experienced; but more commonly there are only slight gushes, or the flow is scanty, and the suffering becomes so severe that the patient is obliged to keep in the recumbent posture. If she obtain a few hours' ease, she is in fear of the pain returning; experience having taught her that a short respite may be followed by a violent paroxysm. It is probable that the ovaries are more the seat of this neuralgic pain than the uterus; though the bearing down may be due to the irritability of the os and cervix uteri, being analogous to that troublesome straining and frequent desire to go to stool which is so constantly present in diseases of the rectum. On making a vaginal examination, during the intervals, only negative information will be obtained. The parts are neither swollen nor hot, and even on pressing about the ovarian regions little or no tenderness may then be complained of. The effects upon the system are seldom well-marked. Yet the patient without being ill can scarcely be said to be well. She is sometimes hysterical, is apt to suffer from flatulence and constipation, has frequent attacks of headache, is chilly, and often labors under fits of mental depression.

The cure of neuralgic dysmenorrhœa is almost always tedious. To relieve the pain just before the flow comes on, the hot hip bath should be employed; the patient remaining in it for from thirty to forty-five minutes. The addition of an ounce of carbonate of soda with the same quantity of extract of poppies to the water, renders it more soothing; while this good effect may be best kept up by the use, immediately afterwards, of a pessary of oxide of zinc and belladonna (F. 423). Where the pain continues severe, some other narcotic will also be needed; and recourse may be had to a mixture of Indian hemp and ether, &c. (F. 342), or to one or two grains of the extract of opium with a glass of hot gin and water, or to the hypodermic injection of morphia (F. 314).

In the intervals between the periods the general health must be improved, and the nervous system strengthened. Such tonics as bark and phosphoric acid and aconite (F. 376), quinine and one of the mineral acids (F. 379), salicin with some bitter infusion (F. 388), or the hypophosphite of soda and sumbul (F. 419), often prove very serviceable. Cod-liver oil (F. 389) is frequently useful. If there be constipation, mild laxatives may be prescribed,—compound rhubarb pill, the effervescing citrate of magnesia, a teaspoonful of taraxacum juice in a tumblerful of cold water, or simple enemata. A cupful of chamomile tea, early every morning, not only acts as a tonic and stomachic, but will probably also serve to keep the bowels regular. The diet is to be nourishing, milk or cocoa being substituted for tea and coffee: a little wine, or weak brandy and water, or bitter ale, may usually be allowed. In married women, it is better to forbid sexual intercourse; while if there be persistent tenderness about the ovaries the belladonna pessaries already recommended should be used every night, or every other night, during the whole interval.

2. *Congestive dysmenorrhœa* generally occurs at a later time of life than the neuralgic form. The suffering commences four or five days before each period with backache, weariness and restlessness, and a sensation of weight about the pelvis. Frequently the patient also suffers from hemorrhoids, she is annoyed with repeated flushings, and there is often severe throbbing pain about the uterus. The discharge comes on very gradually; and as for the first day or two it is usually scanty, so it fails to relieve the suffering. But when the flow becomes more abundant the distress gets mitigated; though there are often paroxysms of pain, as small clots and shreds of membrane get expelled from the uterine cavity. These shreds of membrane are of variable size; occasionally consisting of large flakes, and at other times of small pear-shaped sacs, which constitute casts of the cavity of the uterus. They are smooth and polished on their internal, and rough and villous on their external surface; their continuity is broken at certain parts, showing where the orifices of the os uteri and Fallopian tubes have existed; and they consist of the epithelial lining of the uterus, being analogous to the decidua. The epithelial coat of the vagina is sometimes thrown off under the influence of inflammation, as has been previously mentioned (p. 585).

If a vaginal examination be made during the interval, the cervix uteri will generally be found congested and tender, the lips are often excoriated, and there is pain on pressing the ovaries. There is usually an abundant and tenacious leucorrhœal discharge. Sometimes also there is uterine displacement; the bladder or the rectum being irritable according as the organ is anteflexed or retroflexed. In other instances the uterus is merely found lower in the pelvic cavity than it should be, owing to its being heavier than natural. Frequently the breasts swell and become very tender; the tumefaction and pain increasing as each period approaches, but never entirely subsiding during the interval.

The remedies recommended for the relief of the pain in neuralgic dysmenorrhœa seldom fail to afford considerable alleviation in the form under consideration; but where they seem inefficient, and when the discharge does not come on at the proper time, the application of three

or four leeches to the lips of the uterus will be serviceable. Not unfrequently I have been able greatly to mitigate the suffering by scarifying the œdematous uterine lips directly the increased uneasiness and pain have indicated that the period is approaching.

During the interval attempts must be perseveringly made to effect a cure. The patient should live plainly, avoiding stimulants. She should take out-of-door exercise without inducing fatigue; but long country walks, dancing, and riding on horseback, are to be forbidden. So long as dysmenorrhœal membranes come away, pregnancy is scarcely possible; and in such it is always better that sexual intercourse be avoided. As helping to produce a more healthy condition of the uterus and ovaries, while relieving the backache and bearing-down and the vesical or rectal irritability, I would recommend the steady employment of the iodide of lead and belladonna pessaries (F. 423). And then, if the disease be associated with the gouty or rheumatic diathesis, or if it have its origin in a syphilitic taint, as I am sure it may, the proper remedies for these affections must be resorted to. It is in such cases especially that warm sea-water baths, colchicum, iodide of potassium, cod-liver oil, and mercurial vapor baths succeed in restoring health, when other remedies have failed, and the patient has almost become disheartened.

3. *Mechanical dysmenorrhœa* is that form in which there is a stricture of the internal orifice of the uterus, or a narrowing of the whole canal of the cervix; or the external os uteri is small and contracted; or there is some uterine tumor; or there is a malposition of the uterus, such as retroflexion or anteflexion.

On the present occasion, I shall only treat of those cases where the dysmenorrhœa is due to stricture of the internal or external os, or to narrowing of the entire cervical canal. And believing as I do, that this variety of painful menstruation is far from uncommon, that it gives rise to very considerable suffering at the periods, that it is one of the most frequent causes of sterility, while at the same time it is very amenable to proper treatment,—believing all this, I shall not distract my readers with the different opinions which gentlemen entertain on these several points. For here, as in other departments of uterine pathology, there is much disagreement; the views of obstetric physicians as to the proper management of many of the cases which fall under their observation varying as widely, as we find those of other practitioners to do when they speak of the treatment of acute inflammation, of the use of stimulants, of glaucoma and iridectomy, of stricture of the male urethra, of the resection of joints, or even of the comparative value of lithotomy and lithotrity.

The symptoms produced by contraction of the cervical canal are such as indicate an obstruction to the escape of the menstrual fluid. There is usually a scanty flow; often the discharge escapes in gushes, instead of oozing drop by drop through the os uteri, each gush being preceded by bearing-down and accompanied by an expulsive pain: while there is always severe backache, often irritability of the bladder, and frequently congestion with tenderness of the ovaries. The narrowing may either be congenital, or it may be the result of an attack of endometritis. On making an examination, the os uteri will be seen very small, perhaps not larger than a common pin's head; or it may be of the natural size,

the stricture only existing at the internal os, through which the uterine sound cannot be introduced without considerable difficulty. Sometimes the contraction is so great that we are unable to pass the sound at all, or it can only be made to enter for about an inch or less. In such cases we must either wait for the end of a menstrual period, or relax the tissues by the application to the uterine labia of three or four leeches, before again using this instrument.

The treatment required in these cases consists in so permanently widening the cervical canal that the menses may pass away easily. The question is, how to do this efficiently and with the least risk? Many physicians recommend gradual dilatation,—either by bougies, sea-tangle, or sponge-tents, or by the introduction of instruments with expanding blades which are specially made for the purpose. Now there is one great objection to this practice,—not that it is painful, for all local interference causes more or less suffering; not that it is apt to be followed by pelvic cellulitis, for there is a liability to this in whatever way the uterus may be handled,—but that it does not effect a permanent cure. For to whatever justifiable extent the stretching may be carried, the contraction will certainly return; unless, indeed, pregnancy should fortunately occur directly the course of treatment is over. If we take a piece of Indian-rubber, shaped and perforated down its centre so as to resemble the uterus, and then daily introduce a bougie along the roughly-made passage, leaving the instrument in for ten or fifteen minutes on each occasion,—we shall succeed in forming, by the end of a month, just as large a canal as we can do in the case of the cervix uteri by the same means. A piece of caoutchouc does not more certainly contract after extension, than does the fibro-muscular structure of the nulliparous uterus. It has happened to me to have to dilate, with sponge-tents, a virgin cervix for the removal of an intra-uterine polypus. Six weeks after the extraction of this growth, which was the size of a small orange, the contraction of the cervix was so great that the sound could be only introduced by employing a little force; although there had been no evidence of inflammatory action, and the cure had been effected without an untoward symptom. But I might speak nearer the mark, and adduce instances where I have perseveringly tried dilatation in these cases of contraction, and where the result has been most disappointing to the patient and myself. Suffice it, however, to say, that nothing which I have read, and nothing which I have done, can lead me to advocate this practice.

Some years since (about 1847) Dr. Simpson recommended the incision of the narrowed uterine canal by means of the hysterotome. Of course, this operation has been deemed perfectly unjustifiable, and sad pictures have been drawn of the results which have followed its employment. Nevertheless, among the many improvements in practice which we owe to Dr. Simpson's great skill, I believe there are few for which we ought to be more grateful than for this. The hysterotome invented by this gentleman is well known. It is indeed only a concealed knife, the sharp edge of which can be made to protrude to a regulated extent by pressure upon a spring; but as there is only one blade, it has to be applied first to one side of the canal and then to the other. In using it there is a fear also that the incisions may be made too deeply, and hence that severe hemorrhage may arise from wounding the circular arteries which

are found in the neighborhood of the internal os. To obviate these inconveniences, a very ingenious curved double-action hysterotome has been constructed by Mr. Coxeter, under the direction of Dr. Routh; and I have pleasure in saying that this instrument answers its purpose admirably. The blades are protected, so that the instrument is introduced like the uterine sound, passing it upwards until the lips of the os rest upon the broad shoulder; and then by pulling down the handle from the sheath, the blades are made to open and expand, producing a limited and uniform cut surface as they descend.

The way in which, then, I now treat these cases of contraction is as follows: The patient is placed upon her left side, in the ordinary position for labor, with her legs drawn up and the body curved. The bowels have been previously well acted on. Chloroform is seldom needed. The hysterotome is introduced, without the speculum, the incisions made, and the instrument withdrawn. Having been taught by experience that severe bleeding is apt to follow this operation, I next introduce the speculum; through which I first pass a long strip of oiled lint completely up the whole length of the cervix, and then push up pellets of cotton-wool into the vagina so as firmly to plug this canal. I believe that this plugging is thought unnecessary by Drs. Simpson and Routh, but I certainly do not feel justified in abandoning it. The only inconvenience which results from its employment is, that micturition is sometimes impeded, so that the catheter has to be employed. The plug, so introduced, is usually left undisturbed for forty-eight hours; and then, after its removal, I insist upon the strictest quiet being maintained, not even allowing the patient to sit up in bed, lest hemorrhage should come on. The following day I introduce the uterine sound, well covered with lard; for it must be remembered that no operation will answer in these cases unless we adopt measures to keep the incisions open. After thus using the sound on two or three days I introduce a slight and curved uterine stem which has been made for me by Mr. Coxeter; and this the patient is allowed to wear, unless it be badly borne, for several weeks. She leaves her bed and walks about while the stem is in the cavity; although of course she is watched at intervals, so as to guard against any attack of inflammation. Very rarely, symptoms of pelvic cellulitis have set in; but the prompt use of hot hip baths, medicated pessaries, and opiates has always checked the mischief. I do not remember having met with any case where the inflammation has gone on to suppuration under these circumstances. Moreover, the operation has never proved directly or indirectly fatal in my hands. I have been thus minute in describing this proceeding partly on account of its importance in regard to the cases under consideration, and partly also because, as will appear further on, it is a valuable operation in some of the other diseases to which the uterus is liable.

3. Menorrhagia.—To the remarks already made on this subject (p. 78) it is only necessary to add that by excessive menstruation we may mean either a more abundant escape than is natural to the subject of it, or a prolonged flow, or a recurrence of the sanguineous discharge at short intervals—sometimes so short that the patient says she is constantly unwell. As a rule, to which there are many exceptions, the first variety depends upon undue uterine and ovarian congestion, set up

by constitutional causes; the second is also caused by some general influence, or it is induced by slight disease of the uterus or ovaries; while the third (more correctly spoken of as uterine hemorrhage) is generally significant of the presence of some tumor or foreign body in the uterine cavity, or of the existence of a polypoid growth which will be found more or less protruded through the os uteri, or of the infiltration of a part of the tissues of the uterus with cancer.

4. Endometritis.—The mucous membrane lining the uterus, like that of other cavities, may be affected with catarrhal or croupy inflammation. Endometritis (*Ἔνδον*, within; *μήτρα*, the womb; terminal *-itis*) is attended with one prominent symptom—a mucous discharge; and hence the disease is sometimes spoken of as *uterine catarrh*, or *uterine leucorrhœa*.

Causes.—Whatever irritates the uterine mucous membrane is apt to set up inflammation in this tissue. Hence the most common cause of endometritis is the too frequent occurrence of pregnancy, especially when one gestation after another ends in abortion. Congestion of the uterus may terminate in inflammation of the lining membrane; and in this way exposure to cold and wet, excessive sexual excitement, &c., must be mentioned as causes. Contact with an unhealthy secretion from the male urethra will often induce inflammation; or vaginitis, however originated, may give rise to it when the morbid action travels upwards. Endometritis occasionally occurs as the consequence of a morbid state of the blood. Thus, it is sometimes a manifestation of a syphilitic taint; it may happen during the course of the eruptive fevers; and it has been also observed in cases of typhus and typhoid fever, in cholera, dysentery, &c. Just prior to the menstrual period a state exists very much resembling that of catarrhal inflammation; and unless there be sufficient vitality to produce rupture of the vessels and the consequent natural discharge, the inflammatory action will very probably persist and uterine leucorrhœa supersede or become vicarious of the catamenia. This is a condition often met with in delicate young women for two or three periods after the first menstruation, constituting the *menstruæ albæ* of old authors; while it is very common in cases of chlorosis, in the anæmic condition which is present during convalescence from severe disease, &c. About the change of life, moreover, a mucous discharge from the uterus not uncommonly takes the place of the menses for a few periods before their final cessation.

Pathology.—The inflammation may be acute or chronic; while it is either limited to the mucous membrane of the cervix, or that of the body of the uterus will likewise be involved. In the acute variety, the whole organ becomes congested. The lining membrane is rendered intensely red, œdematous, and softened; its papillæ become prominent; it is easily separated in shreds or laminæ from the subjacent tissues; and although at first it is unnaturally dry, it soon pours out a thick tenacious discharge, which subsequently becomes muco-purulent and more or less tinged with blood, and which imparts a greenish-yellow or a yellowish-red stain to the patient's linen. In the chronic form there is a condition analogous to that which is seen in chronic nasal catarrh; that is to say, we have an irritable membrane, congested in some parts and excoriated in others, secreting an abundant glairy mucus, resembling

the white of egg. Acute endometritis sometimes runs its course in ten or fifteen days, and the morbid action entirely ceases; but much more commonly it insensibly passes into the chronic form, when a most troublesome and obstinate disorder gets set up.

Symptoms.—In the *acute* variety there are certain general symptoms always present. Thus, we find more or less fever, general irritability, a sallow complexion, and loss of appetite; pain about the lower part of the abdomen, the sacrum, groins, and upper part of the thighs; a feeling of heat and fulness in the pelvis; a sense of bearing-down, which is relieved by the recumbent posture; and a frequent desire to pass urine, this secretion being loaded either with urates or uric acid. At first also, there is often diarrhœa and tenesmus; but in a few days the bowels may become just as much confined as they were previously relaxed. Hemorrhoids are not uncommonly present. The ovaries and uterus are always very tender on pressure, while an internal examination shows that the latter organ is congested and augmented in volume; but when, about the third day, a secretion takes place from the mucous membrane, this tenderness and congestion begin to diminish, while we find the os uteri patulous and the cervical canal dilated.—The chief symptoms of the *chronic* form are the abundant discharge, an obstinate disturbance of the digestive functions, and a slow loss of strength. After it has continued some weeks we may discover a contracted condition of the mouth of the womb.

Now although there is much difficulty in saying where the acute process terminates and the chronic commences, yet it is much easier to ascertain from the symptoms whether the morbid action be confined to the mucous membrane of the cervix, or whether that of the body and fundus be also involved. For in the latter case, the disease not only appears to be more generally severe, but it has a peculiar tendency to set up hysterical or convulsive affections, to induce frequent attacks of nausea and tympanitis, to make the breasts tender and swollen, and to cause menorrhagia. Moreover, in endometritis of the fundus, a digital examination provokes much more abdominal and pelvic pain than is complained of when the inflammation is limited to the cervix; while in the former the introduction of the uterine sound causes much local suffering, and often brings on an attack of hysteria or even an epileptiform seizure. In both, the withdrawal of the sound is followed by a glutinous and often sanguineous discharge, the latter perhaps persisting for two or three days; while also in both forms, ulceration, or at all events, excoriation, is set up about the lips of the womb, probably through the irritation caused by the acrid discharge.

Diagnosis.—The symptoms of acute endometritis are so characteristic that this disease can scarcely be mistaken for any other. After the disorder has been present for some time, in a chronic form, there may be some little difficulty in distinguishing between it and chronic vaginitis. Attention to the remarks made at p. 585 will help to prevent the practitioner from committing any error.

Treatment.—The management of the *acute* form consists in ordering complete rest in bed, a diet of fish and milk and mucilaginous drinks, and in regulating the bowels. At the commencement, a dose of calomel and compound jalap powder (F. 159) often acts very beneficially. A warm hip bath night and morning, where there is no hemorrhage,

should be prescribed; while the injection of hot water with a syphon syringe, as the patient sits in the bath, gives considerable relief. At night, a pessary of mercury and belladonna (F. 423) may be introduced into the vagina; and if there be much tenderness at the lower part of the abdomen hot linseed poultices ought also to be applied. If the symptoms do not appear to yield, and if there be no menorrhagia, the application of from four to six leeches to the lips of the uterus can be recommended. It would seem unnecessary where there is so much pain and tenderness to forbid sexual intercourse; but remembering that women with even uterine cancer will sometimes submit to connection, it is better to be explicit on this head. I have seen patients nearly well from an attack of endometritis, have all their suffering reproduced by sleeping with their husbands. Moreover, the uterine discharges in these cases may excite severe inflammation in the male urethra.

The *chronic* variety runs a tedious course, which it often seems impossible to influence. Frequently, advice is not sought until the disease has existed some time; or perhaps inefficient treatment is adopted, the case being regarded as one of hysteria. Speaking generally, the two remedies from the simultaneous employment of which I have found the most benefit are mercury and cod-liver oil. With regard to the first, we have several preparations to choose from. In very obstinate cases, the green iodide of mercury (F. 53), or the red iodide (F. 54), or even Donovan's triple solution (F. 51), will prove useful; but a course of the corrosive sublimate (F. 27) often suffices, and is usually better borne. Sometimes it has seemed more efficacious to employ iodide of potassium (F. 31), while the mercurial and belladonna pessaries have been introduced into the vagina. It is difficult to explain the action of the cod-liver oil, but of its efficacy I have no doubt. The use of pepsine (F. 420) will often aid its digestion. Where there is evidence of much congestion about the uterus and its appendages, leeches may be applied once or twice a week to the labia; but in the absence of this symptom, local depletion is often more powerful for harm than good. Moreover, when there is anything like menorrhagia leeches are of course unnecessary. The instances in which they prove most useful are those where, with congestion, we find considerable narrowing of the os uteri; but here it is often a better practice to divide the constricted mouth with the hysterotome (p. 604), more especially where the patient is married and is anxious to have children. For it must be remembered, that not only is endometritis a cause of sterility, but by producing constriction of the cervical canal it may render the woman barren after she has been completely cured of the inflammation.

Where the symptoms indicate that the mucous membrane of the body and fundus is involved in the inflammation, I believe that the introduction of remedies into the uterus will only aggravate the mischief. If there be any exception to this rule, it is when the disease has become very chronic and all tendency to convulsive affections has passed off. But in cervical endometritis considerable assistance may often be derived from the application of astringents to the diseased membrane. Hence the solid nitrate of silver may be passed up the canal, or the latter may be swabbed with a piece of cotton-wool dipped in a concentrated solution of perchloride of iron; or a stick of tannin and cocoa butter, or of sulphate of zinc and the same material, or of mercurial ointment

and cocoa butter (F. 424) may be advantageously used. The cases which have been recorded of death from the use of intra-uterine injections, have prejudiced me against the practice of throwing fluids into the uterus; and certainly such remedies ought never to be employed, unless the os uteri be so patulous that the injection can readily flow away while the small tube of the syringe is in the orifice of the womb.

It only remains to add that the diet must be nourishing, animal food and milk and raw eggs being useful. Stimulants need not be forbidden, with the exception of malt liquors. Gentle exercise in the open air does good: a daily drive in an open carriage is especially serviceable. When the discharge has entirely ceased, the necessity for further treatment is generally at an end; but if the system appear deficient in tone, the cod-liver oil should be continued, and one of the mineral acids with bark (F. 376) administered. I am generally averse to the employment of steel until the recovery has been complete and of some duration; but if there be depression, and other circumstances will permit of it, a visit to the baths of Spa (F. 467), Homburg (F. 491), Carlsbad (F. 496), Marienbad (F. 497), or Kissengen (F. 493), may be advised.

5. Inflammation of the Uterus.—Inflammation of the substance of the unimpregnated uterus is a rare disease. When it occurs, the muscular tissue of the body may be alone affected; or the morbid action may be confined to the cervix; or, as more frequently happens, the whole of the organ may be involved. When the inflammation ends speedily in resolution, the lining membrane generally escapes.

Causes.—Acute metritis (*Μήτρα*, the womb; terminal *-itis*) may result from the sudden suppression of menstruation before that congestion of the uterus and its appendages which is present at each period has been sufficiently relieved. In this way, exposure to cold, great fatigue, excessive mental excitement, and intercourse with violence may induce it. Occasionally, the irritation set up by a fibroid tumor in the uterine walls has been the starting-point. The extension of the inflammation in endometritis is also possible. But probably the most frequent cause is mechanical injury,—such as may be inflicted by the careless use of the uterine sound, or by rude and criminal attempts to bring about abortion at an early period of pregnancy.

Symptoms.—The attack may set in suddenly with rigors followed by feverishness, though ordinarily it comes on gradually. Complaint is made of a feeling of fulness, weight, and heat about the pelvis. There is an unpleasant sense of throbbing, with tenderness, about the pubes, the groins, and the perineum. The bladder is irritable, there is often nausea and vomiting, while there may be diarrhœa with tenesmus. And then, at the end of twenty-four or thirty-six hours, the uterus becomes the seat of considerable suffering, acute paroxysms of pain coming on at short intervals. With these attacks of pain there is usually a mucous discharge, but sometimes there is a flow of blood. If a vaginal examination be made, the uterus will be found hot, congested, and exceedingly sensitive; while the canal of the vagina often appears shortened and its walls œdematous. The bloodvessels also, about the cervix and upper part of the vagina, can be felt pulsating with considerable force. Moreover, great pain is experienced on making pressure downwards into the pelvis, through the lower part of the abdomen.

The patient keeps in the recumbent posture, because sitting up increases the pain, throbbing, and irritability of the bladder and rectum.

The acute symptoms generally subside in from five to eight days. In favorable cases the inflammation gets resolved, and no ill effects ensue. But occasionally, the disease leads to the formation of one or more abscesses in the parenchyma of the uterus; or it may give rise to hypertrophy of the uterus, with induration of the labia, abrasions, and subsequent menstrual irregularities with obstinate leucorrhœa, &c.; or it even terminates, in very exceptional instances, in fatal gangrene; or a form of subacute inflammation is set up, which may extend to the pelvic areolar tissue as well as to the peritoneal investment of the womb.

Diagnosis.—This disease can scarcely be mistaken for any other if all the symptoms be fairly considered, and an internal examination resorted to. The only fear is that the practitioner may fail to make the latter, from his attention being exclusively devoted to the gastric or intestinal irritation.

Treatment.—In the acute stage, complete rest, a simple diet with cooling drinks, and hot hip baths are required. After the patient has sat in hot water for half an hour, she can bear, without much pain, the introduction of the speculum, so as to allow of the application of four or five leeches to the lips of the womb. The bites should be encouraged to bleed, for a short time afterwards, by filling the speculum with warm water; and then when the redness and the fulness of the cervix seem to have diminished, the instrument is to be withdrawn and a medicated pessary—especially one consisting of opium and belladonna (F. 423) introduced into the vagina. If the paroxysms of pain continue severe in spite of these remedies, the same practice should be resorted to on the following day. But usually it will suffice to continue the baths, and to have a pessary used each night for some five or six times. The gastric irritability will seldom require any special attention; though supposing it to do so, the use of a sinapism to the epigastrium, with the frequent sucking of small lumps of ice, will prove efficacious in controlling it. When the evacuations cease to contain fecal matter and consist almost entirely of mucus, the irritability of the bowel should be decidedly checked by an opiate enema or suppository (F. 339, 340).

In chronic cases, the engorgement and induration will be best removed by the use of iodide of potassium with bark, by cod-liver oil, by a nourishing diet, and by the employment of pessaries of iodide of lead. Unless the general health be maintained, the treatment will be useless. —Where the cervix remains much hypertrophied and indurated, it will often be advisable to rub down the hardened tissue with a stick of caustic potash. For this purpose, a glass speculum (and I may here mention, that in the treatment of uterine disease I very rarely employ any other instrument than the excellent one devised by Mr. Fergusson), sufficiently large to admit the cervix uteri into its extremity, is to be introduced into the vagina; the patient lying on her left side, with the knees drawn up. The mucous membrane over the labia is then to be destroyed with a hard pencil of caustic potash; taking care, by frequent mopping with cotton-wool, that none of this deliquescent corrosive runs down between the labia and speculum into the vagina. Having made an eschar of sufficient size on one or both lips, the latter are to be well washed with equal parts of vinegar and water, then

covered with oil, and the speculum withdrawn. Three or four days afterwards the parts are to be examined, and if necessary the operation should be repeated. In this way, two or three applications will often suffice to remove a state of induration which would be unaffected by any milder measures. The patient had better remain in bed for a day or two after each cauterization; while she is to persevere with the general remedies already mentioned. If there be any suspicion of the presence of a syphilitic taint, the solution of corrosive sublimate (F. 27) ought to be taken steadily for several weeks.

6. Ulceration of the Cervix.—As a frequent result of congestion and inflammation of the lower portion of the uterus we find various forms of ulceration. Many cases which are regarded as examples of irritable uterus, of so-called leucorrhœa, or of menorrhagia, have their symptoms produced by abrasions or ulcerations about the cervix.

The most simple and most frequent condition which is met with, consists of *abrasion* or *excoriation* of the uterine lips. In this affection, the epithelium is removed from a part of one or both lips; the exposed villi with their looped capillaries conveying a "velvety" feel to the touch. The abrasion is usually most marked at the edges of the uterine orifice, while it often extends for some little distance up the canal of the cervix. Sometimes the erosion is so superficial that it is difficult to say whether there is more than intense congestion present; but any doubt which may be entertained on this head can be readily solved—as suggested by Dr. Henry Bennet—by lightly touching the suspected surface with nitrate of silver. On doing this, the abraded surface assumes a much whiter tint and a more coarse appearance than the region which is simply congested, while the limits of the denuded portion become well-marked. These excoriations are of no little importance, inasmuch as they tend to keep up cervical and ovarian congestion, and thus to cause menstrual irregularities; while the pelvic and sacral pains which they produce irritate the patient, and the leucorrhœal discharge ultimately gives rise to considerable weakness. Should the general health become much affected, an abrasion may degenerate into a troublesome ulceration; such an occurrence, however, being far from common.

Now although there can be no doubt that these abrasions are frequently the result of some general derangement of the system, yet I believe that they are not to be cured by constitutional remedies alone. The treatment must be *local* and *general*. With regard to the *first*, considerable benefit will ensue from the use of two or three leeches, or from scarifications of the labia, where there is much congestion. Then, alum or zinc vaginal injections (F. 425), or astringent and sedative pessaries (F. 423) should be employed; or, if the woman be married, there can be no objection to the occasional application, through the speculum, of the solid nitrate of silver, or of what often answers better—the undiluted solution of subacetate of lead. In some obstinate cases, gently dabbing the excoriated surface with a pellet of wool dipped in the acid solution of nitrate of mercury, proves very efficacious; but this caustic must be applied most sparingly, since it exerts a powerful influence, both locally and generally. I have seen it frequently produce tenderness of the gums, lasting for two or three days; while once or twice it has even caused salivation. Moreover, after the use of this escharotic,

as of any other, I would advise the practitioner to thoroughly smear the cauterized tissue with oil or lard; a suggestion so simple that I should hesitate to make it, had not experience taught me how much such a practice adds to the comfort of the patient.

The *general* treatment of these cases is by no means so simple as might be imagined. Even as regards the daily mode of life, opinions vary greatly; some practitioners confining the patient to the sofa and bed, whilst others insist upon her taking horse exercise and long walks. Both extremes, however, are equally injudicious. It seems to me better to allow the usual avocations to be quietly pursued, provided no injurious habits have been contracted. The diet should be nourishing, with a proper supply of animal food and milk; while if stimulants be needed, a little claret, or sherry, or champagne, or weak brandy and water, will be found preferable to malt liquors. The digestive organs ought always to claim attention, though I would warn the practitioner against resorting to over-active remedies. If abrasion of the uterus, as a local disease, has been the favorite hobby-horse of some physicians, it is certain that others have found as rampant and mischievous a steed in the same affection when saddled with torpidity of the liver. Dyspepsia is common in these cases, but the stomach only requires gentle aid. Such agents as pepsine (F. 420), rhubarb and ipecacuanha (F. 179), oxide of silver (F. 47), or the nitro-hydrochloric acid in some bitter infusion (F. 378), are much more valuable than calomel, anti-bilious pills, black draughts, &c. Generally the system is depressed, and small doses of quinine (F. 379), or especially of salicin (F. 388), improve the appetite and tend to give tone. Supposing any alterative is needed, arsenic in combination with iodide of potassium or with quinine (F. 52) will deserve a fair trial. Where cod-liver oil can be digested, it will prove very serviceable.—I have spoken somewhat at length on the subject of treatment, because the remedies here recommended are useful in all ulcerations—save those of a specific nature—which occur upon the cervix.

The term *ulceration* is applied to those cases, where the uterine lips are not only more or less deprived of their dense epithelium, but the villi with their vascular loops are also destroyed in patches. Sometimes the proper tissue of the uterus is involved; the process of molecular gangrene occasionally running on to such an extent, as ultimately to remove a considerable portion of the cervix.

A simple ulcer on the lips of the uterus is generally of an irregular shape, its edges are seldom well-defined, and it presents an uneven granular aspect. The tissue around the orifice of the womb is often involved, and the ulceration extends up the cervical canal, from which a quantity of tenacious mucus can be seen exuding. The vaginal portion of the cervix is also found much congested, and perhaps covered with a thick muco-purulent secretion. Where the ulcer is deep, it is usually coated with a grayish slough; the congestion is greater, so that an examination may produce rather free bleeding; dilated varicose veins can frequently be seen ramifying about that part of the neck which is not involved; and the muco-purulent discharge is abundant. The congestion attendant upon ulcerations of the cervix not only extends to the body of the uterus, but to the Fallopian tubes and the ovaries. Hence there is much general uneasiness about the pelvis, sometimes burning

pains are complained of, attacks of menorrhagia are common, and there is troublesome backache. The general symptoms are those of anæmia with deficient nervous power: headache is common, there is often neuralgia, the skin is of a dirty sallow hue, the pulse feeble, the appetite bad, the tongue furred, and the bowels are irregular. As the patient feels weak, so she is indisposed to make any exertion; and as she finds the bearing-down and pelvic weight increased by walking or sitting up, she prefers keeping to the sofa. The breasts, bladder, and sometimes the rectum, may likewise suffer from reflex irritation.

The remedies required are much the same as those recommended for the cure of abrasion. Local bloodletting, however, is less frequently called for, since the ulcerated surfaces usually bleed freely. Care must also especially be taken not to allow the leucorrhœal discharge to accumulate in the vagina; cleanliness being insured by the employment, night and morning, of warm water or astringent injections. If the ulceration be deep, the gentle application of caustic potash, or of the acid solution of nitrate of mercury, will be required. No remedies relieve the reflex irritations so effectually as the pessaries of iodide of lead and belladonna.

Primary syphilitic sores are very rarely met with on the cervix or labia uteri. Ricord mentions a case in which there was a round ulcer, with well-defined and sharp edges, and an ash-colored surface, surrounded by a red areola or border, which doubtless was syphilitic. Sometimes the chancre is concealed within the canal of the cervix; so that in any suspicious case, where an abundant muco-purulent discharge is seen issuing from the os uteri, and where one or both lips are much injected, the edges of the opening should be gently everted with a long probe. A true chancre on the uterus has the same tendency to spread and to infect the system as one elsewhere, and it requires similar treatment.

Secondary syphilitic affections of the uterus are by no means uncommon. The chief symptoms are enlargement and increased firmness of the vaginal portion of the cervix; an abundant muco-purulent discharge, both from the uterus and vagina; with patches of abrasion, or even superficial ulcerations, upon the labia uteri. Menstrual irregularities are frequent,—usually a too abundant flow. There is also evidence of morbid changes in other parts of the body,—such as loss of hair, sore throat, cutaneous eruptions, and nodes upon the tibia or upon the frontal bone. Should a woman thus affected become pregnant, she will either abort, or she will be delivered (probably prematurely) of a dead child, or she will give birth to an infant who will soon exhibit proofs of a contaminated system. The treatment of this disease must be carried out according to the principles already (p. 212) laid down.

Rodent ulcer of the uterus is a severe disease, which has often been confounded with epithelial cancer. The general characters of this peculiar ulceration have already been described in the chapter on diseases of the vulva (p. 569).

Rodent, or corroding, ulcer of the os uteri is rarely if ever, met with before the age of thirty; while in the greater number of cases it seems to have commenced about the time of the cessation of the menses. The ulceration begins very gradually, and extends slowly. As it eats away the affected tissue, complaint is made of pelvic heat and discomfort; there

is a thin serous discharge, occasionally streaked with blood; and the patient becomes pallid, and suffers from indigestion, debility, &c. After a time, a burning pain often sets in, though it is seldom severe; the suffering altogether, as a rule, being less intense than is experienced in cases of cancer. Attacks of hemorrhage are not uncommon; sometimes constituting the earliest prominent symptom of the disease,—or at all events, that one which first leads the patient to seek advice.—On making a vaginal examination we shall probably find an irregularly-shaped ulcer with ragged or indurated edges; the sore being more or less excavated, and presenting a dry and glossy or a pulpy surface. The parts adjoining are neither indurated nor unhealthy; while the uterus is movable instead of being fixed as in carcinoma. Sometimes the whole of the cervix around the os is removed, the destruction of tissue having proceeded to such an extent as to produce a large pulpy cavity, into which the finger readily enters without causing pain. The disease, moreover, eats its way upwards into the body of the uterus, instead of extending downwards; so that the vaginal canal generally remains healthy. Ultimately the entire muscular structure of the uterus may be destroyed; though generally death occurs from exhaustion, or peritonitis, or even from hemorrhage, before this stage is reached.

The diagnosis of rodent ulcer from malignant disease will seldom be difficult, if we bear in mind that in the former there is simply destruction of tissue; whereas, in the latter, we find not only ulceration, but also an infiltration of cancerous matter into the affected part and the surrounding textures. It is owing to this infiltration that the uterus becomes immovable, and that the walls of the vagina get thickened so as greatly to diminish the calibre of this canal. Moreover, in rodent ulcer there is no affection of the lymphatic glands, neither is any deposition of morbid material to be discovered in distant organs.

The treatment is very unsatisfactory; partly because the disease is remarkably intractable, and partly for the reason that advice is seldom sought until the ulceration has made considerable progress. In the earliest stage, when the cervix alone is affected, excision of this portion of the uterus would probably afford a greater hope of cure than any other proceeding. But at a later period this operation is out of the question. The strongest escharotics have been employed, but almost universally they have proved useless. In fact, we are seldom able to do more than soothe the ulcer with sedative vaginal injections (F. 425), or with pessaries containing opium and belladonna (F. 423); while we attempt to improve the general health by a nourishing diet, by tonics, and by cod-liver oil. As I believe that I have found benefit from the administration of arsenic (F. 52) in rodent ulcer of the cheek, I would recommend a trial of this remedy when the disease has its seat on the cervix uteri.

7. Elongation of the Cervix.—The cervix uteri may be divided into two portions, viz., that part which projects into the vagina, and that which is situated above this canal. Consequently, as M. Huguier has shown, longitudinal hypertrophy of the cervix may be confined to the intra-vaginal portion; or the supra-vaginal part may be alone affected. With regard to the latter I shall merely observe that it is a condition seldom met with, save among laundresses, and women whose occupations

entail much standing or walking; that it occurs for the most part in those who have had large families; and that it gives rise to the symptoms which accompany prolapsus of the uterus. It is also often combined with cystocele or rectocele. The os uteri is usually dilated, and the sound will be found to penetrate for four, five, or more inches. As I am far from convinced of the necessity for the severe cutting operation recommended by M. Huguier, I would advise the practitioner to be content with palliating the symptoms. Rest for some days, followed by remedies which give tone locally and generally, ought to be tried,—such, in short, as the reader will find described in the remarks on prolapsus uteri.

Longitudinal hypertrophy of the vaginal portion of the cervix is attended with a feeling of pelvic weight and discomfort, tenderness on sitting down, and leucorrhœa. There is usually pain during coition, and conception is prevented. On examination, the vagina will be found in its normal position, but more or less filled by the elongated cervix, which also projects at the vulva. The patient complains either that she has a tumor, or that there is a falling of the womb. If the sound be introduced it will pass readily for perhaps some five inches. Sometimes one lip is more prolonged than the other; but in the worst cases the whole of the vaginal cervix is equally lengthened.

Amputation of the cervix constitutes the only effectual remedy. To avoid hemorrhage it is better to employ the écraseur rather than the knife. In applying the chain of the instrument around the cervix care must be taken not to wound the bladder; which viscus can hardly be injured if its upper limit be ascertained with the catheter. So also, by not drawing the womb downwards, and by adjusting the chain about a quarter of an inch in front of the union of the vagina with the cervix, the risk of cutting into the posterior peritoneal cul-de-sac will be removed. Subsequently, as the wound heals, the sound should be introduced every second day, so as to prevent undue constriction of the os uteri. As this operation is not a very common one, I append here short notes of the only cases in which I have resorted to it:

Case 1. S. J., aged 42, single, a laundress in the Temple, had suffered so much from a supposed falling of the womb for two years, that she was unable to do her work. I saw her in consultation with Mr. Brooks, of Fleet Street, on the 23d October, 1861. On examination, a greatly hypertrophied cervix was discovered, the uterine sound passing for five inches. The catamenia were regular and healthy; there was copious leucorrhœa. On the 26th October, Mr. Brooks administered chloroform while I slowly removed about two inches of the cervix with the écraseur. Not a drop of blood was lost. On the 23d November she called upon me, the wound being healed. The sound passed for two and a half inches.

Case 2. In February, 1863, I saw a lady suffering from elongation of the cervix, who had frequently consulted me for attacks of ovaritis. She was 32 years of age; had been twice married; and had only been pregnant once, her child being eight years old. At the hands of other gentlemen she had been salivated, and the cervix had been repeatedly painted with iodine. On the 4th March I removed the cervix with the écraseur. Chloroform was given by Mr. Read, Assistant-Surgeon of the Grenadier Guards. She returned home, in good health, on the 14th

April. Eight months subsequently she suffered from pelvic abscess, which discharged and then reformed on three or four occasions. A cure was ultimately effected towards the end of 1864.

Case 3. Mrs. W., aged 62, married 40 years, a pew-opener at St. Martin's Church, came under my care in March, 1863. Has been pregnant seventeen times, having had ten children and seven miscarriages. The last pregnancy was 18 years back. Got over "the change of life" at 48. Has suffered from the womb coming down for many years. Complains of great pain in thighs, at bottom of stomach, and about the sacrum. Never can sit down in comfort. Sometimes has retention of urine, sometimes an involuntary escape. On the 11th March Mr. Hulme administered chloroform, and I amputated a greatly hypertrophied cervix, the only disease which could be detected. On the 18th April she was well, with the exception that there was a slight prolapsus of the bladder on standing for any length of time.

Case 4. Mrs. Y., of Greville Street, Hatton Garden, was sent to me by Mr. James Wilson, of Beaufort Buildings, on the 8th April, 1864. She was 41 years of age; had been married 15 years; and had had two pregnancies, and gone the full time with each, the last child having been born twelve years ago. The catamenia were quite regular. She complained chiefly of leucorrhœa, debility, backache, and a "falling of the womb" which prevented her from following her occupation. On examination, great longitudinal hypertrophy of the vaginal portion of the cervix was discovered. On the 3d May, Mr. Wilson administered chloroform, and I amputated the cervix with the écraseur. As there was some hemorrhage, the vagina was plugged with cotton-wool. The cure was complete by the end of the month.

Case 5. Mrs. M. C., ætat. 45, applied to me on the 26th April, 1864. She has been married 15 years, and has been pregnant three times. The last child was born 8 years ago. Catamenia regular, and natural in quantity. Has leucorrhœa. Since her last labor has had what she calls "a falling of the womb." The sound passes four and a half inches. On the 2d June, Dr. Meadows administered chloroform, and I proceeded to operate. Drawing down the cervix, a circular incision was made through the mucous covering, and the membrane dissected upwards for rather more than half an inch. The chain of the écraseur was then applied at the upper limit of the dissection, and the cervix removed. In this way two flaps were procured, which were brought together over the wounded structure, and kept in apposition with wire sutures. Care was taken to maintain a proper sized os uteri. The sutures were removed at the end of a week, and the parts found nearly healed. She returned home to the country, quite well, on the 20th June.

8. Cancer of the Uterus.—This fearful affection is most commonly observed under the form of medullary ulceration of the lips or vaginal portion of the uterus. In the small proportion of about 2 or 3 per cent. the infiltration appears to commence in the mucous or muscular coat of the body or fundus of the womb; the disease occasionally running its entire course while confined to this part, and sometimes spreading downward until the whole organ is involved. Probably in nearly one-third of all the cases of cancer which occur in women the uterus is the organ affected.

Medullary cancer is very much more frequent than any other variety of malignant disease of the uterus. Examples of scirrhus are not often met with. Cauliflower excrescence, or epithelioma, is also a rare affection; and when discovered, the excrescence is usually found growing from the posterior lip of the uterus. Just as seldom, I believe, an inveterate form of ulcerated epithelial cancer of the lips or interior of the cervix falls under observation.

Symptoms.—In whatever way malignant disease of the uterus sets in, it gives rise to certain prominent symptoms. Briefly, these may be described as consisting of an abundant watery discharge, which is of a dirty pale-green color, is always offensive, but sometimes so fetid as to render the patient loathsome to herself and almost so to those around her; sudden attacks of hemorrhage, which (contrary to what might be expected) diminish in frequency and severity as the disease approaches a fatal termination; pain of the most distressing kind, which at first may only come on at night, but ultimately gives the sufferer no respite, unless relief be afforded by medicine; disturbance of the digestive organs, as is chiefly indicated by frequent attacks of nausea with vomiting, distressing flatulence, and a loathing of food; and, lastly, there is most painful mental depression, debility which increases daily, and rapid wasting of the tissues. It must not be supposed that instances are not sometimes met with where one or more of these symptoms are absent, but they are exceptional cases. Thus, hemorrhage is often the first indication of the presence of cancer of the uterus, though in a few instances the disease has run its whole course without an attack. When these symptoms, or most of them, have been present for a short time, the patient's countenance assumes that dingy sallow hue and pinched anxious expression so well known as the cancerous facies. This cachectic appearance follows the symptoms just mentioned and never precedes them, while it occurs the more quickly in proportion to the extent to which the patient has been weakened by the discharges and pain. The only constant symptom which I have observed as a forerunner of the outbreak of uterine cancer is great mental depression; this, of course, being attended with its almost necessary accompaniments of loss of appetite, and restlessness at night.

Diagnosis.—In the great majority of cases the practitioner has no opportunity of making a vaginal examination in the early period of the disease, when the lips of the cervix are merely infiltrated with encephaloid matter, and present a moderately hard, uneven, nodulated character. It is but seldom that he is consulted until the disease has advanced to the stage of ulceration. Then the finger detects readily a more or less deeply excavated ulcer, of a loose spongy character, seated on a tumid hardened base, and surrounded by indurated tissue; while the whole womb is felt to be immovably fixed in the cavity of the pelvis. The vagina is either involved, or it soon becomes so by the gradual infiltration of its tissues; and then the cancerous degeneration extends through the walls of this canal into the bladder, or more rarely into the rectum, or still more rarely into both these parts, so that one large ulcerous cloaca results. As the process of disintegration rapidly proceeds, the lips and cervix become completely destroyed; and the body of the uterus gets converted into a funnel-shaped cavity, with

its walls irregularly eaten away, or covered with a fungous vascular growth.

When epithelial cancer assumes the form of the cauliflower excrescence its diagnosis is easy. The peculiar feel of the outgrowth, its fringed or papillary structure, the ease with which its tissues are broken down, the exhausting hemorrhages of frequent occurrence, and the profuse serous discharges which it gives rise to, clearly point out its nature.

Treatment.—In very few cases is it possible to do more than attempt to relieve the prominent symptoms as they arise. And in the *first* place the general health is, if possible, to be improved. Hence the patient ought to be allowed a wholesome nutritious diet; of which milk and cream, raw eggs, and properly cooked animal food, must form the chief constituents. Stimulants will be needed in almost all cases; and none will be found more useful than either of the light sparkling wines, good sherry, or pale brandy. Malt liquors almost invariably disagree, by aggravating the dyspeptic troubles generally, and especially by increasing the flatulence. Such tonics as ammonia and bark (F. 371), phosphoric acid in some bitter infusion (F. 376, 379), quinine and belladonna (F. 383), zinc and conium (F. 413), and cod-liver oil (F. 389), are valuable in strengthening the system, as well as in alleviating that terrible sinking and feeling of depression which is so generally complained of. Where the stomach is very irritable the use of pepsine (F. 420), of nitro-hydrochloric acid with the dilute hydrocyanic acid (F. 378), or of ammonia and ether (F. 364), gives relief. From one hundred and twenty to two hundred grains of chlorate of potash in a pint of barley-water, taken for some days together, will always cure that soreness of the mouth which is often present. Sucking lumps of Wenham Lake ice is frequently grateful; while good often arises from the free application of extract of belladonna, with the wet compress, over the stomach. Small doses of castor oil, or of confection of senna with the juice of taraxacum (F. 194), or the use of simple enemata, will regulate the bowels better than any other aperients. It need scarcely be added, that the purer and more bracing the atmosphere in which the patient lives the better: while, as all ovarian or uterine excitement must prove very injurious, sexual intercourse is to be strictly forbidden, even though the disease be in an early stage. It is for this last reason that I very rarely resort to the administration of any preparation of steel in cases of cancer uteri; since these remedies, as has already been pointed out, cause congestion of the sexual organs, and increase the pain and tendency to hemorrhage. I am sure that much mischief is done in many other diseases of the uterus by the indiscriminate way in which ferruginous tonics and chalybeate waters are given.

Then, *secondly*, the practitioner must endeavor to keep the sufferer as free from pain as possible; for while persistent uneasiness causes anxiety and irritability, long-sustained physical suffering will alone suffice to kill. In the early stages a good night's rest may often be afforded by the administration of a couple of pills of henbane and camphor (five and three grains), washing them down with a peppermint draught containing fifteen or twenty minims of the spirit of chloroform. But sooner or later the time arrives when full doses of opium or morphia are needed to allay the anguish. The subcutaneous injection of morphia (F. 314)

proves very valuable. For exhibition by the mouth or rectum, no preparation is so generally useful as the extract of opium; since, when given in a dose proportionate to the necessities of the case, it seldom induces that subsequent nausea and headache which are so commonly caused by the tincture or the powder. Chloroform, spirit of ether, henbane, Indian hemp, and conium are also useful; and especially so are mixtures containing combinations of these drugs (F. 317). Very frequently, and more particularly when the bladder is irritable, I employ belladonna locally, mixing four or five grains into a pessary with cocoa-butter, and directing it to be introduced into the vagina every night. When this canal is free from disease, the application to the cervix of a frigorific mixture, by means of a gutta-percha speculum, often affords considerable relief. Although the employment of intense cold as a means of cure is quite futile, yet, as an adjunct to other remedies for the relief of suffering, it is of much value. I have tried the local application of carbonic acid gas, as well as the injection into the vagina of chloroform vapor, but neither proceeding has appeared to be of any service. Sympathetic pains in distant parts are best relieved by the use of strong belladonna liniments or plasters, or what is often more effectual, the subcutaneous injection of morphia.

In the *third* place, it has always seemed important to me to check the attacks of hemorrhage as speedily as possible. Independently of the alarm and depression which every flooding gives rise to, I am sure that the loss of blood rapidly hastens the case to a fatal termination, although immediate death from bleeding is of rare occurrence. The general remedies in which I have most faith are gallic acid, the mineral acids, and cinnamon; the acetate of lead, turpentine, and digitalis having only disappointed me. A very useful draught, which may be given every four hours during an attack of bleeding, may be made with ten grains of gallic acid, fifteen or twenty minims of the aromatic sulphuric acid, a drachm and a half of compound tincture of cinnamon, a drachm of syrup of poppies, and water. It must be confessed, however, that local applications are often more valuable, since they more speedily effect our object than medicines given internally. If a small speculum can be used, the bleeding will generally be immediately controlled by inserting into the ulcerated surface a plug of cotton-wool, moistened with a strong solution of the perchloride of iron in glycerine; or a plug of simple cotton-wool may be gently resorted to, when it is deemed improper to introduce any instrument for fear of rupturing the vascular mass. So also the actual cautery, cautiously applied, will commonly at once serve to close the orifices of the bleeding vessels. But the great disadvantage of these applications is generally that they cannot be employed when they are most wanted, for the floodings come on suddenly and violently, to the patient's great alarm. I usually, therefore, instruct the nurse how she may use an injection of alum and gallic acid, or of infusion of matico, under these circumstances; explaining that it is only necessary to have the hips well raised by pillows, and then to inject with a common syringe, or even to pour into the vagina a small quantity of either of these astringents, in order to moderate the discharge of blood, if not to control it entirely. Sometimes a pessary made with as much tannin as can be held together by thirty grains of

cocoa-butter, forms an effectual styptic. The use of ice to the vulva may also be recommended.

And, *fourthly*, it is necessary to mitigate the horribly offensive odors of the discharges; by attempting which we may generally also succeed in lessening the quantity of the serous flow. This duty will not be thought unimportant by any practitioner who has had the misfortune to see a few neglected or badly-managed cases. And to begin with, it is necessary—at least as far as the women seen in the hospital out-patient rooms are concerned—to recommend free ablution twice or thrice daily with tepid water. Then, when we can depend upon injections being gently but effectually used, we may order a pint of water containing twenty grains of chloride of zinc to be employed twice a day; or half an ounce of the solution of chlorinated soda, or one hundred and twenty grains of chlorinated lime, to the pint of water, may be tried; or one drachm of creasote to a pint of barley-water or thin gruel may be injected; or about four fluid drachms of the solution of permanganate of potash to a pint of water can be ordered. In several instances comfort has been derived from the use every night of a pessary containing extract of logwood and cocoa-butter (thirty grains of each); an application, the power of which is not deteriorated by having combined with it belladonna or morphia. And, lastly, I have known ladies attempt to prevent the fetid smell from being perceptible to others by padding the vulva with small muslin bags of vegetable charcoal; a practice which is only of any value in exceptional cases and under peculiar circumstances.

Now the measures which have just been described may be said to be those which are to be practised in almost every instance of uterine cancer; and it is certain that by their skilful adaptation to the exigencies of each particular case much good may be done. But it sometimes happens that we see the patient when the affection is in an early stage, or when it assumes the form of a polypoid excrescence, or when it appears limited to the cervix uteri. Under these circumstances it becomes an anxious question whether some more decided plan of treatment may not be useful; whether something cannot be done to eradicate the disease completely, or at least materially to check its progress? The truth must unfortunately be confessed that here the art of the physician, for the most part, fails him. With regard to specific remedies, I can only say that I have never seen anything approaching to permanent benefit from their employment. Powerful escharotics, repeatedly and thoroughly applied to the diseased surface, have never seemed to me to retard the disease. And the same disappointment follows excision of the neck of the womb; whether this operation be performed with the écraseur, the knife, or the ligature. If there are any exceptions to this statement, it is in the case of epithelial growths (cauliflower excrescence), but even here I fear that in almost all instances the good which can be done is merely temporary. In only one instance can I persuade myself that I effected a cure by amputating the cervix, and in this instance the patient was lost sight of twelve months after the operation. Yet I do not consider that this proceeding is altogether to be condemned. It may possibly in a few instances prove beneficial; and it may certainly be said that neither in my own practice, nor in that of a few other physicians which I have had the opportunity of seeing, has it done any mischief. It gives the patient the inestimable comfort

of hope revived; so that for a few months, by controlling the symptoms, it greatly lessens anxiety if it does not afford complete peace of mind. The misfortune is, that the cases are so rarely met with in which there is a fair chance of this operation succeeding; since, for obvious reasons, patients rarely apply for advice in the early stages of uterine cancer.

Extirpation of the entire uterus has been practised on some twenty-six occasions for the cure of cancer; but I am only acquainted with one well-authenticated report of its having been really successful, though in four instances the patient recovered from the operation. In the successful case the woman remained well for twenty-five years. But it must be remembered that there was a previous procidentia of the organ, so that the operator, Conrad J. M. Langenbeck, had a comparatively easy task; while, without being hypercritical, a doubt may be suggested as to the correctness of the diagnosis. The details of the case are given by Professor Max. Langenbeck in his thesis "De totius Uteri Extirpatione," Göttingen, 1842. One successful result, however, from a very dangerous proceeding, cannot outweigh a number of failures; failure, be it remembered, implying death within forty-eight hours in fifteen out of twenty-two fatal cases. Hence it is almost unnecessary to say, that no practitioner in the present day would be justified in following the example of the elder Professor Langenbeck, Récamier, and Blundell, with regard to this operation.

It occasionally happens that cases of cancer of the uterus complicated with pregnancy are met with; and when the gestation has not advanced beyond a few months, it becomes a question of some moment as to whether a miscarriage should be induced. There is but little doubt that, as a general rule, it is best to take the proper steps for emptying the uterus at as early a period as possible. The process of parturition, at or near the full term, is one of considerable suffering and risk when the cervix is infiltrated with cancer; two great sources of danger existing —viz., the liability to hemorrhage and rupture of the uterus. Sometimes even delivery by the natural passages after the seventh month is quite impossible; and two physicians in this country have had to resort to the Cæsarian section under these circumstances. For further remarks upon this subject the reader may refer to the description of a case of multiple cancer complicated with pregnancy, in which I induced abortion, for reasons fully stated in my paper.*

VIII. UTERINE TUMORS AND OUTGROWTHS.

1. Fibroid Tumors.—Of all the organic diseases of the uterus which first manifest themselves during the period of sexual vigor, the non-malignant tumors are the most common. In the present section I intend to speak only of the non-pediculated or fibroid bodies.

Pathology.—Fibroid tumors may be developed in any portion of the uterus. According to their position they are often classified as sub-peritoneal or surface tumors, when just beneath the peritoneum; inter-

* Transactions of the Obstetrical Society of London, vol. iv, p. 243. London, 1863.

stitial or intra-mural tumors, when imbedded in the uterine walls; and submucous or intra-uterine tumors, when they are pressed into the cavity of the womb. Fibroids consist of outgrowths of uterine tissue. The dense and firm muscular structure of the uterus is made up of bundles of smooth or unstriped muscular fibres, arranged in layers; together with areolar tissue, bloodvessels, lymphatics, and nerves. And so we find that uterine tumors are composed especially of unstriped muscular fibre, an element which is wanting in fibrous tumors. Hence the use of the term "fibroid" in preference to that of "fibrous," as ordinarily employed.

Fibroid tumors are met with at all ages after puberty, though they occur most frequently between the years of 25 and 48. The earliest age at which I have observed such a growth has been 18, the woman being married. It is very probable that these tumors occur equally in the married and single, in the sterile and fruitful. My own notes of cases of non-pediculated uterine fibroids, show a preponderance of married sterile women; but the experience of one practitioner is of little value on such a point. The following table, however, gives the number of cases of both non-pediculated fibroids and of polypi, of which I have kept a record, between the 1st January, 1851, and the 31st March, 1865, exclusive of eleven doubtful instances, where the diagnosis was either imperfect or the statements of the patient seemed unreliable:

	Nonpediculated.	Polypi.
Virgins,	17	10
Married and sterile,	24	6
Been pregnant, but always aborted,	1	1
Borne children,	12	16
The first pregnancy occurred while under treatment,	1	0
	55	33

Fibroid tumors may vary in size from that of a nut, to that of a fœtus at the full term of gestation. Indeed, their bulk is sometimes much greater than that of a new-born infant. They commonly weigh one or two pounds, but they have been found frequently as heavy as six or eight pounds; while extraordinary cases are recorded where they have reached thirty, forty, and even seventy pounds. In form they differ considerably; but usually they are round, or pear-shaped, or irregular and lobulated. From pressure, however, they may attain every imaginable figure. When the cavity of the womb becomes much enlarged by a fibroid projecting into it, the uterine walls get hypertrophied, while their sinuses may undergo development as in pregnancy. Under the influence of congestion—such as occurs at the menstrual periods—the walls of one or more of these venous canals may get ruptured; blood being poured out until a coagulum forms, or the opening heals, or the uterine contractions compress the bleeding orifice against the tumor. These growths may be single or multiple. Very often there are three or more separate tumors; and in one specimen which I removed from the body of an old woman, as many as nine distinct outgrowths from the external walls of the uterus could be counted.

Symptoms.—The symptoms produced by fibroid tumors are often neither important nor well-marked; and indeed these growths not unfrequently exist without giving rise to a suspicion of the presence of any

uterine disease. But on the other hand, when of a size sufficient to be detected through the abdominal wall, they are usually the cause of menstrual disturbance; of a dull, aching, or throbbing pain; of a sense of weight and bearing-down in the pelvis; of cramp or numbness in one or both thighs; of a difficulty in evacuating or in holding the urine; and of constipation, with hemorrhoids. Just as pediculated fibrous tumors—commonly known as uterine polypi—are almost always attended by one very prominent symptom, viz., hemorrhage; so, with a little latitude, it may be said that the same happens in submucous tumors merely projecting into the cavity of the uterus. When the first symptom of the existence of a fibroid is a sudden attack of hemorrhage, the patient not unfrequently tries to persuade herself that she has been pregnant, and aborted; but the practitioner must not be misled by her statements or opinions. He will distinguish the true nature of the disease by learning that the loss of blood has probably been excessive; that the hemorrhage has returned more than once without warning, and without being accompanied by uterine contractions or pain; and especially by finding that the tissue of the cervix is firm, and the os thin and small, instead of being relaxed, swollen, and patulous, as after abortion. Very frequently, especially with submucous tumors projecting into the cavity of the uterus, the patient first has her attention directed to the womb by noticing that the menstrual discharge is more abundant than usual, that its duration is greater, that it is attended with clots, and that its cessation is followed by leucorrhœa. The monthly periods also recur more frequently than is natural; they are accompanied with great pain in the back and thighs, and bearing-down or dragging sensations; there may be expulsive efforts, simulating labor pains, sometimes occurring only with the catamenial flow, and sometimes coming on in the intervals with more or less frequency; while during the time the courses continue, and even for some few days before and afterwards, the patient is incapacitated from following her usual duties.

On making a vaginal examination we shall generally find the weight of the uterus increased, while its mobility is somewhat diminished; the vagina also being lessened in length. If the tumor be in the cavity, the os may sometimes be found patulous, and the tumor projecting between its lips; but more frequently the mouth of the uterus is closed, and the cervix absorbed into the substance of the walls, so that we feel merely a rounded body with a slight depression and opening at its lowest part. When the tumor occupies the posterior wall it often produces a retroversion of the uterus; and consequently the fundus of this organ then lies upon the rectum, while the cervix is pushed forwards and upwards under the pubis. Supposing the growth to be in the anterior wall, the uterus will often be found anteverted; that is to say, with its fundus on the bladder, and its os looking directly towards the sacrum. Instead of retroversion or anteversion, there may merely be retroflexion or anteflexion; or the tumors may even be large and heavy, without causing any uterine displacement whatever. Provided that the practitioner is certain of the non-existence of pregnancy, he will derive great assistance in forming a positive opinion on the nature of the growth and its exact position from the use of the uterine sound. When this instrument is introduced into the healthy uterus, it passes for two inches and a half;

and by it—without any rough manipulation—the organ can be elevated, or turned to either side, or bent backwards or forwards. In most instances of fibrous tumor the cavity is elongated; while, if the tumor be in the walls, or broadly attached to them, the sound appears to enter the mass so that the uterus cannot be separated from it, both can be only moved simultaneously, and at the same time the womb is found to have lost its healthy mobility and freedom.

Whatever may be the cause of uterine enlargement—whether it be a tumor or retention of the catamenia—the breasts generally become somewhat developed and tumid; while sometimes the areolæ also darkens, or the follicles increase in size and number. But it is only in pregnancy that the nipples and the areolæ undergo all those peculiar changes which are so characteristic of this state; for in no other cases do we find, combined with the development of the glands, enlargement of the follicles and an increase in their number, œdema of the areolæ, moisture of these parts, and a gradually increasing deposit of pigment in their tissues.

If we practise auscultation over a fibroid tumor we shall very frequently detect a souffle, synchronous with the pulse; which may sometimes be due to the pressure of the growth on the aorta or iliac arteries, but which I believe generally has its seat in the vessels of the enlarged uterus. This murmur might lead to the case being mistaken for pregnancy; but unless this condition coexist, we shall of course be unable to discover the fœtal heart, or anything approaching the fœtal movements.

Terminations.—Fibroid tumors of the uterus are generally benign and harmless; many patients having been known to live for twenty, thirty, or even more years after the growth has first manifested itself. In such cases, the tumors commonly attain a certain size, and then remain stationary, giving rise to no symptoms beyond what may be produced by their bulk or pressure upon other organs. Where a fibroid induces severe attacks of hemorrhage, however, the results may be more serious, though death very seldom occurs from this cause. In only one of my cases has death taken place from anæmia due to the frequent floodings; the fatal event happening nearly seven years after the first abundant bleeding.

Fibroids occasionally undergo a cystic degeneration; one or several cavities, containing a limpid fluid, being developed in their centres. I do not believe, however, that the whole tumor can thus be converted into a simple cyst, as some authors seem to imagine. In the cases which have led to this idea being entertained, it is probable that one or more fibroids have coexisted with a cystic growth.—Sometimes these fibroids become swollen, softened, and œdematous; either as the result of great congestion, or possibly of a low form of inflammation. In the same way, an abscess may form in the interior of the tumor; an unfortunate result, which has proved fatal in most instances where it has happened. A more favorable event is that of fatty degeneration; a change which occurs much more rarely than might be expected.

That fibroids are occasionally partially absorbed is I believe certain; while it is highly probable that they may be entirely removed in this way, quite independently of any treatment. The following case affords a striking example of partial absorption synchronous with the climac-

teric change: Mrs. T., 42 years of age, came under my care on the 15th October, 1856. She has been married eight years, and never been pregnant. The catamenia are irregular: has leucorrhœa. Has had some severe attacks of flooding,—one in August, 1854, a second in October, 1854, a third in January, 1855. Then for nine months there was no excessive loss, but at the end of this time the hemorrhage became so abundant that she had to be admitted into Charing Cross Hospital. She did not detect any abdominal tumor until Christmas, 1854. Since then, has rapidly increased in size, so that now she is quite as large as a woman at the full term of gestation, the uterus reaching to the ensiform cartilage. On making an examination, the vagina is found contracted, uterus high up in the pelvis, while presenting at the os uteri (which is as large as a penny piece) is a hard fibroid tumor. This tumor is evidently too large to be drawn through the pelvic cavity. As there were no urgent symptoms, her general health was improved with tonics, &c. In January, 1859, the tendency to flooding returned, and it seemed desirable to remove the tumor if possible. I thought that by ligaturing a portion of it, it would be possible to get away the part when dead, and that by repeating the operation the whole might ultimately be removed. All attempts, however, to pass Gooch's canulæ, armed with whipcord, failed; owing to the presence of firm adhesions between the front of the tumor and the uterus. Drs. Tyler Smith and Graily Hewitt, who were present, allowed that they had rarely if ever seen so large a tumor. After this attempt the floodings lessened in frequency again. Twice or thrice there was a severe loss, but it was generally checked in a day or two by perfect rest, and gallic acid with cinnamon. I have frequently seen this patient up to the present year (1865). The tumor has long been decreasing in bulk: there has been no hemorrhage for many months, the catamenial periods having apparently ceased about the beginning of 1864; and the abdomen is now of natural dimensions, the tumor being reduced to about the size of the fist.

The subperitoneal and submucous fibroids not uncommonly become gradually pediculated, so that in the latter case they may be removed like other polypi. But in both instances it has occasionally happened that the tumor has become entirely detached from the uterus; the growth, when of the subperitoneal kind, having been found with an attachment to one of the abdominal viscera. It is even said that a fibroid may remain loose in the cavity of the peritoneum, and be nourished in the same way that a loose cartilage in a joint is kept from decay, though I have never seen any example of such an occurrence.

And, lastly, a fibroid may undergo calcareous degeneration,—a process which is probably allied to that spoken of as ossification of the coats of the arteries, such as is met with in old people. Whether these tumors ever undergo malignant degeneration, is a disputed point. I have met with two cases where the most careful local examination could detect nothing but what appeared to be true fibroids; though the general symptoms, and the fatal result, proved that the tumors were cancerous. But whether they were so from the beginning, or whether they were originally fibroids which became infiltrated with cancer, I cannot say.

Treatment.—As a general rule, I believe that the less we interfere with fibroid tumors, the better will it be for the patient. It is exceedingly doubtful if drugs have any power in producing absorption of these

bodies, or even of arresting their growth. I have watched the effects of mercury, iodine, iodide of potassium, and liquor potassæ, when given by myself or others, and I have never seen these remedies exert the slightest favorable effect. I question very much whether the chloride of calcium will prove of any real value; although Dr. McClintock has met with one case which got well, after taking the liquor calcii chloridi of the Dublin Pharmacopœia (not the solution of chlorinated lime) for two years. The bromide of potassium has also been largely employed, and all that I can say in its favor, is that one patient became pregnant while taking it. The history of this case, abbreviated from my note-book, runs thus: Mrs. E. R., 35 years of age, has been married six years, and has never been pregnant. The catamenia are regular. Applied to me on the 24th October, 1855. A fibrous tumor, about the size of a cocoa-nut, could be detected in the anterior wall of the uterus. She was ordered the bromide of potassium and cod-liver oil, both of which remedies she took for twelve months; and although the general health improved, the tumor did not sensibly diminish in size. Up to the 12th July, 1856, the catamenia were natural and regular; but they did not appear after this date. On the 19th April, 1857, I delivered her of a fine female child: both mother and infant did very well. Three months afterwards the uterine tumor could still be detected, but it was greatly diminished in size.

Remembering, therefore, the low vitality of these bodies, that they frequently are only productive of inconvenience, that they will often attain a certain size and then remain stationary for years, and that their partial absorption or degeneration occasionally takes place at the climacteric change, we had better be content with limiting our treatment to the palliation of any important symptoms which may arise. The danger of attempting a radical cure, either by enucleation, or by gouging the growth and scooping away portions, or by opening the abdominal cavity and extracting the tumor, is so great, that I should be loath to recommend any such proceedings. It is certain that even in the case of a pediculated subperitoneal fibroid, the risk of the abdominal section and removal of the tumor is much greater than that of ovariotomy. With regard to the submucous growths which have become polypoid, a simple and effectual plan of treatment may be resorted to, which will be described in the next section.

One of the commonest symptoms we have to treat is menorrhagia, which occurs most frequently in the submucous and next in the intramural fibroids. The most efficient drugs are, corrosive sublimate (F. 27); gallic acid alone, or in combination with the aromatic sulphuric acid and cinnamon (F. 103); the oxide of silver with Indian hemp (F. 47); and the iron-alum (F. 116), which is particularly useful where there is much anæmia. But it sometimes happens that all astringents prove inefficient, and we must then resort to surgical measures. An excellent practice is that recommended by Dr. McClintock, Mr. Baker Brown, and M. Nélaton; who all allow that a free incision of the os and cervix uteri is generally followed by a remarkable decrease in the hemorrhage. According to Mr. Brown the division of these parts permits the fibres of the body of the uterus to contract upon the contained tumor, so as to compress the vessels. Where the fibroid can be reached, Dr. Atlee recommends a free incision into the most exposed part of the tumor;

which is to be practised by passing a bistoury, upon the finger, along the vagina into the uterine cavity. The incision is followed by a slight gush of blood; but as the cut ends of the vessels quickly retract and get closed by clots, the hemorrhage entirely ceases. According to this gentleman, therefore, the source of the discharge is not in the uterine walls, but in the vessels of the membrane covering the tumor.

When a fibroid is confined to the true pelvis, and by its pressure is interfering with defecation and micturition, or causing severe cramps, these mechanical inconveniences may possibly be removed by pressing the growth upwards into the false pelvis. The difficulty is that there may be adhesions, though they cannot always be detected; and if these be ruptured fatal peritonitis may ensue. Moreover, it is by no means easy to draw the line between judicious and injudicious force. In one instance where I succeeded in efficiently raising the tumor, I certainly remember that an amount of force had to be employed which many would have condemned. However, great relief was afforded without any mischief resulting. Sometimes, where the pains, &c., are due to temporary congestion of the growth, or to œdema, the administration of the bromide of potassium (F. 42) will remove these complications; or they may be subdued by the use of the Kreuznach waters (F. 484), the patient's system being at the same time invigorated by the change of air and the regular living adopted at this bath.

2. Polypus of the Uterus.—The term polypus (*Πολύς*, many; *πούς*, a foot) is by general consent here employed to designate those tumors which are attached to the inner surface of the uterus by a pedicle or neck. They differ much in size, sometimes being scarcely larger than a pea, while on other occasions they have a bulk equal to that of the adult head. Moreover, they are either found occupying the uterine cavity, or they may be in the vagina and merely attached to the uterus by their pedicles.

Pathology.—Polypi vary in structure, but it is probable that they may all be referred to one of the three following species:

The *fibroid* have the same structure as the tumors of the uterus already described; that is to say, they are essentially outgrowths of the uterine muscular tissue. I believe that it is not an uncommon occurrence for a common intra-mural fibroid gradually to assume the polypoid form, as it increases in size, and gets forced more and more into the uterine cavity by the muscular contractions. These contractile efforts are, in fact, attempts on the part of the uterus to throw off the tumor: and they might be divided into three stages,—in the first, they render the growth polypoid; in the second, they expel the tumor into the vagina, possibly with all the symptoms which attend a natural labor; while in the third, they would cause rupture of the neck, did not art generally step in and divide this part.

The *mucous* or *gelatinous* polypi spring from the canal of the cervix. They are composed of delicate bundles of fibro-areolar tissue, covered with mucous membrane containing numerous bloodvessels. They are often very small, perhaps seldom exceeding a walnut in size. It is probably true, as Dr. Hassall has conjectured, that these growths sometimes have their origin in enlarged villi of the cervix.

Placental polypi are formed by portions of after-birth left in utero,

after an abortion or a labor at the full term. The profession is indebted to Dr. Carl Braun, of Vienna, for showing the great importance of retained masses of placenta in the pathogenesis of uterine polypi. This eminent physician and pathologist believes that at least the majority of the so-called fibrinous polypi are the remains and products of pregnancy; and his opinion has been especially confirmed by Dr. Stadfeldt in a paper which should be read by every obstetrician.* From this essay it appears that Dr. Braun rests his views on five cases, in which at a variable interval after delivery there was violent hemorrhage from the uterus. On examination, the polypi were found; in four instances being extracted with the finger, while in the fifth the tumor separated spontaneously. On investigation, these bodies distinctly exhibited the composition of the placental tissue. He moreover describes two preparations in the Vienna Museum, in which may be seen polypoid tumors in puerperal uteri; and these tumors consist of distinctly recognizable placental remains. It is of course no new fact that a portion of placenta may be left in utero after the removal of the greater part of this structure. But it has not previously been shown that such placental débris can assume the external form of polypus, and may, even years after delivery, give rise to all the symptoms of a common polypus.

Symptoms.—The most important symptom produced by a polypus is menstruation. After a time, there are irregular and frequent discharges of blood, often amounting to attacks of flooding. The tumor also, by its irritating effect upon the mucous lining of the uterus or vagina, gives rise to a profuse leucorrhœal discharge; which discharge is often sanious, while in other respects its character varies according to its seat. Moreover, as the growth increases in size, so by its pressure it irritates the pelvic viscera; and we have complaints of frequent micturition, tenesmus, &c. Occasionally also, there are paroxysms of pain, such as attend upon abortions.

The foregoing symptoms are of little value, except in so far that they show the necessity for a digital examination. On instituting this, all doubt about the nature of the case is removed when the practitioner finds the tumor in the vagina, or feels it presenting at the dilated orifice of the uterus, while at the same time the sound can be made to enter the uterine cavity for two inches and a half. But frequently there is no body present in the vagina, and the os uteri is closed. Sometimes, under these circumstances, the cervix is discovered much shortened, and the uterine body more or less enlarged; or there is retroflexion or anteflexion of the uterus, or even greater displacement; or the position of the womb is normal, while the educated finger feels that this organ is

* "On Placental Polypi and Placental Remains in the Cavity of the Uterus. By Dr. Stadfeldt, of Copenhagen. Translated from the Hospitals-Tidende for the 25th December, 1861, by William Daniel Moore, M.D." The Dublin Quarterly Journal of Medical Science, vol. xxxvi, p. 491. Dublin, 1863.

An interesting case of fatal hemorrhage from placental polypus has also been recorded by Mr. John S. Beale (Lancet, 23d April, 1864). At the autopsy, on opening the uterus, a fleshy tumor seven inches in length, and surrounded by a coagulum weighing over twenty ounces, was exposed. The tumor was attached by a pedicle, over one inch in diameter, to the right side of the fundus uteri. This pedicle was about three inches in length, and so firmly adherent that the uterine wall was injured in its removal. The tumor itself was about three inches long, by seven broad; and it consisted of a glossy, soft, even mass, which presented the cotyledonous structure (only smaller) of the placenta, with the usual spongy areolar tissue.

heavier than natural, and its body increased in size. The investigation must therefore be pursued another stage with the aid of the uterine sound; by which instrument the size of the uterus will be learned, and the presence of any movable body in the cavity be ascertained. If still there be doubt, the os and cervix ought to be dilated by tents, in the manner presently to be mentioned, so that the interior of the uterus can be explored by the finger. Very shortly we shall probably be able to obtain a view of the uterine cavity by means of Dr. Cruise's endoscope; with which instrument it seems that deep cavities hitherto looked upon as inaccessible to sight, have been satisfactorily examined.

Terminations.—So long as the polypus remains either in the uterus or vagina there is considerable danger from the hemorrhage. For if this seldom destroys life directly, yet it often goes on to such an extent as to induce severe anæmia, while it may even lay the foundation for some tubercular affection. And it is important to remember that the amount of hemorrhage is in no way dependent upon the size of the tumor; a polypus no bigger than a hazel-nut often giving rise to as much flooding as a very large growth. This circumstance affords strong support to the view that the bleeding takes place from the uterus, and not from the tumor as some imagine.

Very rarely the tumor has set up inflammation and ulceration of the uterus; the morbid action having progressed to such an extent, in a few instances, as to destroy adjoining structures. The following remarkable case is a proof of the truth of this remark: On the 12th May, 1847, a laundress, ætat. 51, the mother of seven children, put herself under the care of M. Loir. The menses had stopped at the age of 46, but two years subsequently she became liable to attacks of uterine hemorrhage. On examination, M. Loir detected the enlarged uterus above the pubes; while a soft polypus was felt at the upper part of the vagina. This polypus, the size of a fowl's egg, came away while an attempt was being made to put a ligature round it; and the profuse hemorrhages to which the patient had been liable then ceased. The cervix became healthy, but the bulk of the uterus did not diminish, and a tumor could be felt in the body. On the 19th June, expulsive pains set in; the os uteri closing, however, instead of dilating. The skin above the pubes became red and tumefied, and at this part the tumor could be distinctly felt. There was fever, with disturbance of the digestive organs. During the ensuing fifteen days eschars were formed at the lower part of the abdominal wall, their separation being accompanied with a purulent and fetid sanies. Suppurating engorgements extended towards the iliac fossæ, particularly to that of the right side. On the 6th July the detached eschars exposed a black substance, about the size of two fists. By the 12th July, the general health had become much impaired under the influence of the offensive discharges from the gangrenous mass, the vomitings, &c. Two days subsequently the prominent portion of the growth was excised; but the patient refused to submit to the attempts which were made to extract the tumor. She gradually sank, and died on the 31st. At the autopsy, the aperture in the abdominal wall was found to measure $3\frac{1}{4}$ inches in length, by $2\frac{1}{2}$ in breadth; and through it a gangrenous pediculated tumor, the size of a fist, protruded. The uterus was adherent by the whole of its anterior surface to the sides of the abdominal opening; and in the thinned anterior uterine wall was an

irregular aperture traversed by the polypus, the pedicle of which was connected with the left side of the uterus. The muscular substance of the remainder of the uterus was much hypertrophied.*—MM. Danyau, Nélaton, and Huguier, who were appointed by the Society of Surgery to report upon this case, regarded it as unique; only three others bearing the least resemblance to it being known. The first of these was reported by Roux, and in it the polypus worked its way through the upper and posterior part of the vagina, becoming lodged between this canal and the rectum. In the second, published by A. Bérard, the tumor traversed the posterior wall of the vulvo-uterine passage, and was expelled through the perineum. While in the third, a case of Lisfranc's, the polypus perforated the recto-vaginal septum, and made its way into the bowel.

Treatment.—I do not think it necessary to speak here of the remedies which may be employed to relieve the symptoms, because it is mere trifling to waste time with astringent injections, blisters to the sacrum, and astringent medicines. So long as the tumor remains, it does so to the jeopardy of the patient. The only question is, as to how the polypus may be best removed.

When the tumor is in the vagina, I believe that no operation is more simple or less dangerous than that of cutting through the pedicle with a pair of curved blunt-pointed scissors. I have not only thus removed almost all the growths of this kind which have fallen under my observation, but I have seen other physicians adopt the same practice with the best results. There has been, in short, neither hemorrhage nor any other unfavorable symptom. At the same time, if the practitioner be nervous, or if the neck of the growth be unusually large, there can be no harm in using the écraseur armed with copper wire, in place of the scissors or bistoury. But to place a ligature round the neck of the tumor, and gradually to tighten this until, at the end of some days, the semi-putrid polypus comes away, seems to me a practice which can no longer be defended. There is but one caution to be added with regard to excising the tumor, and it is this: that before using any cutting instrument the sound must be fairly introduced into the uterine cavity; so that the practitioner may feel thoroughly convinced that he has to deal with a tumor, and not with an inverted womb.

Now although nothing can be more simple than the treatment of uterine polypus when the growth has been expelled into the vagina, and is merely attached by a pedicle, yet the removal of the tumor is not so easy when it is still retained in utero. Under these circumstances, the os and cervix have to be thoroughly dilated with sponge or sea-tangle tents (F. 426). The best plan of using these instruments is as follows: The patient, having had her bowels freely operated on a few hours previously, is to lie at the edge of the bed in the ordinary position for labor. A sea-tangle tent, of such a size that it will pass easily, is then introduced up the whole length of the uterine cavity. This tent should be left for twenty-four or forty-eight hours, the latter being preferable. At the end of the time it is removed, and one of a larger size introduced; this being taken away in its turn, and another used, until the finger will readily enter the uterus. The tumor and its attachments

* Mémoires de la Société de Chirurgie de Paris, tome ii, p. 1. Paris, 1851.

can then be thoroughly explored; and if it appear probable that the growth can be removed we may proceed to induce further dilatation, supposing it seems to be required. I am sure it is a bad practice to attempt extraction of the polypus until the os uteri be sufficiently dilated. For the stretching of the os at the last stage, a sponge is better than a tangle tent; since the former expands more readily than the latter, and does not exert as much force. When sufficient room has been obtained, I have generally removed the tumor by torsion: but if the pedicle be thick, then it ought to be divided by the wire écraseur. Should there be any difficulty in introducing this instrument, a whipcord ligature may be applied by means of Gooch's canulæ provided with a windlass; so that the ligature may be made to cut through the neck of the growth at once, or at all events on the following day. The patient had better remain in bed for a few days after the operation, until the uterus seems to have contracted to its normal size. Since I published some cases illustrative of this plan of treatment about three years ago,* I have adopted it in a few other instances with success.

3. Cysts of the Uterus.—Unilocular cysts, or closed sacs, filled with mucus or serum, are occasionally developed either in the substance of the uterus, or beneath the internal mucous coat, or just under the external serous covering. Sometimes one portion of the uterine structure is invaded by a cystic growth, while another part is the seat of an ordinary fibroid tumor.

The *mucous* cysts have their origin in the follicles about the os and cervix uteri; and they are found to have their seat immediately beneath the lining membrane, or in the muscular substance. They are either single, or several may be developed; and their size may vary from that of a large pin's head to that of a small pear. Not uncommonly the lips of the cervix are studded with them. They are occasionally found projecting through the os; but they may also, instead of passing downwards, extend upwards into the cavity of the womb. This latter direction is possibly most commonly taken in the case of women who have borne several children, owing to the resistance which is offered to such a route being less than in instances where fecundation has only occurred once or twice some long time previously. After they have passed into the cavity of the uterus, their attachment seems occasionally to become pediculated; while subsequently they may be expelled with all the symptoms which attend upon an abortion. On one or two occasions where this has happened, I have been so struck with the resemblance borne by the tumor to a small hydatid cyst, that search has been made for the echinococci heads; though, of course, nothing of the kind has been discovered. The vesicles or cysts which not very unfrequently result from a morbid alteration of the villi of the chorion, and which lead to the formation of the "vesicular mole," might likewise, if they were expelled singly, give rise to an erroneous diagnosis; but as they almost always come away in masses, as their formation is attended with the symptoms of pregnancy, and as the indications of their presence are well-marked and characteristic, it is scarcely possible for them to be mistaken for the cysts under consideration.

* The London Medical Review, vol. ii, p. 3. London, 1862.

In an excellent essay on "Cysts of the Womb," by M. Huguier,* it is shown that each of these growths has two envelopes: First, an internal one, which is smooth, polished, transparent, excessively thin, and very vascular; and secondly, an external membrane, composed of elastic areolar tissue, thicker than the first tunic, and like it transparent. The fluid in these bodies is albuminous, unctuous to the touch, stringy, alkaline, clear, and transparent,—in short it resembles the mucus secreted by the follicles of the cervix. Occasionally it is slightly opaque, and sometimes it contains one or two little grayish or yellowish-white bodies which vividly reflect the light. A microscopic examination of the liquid by MM. Huguier and Robin, has shown that it contains a quantity of molecular granules, as well as spherical or ovoid granular globules formed by the agglomeration of the molecular particles. The uterine tissue around the cysts, as well as the mucous membrane covering them, is generally somewhat congested; while the entire cervix is frequently hypertrophied.

The formation of these cysts takes place more rarely than might be expected. Their growth is slow; while as they occupy parts of feeble sensibility they give rise to no appreciable symptoms in the early stages of their development. But when they have attained a certain size they produce uterine leucorrhœa, irregular and too abundant menstruation, and often attacks of hemorrhage. Pains in the loins and upper part of the thighs are complained of, frequently there is a sense of bearing-down, and in exceptional instances the growth is thrown off with the symptoms which are produced by the expulsion of an early ovum or of a polypus. An examination may fail to detect the cyst if it be situated in the substance of the uterus, or if it project into the canal of the cervix without causing dilatation of the os uteri; but where the latter is patulous, or where the cyst projects from the external surface of the neck, it will be found as a somewhat supple and imperfectly fluctuating, or as a firm and elastic, body. When the cyst occupies the cavity of the uterus, the body of this organ will be appreciably enlarged, and feeling as if occupied by a fœtus or fibroid tumor; the diagnosis being difficult until the os and cervix have been dilated, so that the growth can be reached with the finger.

The treatment consists in making a sufficient incision into the mucous cyst, with the assistance of the speculum; or in having recourse to an incision with the application of caustic to the walls; or in snipping or twisting off the growth if it be at all pedunculated. These cases ought never to be allowed to end fatally, or even to injure the general health; because in any instances of uterine disease where there is constant leucorrhœa, with occasional attacks of hemorrhage, and a small healthy os uteri, the latter should be dilated with sponge or sea-tangle tents (F. 426). After this has been fairly accomplished, the removal of a dead ovum, or of a mass of hydatids, or of a pediculated fibroid or cystic tumor, becomes comparatively easy.

The *serous* cysts may be developed in the subperitoneal areolar tissue, or very rarely in the muscular substance of the uterus. They are probably of more frequent occurrence than the mucous bodies; but their presence is ascertained with greater difficulty during life, inas-

* Mémoires de la Société de Chirurgie de Paris, tome i, p. 253 et seq. Paris, 1847.

much as they grow from the external or abdominal surface of the uterus, while they give rise to no symptoms of any moment unless they happen to press upon the rectum or bladder. It is very probable that not a few of the cases of floating abdominal tumors, which are every now and then met with, consist of these cysts with a long pedicle; while it is also not unlikely that some of the instances of ovarian tumor, that have been recorded as cured by spontaneous rupture into the peritoneum, have really been uterine cysts. The largest growth of this kind with which I am acquainted, occurred in a patient long under my care for severe uterine hemorrhage, due to a fibroid tumor seated in the posterior wall of the uterus. In this case, the post-mortem examination revealed the presence of an oval cyst, formed under the peritoneum which was stretched upwards from the fundus uteri; and as the growth was supported upon the expanded wings of the iliac bones, the uterus had been almost kept out of the true pelvis by it. The sac measured nine inches in breadth, and contained about a pint and a half of urinous-looking fluid. Accompanying the published report of this case, the reader will find an excellent sketch, by Dr Westmacott, of the uterus with the tumor.*

When these serous cysts are detected during life, and when they give rise to troublesome irritation of the rectum or bladder, they should be cautiously punctured, either with a bistoury or a trocar and canula.

IX. DISPLACEMENTS OF THE UTERUS.

1. Prolapsus and Procidentia.—These terms have long been used in practice to designate a descent of the womb as it exists in two different grades. By "Prolapsus" (*Prolabor*, to glide forward) is meant that condition in which the uterus falls below its natural level in the pelvic cavity; while by "Procidentia" (*Procido*, to fall down) is signified the protrusion of the uterus beyond the vulva. The causes of both conditions are the same; while the symptoms vary but little save in degree.

Causes.—All women are liable to a falling of the womb; but it occurs most commonly after the age of thirty-five in such as lead a laborious life. Hence, cooks and laundresses often suffer from it, and next to these perhaps are nurses. Women who have borne children are more frequently affected than such as are sterile; while lingering or instrumental labors especially predispose to it. Amongst other causes also must be enumerated all those conditions which tend to increase the weight of the uterus, such as congestion, hypertrophy, tumors, &c.; violent bearing-down efforts, as in straining to pass hardened fæces, or to procure an evacuation in stricture of the rectum; and forced respirations, particularly those used in coughing, the lifting of heavy weights, &c.

The immediate causes of the displacement may be said to be pressure on the uterus by the superincumbent viscera, and diminution in

* Transactions of the Obstetrical Society of London, vol. iii, p. 11. London, 1862.

tone of the uterine supports. Consequently, prolapsus or procidentia is prevalent among women who have a preternaturally shallow and capacious pelvis; in the sufferers from ascites and ovarian dropsy; in delicate flabby subjects, where the vaginal walls are relaxed, and the broad and round ligaments unbraced and elongated; as well as in cases where the perineum has been lacerated and the torn edges have not reunited. Very rarely we find procidentia in the early months of pregnancy; the uterus, however, as it subsequently rises out of the pelvic cavity assuming its normal position.

Symptoms.—Complaint is generally made of a sense of fulness or weight about the pelvis, of dragging or bearing-down pains, of a wearisome backache, and of a leucorrhœal discharge. Menstruation is seldom interfered with; there is no impediment to conception, since even in most cases of procidentia the uterus goes back by itself or is easily pushed up when the patient is in bed; and the general health is not directly affected. The extent to which the bladder and rectum suffer, in consequence of the pressure of the displaced womb, varies very much independently of the amount of displacement. In some few instances, there is a complete inability to pass water until the patient lies down and replaces the uterus with her fingers, while in other cases micturition may be annoyingly frequent. Constipation is often complained of, and if the woman be careless a large accumulation of fæces may take place in the rectum.

By a vaginal examination, in cases of prolapsus, the uterus is found depressed from its normal site, being often so low that it rests upon the perineum. The detection of the os uteri, at the inferior part of a cervix of the natural length, prevents any error in diagnosis.—In procidentia uteri, a round or pear-shaped tumor, of variable size, is seen projecting beyond the vulva; the mouth of the uterus, often somewhat dilated, being visible at the centre of the lowest part of the tumor. It is always advisable to introduce the sound so as to learn the depth of the uterine cavity, and to make sure that the opening is not a mere cleft in a polypoid growth. The labia uteri frequently present excoriations, or even rather deep ulcers, produced by friction with the clothing and the irritation of the discharges. The epithelium of the vaginal mucous membrane is also dry and harsh and cracked; while sometimes there are one or more ulcers, looking as if portions of the mucous lining had been punched out.

Treatment.—The general principles may be summed up in a few directions: Afford artificial support to the superincumbent abdominal viscera; give tone to the round and broad ligaments of the uterus, to the relaxed vaginal walls, and to the perineum; and remove any complications which can favor the falling, such as uterine congestion or hypertrophy, cough, constipation, &c.

Before speaking of the best mode of carrying out these indications, a remark or two must be made as to the way in which a procident womb is to be replaced. In the great majority of cases there is no difficulty in effecting reposition. It is merely necessary to put the patient on her left side, with the legs well flexed; and then, having thoroughly oiled all the parts, to push up the uterus so as to allow this organ in its ascent to draw in the vagina. Supposing this plan to fail, it will be well to repeat the attempt while the woman rests upon her hands and

knees, with her head much lower than her pelvis; in which position the downward pressure of the intestines must be removed. And still success not following, the procident womb should be firmly encircled with strips of adhesive plaster, reapplying them every forty-eight hours; while the patient is to be kept quiet in bed for a few days, until the circumference of the tumor is sufficiently reduced. After the removal of the strapping the uterus will almost certainly be replaced with ease. Dr. McClintock has recorded a case where, the procidentia having existed continuously for four years, he was unable to effect reposition until he had thus compressed the uterus and vagina by four consecutive strappings. In a remarkable instance, where this plan was not tried, and where the uterus was passing into a state of sphacelation although it had only been down three or four days, Mr. T. F. Edwards applied a whipcord ligature around the neck of the tumor. On the following day a fresh ligature was put on; while the parts below it—consisting of the whole uterus—were excised. Seven days subsequently, the ligature came away; and in another fortnight the patient—74 years of age—was walking about the streets of Denbigh to the astonishment of her surgeon and friends. The first symptoms of displacement had been observed twenty years previously, and there had often been some trouble in replacing the womb. Three months after the operation she was in good health.*

Returning to the subject of general treatment, attention must be directed to the importance of affording support to the abdominal viscera, a point which is too often neglected. Now support may be given in many ways. Where the patient is poor, I generally direct her to manufacture a belt of common jean, making it to lace behind; taking care that it is so constructed as to produce pressure from below upwards, while it is to be comparatively easy above. A couple of bands, covered with wash-leather, are fastened behind, so that they may be brought under the perineum and then buttoned to the jean in front. These bands prevent the belt from riding upwards: while a pad covered with oil-silk may be fitted on them, if necessary, to give support to the perineum. A much more perfect instrument is known as Hull's "Utero-abdominal Supporter," which forms an excellent abdomino-perineal bandage. Mr. Bigg has also contrived a very useful kind of abdominal plate, which is fixed with steel bands something like a double truss.

To give tone to the uterine ligaments and vagina, a nourishing diet with strengthening medicine ought to be prescribed. Every practitioner has a preference for some particular kind of tonic, and my predilection is in favor of a combination of nitric or phosphoric acid, nux vomica, and bark (F. 376). Of the various ferruginous preparations none are superior to the common tincture of perchloride of iron (F. 380, 392). Locally, recourse is to be had to astringent vaginal injections (F. 425); or to astringent pessaries (F. 423), which have answered admirably in my hands. In mild cases, tannin pessaries will almost alone effect a cure; but care must be taken that they do not set up too much irritation. Cold salt-water hip baths are also recommended. Where the mucous membrane is ulcerated, the application of nitrate of silver proves very serviceable.

Three special methods of giving relief in these cases yet remain to be

* British Medical Journal, p. 147. 6th February, 1864.

considered. And, first, with regard to mechanical pessaries, I would say that they have only seemed to me to be required in very rare instances. They are indeed clumsy inventions, mostly of use for concealing the practitioner's want of skill. But some poor women do not ask to be cured; they are unable to give the necessary attention, and all they desire is that they may still work as laundresses, cooks, market gardeners, &c., without a day's cessation. Under these circumstances the womb may be kept up by a well-adapted pessary. Many various kinds of instruments are sold; the best being the oval boxwood, the vulcanized India-rubber, the gum-elastic, and that known as Zwanke's pessary. This latter support is made of two oval plates of tin, united at one extremity by a hinge. On each side of the hinge, upon the lower surface of the plates, there is a metallic stem. These stems, on being widely separated from each other, carry the oval plates face to face, thus allowing the instrument to be closed and easily introduced. Then by bringing the stems in contact, the plates are separated, so as to form an expanded surface like a pair of wings; this position being maintained by a screw which holds the stems together. Mr. Coxeter has somewhat modified this instrument for me, by substituting strong wires interlaced, for the oval plates; so that while the pessary is worn the patient may still use astringent injections, and thus hope for an ultimate cure.—Whatever pessary, however, is employed, the patient should be impressed with the importance of frequently removing it. The most offensive task I ever had was to extract an impacted boxwood pessary, which had been worn continuously since its first introduction two years previously. It was impossible to get it away without breaking it to pieces, and the stink from the matters which had accumulated in its interior was exceedingly disgusting. Moreover, several weeks elapsed before the ulcerations upon the vaginal mucous membrane healed, and even then it was found that the procidentia remained uncured.

The second method aims at a radical cure, and consists in subjecting the patient to a somewhat severe surgical operation. The plan, known as Marshall Hall's, is to dissect off one or more longitudinal strips of the vaginal mucous membrane, and then to bring the edges of the wound together with sutures; so that after the surfaces have healed, the calibre of the canal will be found diminished in proportion to the extent of tissue removed. The strips ought to be somewhat wedge-shaped, the apices being towards the os uteri; and it is generally better to remove a slip from each side of the vagina, rather than to take a very broad one from only the anterior or posterior surface. In the very few instances in which I have resorted to this procedure, the result has been successful; but it must be remembered that it is an operation not free from danger, and that the after-treatment is somewhat tedious.

A third proceeding, which has been extensively practised, and which I formerly resorted to more frequently than I do now, consists in partly closing the vulval opening; so that if the uterus afterwards descends it falls upon an elongated perineum, instead of escaping externally. The mucous membrane from part of the sides and posterior wall of the lower part of the vagina is cleanly dissected off, an extensive horse-shoe shaped raw surface being formed. Quill or clamp sutures are then employed to keep the opposite surfaces in close contact, and the edges of the wound are brought together with a few superficial sutures; the former being

removed about the sixth or seventh day, while the latter are allowed to remain for a couple of days longer. This operation is principally adapted for those cases where the perineum is more or less deficient, owing to some rent having occurred at the time of labor; but where there is a healthy perineum it has seemed to me very often to fail. At all events, I have not succeeded to anything like the extent I had anticipated; and cases have come under my care of bad procidentia, although the perineum had been thus lengthened some months previously by surgeons of great experience. And this is not surprising. For it must be remembered after all, that the perineum has but little to do in preventing uterine depression; inasmuch as it is sometimes seen completely ruptured without any procidentia occurring, while it may be perfectly natural in some of the worst forms of descent. I have even observed a firm and large hymen coexist with procidentia, as in the following case: On the 3d June, 1864, C. P., aged 41, single, with the catamenia regular, and following the occupation of a nurse, consulted me for a falling of the womb, from which she had suffered for three years. To my surprise I found a small cervix uteri completely protruded, there being also a tough and extensive hymen. The cervix, which appeared constricted, was gently pushed upwards into the vagina; the opening in the hymeneal membrane being then felt so contracted that it only admitted the finger with pain. A complete cure was effected by using the tannin pessaries, while a slight abdominal belt was worn.

In conclusion, it is necessary to warn the practitioner against placing much reliance upon those reports of cases of procidentia of the uterus which only show that the patient leaves the hospital "cured." For this term can never fairly be applied, unless she remains well for many weeks after resuming her customary occupation. To assert that a woman is cured, because her womb does not descend when she has just undergone some operation and has had a month's rest in bed is as great an abuse of language, as to say that a sufferer from mammary cancer is cured because her breast has been amputated and the wound has healed.

2. Retroflexion and Anteflexion.—The condition known as retroflexion (*Retro*, backwards; *flecto*, to bend) consists of a bending back of the uterus at the part where the neck joins the body; so that the fundus is found between the cervix and rectum, the os uteri being in its normal position. The uterus, indeed, becomes shaped like a retort. In anteflexion (*Ante*, forwards, and *flecto*,) we find the fundus pressing upon the bladder. Considering that in the natural condition of the womb this organ is slightly anteflexed, it is certainly remarkable that retroflexion should be so much more frequently met with than an exaggerated degree of anteflexion.

Causes.—The displacements under consideration may result from the fundus being top-heavy, owing to the presence of a fibroid tumor in either the anterior or posterior wall of the uterus, or of a polypoid growth in the uterine cavity. Prolonged congestion also probably acts in the same way. Relaxation of the proper tissue of the uterus is not an uncommon cause of retroflexion; and therefore we meet with this displacement in cases of too frequent childbearing, in delicate women suffering from menorrhagia, and in women who become exhausted through excessive sexual intercourse. Irregular contraction of the uterus, espe-

cially after abortion, often produces backward displacement; while the latter is certainly increased, even if it be not sometimes originated, by constipation and the straining exerted to pass hardened fæces.

Symptoms.—Retroflexion may undoubtedly exist without giving rise to any symptoms of the least importance. This happens, I believe, only when the displacement is slight and the uterine structures are flabby, or when the pelvic cavity is more than ordinarily capacious. But where the angle of flexion is acute, where the circulation through the uterus is much interfered with, and where the fundus is immovably pressed upon the rectum—encroaching upon its cavity like a firm tumor—I have always found the patient complain of considerable suffering.

In a typical case of retroflexion the practitioner's attention is first directed by the patient to a dull, wearying, and constant backache, which is most marked about the sacral region. He will be told that the pain shoots down the thighs, and that the groins are tender. Complaint is also made of a feeling of fulness about the rectum, so that there is an unusually frequent desire to go to stool although nothing comes away. Moreover, the passage of a motion which is at all constipated aggravates the aching in the back, and perhaps produces pains which shoot through the pelvis. Sexual intercourse is attended with suffering; whilst just before and after the monthly periods there is so much tenderness that connection cannot be tolerated. The catamenia always come on with pain and difficulty; but about the end of the second day the flow of blood seems to give some relief. The general health is bad; there are frequent attacks of nausea; the appetite is small; the spirits are much depressed; and a train of symptoms is present which the sufferer has been assured is due to hysteria.—On making an examination, the os and cervix uteri are found in their proper situation; but pressing upon the rectum is a round body, exquisitely sensitive to the touch, and which consists of the congested fundus. On touching this part, or on attempting to elevate it, the patient will exclaim that it is the seat of her suffering. Owing to this great tenderness there will be but little difficulty in recognizing the nature of the case; but in order to be absolutely certain that there is no tumor, the substance must be gently raised with the finger, while the sound is cautiously passed into the uterine cavity. The disappearance of the tumor while the uterus is kept in its normal position, makes the diagnosis certain; but if any confirmation be still needed, it may be found in the circumstance that after the withdrawal of the sound the fundus will be gradually felt falling back again.

In the comparatively few cases of anteflexion which I have seen, the general symptoms and the local suffering have been very much less severe. In fact, such cases would hardly fall under observation, were it not that the pressure of the fundus very commonly produces great irritability of the bladder; so that while the patient is in the erect position the desire to micturate is almost as frequent as in cases of stone. Moreover, although it is not uncommon to find considerable engorgement and tenderness of one or both ovaries in retroflexion, such complications are rare in anteflexion. Sterility is the consequence of both displacements.

Treatment.—In some few cases, the uterus when replaced by the sound retains its natural position; and the patient by remaining quiet in bed, for some twenty-four hours, may be able to leave it quite well.

But in the greater number of instances, the womb falls back almost

immediately after it has been replaced. Sometimes, when it is certain that there is no endometritis, a cure may be effected by the introduction of a stem pessary; by which instrument the circulation through the uterine tissues is allowed to go on naturally, and therefore the fundal congestion gets removed. The intra-uterine stem which I have found most useful is one which has been made by Mr. Coxeter at my suggestion. It is two and a quarter inches in length, and is fashioned somewhat like a flattened silver female catheter; having a slight curve corresponding to the natural bend of the uterus, and terminating at its lowest part in a thin concave plate on which the labia uteri rest. If this instrument produce the least pain, if the congestion of the uterus do not gradually disappear, or if there be any ovarian tenderness, medicated pessaries containing belladonna and the iodide of lead or the mercurial ointment (F. 423) are also employed at the same time. The patient is kept in bed for the first few days, and then gradually allowed to get about; but she is watched during the whole period of treatment.

There are cases, however, where this plan is inapplicable. Then, when the mucous membrane of the uterine canal is healthy, we may resort to the measure suggested by Dr. Moir, of Edinburgh. This consists in dilating the cavity of the uterus with the sponge or sea-tangle tents (F. 426); beginning with a small size, and persevering until the finger can readily enter and explore the cavity. Having satisfied ourselves that there is no foreign body present, the uterus is allowed to contract upon a metallic stem such as has just been described. The stem should be changed every forty-eight hours, beginning with one of considerable size and ending with one rather larger than the uterine sound. The stem last used, moreover, had better be worn for some few weeks. Dr. Moir recommends wire pessaries covered with gutta percha, but I have not employed them.

In the third class of cases, where the uterine congestion and tenderness have been very great, or where there have been more or less prominent symptoms of endometritis, I have adopted a practice which I first learned the value of from Mr. Baker Brown. This gentleman, believing that the muscular tissue is not passive in retroflexion, and that there is probably active contraction at the point of flexion, has incised the os and cervix with the hysterotome; dividing the parts freely up to, but not through, the internal os. I am not quite certain whether Mr. Brown divides the tissues at the angle of flexion, but I have always done so; although the incisions at this point must be made very cautiously, inasmuch as the tissues are often thinner there than in healthy uteri. With the precautions already recommended in using the hysterotome (p. 603), I believe that this operation is almost free from danger, and that if adopted in suitable cases it will effect a cure.

One word of warning must be added as to those very rare cases where the uterus is not only displaced, but in which the fundus is bound down by adhesions in its unnatural situation. To rupture these would probably excite severe, and perhaps fatal, peritonitis. Should such adhesions be present they may be diagnosed by the practitioner finding it impossible to elevate the fundus with the finger; while if he attempt to replace the womb with the sound the tearing pain produced will be unbearable. In such cases, we shall have to be contented with giving relief by the frequent use of the iodide of lead and belladonna pessaries;

two or three leeches must be occasionally applied to the uterine lips when there is evidence of congestion; and the bowels ought to be kept regular by pepsine, the mineral acids, and very simple aperients, so as to prevent any lodgment of fecal matter in the rectum above the projecting fundus.

3. Retroversion and Anteversion.—These displacements are very seldom met with in the unimpregnated state. In retroversion (*Retro*, backwards; *verto*, to turn) the uterus lies almost transversely in the pelvic cavity; the fundus being towards the hollow of the sacrum, while the os is under the arch of the pubis. The opposite condition, anteversion (*Ante*, fowards; *verto*), is characterized by the fundus lying towards the bladder, while the os is found directed to the cavity of the sacrum.

The chief *symptoms* are backache and bearing-down pains. There is usually a leucorrhœal discharge, but this is due more to the cause of the malposition than to the displacement itself. Menstruation is not interfered with, neither is impregnation absolutely prevented. In retroversion the os uteri is seldom pushed forward with such firmness as to press on the urethra, and so give rise to retention of urine; although such an occurrence is very commonly the result of this displacement when the uterus is enlarged by the existence of pregnancy. Nevertheless, it may happen that micturition is impeded; and therefore if any tumor be felt at the lower part of the abdomen, or if the patient complain of a constant desire to pass water, or if the urine dribbles away, the catheter ought to be passed.

In the cases which I have seen, the general condition has been one of debility; the muscles especially being deficient in tone, and the vaginal walls much relaxed. The *treatment* has therefore consisted in allowing a nourishing diet; in administering such tonics as quinine and steel and nux vomica (F. 380), or the mineral acids with strychnia and some bitter infusion (F. 378); while locally astringents have been employed, particularly injections of alum and sulphate of zinc (F. 425), or tannin pessaries (F. 423). Cold sea-water baths have proved especially useful. The occasional replacement of the uterus with the sound has also materially assisted the cure.

4. Inversion of the Uterus.—Not a few practitioners pass through a long and busy life without ever meeting with a case of uterine inversion. The uterus, in this accident, is literally turned inside out. The fundus descends through the os uteri; so that the mucous lining of the cavity of the womb becomes the external covering of the tumor, which projects into the vagina and generally through the vulva.

The uterus may be inverted immediately after labor; either from delivery occurring unexpectedly while the patient is in the erect posture, or from irregular contraction of the uterine fibres, or from the practitioner making violent traction on the funis to remove the placenta. The only examples of inversion which have been under my own observation were due to the latter cause. The *first* case happened on the 2d July, 1860, when I received a note asking for my immediate attendance, as "a large tumor had been spontaneously expelled from the womb directly after the birth of the child." The gentleman who had effected

delivery thought the tumor might be ligatured, or at once cut off, with advantage. On examination the uterus was found completely inverted, with the placenta attached. The patient was very faint, but on peeling off the after-birth only slight difficulty was experienced in effecting reposition. She recovered favorably.—The *second* instance occurred on the 2d August, 1860, a rather curious circumstance, as during twenty years I have seen no other cases. The patient, a primipara, was attended by an experienced student from King's College Hospital. On the birth of the child there was considerable hemorrhage; and while the accoucheur was attempting to check the flooding by removing the placenta, the uterus became completely inverted. I took away the placenta, reduced the inversion, and the patient did well.

The fundus of the uterus may become much depressed directly after labor, although complete inversion does not follow for many hours or even for a few days until some irregular contractions have forced the fundus and body quite externally. These cases are sometimes spoken of as examples of *spontaneous* inversion, the accident occurring independently of any interference on the part of the practitioner.

Cases of inversion have also been observed quite independently of parturition. Thus, a polypus attached to the fundus uteri having been expelled into the vagina, the womb has become inverted owing to the continuance of the forcing pains. Or, straining efforts like those of labor have been set up by a fibroid tumor, and the uterus has been inverted so that the growth could be seen projecting from the uterine wall.

The symptoms which immediately result from inversion are those of severe nervous shock. There is also a bearing-down pain, nausea and vomiting, cold sweats, a rapid feeble pulse, and perhaps hemorrhage. If the placenta has come away prior to the accident, the latter may escape detection; the symptoms probably being attributed to the hemorrhage. Under these circumstances, death has occurred from exhaustion without a suspicion as to its cause, until the nature of the case has been revealed at the autopsy. Or the patient has gone on for months, or perhaps years, suffering from very bad health, anæmia, repeated attacks of hemorrhage, nausea, &c., without the cause being surmised until a proper vaginal examination has been made. And even then, at least some nine or ten cases are known where the inverted womb has been mistaken for a polypus; the error not having been discovered until after the organ has been excised, or a ligature placed around it. No false diagnosis can be made, however, if the relations of the tumor to the os uteri be observed. For on passing the finger, or the sound, upwards along the tumor, a cul-de-sac will be found all round its neck; so that the instrument will not penetrate between the tumor and the os uteri for more than about half an inch. If the inverted womb be protruded beyond the vulva, the rough and bleeding surface of the body will proclaim its nature. While if further evidence be needed, the orifices of the Fallopian tubes may be sought for, and a probe passed for some little distance into each.

Supposing that the uterus is inverted with the placenta attached, the latter organ must be peeled off before attempting reposition. It has been thought that by adopting this practice, the risk of hemorrhage would be increased; but independently of the great advantage derived from lessening the bulk of the womb, the danger is more imaginary

than real. Then the uterus should be grasped as firmly as possible, and steady long-continued pressure made in an upward direction, so as to reduce that part first which has last descended. The inhalation of chloroform may generally be allowed with advantage; for independently of the importance of saving the patient unnecessary pain, this anæsthetic serves to relax the os uteri.—In chronic cases the same plan of treatment is to be resorted to. If the inversion be of some years' duration, it will probably be necessary to repeat the attempts at replacement day by day, for some eight or ten occasions, keeping up pressure in the intervals by the introduction into the vagina of a well-adapted air pessary. Assuming that, after as many fair attempts as seem justifiable, the inversion be found irreducible, is further treatment to be abandoned? As a general principle, the answer to this question must be in the negative. For there is sufficient evidence to show, that the danger of the patient sinking from the constant irritation and repeated hemorrhages produced by an inverted womb is really greater than that which follows the removal of the organ by the ligature or écraseur. The experience which I have had with the latter instrument in other operations upon the uterus, leads me to recommend its employment in this; for if the chain be worked slowly and cautiously there is no fear of hemorrhage, while the risk of inflammation is certainly not greater than with the ligature.

X. DISEASES OF THE OVARIES AND OVIDUCTS.

1. Acute and Chronic Ovaritis.—Inflammation of the ovary, in the non-puerperal state, occurs under two forms,—the acute, and the subacute or chronic. The first variety is as rare as the second is common. It is comparatively seldom that both glands are simultaneously affected in either form; while the left ovary is more frequently attacked than the right. In sixty-eight cases of acute and chronic ovaritis, the histories of which have been collected by Dr. Tilt, the inflammation was on the left side in 34, on the right in 21, and on both sides in 13. Moreover, it is happily an exceptional circumstance to find the morbid action running on to suppuration.

Acute ovaritis may be due to violence, or to the use of strong caustics to the cervix, or to the sudden suppression of the menses from a sudden shock or cold, &c. It has also occurred during the progress of gonorrhœa; but whether due to this disease, or to its treatment by astringent injections, copaiba, &c., seems doubtful.

One of the prominent symptoms is pain, which is of a variable character. Sometimes it is most intense; although more frequently it is not continuously severe but rather of a dull aching character, with a recurrence of sharp lancinating paroxysms. The lower part of the abdomen is tender; and especially so is the groin and the inner part of the thigh, on the side corresponding to the affected gland. If the morbid action continue unchecked, the peritoneum often becomes involved; and then the bladder usually suffers, the calls to micturate being frequent, while the urine becomes scanty and high-colored and

scalding. When also that portion of the serous membrane covering the lower part of the descending colon and rectum gets affected, there will be symptoms of tenesmus; while the passage of scybala often causes intense suffering, especially if the hardened fæces press upon the inflamed ovary. There is usually considerable constitutional disturbance,—such as fever, rapid pulse, nausea, disgust for food, restlessness, &c.—A vaginal exploration shows that the cervix uteri is free from swelling or undue heat, although it is often somewhat tender. But on moving the finger to the right or left side, the practitioner will detect an exquisitely sensitive body, which is found to be movable, and about the size of a large walnut. Where the abdominal walls are thin, the gland may be more distinctly felt by making pressure with the left hand above the pubes, while the forefinger of the right hand is retained within the vagina.

Pus may form in the ovary without there being any well-marked symptoms to indicate its presence. This was the case in a lady who was under my care several years ago, and who died in consequence of the effusion of the matter into the peritoneum.* In other instances, however, the occurrence of suppuration has been indicated by rigors, a quick and feeble pulse, a glazed red tongue, excessive sickness, and a sense of weight and throbbing about the lower part of the abdomen. Should the abscess burst into the rectum, or into the vagina, a feeling of relief will usually be experienced immediately, and the patient may ultimately do well; though not unfrequently these cases are very troublesome, as the opening closes and the matter accumulates again and again. Where the pus is discharged into the peritoneum, inflammation will be set up, which is almost certain to end fatally.

In the treatment of acute ovaritis I have seldom had recourse to depletion, unless the attack has been connected with a sudden suppression of the menses. But in such cases, the application of four or six leeches to the lips of the uterus often gives marked relief. Hot hip-baths, repeated night and morning, for twenty or thirty minutes at a time, are always serviceable; their employment being followed by the introduction of a pessary of opium and belladonna (F. 423) into the vagina. When the bath produces faintness, half a tumblerful of white-wine whey (F. 10) ought to be given at the time of depression. If it be thought desirable to administer mercury, this agent may be advantageously mixed with the pessary; but care should be taken not to produce salivation. Then, fomentations to the lower part of the abdomen, or hot linseed poultices applied over the vulva and hypogastric and inguinal regions, are serviceable. Where these measures fail to relieve the pain opium should be given; sometimes one grain of the extract being needed every three or four hours. Supposing that suppuration has occurred, and that the abscess points in the vagina, it may be advisable to carefully open it with a trocar or bistoury; but the practitioner had better not interfere unless he feels quite certain with regard to the diagnosis.

Chronic or *subacute ovaritis* is a very common affection during the period of sexual vigor. This will not appear remarkable if it be remembered how closely allied the process of ovulation is to inflammation.

* Lancet, p. 75. 24th July, 1852.

The monthly congestion of the ovary, terminating in a rupture of its coats, is just that kind of physiological process which would seem most likely to run on to disease upon very slight provocation. And not only does this periodical congestion predispose to attacks of ovaritis, but it often renders the affection very obstinate when once established; for while the inflammation interferes with the healthy performance of the menstrual functions, the morbid menstruation aggravates or perpetuates the inflammation. So, also, whatever interferes with the due performance of the uterine and ovarian functions may induce subacute ovaritis. In this way it may be set up by cold, especially if this cause be called into play during menstruation. The injection of iced water into the rectum to check flooding, has been known to induce an attack of ovaritis. Again, this disorder is not infrequent in the newly-married, being produced by excessive sexual intercourse; while it is not an uncommon cause of suffering to prostitutes. The improper application of caustics to the uterus, or the rough use of the uterine sound, may set up inflammation; just as the rash employment of the male catheter may make false passages or induce orchitis. But as catheterism is not to be condemned because it is productive of mischief in unskilful hands, so the uterine sound can only be spoken of as "an abomination," by gentlemen who have not the dexterity to handle it with the care which all instruments require. Lastly, I believe that subacute ovaritis may occur spontaneously in women of a rheumatic diathesis; and possibly also in such as have a syphilitic taint.

The chief symptoms of this form of inflammation are—a dull and continuous aching in the ovarian and sacral regions; tenderness of the upper part of one or both thighs; scanty and difficult menstruation; pain on sexual intercourse; irritability of the stomach, so that there are frequent attacks of nausea, indigestion, and sometimes sickness; paroxysms of hysteria; irritability of the bladder; more or less dysmenorrhœa; tumefaction and tenderness of one or both breasts; while in exceptional cases there may be appearances leading to the suspicion of masturbation. Attacks of nymphomania, or even some chronic forms of insanity, may have their origin in subacute ovaritis. If pressure be made over the groin on the affected side complaint will be made of pain, while sometimes there is a slight apparent fulness; and if a vaginal examination be instituted, the inflamed gland will be felt swollen, and sensible to the touch.

In the selection of remedies it must be remembered that the sufferers from subacute ovaritis are for the most part delicate women; and that no plan of treatment will be successful which does not tend to improve the general health. Hence it is always important to attend to all that pertains to hygiene. The patient should clothe warmly; and especially ought she to wear cotton drawers in the summer, and flannel ones during the winter months. Her diet should be nourishing, animal food being taken at least once a day; while malt liquors ought to be forbidden, and milk freely allowed. Gentle exercise had better be taken daily in the open air; walking generally causing less annoyance than the jolting of a carriage. Warm hip-baths, once or twice a week, are also useful; whereas cold bathing is generally injurious. Sexual intercourse will at least retard the cure.—As regards drugs I confess to having most faith in the iodide of potassium, which I generally give in

combination with some bitter infusion (F. 31). Where there is much pain, from five to ten minims of tincture of aconite should be added to each dose. Cod-liver oil is especially serviceable, provided the stomach can digest it; and even if there be any difficulty in this respect, a daily dose of pepsine (F. 420) will often overcome it. And then, locally, no agents will prove so serviceable as the iodide of lead and belladonna pessaries (F. 423), one being introduced into the vagina every night. When the sacral pain continues in spite of the use of these pessaries, a belladonna plaster ought to be applied. It is only necessary to add that bleeding and blistering have never appeared to me to be necessary; while I have seen all the symptoms considerably aggravated by the administration of steel.

2. Ovarian Tumors.—Three varieties of tumors are met with in the ovary, viz.: the fibrous, the cancerous, and the cystic. The first two kinds demand but little notice. For not only are they rarely met with, but the innocent growths seldom destroy life unless improperly interfered with; while the attempt to remove a malignant tumor by abdominal section will probably prove fatal, and in any case cannot effect a cure.

Cystic disease of the ovary—the common ovarian tumor—consists in the conversion of the gland, or of parts of it, into cysts. These cysts, in the majority of cases, very probably have their origin in the Graafian vesicles. There are three varieties of ovarian cysts,—the simple or unilocular; the compound, multilocular, or proliferous; and the dermoid cysts. The simple cysts are less frequently met with than the compound; they often attain a considerable size; and the fluid they contain generally resembles urine in appearance and density, while it is loaded with albumen. The multilocular tumor is the most common; the cysts vary in size, there frequently being one large one, with a number of smaller sacs congregated towards the pedicle; and the albuminous contents are thick or gelatinous, often dark-colored from admixture with altered blood, and presenting large quantities of cholesterine, which may be skimmed from the surface after the fluid has been evacuated. The dermoid cysts are peculiar, inasmuch as their lining membrane has the power of producing the appendages of the skin: so that they are found to contain hair, teeth, and sebaceous matter.

Ovarian tumors run their course much more rapidly than is generally supposed; and it seems to me probable that the greater number prove fatal within four years from the first appearance of the symptoms.*

* The most marked exception to this rule which I have met with is the following: On the 22d July, 1861, I saw Mrs. W., Camberwell, in consultation with Drs. Brodie, Sewell, and Crosby. She was 72 years old, was married at 19, had 3 children, and aborted exactly 40 years ago. After this abortion there was no pregnancy, but she noticed that her stomach remained enlarged. On consulting Sir Astley Cooper and Sir Charles M. Clarke she was told that there was an ovarian tumor. This tumor continued to grow very slowly: it did not interfere with the uterine functions, the catamenia continuing regular until the age of 52. Since the change of life her health has been good, but the tumor has been very inconvenient owing to its size. During the past six months there has been a painful ulcer on the left ankle, which resists all attempts at cure. On examination there is found an immense ovarian tumor, consisting of one large cyst and several smaller ones. The dyspnœa is most urgent. To alleviate the latter I tapped her, and removed seven gallons of a thick dark-colored fluid loaded with cholesterine. The relief was very great; and in four

For although the growth of the tumor is at first slow, yet after it has attained sufficient size to prove of considerable inconvenience the rate of increase is rapid.—Like all diseases of the sexual organs, the one under consideration is most common during the time that the functions of the ovaries are called into play. It affects both married and single women,—perhaps the former more frequently than the latter; while the sufferers from it are often sterile, or at all events their pregnancies have been few.—With regard to the ovary most liable to be affected, it seems that if we look to the records of 500 cases of ovarian tumor, examined only during life, we shall find the disease said to be seated in the right gland in about 250 cases, in the left in some 170, and in both in 80. But if we take only those cases where the opinion has been verified by operation or post-mortem investigation, then the numbers become much more equal, though there is still a slight preponderance in favor of the right side. In about one case in twenty both glands are diseased, although the proportion is said to be much greater by some authorities.

The *symptoms* produced by an ovarian tumor in its early stages are usually so slight that the disease escapes detection until the patient finds her abdomen rapidly enlarging: while even then, so little pain or annoyance does she experience that the increase in size is often attributed to pregnancy, or to the growth of fat. It is only in exceptional instances that the tumor, while small enough to remain in the pelvic cavity, gives rise to irritation of the rectum or bladder, or to a sense of weight and oppression, or to pain and numbness extending down the thigh of the affected side; these symptoms being much more characteristic of ovaritis, and even of fibroid tumors of the uterus. Pain in the back—an annoying aching and weakness about the sacrum—is not unfrequently complained of; but women so constantly suffer from this, that they hardly think of seeking advice for it. Moreover, in most cases menstruation continues regular; though in others, the flow may be entirely suppressed, or it may appear irregularly, or it may be scanty or profuse.

When the tumor has attained such a size as to attract attention—which, strange as it may appear, will probably not be until it is as large as a child's head—then pain or tenderness begins to be complained of; the pain not being so unbearable, however, as the sense of distension, although the suffering becomes severe when any peritoneal inflammation sets in. The menstrual function often gets disordered or suppressed, the patient loses flesh, and the tumor by its pressure interferes with the functions of the abdominal viscera. Constipation, indigestion, diminished secretion of urine, with frequent micturition, are amongst the chief complaints; while there is loss of appetite, restlessness at night, dyspnœa, diminution of strength, and in fact a sense of progressive general decay. On examining the abdomen, it is found much enlarged; and it may be difficult at first to decide whether this enlargement be due

days the ulcer on the ankle healed.—On the 1st July, 1862, she was nearly as large as before, and therefore tapping was resorted to for the second time, six gallons of fluid being taken away. She had enjoyed, however, nine or ten months of comparative ease since the first operation.—By the 30th January, 1863, the cyst had refilled; the tumor being of such a size that it rested upon the thighs down to the knees when she sat up. She was much prostrated, there was urgent dyspnœa, and great swelling of both legs. In the hope of giving her a respite, Drs. Sewell and Crosby agreed that she should be again tapped, and I drew off four and a half gallons of very thick fluid. The operation gave relief, but she sank from exhaustion four days afterwards.

to a tumor or to ascites. There is fluctuation, which varies in distinctness, according to the number of cysts, their distension, and their size; while percussion elicits a dull sound over the whole tumor, except in those rare instances which will presently be referred to.—In not a few cases the growth gives rise to ascites; but almost always, after a time, the lower part of the abdomen, the vulva, with the thighs and legs, become œdematous. Then the suffering rapidly increases, and the tumor greatly impedes the patient's movements; the nights are wretched, the sleep being imperfect and unrefreshing, while the attacks of dyspnœa prevent the woman from lying down; there is sometimes suppression of urine, followed by headache, stupor, convulsions, and coma; or great prostration sets in, which soon ends in death.

The *diagnosis* of this disease is not always so easy as the physician might imagine from examining a well-marked case. In the early period, when the tumor is confined to the cavity of the pelvis, the patient seldom seeks advice; since she is either unaware of the existence of any morbid condition, or, if she experience some slight inconvenience, she deceives herself as to its cause. At this stage, however, if an examination per vaginam be made, a tumor, varying in size from a hen's egg to a large orange, will be discovered on one side or other of the uterus; while the vagina will be found elongated, and the os uteri drawn upwards, and towards the affected side. At the same period inspection of the abdomen will detect the existence of a certain amount of fulness on one side of the hypogastrium, or in one of the iliac regions. As the enlargement increases, the abdominal swelling becomes more symmetrical, so that when the tumor has reached the umbilicus, it is often somewhat difficult to decide whether one side of the abdomen presents any greater prominence than the other. Many practitioners imagine that an ovarian tumor always occupies the side on which the disease is situated, while the pregnant uterus is believed to have its centre as constantly in the median line; but neither of these propositions are absolutely correct.

A small ovarian tumor is more likely to be mistaken for a fibroid tumor growing from the side of the uterus, or for a distended urinary bladder, or for an abscess in the broad ligament, or for an extra-uterine gestation, than for the pregnant uterus. But the former may often be distinguished by the feeling of great elasticity, hardly amounting to fluctuation, communicated to the touch on making a vaginal examination; by the facility with which the sound can be passed into the uterine cavity, and the manner in which the uterus can be perceptibly moved away from the tumor, and independently of it; by the persistence of the tumor after emptying the bladder with the catheter; by the non-existence of those constitutional symptoms which arise from inflammation ending in suppuration; and by the absence of those inequalities of surface which are produced by the different parts of the fœtus. The history of each case, and the duration of the symptoms, will also afford material help in forming the diagnosis: though I have seen recent cases of ovarian dropsy where there has existed suppression or irregularity of the catamenia, morning nausea and vomiting, indigestion, troublesome constipation, irritability of the bladder, a sense of movement in the abdomen, and swelling with tenderness of the breasts.

The chief diagnostic marks of an ovarian tumor which has attained a

large size are the following: The abdomen is found more or less completely occupied by the morbid growth; the enlargement being smooth and rounded, without any prominences when the disease is of the unilocular variety, but often very uneven in the multilocular form. A practitioner has been known to confidently assert that the limbs of a child could be distinctly felt through the parietes, when there was only an ovarian tumor causing a considerable inequality of surface. In the erect posture, as well as in the supine, the tumor projects forwards, the flanks being undistended. In the multilocular, more commonly than in the unilocular tumor, the superficial veins coursing over the abdomen are seen to be enlarged; and it has been thought by some observers that the vessels on the side corresponding to the diseased ovary are generally the most distended. This observation, however, I have not been able to confirm. Pressure with the hand on the tumor communicates a sensation of great resistance; this resistance being most equable in the case of the unilocular disease, though it is almost the same in the multilocular tumor when there are large cells. Fluctuation is always very distinct when there is only one cyst; being of course more imperfect and obscure when there are several, and no single one of great size. Unless the morbid growth is very large and projects into the loins, or unless ascites coexists, fluctuation will not be detected in the flanks. The more viscid the contents of the cyst, the more obscure will be the fluctuation, as a general rule; and the same remark holds good when the cyst-walls are very thick, or when the sac is very much distended. The pulsations of the aorta are sometimes communicated to the hand laid over the tumor. Percussion elicits a dull sound over the whole of the tumor, the only exceptions being, when a coil of intestine passes between the tumor and abdominal wall, as it sometimes does just above the pubes; or when the cyst has been tapped, and has afterwards filled with air; or when a cyst has emptied itself into the intestine, and flatus has passed from the latter into the former. The dulness is uniform over the mass of the tumor, and its note is not affected by change in the posture of the patient; but there is resonance above the tumor, and in that lumbar region into which the intestines have been forced, which is always the one corresponding to the healthy gland. By auscultation a murmur is sometimes heard in one or both iliac regions, owing to pressure exerted by the diseased mass upon the iliac arteries: but otherwise only information of a negative kind is gained, there being an absence of borborygmi, and of the sounds produced by pregnancy. Cysts of moderate size, when free from adhesions, do not modify the respiratory movements; but when large they restrain the descent of the diaphragm, and especially do they do so when adherent. And, lastly, in every case the signs of pregnancy should be looked for; not only to prevent any gross error in diagnosis, but so as to avoid the more excusable error of overlooking the coexistence of utero-gestation with ovarian dropsy.

As regards the *treatment* of ovarian tumors, nothing can be more absurd and reprehensible than the practice which some gentlemen adopt of administering hydragogue cathartics, diuretics, emetics, mercurials, iodine, iodide of potassium, liquor potassæ, bromide of potassium, muriate of lime, &c. Equally injurious are the local applications which the same practitioners employ, such as leeches, blisters, iodide ointment, friction with stimulating liniments, electricity, &c. It is only necessary

to examine a single ovarian tumor, to see that such agents cannot by any possibility do good; and consequently, as they are of a very powerful nature, they must be productive of harm. That such is really the case, I know too well; and I am led to speak thus plainly, from the painful examples which have come under my notice of health entirely ruined, and death hastened, by violent medical treatment. The only way in which relief or cure can be effected is by abdominal tapping (see p. 516), followed by firm well-adapted pressure and the administration of iodide of potassium; or by paracentesis and leaving an elastic catheter, or drainage-tube, in the wound to withdraw the fluid as it is re-secreted, a proceeding by no means free from danger;* or by ovariotomy. The injection of ovarian cysts with the tincture of iodine has been lately much practised; but in most of the cases in which I have tried it no permanent good has resulted, while in the hands of some physicians it has caused death. The only instances in which it is available are the unilocular tumors, or just those that may be often cured by tapping and pressure. If it be resorted to, the cyst must be emptied; and a mixture made of forty grains of iodine, sixty grains of iodide of potassium, and two ounces of water, injected and left in the cyst, care being taken that none of it escapes into the peritoneal cavity. Tapping per vaginam has been advocated by some authorities; but as it has not appeared to me to possess any advantages over the ordinary plan to counterbalance the increased risk of wounding important structures, I have not practised it. Nature sometimes effects a cure by rupture of the cyst, with extrusion of its contents into the intestine or vagina, or into the end of the peritoneum, whence it is removed by absorption. I have never seen a case where the fluid has been discharged through the Fallopian tube; and I believe that in all probability the examples which have been recorded of such an occurrence have been instances of dropsy of this canal owing to inflammation combined with obliteration of its orifices.

My first rule in these cases is this: When the tumor is not increasing in size, is not affecting the patient's health, and is unproductive of any unpleasant symptoms beyond those resulting from its weight, I do nothing at all, merely directing the patient to see me in the event of any change. These cases are unfortunately very rare. In deciding between paracentesis and ovariotomy, regard must be had to the patient's health, constitution, age, the condition and nature of the tumor, the presence or absence of adhesions, &c. Where there is any hope of cure from

* If the tumor be movable, it should be made to adhere to the abdominal wall before evacuating the contents of the cyst and introducing the tube. With this object the ingenious plan suggested by M. Trousseau had better be adopted, in preference to the use of caustic. This gentleman selects the site most convenient for the ultimate introduction of a trocar, and covers the skin in this region with a patch of diachylon plaster about the size of a crown piece. Through this he plunges from twenty to thirty steel needles—each about four inches long, and tempered in the flame of a candle—which pass into the tumor, and are prevented from sinking through the skin by a head of glass or sealing-wax that rests upon the plaster. These needles cause hardly any pain in their introduction, and they are allowed to remain in situ for five days. During this time some local pain develops itself, which is strictly limited to the area in which the needles are introduced. At the expiration of the five days the needles are removed, and a small drop of the fluid of the cyst follows the withdrawal of each, showing that adhesion has taken place, a fact which can also be ascertained by palpation. It is now possible to plunge a trocar into the cyst without fear of any accident.

paracentesis, it is of course to be resorted to, in preference to removal of the tumor; but in certain cases, and especially in the multilocular tumors, ovariotomy is the only proceeding which offers a reasonable chance of rescuing the patient from an early and very painful death. That it will succeed in rather more than two operations out of three is quite certain; and indeed, with greater care in the selection of cases than has yet been generally exercised the results will be more favorable.

The mode of performing *ovariotomy* remains to be described. And first, with regard to the preparation of the patient it is only necessary to say that she should be in her usual health, that the bowels ought to have been properly relieved, and that food must be avoided for three hours before the tumor is to be removed. If the operation can be performed about a week after the catamenial period, so much the better. Secondly, the temperature of the apartment is to be raised to about 70° F., while it is advisable to render the air moist with steam. The duties of the assistants are to be arranged beforehand. The operator will take care to have ready on a handy tray such instruments as scalpels, strong scissors, a broad director, two large trocars with elastic tubing connected with the canulæ, strong vulsellum forceps, artery forceps, a couple of clamps, one or two cauteries, needles with and without handles, silver wire for sutures, and strong hemp ligatures. A supply of new fine sponges, flannels, lint, adhesive straps, towels, ice, basins of warm water, and one or two pails will also be required. An excellent operating table may be made by covering an ordinary dressing table with three or four blankets, and putting three or four pillows at the head. The bed which the patient is afterwards to occupy ought to be in the same apartment. Thirdly, the patient lying upon her back, with the head elevated, and the dress so arranged that the abdomen can be thoroughly exposed, is to be put under the influence of chloroform. The operator having passed the catheter so as to be certain that the bladder is empty, then makes an exploratory incision in the linea alba; commencing about two inches below the umbilicus, and carrying it downwards for about four inches. Easy as it may appear to cut down to the peritoneum, the most experienced operators are sometimes puzzled to know when they have reached this membrane; and cases are reported where gentlemen have proceeded to separate this structure from the superimposed transversalis fascia, under the belief that they were merely breaking down adhesions between the tumor and the lining membrane of the abdomen. However, the peritoneum having been divided, and the ascitic fluid which is usually present having been allowed to escape, the hand (dipped into warm water) is to be introduced so as to learn whether any adhesions are present. If any be found they should be cautiously broken down. When the cyst is freed it begins to bulge through the wound, and the trocar is then introduced at the most prominent part, taking care that none of the fluid escapes into the abdominal cavity. As the sac gets emptied, its walls are to be grasped with a pair of strong vulsellum forceps, and traction exerted so as to withdraw the whole tumor. While an assistant compresses the abdomen with a flannel wrung out of warm water, the operator takes care that the tumor is nowhere adherent to the omentum, and examines the pedicle. Finding that all is clear, he applies the clamp (nothing answers better than the common carpenter's callipers) as tightly as possible round the

latter, and as near the tumor as possible, and then cuts off the greater bulk of the tumor. For by leaving a small portion about the size of half an orange, to be removed at the end of twenty-four hours, all fear of slipping and secondary hemorrhage will be prevented. The other ovary having been examined and found healthy, the wound is to be quickly closed by silver wire sutures. These had better be introduced about an inch apart, by means of a needle with a handle; and I believe it is better to pass the sutures through the entire abdominal wall, including the peritoneum. The portion of tumor left outside, with the clamp, is then wrapped in lint; three or four long strips of strapping are applied completely round the body, so as to cross over the wound; and a suppository of two grains of opium is introduced into the rectum, or—and it answers better—half a grain of morphia is to be injected under the skin. The patient is then lifted into bed; and if the administration of chloroform has been well managed, consciousness will not return until she has been comfortably arranged.

Before speaking of the after-treatment one or two points in the operation have to be mentioned. The most important is as regards the management of the pedicle. Now although the clamp has been just recommended, yet I am sure it will often be advantageous to dispense with this instrument; for it cannot be denied that keeping the pedicle outside the abdomen retards the healing of the wound, while months afterwards the traction exerted may be the cause of very annoying dragging pains. To obviate these inconveniences, the pedicle has been secured with strong hemp ligatures; and these having been cut off short, the stump has been returned into the abdomen. Dr. Tyler Smith has had great success with this plan; and I have seen it answer admirably in the hands of Mr. Fergusson, as well as in one of my own cases. But Mr. Baker Brown has recently resorted to the use of the actual cautery; and I cannot but think that if this plan works well, on further repetition, it will supersede all others. In employing it, the pedicle is compressed with a clamp invented by Mr. Clay, of Birmingham; and the tumor is then removed by dividing the pedicle with the cautery at just below a white heat. There has been much unnecessary discussion with regard to the length of the wound. The best plan is to make the incision as already recommended; and then enlarge it, rather than try by force to bring a large mass of semi-solid matter through a small opening. Where the tumor is of the unilocular kind, or where there are only two or three cysts which can be each emptied by the trocar, a short incision of course suffices. Then with respect to adhesions, care will be necessary lest when they have been broken down, they give rise to hemorrhage. To prevent this, their site should be examined before closing the wound, so that if the blood be escaping the bleeding points may be touched with the cautery. If the omentum be wounded, one or more ligatures had better be applied and the ends cut off short, instead of bringing them out at the wound. And lastly, I would advise the surgeon to dispense with all kinds of bandage after the operation. Having never used one, I can certainly affirm that such an appliance is unnecessary; while it is no little advantage to have the arrangements such, that the wound can be inspected without disturbing the patient.

The more simple the after-treatment, the better. If there be thirst, or troublesome sickness, ice ought to be freely sucked. Then, for nou-

rishment during the first twenty-four hours, iced milk, and the yolk of a new-laid egg beaten up in water with a teaspoonful or two of brandy, will suffice. If there be no sickness, and if all be going on well, white fish with a glass of sherry and water may be allowed on the second day; while on the following, a mutton chop should be given. When there is much vomiting, however, we must trust to enemata of milk, beef tea, &c. In those cases where I have employed the clamp, the part of the pedicle and tumor above this instrument has been cut off close at the end of twenty-four hours; and then two days subsequently the clamp itself has been taken away. The wire sutures have seldom been withdrawn before the fifth day, long slips of strapping being employed until the wound has healed. It need scarcely be added that the air of the patient's room must be kept most pure, that the temperature should be about 60°, and that the strictest quiet ought to be maintained. If any symptoms of general peritonitis set in, linseed poultices, hot fomentations, and opium are the remedies to trust to. Caution will be necessary with regard to stimulants, avoiding both extremes; that is to say, while not commencing them too soon, care must be taken not to defer their administration until it is too late.

Several years since, I proposed that in those cases where the abdominal section was made and it was found impossible to remove the tumor owing to the presence of extensive adhesions, the pedicle should be tightly tied after the withdrawal of the fluid contents of the cysts by tapping. Thus it was hoped, that whilst the supply of blood furnished to the growth by its adhesions might be sufficient to prevent gangrene, the obstruction of the main arterial channel would prevent the fluid from being secreted anew. In truth, however, this suggestion is of little value. For in almost all cases where adhesions exist they will be found in the pelvic cavity; and consequently the application of a ligature around the pedicle is as difficult to accomplish as the removal of the tumor itself.

3. Displacements of the Ovary.—The displacements to which the ovary is liable are of two kinds,—those where one or both glands are forced out of position by some uterine or other tumor, and those where the ovary escapes from the pelvis as a hernia.

The displacements of the first class chiefly aggravate the symptoms of the disease causing them. In addition, however, they will frequently be the cause of considerable suffering. Thus, a small fibroid tumor of the uterus may be accompanied with severe dysmenorrhœa, with attacks of nausea, and with pain; these troubles ceasing as the tumor enlarges and passes upwards out of the pelvic cavity, so as to allow the ovary to occupy its normal position. Under the head of prolapsus of the ovary, Dr. Rigby has described a condition in which this gland has descended between the rectum and uterus—into the recto-vaginal pouch. Complaint is made of a sense of forcing and throbbing at the lower part of the abdomen, backache, pain in the groin of the affected side, indigestion, sickness, difficulty in passing the fæces, &c.; these symptoms coming on in paroxysms. There is also dysmenorrhœa, with the passage of clots and portions of membrane. If a vaginal examination be made, the ovary will be found swollen, exquisitely sensitive, and occupying the recto-vaginal pouch; the pain produced by the examination, like

that caused by the passage of a solid motion, continuing for hours afterwards. The treatment should consist in the exhibition of mild aperients, so as to clear out the intestinal canal and prevent further accumulation of fæces; in the use of the iodide of lead and belladonna pessaries (F. 423), so as to reduce the ovarian swelling and tenderness; and in rest on the sofa, with the avoidance of sexual intercourse. Under such management, the ovary will sometimes be restored to its natural position; or we may be able to gently raise it with the finger, and perhaps to keep it up by the introduction of an elastic pessary.

In the second set of cases, the ovary has escaped out of the pelvis, constituting a true hernia of the gland. This condition is sometimes congenital, but it may also happen accidentally after puberty. Sometimes the ovary forms the contents of an inguinal, crural, or umbilical hernia; and the sac may contain the ovary alone, or with this gland there may be a portion of intestine, the Fallopian tube, and even the uterus.

The history of a peculiar case in which the left ovary was found in the sac of an oblique inguinal hernia, was related at the Royal Medico-Chirurgical Society by Mr. Holmes Coote. The patient, a young woman, was admitted into St. Bartholomew's Hospital with a swelling in the left groin, and suffering from the symptoms of strangulated hernia. In the course of a few hours the usual operation was performed, when the ovary and the Fallopian tube were found in the sac. A similar malposition of parts was subsequently noticed on the opposite side of the body. The left ovary was removed, some thickened omentum carefully cut away, and the patient put to bed; but the sickness and constipation continued, and she died four days after the operation. The cause of the sickness, &c., was displacement of the stomach and transverse arch of the colon. The most remarkable feature in the case, however, was that the woman said she had always menstruated regularly. Now, on the examination of the body, it was found that both ovaries were *well developed*, and that the formation of the Graafian vesicles was going on naturally; but the Fallopian tubes were quite impervious, the uterus was completely absent, and the vagina was a short canal—an inch and a half in length, and terminating in a thin membrane. She said that she had been menstruating the week before her admission; and some of the female attendants at the hospital noticed the usual marks, though faint, upon her dress. If this were so, the menstrual discharge could only have taken place from the mucous lining of the vagina.

An example of hernia of the right ovary, in which this gland was successfully removed, has been reported by Dr. Meadows.* In this case the patient was twenty-three years of age, single, and from birth had had a swelling in the right inguinal region. At fifteen she began to menstruate; but it was only five years afterwards that the swelling began to be painful, when another one appeared just below it. At the next monthly period this second tumor became the seat of considerable suffering, and it increased much in size. From this time the pain was violent at each period, while the tumor would swell up to the size of two fists, and be exquisitely tender to the touch. Dr. Meadows having decided that this tumor was ovarian (the upper being probably an omen-

* Transactions of the Obstetrical Society of London. Vol. iii, p. 438. London, 1862.

tal hernia), got Mr. Lawson to excise it; when it was found to consist of the right ovary, measuring two inches in length and one in diameter, and in a state of cystic degeneration. The operation proved eminently successful.

4. Diseases of the Fallopian Tubes.—Although these canals may undoubtedly be attacked with acute or with chronic inflammation, I must confess that I have never been able to diagnose such affections. And it is very probable that the symptoms produced by them so closely resemble those set up by pelvic cellulitis and ovaritis, that they will generally be attributed to these diseases.

According to most authorities, the principal indications of *acute inflammation of the tubes* are deep-seated pelvic pain, with throbbing and tenderness about one or both groins; a sense of bearing-down on assuming the erect posture; with heat of skin, a dry tongue, and rapidity of the pulse. In *chronic* form, the secretion from the lining membrane is much increased; so that if the uterine orifice of the tube be patent there will be a leucorrhœal discharge. In rare instances, the morbid action has ended in ulceration or in suppuration; and death has occurred from peritonitis set up by perforation of the walls of the canal.

Dropsy of the Fallopian tube is rather an uncommon affection. The fimbriated extremity of this canal, together with the uterine orifice, occasionally get obliterated from the action of chronic inflammation. In such a case the portion of the tube between the openings sometimes becomes the seat of an accumulation of pus or of serous fluid; and instances are recorded where an hypertrophied Fallopian tube has alone weighed seven pounds, and has contained twenty-three pints of fluid. The diagnosis of this disease from a simple ovarian cyst is exceedingly difficult, and can only be determined where we find an elongated and yielding and fluctuating tumor at the side of the uterus, while this latter organ is able to be separated from the swelling by using the sound.—In the museum of the Royal College of Physicians is a preparation, presented by Dr. Francis Hawkins when physician to the Middlesex Hospital, illustrative of dropsy of both Fallopian tubes; the extremities of these canals being all closed.—The treatment of tubal dropsy, where the suffering is sufficiently severe to require interference, consists in puncturing the cyst with a minute trocar and canula through the roof of the vagina. Medicines given with the intention of producing absorption are quite useless.

PART XIII

DISEASES OF THE SKIN.

The early writers on skin diseases separated the study of these affections from general pathology, and thereby committed no small amount of mischief. For medical men having thus been led to regard these disorders as something special, took but little pains to acquire any accurate knowledge of them; so that from inexperience they were led to believe that cutaneous affections were multitudinous in their nature, very confused in their respective appearances, and particularly rebellious to treatment. It is only during the last few years that more enlightened opinions have prevailed, and that practitioners have found these diseases as easy to diagnose and to treat as any which come under observation.

Although the division of cutaneous affections into Orders or Classes assists very materially to simplify their diagnosis and management, yet the student must not always expect to find these disorders existing in one simple form. On the contrary, we quite as frequently see two or three in combination as not; the coexistence of lichen and eczema, or of impetigo and eczema, being just as common as simple eczema, impetigo, &c. So again, one source of irritation may produce a different eruption in different individuals. Thus, the ingestion of some particular kind of food will set up urticaria in one person and erythema or herpes in another; while the Acarus scabiei may give rise to a vesicular, pustular, or papular rash, according to some peculiarity existing in the supporter of this parasite.

The classification which it is proposed to adopt in these pages, is that of Willan, considerably modified. There are certainly much more ambitious and extensive arrangements to be found in our various systematic treatises; but their value can be judged of from the facts that most special writers on these affections ignore the classification adopted by those who have preceded them, although at the same time they confess that the time for suggesting a perfect synopsis has not yet arrived. While hoping therefore that our knowledge may become sufficiently precise to enable us to draw a distinct line between the essentially local and essentially constitutional skin diseases, to determine the exact causes of both kinds, as well as to show in what part of the cutaneous structure the different disorders have their seat,—while waiting and hoping for this good time it seems useless to adopt a confessedly imperfect plan because it is novel. Willan's classification has at least the merit of having lived for

some sixty years, of being based on the *visible* character of the disease, and of being simple and intelligible. The different orders are as follows:

ORDER 1. *Exanthemata.*—Erythema; roseola; urticaria.
ORDER 2. *Vesiculæ.*—Sudamina; herpes; eczema.
ORDER 3. *Bullæ.*—Pemphigus; rupia.
ORDER 4. *Pustulæ.*—Ecthyma; impetigo.
ORDER 5. *Parasitici.*—Tinea tonsurans; tinea favosa; tinea decalvans; tinea sycosis; tinea versicolor; scabies.
ORDER 6. *Papulæ.*—Strophulus; lichen; prurigo.
ORDER 7. *Squamæ.*—Lepra; psoriasis; pityriasis; ichthyosis.
ORDER 8. *Tubercula.*—Elephantiasis; molluscum; acne; lupus; framboesia; keloid; vitiligo.

The order "Maculæ" (*Macula*, a stain or blemish) has been omitted. This has been done partly because it is often a matter of little moment whether portions of the skin are marked by the presence of too much or too little pigment; and also for the reason that where the discoloration is thought to be a symptom of an important constitutional affection (as in Morbus Addisonii), it is better to describe such disease in its proper place rather than give undue prominence to only one of its symptoms, especially as that one is often the least important. It may of course be said that the greater number of skin diseases, properly so called, are secondary affections; but then it should be recollected that in these, the visible sign of the constitutional derangement is of greater significance than the derangement itself. On the opposite principle jaundice, purpura, typhus, and typhoid fever might be regarded as cutaneous diseases. Whether therefore there is an excess of pigment (as in freckles, moles, pregnancy, and Addison's disease), or a deficiency (as in leucoderma and albinism), appears, so far as regards the actual discoloration which results, to be of little consequence.

Skin disease may be materially modified according as the patient is strumous, anæmic, plethoric, gouty, rheumatic, or dyspeptic; as well as by the age and sex, the mode of life, and residence of the sufferer; and by the condition of the uterine functions in women. These affections may also be altered by, or entirely dependent on, a syphilitic taint.

In attempting to cure diseases of the skin, we have to resort to constitutional and local remedies; the former being, as a rule, by far the most important. Speaking generally, our object in employing *constitutional* treatment is twofold. Thus, we endeavor to *eliminate* from the system the morbid matter upon which the eruption depends; and this can best be done by the proper use of purgatives, and often of diaphoretics. Then we have to try and *alter* the constitutional state which led to the formation of the poison, and so restore the healthy tone of the body; a proceeding which will usually be most readily effected by the careful use of such medicines as the mineral acids, the alkalies with vegetable bitters, iodine, arsenic, phosphorus, quinine, steel, cod-liver oil, colchicum, creasote, bichloride of mercury and bark, &c. The *local* remedies (amongst which are included hot air, vapor, water, and medicated baths) are of considerable value in assisting the radical cure of the disease, as well as in moderating irritation and pain; while in the class of Parasitic disorders they can often be alone trusted to for giving permanent relief.

The diet may always be nourishing and sufficient in quantity to satisfy the patient's demands. Cocoa or chocolate, milk, sherry, and soda-water, or claret; white fish, mutton, beef, chicken, and game; together with fresh vegetables, bread-and-butter, and light suet puddings,—these are all unobjectionable articles of diet. On the contrary, it will be advisable to forbid tea and coffee, but especially the latter; as well as beer, raw spirits, sugar, pastry, most salt meats, and indigestible fruits. The patient ought also to avoid wearing flannel next to any of that part of the skin which is affected. He must wash with warm soft water, using a thick downy towel; resorting to oatmeal, or starch, or arrowroot, or glycerine in the place of soap when the eruption is at all irritable. To clean the scalp nothing is more efficacious than the yolk of an egg and warm water; though in the parasitic affections soap may always be freely employed. And then, in giving directions as to treatment, a caution will be necessary with regard to those eruptions which are contagious. When the skin of a nursing woman begins to present any eruption indicative of a cachectic state of constitution—*e. g.*, ecthyma, rupia, pemphigus, &c.,—she ought at once to wean her infant; while no female with elephantiasis, lupus, or any one of the syphilitic cutaneous disorders, should be allowed to suckle her child for a single day.

ORDER I. EXANTHEMATA.

The exanthemata (*Ἐξάνθημα*, from *ἐξανθέω*, to blossom or break out in an eruption) consist of variously formed superficial reddish patches, varying in intensity and size, disappearing under pressure, and terminating in resolution or desquamation. They are frequently complicated with gastro-intestinal irritation or inflammation, and sometimes with cerebral or pulmonary diseases. This order includes erythema, roseola, and urticaria. By many dermatologists, erysipelas, measles, and scarlatina, are regarded as exanthematous diseases; but such an arrangement seems to have only the questionable advantage of making the class as comprehensive as possible.

1. Erythemata.—Erythemata (*Ἐρυθαίνω*, to redden or cause blushing), inflammatory blush, or efflorescence cutanée, is a non-contagious affection; characterized by slight superficial red patches, irregularly circumscribed, of variable form and extent, and most frequently seen on the face, chest, and extremities. Its duration varies from a week to a fortnight; it is seldom preceded or accompanied by febrile symptoms; it causes but slight heat, and no pain; and the prognosis is always favorable.

Several varieties of this disorder are usually enumerated. Thus there is *erythema fugax*, so named from its fleeting nature, and which is generally due to some derangement of the alimentary canal. *Erythema intertrigo* is sometimes produced by friction between folds of the skin, where the secretions are not removed by washing. The parts about the neck, groins, lower part of abdomen, &c., are apt to become thus affected in obese women and children. *Erythema pernio* is the technical name

for the peculiar inflammation of the skin which constitutes an unbroken chilblain. *Erythema circinatum* is very seldom met with. It comes on during the progress of rheumatic fever, especially in young women. The round red patches which form are slightly raised, and ring-shaped; and each lasts for about a week, and is perhaps succeeded by a fresh patch. Then there is *erythema læve*, which is developed on the lower extremities when they become anasarcous; and which, if unrelieved, gives rise to the formation of blisters that burst and discharge quantities of serum, and often to deep ulcers which may end in mortification when severe. But the most curious species of this disorder is that known as *erythema nodosum;* in which the eruption is confined to the fore part of the leg, taking the form of one or more large oval patches running parallel to the tibia, and rising into painful protuberances, much resembling nodes. It occurs commonly in children and young women when badly nourished or overworked.

The *treatment* is very simple if the cause can be removed. A few doses of some mild saline aperient, such as the effervescing citrate of magnesia, or the compound rhubarb powder; warm water or vapor baths; light diet; and tonics—especially quinine, or the compound tincture of bark, or the mineral acids—are sufficient for the cure of most forms of this affection. Any derangements of the digestive, urinary, or uterine functions which may be present, must be remedied. In some varieties a local application will be required, and then the dilute solution of subacetate of lead can be used. In erythema nodosum the officinal ointment of veratria may be employed, if there be much tenderness, while quinine is being administered to effect a cure. The annoyance of erythema intertrigo will be greatly relieved by washing the part every few hours with the lead lotion, thoroughly drying it, and then dusting it over with the oxide of zinc. Warm gloves or stockings, friction with a stimulating liniment, and the administration of cod-liver oil will remove unbroken chilblains. And lastly, in erythema læve the limbs ought to be raised so as to favor the return of blood from them; while the skin should be punctured here and there with a lancet, in order that the collected serum may drain away.

2. Roseola.—Roseola (Dim. *Rosa*, a rose), rose-rash, or false measles, is a non-contagious inflammation of the skin, which runs its course without producing constitutional disturbance of any importance. It is characterized either by transient patches of redness, of small size and irregular form, distributed over more or less of the surface of the body; or by the formation of numerous, small, slightly raised, rose-colored spots. The eruption, at first brightly red, gradually subsides into a deep roseate hue, and slowly disappears. It is accompanied by slight fever, and it has a duration varying from one to seven days.

Sometimes this eruption similates measles, or more frequently it resembles simple scarlet fever. Coryza is never present, however, nor is the rash of a crescentic form, as in measles; though there is often soreness and redness of the fauces, with gastric disturbance, as in scarlatina. An epidemic of roseola which prevailed in London during 1863, was probably caused by some peculiar atmospheric condition.

There is one form of this affection which frequently affects adults, especially females, in the summer; it is called *roseola æstiva*. Women of

an irritable system, with irregularity of the uterine functions, are mostly attacked; the disorder is preceded by chills and smart fever; when the eruption appears the fauces often become affected; while the rash and general symptoms disappear on the fifth day.

But little *treatment* is usually necessary for the cure of this rosy eruption. Mild alteratives or laxatives, a plain diet with lemonade, a few doses of one of the mineral acids with any bitter infusion, may in some cases be required. Where the eruption occurs in children, during dentition, the gums—if tender and swollen—ought to be lanced.

3. Urticaria, or Nettle-Rash.—Urticaria (*Urtica*, a nettle) may be described as a non-contagious exanthematous eruption. It is characterized by the formation of prominent patches or wheals (technically known as pomphi), which are either red or white, of irregular shape, and of uncertain duration; while they are accompanied by intense heat, a burning and tingling, and great itching.

There are two varieties; one in which the disease is *acute*, running a short, rapid course; another in which it is *chronic*, very obstinate, and either persistent or intermittent. Both forms attack individuals of all ages and constitutions. The chronic intermittent variety is the *urticaria evanida* of Willan; it sometimes lasts for months, or even years.

Urticaria is caused by certain derangements of the digestive organs, arising from the use of particular articles of diet, such as shell-fish of different kinds, cucumbers, mushrooms, nuts, bitter almonds; or of peculiar medicines, as henbane, turpentine, and balsam of copaiba, &c. It is also seen occasionally in connection with uterine irritation; or mental anxiety, over-fatigue, rheumatism, dentition, &c., may induce it. Patients are occasionally met with whose cutaneous nerves are so susceptible that slight pressure with the finger will produce a patch of urticaria.

The *treatment* of acute urticaria must consist in the administration of emetics and purgatives, where the disease depends upon stomach derangement. In the chronic form, a simple diet, without wine, beer, spirits, or tea and coffee, must be rigidly adhered to; while laxatives, antacids (especially bismuth, F. 65), and tepid or cold baths, are the chief remedies. Steel (F. 392, 394, 397, 403) will often effect a cure. In obstinate cases, where there are no symptoms of gastro-intestinal irritation, small doses of arsenic (F. 52, 399) may be required. If the patient be gouty, colchicum (F. 46) should be tried. The irritation can be relieved by the common lead lotion, or by sponging with equal parts of vinegar and water, or by a solution of corrosive sublimate (F. 271, 276) frequently applied.

ORDER II. VESICULÆ.

A vesicle is a slight elevation of the epidermis, containing a serous fluid—generally transparent, but occasionally opaque or sero-purulent. The fluid may become absorbed; or it may be effused upon the surface, causing excoriation and small thin incrustations. Vesicular eruptions are occasionally preceded by fever, but often break out imperceptibly;

they give rise to a peculiar appearance, as if drops of water had been scattered over the surface of the skin; they may appear upon any part of the body; and they are not unfrequently more troublesome to cure than would be anticipated from their apparently slight nature. In this order we find three affections—sudamina, herpes, and eczema. Varicella, vaccinia, and scabies are often also included; but the first two may be much more appropriately placed among the eruptive fevers, while the third is a parasitic disease.

1. Sudamina.—In the progress of many acute and chronic diseases attended with sweating, crops of small transparent vesicles make their appearance. Thus, in acute rheumatism, typhoid fever, &c., sudamina (*Sudo*, to sweat) are frequently found upon the trunk and extremities; especially in the latter stages of these affections.

Some authors speak of *Miliaria* (*Milium*, millet) as a distinct fever, arising from constitutional causes, and differing from sudamina produced by copious sweating. The distinction, if it exist, is unimportant; since the vesicles in both cases resemble each other, and disappear spontaneously without requiring any treatment. Miliary eruptions have occasionally been epidemic, and then they have been attended with considerable danger.

2. Herpes.—Herpes (*Ἕρπω*, to creep), or tetter, is a transient, non-contagious affection, consisting of clusters of vesicles upon inflamed patches of irregular size and form.

The eruption runs a definite course, rarely continuing for more than two or three weeks; while it is not usually severe, leaves no scar, nor is it accompanied by any constitutional symptoms. Care must be taken not to mistake its nature, since *herpes preputialis* has been actively treated for syphilis, and *herpes circinatus*—when occurring on the scalp—for tinea tonsurans or ringworm. In a common cold, a cluster of herpes will usually be found upon one of the lips (p. 319) constituting *herpes labialis*. A singular species of this disease is named *herpes zoster*, or *zona*, or the *shingles;* the inflamed patches with their clustered vesicles being arranged in the form of a band, encircling half the circumference of the body. In nineteen cases out of twenty the zone will be found to occupy the right side of the body. This variety is popularly regarded with great fear; and village nurses assert that death is certain if the patches extend round the body. There is, however, no danger, unless the patient be particularly old and feeble.

Very little is necessary in the way of *treatment* beyond attention to the bowels, and regulation of the diet. The local irritation may be relieved by the application of zinc ointment, or the officinal ointment of subacetate of lead, or the dilute solution of the same salt. Herpes zoster is sometimes followed by a neuralgia of the affected part. In these instances, friction with the aconite liniment may remove the pain; but if it be severe or obstinate, a mixture of quinine and arsenic (F. 52) will certainly prove curative.

3. Eczema.—Eczema (*Ἐκζέω*, to break forth in pustules), humid tetter, or running scall, is a very common non-contagious disease; consisting of an eruption of small vesicles on various parts of the skin,

closely crowded together, and often running into each other, so as to form, on being ruptured, superficial moist excoriations. The heat and inflammation of the affected part, the irritation and tingling produced by the scabs or crusts, and the pain of the fiery red or raw surface which results, all tend to produce considerable fever and restlessness.

There are several species of this disease. When the eruption consists of minute vesicles on different parts of the skin, without any inflammation, it is called *eczema simplex;* when the skin is inflamed, the redness persistent, and there is heat and swelling, *eczema rubrum. Eczema impetiginodes* is a severe degree of eczema rubrum. When the disorder arises, as it sometimes does, from great heat, especially the heat of the sun, it is called *eczema solare;* when as the result of the use of mercury, *eczema mercuriale.* In infants at the breast, and in children during dentition, this disease—*eczema infantile*—is often very severe, and may extend over the whole body; becoming complicated with erythema, impetigo, pityriasis, and in fact with almost every eruption that the skin seems liable to.

All the varieties of eczema are often obstinate, and for a time will resist the power of medicines. Mild local applications, such as thin gruel, barley-water, or linen rags dipped in warm water and covered with oiled silk, are useful. I have found glycerine, or a lotion of glycerine and water in equal parts, very beneficial. The officinal lime liniment—the old carron oil—has been recommended. Great attention to cleanliness will be needed. The scabs ought to be thoroughly saturated with washed lard or olive oil, and then removed by linseed poultices. The general treatment must consist in the use of warm or tepid baths, a plain diet with fresh meat and milk, daily walking exercise, saline laxatives or an occasional dose of blue-pill and colocynth, slightly acidulated drinks, opiates to relieve the irritation, sarsaparilla, the mineral acids, &c. In severe or chronic cases, the remedies which have proved most efficacious in my hands have been steel, quinine, arsenic, and cod-liver oil. Sometimes one of the first three agents has been administered separately; but often it has appeared advisable to give them in combination (F. 381). Supposing improvement has been manifested for a few weeks, and the case should then have become stationary, benefit has resulted from substituting the corrosive sublimate with sarsaparilla (F. 27) for the tonics. Moreover, where there has been any evidence of gout in the system, colchicum (F. 46) has been employed; when rheumatism has been present, iodide of potassium and bark (F. 31), or iodide of iron (F. 32), have been trusted to; while if there has appeared to be any syphilitic taint, mercurial vapor-baths (F. 131) have been ordered, and the red iodide of mercury (F. 54) has been administered by the mouth.

In eczema infantile, the child must be purged by a few doses of calomel; care ought to be taken that the milk on which it is fed is pure; the local distress is to be relieved by the free application of zinc ointment, or the use of Mr. Erasmus Wilson's benzoated oxide of zinc ointment; and the blood has to be restored to its healthy condition by the employment of the arsenical solution (one minim may be given to an infant three or four months old, thrice daily) in a little steel wine and syrup. If the patient be strumous, cod-liver oil will prove valuable, especially during the winter months.

ORDER III. BULLÆ.

As a general rule, bullæ differ from vesiculæ merely in being larger; and hence it is almost unnecessary to separate them into two orders. Bullæ (*Bulla*, a bubble of water) consist of round superficial tumors or blebs, caused by effusions of serum beneath the epidermis; the bladders bursting after a few days, while their contents form thickish crusts. Pemphigus and rupia are the two eruptions which are classed under this denomination.

1. Pemphigus.—This affection is characterized by the appearance of large round or oval bullæ, two or three inches in diameter, upon one or more regions of the body. Each bleb is filled with ordinary alkaline serum; which after a time loses its transparency, and then becomes acid and puriform. The eruption is pemphigus (*Πέμφιξ*, a bubble or blister) is generally preceded for twenty-four or forty-eight hours by slight general indisposition, fever, and itching of the skin; small red circular patches then form, gradually increase in extent, and become covered with bullæ, which either fade away on attaining their full size, or burst, and are replaced by thin brownish-colored incrustations. The duration of this disease is usually from one to three weeks, although it occasionally becomes chronic and is prolonged for months.

Pemphigus sometimes attacks infants within a short time after birth. The bullæ usually appear on the palms of the hands or the soles of the feet, or more seldom about the buttocks; and as they burst, unhealthy ulcers are often disclosed. Unless these cases are promptly treated, the disorder rapidly runs on to a fatal issue. Diarrhœa and vomiting set in, the little patient quickly becomes greatly emaciated, and death occurs from exhaustion. The only remedy which has appeared to me to have any beneficial effect, has been a simple solution of raw meat; while the infant has also been fed by a healthy wet-nurse. It has never seemed advisable to trust to the mother in these cases. Moreover, where the child has presented any indication of syphilis, chlorate of potash—one or two grains thrice daily—has been given.

Pompholyx (*Πομφὸς*, a blister) is merely a variety of pemphigus, unattended with fever, and running its course in eight or ten days: it is very rare.—A kind of artificial pompholyx may be produced by the application of cantharides. I remember a young woman in King's College Hospital who deceived me for a short time by rubbing powdered cantharides into various parts of her person, and thus raising numerous small blisters. Particles of the fly were detected with a lens.

Tonic and mild aperient medicines, with generous diet and fresh air, appear to be the remedies called for. Hence ammonia and bark (F. 371), nitro-hydrochloric acid and some bitter infusion (F. 378), or quinine and iron (F. 380) should be prescribed. In the aged or weakly, cod-liver oil is very useful. As an aperient, the effervescing citrate of magnesia answers well. In any obstinate cases, arsenic with quinine and steel (F. 381) will certainly effect a cure. Most practitioners agree that it is better to puncture each blister with a fine needle, directly it has formed. Care should be taken that the cuticle is not rubbed off.

2. Rupia.—Rupia (*Ῥύπος*, filth; from the foulness of the affected parts) may be considered as a modification of pemphigus occurring in persons of debilitated constitutions, and especially in those whose systems have been contaminated with the poison of syphilis. It is characterized by the eruption of small flattened bullæ; these blebs containing at first serous fluid, which soon becomes purulent or sanguinolent, and then concretes or dries into dark and black and rough scabs. The margins of the surrounding skin inflame; more serum continues to be poured out; and thus the incrustation increases in circumference and thickness until it somewhat resembles the shell of one of the mollusca. When the crusts fall off they leave circular ulcers, of various sizes, indisposed to heal, and which often only cicatrize after the lapse of many weeks. The loins and lower extremities are most frequently affected. Its duration varies from two or three weeks to several months. There is seldom any danger, unless a great deficiency of vital power be present.

Three forms of this disease are usually described. When the crusts are thin, and the ulcers beneath them superficial, we speak of *rupia simplex*. If the crust be large, constituting the marked feature of the case, the disorder is known as *rupia prominens*. While, where the ulceration is extensive and deep and spreading, *rupia escharotica* is the technical term employed to distinguish this variety.

Warm baths, generous diet, wine, cod-liver oil, and bark with nitric acid, or quinine with tincture of serpentary, will form the *treatment* to be pursued. Change of air is often very serviceable. In syphilitic rupia, which may generally be diagnosed by the skin around the crusts having a coppery hue, iodide of potassium (F. 31) will generally effect a cure. The bullæ ought to be punctured early in all cases.

ORDER IV. PUSTULÆ.

The pustular affections of the skin are characterized by the formation, between the cuticle and cutis vera, of small tumors or pustules containing purulent fluid. The pustules are sometimes scattered irregularly, sometimes united in clusters; they vary in their shape and degree of elevation, as well as in the size of their inflamed bases; while they are succeeded by irregularly formed scabs, and frequently by permanent cicatrices. The diseases of this class are—ecthyma and impetigo. Small-pox is often ranged with the pustular diseases.

1. Ecthyma.—Ecthyma (*Ἐκθύω*, to break out in eruptions) is a non-contagious inflammation of the skin; characterized by large, round, prominent pustules, occurring upon any part of the body. The pustules are usually distinct, seated upon a hard inflamed base, and terminate in thick dark-colored scabs. The latter leave superficial ulcers, followed by cicatrices. The disease may be acute, and preceded by lancinating pains with fever; but more commonly it is chronic, and is often one of the ills of poverty, resulting from the use of improper food, and residence in close rooms. In *ecthyma cachecticum* the ulcers assume an unhealthy appearance; while the general health, which was bad prior to the erup-

tion, becomes still more deteriorated. The lower the constitutional powers, the more chronic will be the disease.

Ecthyma will frequently occur spontaneously; or it is often met with as a sequela to some other disease,—as one of the eruptive fevers, syphilis, &c.; or it may result from some irritant applied to the skin. Thus it is easily produced by croton-oil liniment, or by tartar-emetic ointment: the irritation caused by handling sugar gives rise to it—grocer's itch. When arising without any apparent cause, young persons appear to be most obnoxious to it, especially in the spring and summer. The eruption may be very partial, or it may almost cover the body; and it may continue troublesome for many weeks, sometimes one crop after another appearing in rapid succession. In infants it is often met with on the scalp.

The *treatment* of the acute form must consist in the use of gentle laxatives, slightly acidulated drinks, and a nourishing diet. Water-dressing, or the lotio plumbi, or the unguentum zinci, may be applied to the pustules.—In the chronic variety, stimulants and generous living should be allowed, while the health is improved by cod-liver oil, quinine and iron, and warm or tepid baths. Where the disease is very chronic, a cure will be effected by combining small doses of arsenic with the tonic.

2. Impetigo.—Impetigo (*Impeto*, to attack; terminal *-igo*) is a severe, sometimes contagious, inflammation of the skin; characterized by an eruption of small hemispheroidal or flattened pustules, most frequently grouped in clusters, and forming thick, rough, yellowish scabs or incrustations. From beneath the incrustations a discharge takes place; while the crusts become thicker and larger, and fall off, leaving a raw surface. The mode of distribution of the pustules has caused a division of the disease into two varieties,—*impetigo figurata* and *impetigo sparsa*. The first occurs generally on the face, especially on the cheeks; it is attended with constitutional disturbance, and often with swelling of the lymphatic glands; while, as the pustules—which are arranged in round or oval groups—burst and form scabs, the heat and itching become intolerable. In children, the impetiginous eruption sometimes covers the face or head like a mask, and is called *crusta lactea*. The second form slightly differs from the first, inasmuch as the pustules are more scattered, being sometimes irregularly distributed over an entire limb, or even over the whole body.

When there is much inflammatory action, the patient ought to be kept very quiet, on a light diet, and with a free supply of diluents. The bowels must be acted upon by saline purgatives. The best local applications are lotions containing the oxide of zinc, or hydrocyanic acid, or creasote, or glycerine: dusting the affected part with the oxide of zinc occasionally relieves the irritation. Vapor or warm-water baths are always beneficial. The scabs ought to be removed by poultices or water-dressing, and ointments. Creasote ointment, after the scabs have come off, is useful. The ointment of nitrate of mercury, or that of the red oxide of mercury, may also prove valuable. If the scalp or beard be involved, the hairs will have to be cut short. The constitutional treatment must consist in attention to diet; with the use of mild laxatives, alkalies, and tonics—especially quinine. Arsenic is sometimes required; and so is cod-liver oil.

ORDER V. PARASITICI.

The order Parasitici must be divided into two groups; according as the parasite belongs to the vegetable or animal kingdom. The cutaneous affections depending upon parasitic plants, or epiphytes, are—Tinea* tonsurans, Tinea favosa, Tinea decalvans, Tinea sycosis, and Tinea versicolor or Chloasma; while of the diseases produced by animal parasites, or ectozoa, Scabies is the one now to be described. All are contagious.

1. Tinea Tonsurans.—This is a chronic contagious disease, known by the decolorization and brittleness of the affected hairs (hence the name, from *Tondeo*, to shave), the scaly eruption, and the roundness of the diseased patches. It is called porrigo scutulata, or scalled head, by Bateman and Willan; herpes tonsurans by Hebra: herpes circinatus by Erichsen; trichosis furfuracea by Erasmus Wilson; and vulgarly ringworm. The parasite is the *Tricophyton tonsurans*, the sporules and mycelium of which infiltrate the texture of each hair, while they also spread among the epithelial scales.

Ringworm occurs not only on the scalp but on other parts of the body, as the neck, trunk, &c. In children it affects the scalp; in young adults it attacks the general surface. It is a local disease just as scabies is. When it occurs on the head, there is generally at first an erythematous or else a vesicular eruption, attended with itching. Then the disease causes the hairs to break off almost close to the scalp; so that one or more somewhat circular patches are seen, where the hairs look as if they had been cut short, and where small scales of dry epithelium are found. Moreover, the hairs just around the part appear dry and dirty. The hair-follicles seldom become obliterated in this disease, and consequently permanent baldness need not be feared.

2. Tinea Favosa.—This parasitic disease is seldom met with. It most commonly affects the scalp, in the form of small cup-shaped, dry, yellow crusts; each crust containing a hair in its centre, and somewhat resembling a piece of honeycomb (*Favus*, a honeycomb). There is itching; the hairs become brittle, and ultimately fall out; the crusts have a mouldy offensive odor, and are often surrounded with lice; while the crusts are small, unless they coalesce and form a large dry mass. This disease occurs mostly in children, and according to Hebra is due to dirt and neglect in cleaning and combing the hair. In cases of long standing, the disease will be found on parts of the trunk as well as on the scalp, inoculation with the spores having taken place. It may produce permanent baldness by destroying the hair-follicles. The synonyms for this contagious disease are honeycomb ringworm, favus, tinea lupinosa, and porrigo favosa. The cryptogamic parasite causing it is the *Achorion*

* This term (from *Tinea*, any gnawing or destructive worm) may be applied generally to all those cutaneous diseases which are due to the presence of vegetable growths. Hebra of Vienna, believes that all the forms of tinea are produced by the same parasite; the different appearances produced by it depending upon the stage of development of the fungus, the exact nature of the soil on which it is implanted, &c. This opinion is contrary to that generally entertained in this country.

Schönleinii; the sporules of which are large and oval, instead of small and globular like those of the tricophyton.

3. Tinea Decalvans.—The third variety of these diseases is easily diagnosed. The hair falls off one or more circular or oval spots, leaving perfectly smooth bald patches, which vary in size, sometimes extending over the entire scalp (*Decalvo*, to make bald). It seldom leads to permanent baldness. It is contagious, though less so than the other varieties of tinea. In rare cases it spreads and destroys every hair upon the body, thus inducing considerable deformity. This affection is usually known as porrigo decalvans, or alopecia circumscripta, or alopecia areata. The parasitic fungus is the *Microsporon Audouini;* the sporules of which are round, and much smaller than those of the fungi previously described.

4. Tinea Sycosis.—The fourth species of tinea is characterized by inflammation of the hair-follicles, causing successive eruptions of small acuminated pustules. These pustules have been fancifully thought to have a granulated appearance resembling the substance of a fig (*Συκόομαι*, to become like a fig). Sycosis is met with most frequently upon the chin and other parts occupied by the beard; it seldom occurs on the scalp, and rarely affects women. In some cases it is at least aggravated by the excessive use of alcoholic liquors. It is called mentagra by Willan and Bateman, and sycosis by Cazenave. The parasite is the *Microsporon mentagrophytes.*

Treatment.—This is the same in all these varieties of tinea. It consists in constant attention to cleanliness; removal of the hairs with the scissors, or extraction of them by the forceps (epilation); separation of all scabs, or incrustations, by poultices and simple ointments; improvement of the general health by a generous diet, cod-liver oil, bark or steel; and the destruction of the parasitic plant. By the latter proceeding, the disease will in all cases be cured. It may often be effected by the application of the sulphurous acid lotion (F. 272), or by creasote or carbolic acid (F. 270), or by corrosive sublimate (F. 271). Sometimes ointments appear to succeed better than lotions. A mixture of equal parts of calomel, creasote, and sulphur ointment is useful; or the nitrate of mercury ointment may be tried; or the ammoniated mercury and sulphur ointment (F. 300), or the iodide of sulphur (F. 310), can be recommended. In ringworm, the strong acetic acid is a good application, as is the glacial acetic acid, provided the part be washed directly after its use with cold water; while in tinea decalvans an occasional painting with the liniment of cantharides acts very favorably.

5. Tinea Versicolor.—This affection (commonly known as chloasma—*Χλοάζω*, to be of a greenish yellow color) makes its appearance generally on the front of the chest or abdomen, in the form of small spots of a dull reddish color, which gradually increase in size, and assume a yellow tint. It may last from a few days to many months or years. It is contagious. Want of cleanliness, and the wearing of dirty flannel shirts, seem to favor the occurrence of chloasma, by forming a fit soil for the parasite. This, according to Eichstedt, is a cryptogamic plant—the *Microsporon furfur.* It may be completely destroyed by the

use of the sulphurous acid lotion (F. 272); or by a liniment of corrosive sublimate in water (F. 271), which ought to be rubbed all over the affected part every night and morning. Mr. Startin considers that it is apt to return, if an arsenical course be omitted; hence in obstinate cases this remedy may be resorted to (F. 52). I have, however, cured many cases by the mercurial liniment alone, continuing its use for a short time after the disappearance of the eruption. It is scarcely necessary to add that the skin must be kept thoroughly clean; while the dirty habit of sleeping in a flannel waistcoat ought to be abandoned, or at all events the one worn during the day should be changed at night.

6. Scabies.—Scabies (*Scabo*, to scratch), or the itch, is a troublesome disease, attended with great itching, the irritation being increased by warmth. It commences as a papular, vesicular, or even pustular eruption; the vesicles or pustules becoming ruptured, and excoriations being produced, by the scratching with the nails which is being constantly resorted to. This affection may attack every part of the body, though it most frequently occurs in the flexures of the joints, especially on the fingers. It is often stated that scabies is never seen on the face; but this opinion is probably incorrect, for I am told that at the Hospital for Skin Diseases cases of its occurrence in this region are not uncommon.

The cause of the disease is an animal parasite called the *Acarus scabiei* or *Sarcoptes hominis*. The female is considerably larger than the male; and after impregnation she burrows beneath the epidermis, forming furrows or cunicula, in which her eggs are usually deposited at the rate of one a day. The males do not make these galleries, but wander over the surface of the epidermis. The furrow produced by the female can be recognized as a faint white streak, leading from the papule or vesicle.

Sulphur effects a cure by destroying the acarus. Hence, after thoroughly washing the affected parts with hot water and soft soap, the sulphur ointment is to be freely applied. Where this loathsome disease is extensive, sulphur baths (F. 125) are useful. The contaminated clothes should generally be destroyed; or if it is desirable to keep them they must be purified by exposure to a temperature above 180° F., or they may be well fumigated with sulphurous acid gas. This gas can readily be produced by igniting a rag dipped in melted sulphur.

An aggravated form of itch, known as *Norwegian scabies*, has been occasionally observed in different parts of Europe. It is only peculiar in its great severity; and in its presenting large scaly crusts, which are composed of epithelial cells, acari and their eggs and excrement, sebaceous matter, and lymph. The parasite is identical with that commonly met with.

ORDER VI. PAPULÆ.

Papulæ (*Papula*, a pimple) are small, solid, acuminated elevations of the cuticle, resembling enlarged papillæ of the skin. They generally terminate in resolution or in slight desquamation, but sometimes in ulceration of their summits. Papular eruptions are usually preceded by

itching; they are rarely accompanied by fever; they are slowly formed; they are not contagious; they may be developed on any part of the body; and they vary in their duration from a week to several months. Strophulus, lichen, and prurigo are the diseases of this class.

1. Strophulus.—This papular disease, commonly known as red-gum or tooth-rash, is peculiar to infants and young children. It is characterized by an eruption of minute, hard, sometimes slightly red, and clustered or scattered pimples; which may appear upon a part, or extend over the whole surface of the body. The irritation is slight. Several varieties of strophulus have been described, according as the papulæ are large or small, scattered or grouped. But whether the papules are scattered, with red dots interspersed among them, as in *strophulus intertinctus;* or whether the spots are white and large, often resembling flea-bites, as in *strophulus candidus;* or whether the papulæ form circular patches, which come out successively in different parts of the body, as in *strophulus volaticus*,—whichever variety is present is of little moment. For practically, all forms are due to stomach or intestinal derangement; this derangement being the consequence of improper feeding, or of irritation about the gums from dentition. In infants brought up by hand, the acidity of cow's milk often produces diarrhœa and sometimes red-gum. To prevent these results, and to make the milk more nearly resemble that of the human female, it ought to be rendered slightly alkaline by the addition of a few grains of the bicarbonate of potash to each pint. Even in infants who are properly nursed, but who are suffering from strophulus, care should be taken to ascertain that the mother's milk is natural. Then, if there be constipation, a little rhubarb and magnesia in dill water may be given; or if there be any diarrhœa, a few doses of chalk mixture will be required. Where the eruption seems connected with dental irritation, lancing the gums often gives complete relief. If there be any troublesome itching, a little oxide of zinc ointment, or glycerine and rose-water, should be applied.

2. Lichen.—Lichen (Λειχήν, moss) is an obstinate and annoying papular affection. It may be readily recognized by the minute, hard, red elevations of the skin which it presents, and which are either distinct or arranged in clusters; by the tingling and itching that accompany the eruption; as well as by the slight desquamation which follows its fading.

According to Willan there are seven species of this eruption: 1. *Lichen simplex*, in which there is an eruption of red inflamed papulæ, appearing on the face or arms, and extending to the trunk and legs. There is slight fever, with itching or tingling; the eruption begins to fade in about a week, when desquamation takes place; and the disease is apt to return every spring or summer in individuals of irritable constitution. This form is sometimes mistaken for measles or for scarlet fever.—2. *Lichen pilaris*, or hair lichen, is a modification of the preceding, the papulæ appearing only at the roots of the hairs. It is often due to stomach derangement, especially such as arises from the abuse of alcoholic drinks.—3. *Lichen circumscriptus*, or clustered lichen, is characterized by patches of papulæ which have a well-defined margin, and an irregularly circular form.—4. *Lichen agrius*, or wild lichen, is by far the

most severe form, and is ushered in with fever. The papulæ are much inflamed, and are developed on an erythematous surface, which appears hot and painfully distended. In a short time the inflammation diminishes, and the papulæ become covered with a furfuraceous desquamation; or their points are scratched off, the skin around them becomes fissured into deep and painful cracks, and a sero-purulent fluid exudes, forming thin scaly crusts. The itching, tingling, and smarting are often very intense; there is usually fever, nausea, headache, rigors, and other symptoms of constitutional disturbance; while although in mild cases the symptoms may subside and the eruption die away in about fourteen days, yet in severe varieties the disease is frequently prolonged for several months. Women are said to suffer more frequently than men from this variety.—5. *Lichen lividus* is distinguished by the livid hue of its papulæ, which chiefly form on the limbs, and are not accompanied by fever.—6. *Lichen tropicus*, or prickly heat, is peculiar to tropical climates. It appears to be partly due to exposure during the heat of the day, before the system has become acclimatized.—7. *Lichen urticatus*, or nettle lichen, is peculiar, inasmuch as its commencement is marked by the occurrence of wheals, like those which are produced by the bites of bugs or gnats. These wheals soon subside and leave papulæ, which are sometimes obstinate; both wheals and papulæ being accompanied with itching, pricking, and tingling.

The *treatment* of all forms of lichen except the fourth and fifth is, as a rule, simple; for tepid baths, mild laxatives, an unstimulating diet, and acidulous drinks will most times effect a cure. The irritation will be best relieved by a weak lotion of the liquor plumbi subacetatis, to which a little hydrocyanic acid has been added; or by equal parts of the subacetate of lead and oxide of zinc ointments; or by a lotion consisting of two ounces of glycerine, six grains of corrosive sublimate, twenty or thirty drops of chloroform, and six ounces of water.

In lichen agrius, however, alterative remedies will be required. Sometimes a mixture of corrosive sublimate and bark (F. 27) acts very favorably; in other cases arsenic (F. 52) has certainly proved more useful. Occasionally I have found it advantageous, where the disease has proved very refractory, to administer arsenic, while about twice a week a mercurial vapor bath (F. 131) has been employed. The sulphur baths (F. 125, 126) are recommended by some authorities.

With regard to lichen lividus, it is only necessary to say that our remedies must be such as impart tone to the system. A generous diet with a moderate allowance of wine, quinine and one of the mineral acids (F. 379), and cod-liver oil, are the agents to be trusted to.

3. Prurigo.—Prurigo (*Prurio*, to itch; terminal *-igo*) is a cutaneous disease characterized by an eruption of small papulæ or pimples, of the natural color of the skin. It is a chronic affection, lasting for months or years, and causing great discomfort, not to say misery. Patients affiicted with it scratch and tear themselves constantly till the blood flows; the sufferings being aggravated by warmth. Willan describes three varieties—*prurigo mitis*, *prurigo formicans*, and *prurigo senilis*. The first is the mildest form; in the second, the itching is combined with a sensation like the creeping of ants or the stinging of insects;

while the third occurs in old persons, and is the most obstinate, often continuing for the rest of the patient's life.

The itching arising from prurigo must not be confounded with that caused by insects. To prevent any error, not only must the skin be carefully examined, but also the patient's under clothing. Some authorities appear to believe that all cases of prurigo senilis are due to lice, the pimples arising from the friction and scratching. Without indorsing this extreme view, I believe that it applies correctly to a large number of cases.

In attempting the cure of prurigo, alkaline (F. 121), sulphur (F. 125, 126), conium (F. 122), creasote (F. 123), or even plain water baths, should be used daily; the temperature ought not to exceed 70° Fahr. The local applications which give the most relief are vinegar, lime-water, a weak solution of corrosive sublimate, a dilute solution of creasote, a lotion containing prussic acid, an ointment prepared with a small quantity of aconitine, tar ointment, &c. Attention will have to be paid to cleanliness, both of body and apparel; while the less the patient scratches himself, the better.

The general treatment must consist in the use of a light and cooling regimen; the avoidance of stimulating food or drink; and the employment of laxatives (F. 148, 153, 165), sarsaparilla and iodide of iron (F. 32), tar in pills or capsules (F. 36), acid tonics (F. 376, 377, 378), and even arsenic (F. 52, 399).

Dr. Bowling, of Kentucky, says, in a letter to Dr. Watson, that he has cured numerous cases of obstinate prurigo senilis thus: "I direct that the affected parts be sponged for a minute or so with good apple vinegar, and then be allowed time to dry. After this they are to be *smeared* over with citrine ointment (*unguentum hydrargyri nitratis*). The applications are to be made twice a day. The cure is usually effected in a week."

ORDER VII. SQUAMÆ.

The term Squamæ (*Squama*, a scale) is applied to the scales of degenerated, thickened, dry epidermis which cover minute papular elevations of the skin; these scales or particles of scurf being readily detached, though they are reproduced by successive desquamations for a long time. The scales or scurf are the result of a morbid secretion of the epidermis. Their formation gives rise to but slight constitutional disturbance, and to mere local heat and itching; while none of the squamous diseases are contagious, though they are very chronic in their duration. Lepra, psoriasis, pityriasis, and ichthyosis are the disorders included in this division.

1. Lepra.—Lepra (*Λέπρα*, a scaly state of the skin) is perhaps the most obstinate and troublesome of all curable cutaneous diseases. It is a non-contagious chronic eruption; consisting of red and scaly circular patches, of various dimensions, scattered over different parts of the body, but most frequently found in the neighborhood of the joints, especially near the knee and elbow. By degrees the patches increase in size and number, and extend along the extremities to the trunk.

When the patches are of a moderate size, round and reddish and covered with thin white scales, the affection is known as *lepra vulgaris;* when the eruption is smaller and whiter than the foregoing, and of long standing, the disease is termed *lepra alphoides;* while when it is copper-colored, and the result of syphilis, *syphilitic lepra* is the term given to it.

In the *treatment*, all local applications, with the exception of alkaline baths, or the simple warm bath, and tar ointment (unguentum picis liquidæ, "Phar. Lond.," 1851) are useless. Before resorting to internal remedies the condition of the gastro-intestinal canal must be attended to; mild aperients, or remedies to aid digestion, being prescribed when necessary. Then, liquor potassæ, in half-drachm or drachm doses, thrice daily, is often beneficial; or the liquor arsenicalis (F. 52), or the triple compound of iodine and arsenic and mercury, known as Donovan's solution (F. 51) may be cautiously given with the greatest advantage. Where these remedies fail, the officinal infusion of dulcamara, or decoction of sarsaparilla and corrosive sublimate (F. 27), tar capsules (F. 36), tincture of cantharides (F. 226), or the iodide of potassium (F. 31), may be tried. Mercury will generally cure the syphilitic form. The Harrogate waters (F. 466) have been recommended. At the same time, the diet must be very simple, and all stimulating food or drink avoided. During an arsenical course, acids, fruits, and most vegetables should be abstained from. Moreover, the dose of arsenic should not be too large. I have so frequently found the liquor arsenicalis in five minim doses quickly disagree, that I generally prescribe only three minims, thrice daily, upon a full stomach; diminishing this quantity after a few weeks, if there be any tendency to sickness or diarrhœa. When the silvery coat upon the tongue—which results from the use of arsenic—becomes well-marked, the patient had better be seen every four or five days.

2. Psoriasis.—Psoriasis (*Ψώρα*, tetter), psora leprosa, or dry tetter, is a chronic non-contagious inflammation of the derma; characterized by the development of patches of various extent and form, which are slightly raised above the level of the skin, are covered by thin whitish scales of altered epiderma, and are accompanied by rhagades or fissures of the skin. The eruption may be local, or it may be diffused over the whole body. The *local* varieties consist of—psoriasis palpebrarum, psoriasis labialis, psoriasis preputialis, psoriasis scrotalis, psoriasis palmaris, and psoriasis unguinum. The general varieties are—psoriasis vulgaris, psoriasis gyrata, and psoriasis inveterata.

Psoriasis is so closely allied to lepra in its appearance and general pathology, that probably those authors are correct who disbelieve in the existence of any real difference between the two disorders. As regards the eruption, it is generally noticed that in psoriasis the patches are irregular, and not depressed in the centre; while in lepra they are circular, and depressed in the centre, with elevated margins. Both affections are sometimes hereditary, and both require the same treatment.

3. Pityriasis.—Pityriasis (*Πίτυρον*, bran), or dandriff, is a chronic inflammation of the skin, attended with redness and itching, and cha-

racterized by the production of minute white scales or scurf in great quantity. It may attack any region; but the scalp and parts covered with hair are the most common seats of it (*Pityriasis capitis*). The desquamation takes place copiously and incessantly. This affection is often very rebellious to treatment, and may be prolonged for several months; in which cases it gives rise to much annoyance, with slight constitutional disturbance. When the disease occurs in red and rough patches, it is known as *pityriasis rubra*. This form is very rarely met with.

Some tonic infusion, an occasional purgative, and the use of sedative or alkaline lotions to the affected part, are the measures to be employed. In obstinate cases, however, arsenic (F. 52) has appeared to me to be the only remedy to be depended on. Occasionally the nitrate of mercury ointment does much good, applied daily. Glycerine is an excellent local palliative. When the head is the part affected, the hair should be cut off close to the scalp, with a pair of scissors. Great cleanliness is, of course, essential.

4. Ichthyosis.—Ichthyosis (Ἰχθύς, a fish), or the fish-skin disease, is characterized by the development, upon one or more parts of the integuments, of thick, hard, dry, imbricated scales of a dirty gray color; these scales resting upon an uninflamed surface. It is unattended by heat, pain, or itching. The scales, or shagreen-like flakes, when shed have sometimes been found to measure three-quarters of an inch in thickness. Ichthyosis is said to be a congenital disease, and to last during life. Examples of it are very seldom met with.

Simple warm and alkaline baths may be employed as palliatives; no other *treatment* seems to be of any use. Donovan's triple solution (F. 51) might be tried.

ORDER VIII. TUBERCULA.

The diseases belonging to the order Tubercula (*Tuberculum*, a little protuberance), are elephantiasis, molluscum, acne, lupus, frambœsia, keloid, and vitiligo. They are all characterized by the formation of small hard tumors or tubercles, more or less prominent, circumscribed in form, and persistent. The tumors may become ulcerated at the summit, or they may terminate in suppuration. Tubercular diseases are slowly developed, and are very chronic; the most formidable are peculiar to tropical regions; and the symptoms of all are so characteristic that their diagnosis is free from any difficulty.

1. Elephantiasis.—There are two species of this disease; viz., Elephantiasis Græcorum, and Elephantiasis Arabum.

Elephantiasis Græcorum or *Elephantiasis anæsthetica*, or the *Eastern leprosy*, is a terrible and dangerous constitutional disease; being endemic, and affecting the poor and badly-nourished in preference to the well-fed; while it is non-contagious, hereditary, and generally incurable. It is characterized by the appearance of patches of a purplish color; which are succeeded by elevated tumors, having the same tint, being irregular in shape and size, soft, smooth and insensible to the touch, and

which generally—after a certain time—become the seat of unhealthy ulceration. It is not met with in temperate climates; but there is found to be a predisposition to it as we approach the polar regions on the one hand, and the tropics on the other. Males suffer from it more than females. It is designated by the Jews *tsaraäth*.

Elephantiasis Græcorum appears to be endemic in Lisbon. The first indication of it, as observed there, is a discoloration, in patches, of the skin of the face; an elongation and thickening of the lobes of the ear; and a spreading out of the alæ of the nose. Then the face gets beset with tubercles, the features become puffed out and traversed by deep lines, the lips thicken, and the whiskers and eyebrows and eyelashes fall off. Gradually the tubercles extend over the limbs; the sensibility of both mind and body becomes greatly blunted; and at length there is mere animal life. After some years the tubercles ulcerate, there is ozœna, the fingers and toes become gangrenous, and the body exhales a loathsome fetor. Death occurs from exhaustion, or diarrhœa, or erysipelas.

Elephantiasis Arabum, or *Barbadoes leg*, is characterized by great swelling and induration of the true skin, or derma, producing marked deformity. Sometimes it is probable that the subjacent areolar and adipose tissues are also implicated. The disease frequently attacks the lower extremities, causing swelling so great that the limb becomes double its natural size. There is also hardness, severe pain, and thickening; with an appearance resembling—it is fancifully said—the leg of an elephant, whence the disease has derived its name (*Ἐλέφας*, the elephant). The scrotum is not an uncommon seat of this affection. It is rarely met with in Europe, occurring principally in the West Indies. Elephantiasis generally continues for life; it causes alarming constitutional disturbance; it is neither contagious nor hereditary; and it attacks males and females, rich and poor, indiscriminately. When confined to one foot and leg, amputation has been resorted to with advantage. The success which has followed the removal of large scrotal tumors in India is very remarkable.

2. Molluscum.—This affection—so called from the similarity of the tubercles characteristic of it to the eminences growing on the bark of the maple tree—consists in the presence of small tumors; these varying in size from that of a pea to that of a pigeon's egg, being occasionally of a brown color, while sometimes they are found growing from a broad base, and sometimes from a narrow peduncle. There are two forms, one contagious the other not. Contagious molluscum is a very rare, severe, and chronic affection: Bateman saw two cases only. Non-contagious molluscum is less severe, and does not produce so much irritation as the opposite kind; while after a time the tumors neither grow nor alter, but remain stationary for life. A cure can only be effected by snipping off the tumors, or by incising them and applying the nitrate of silver.

3. Acne.—Acne (perhaps a corruption of *Ἀκμαὶ*, pimples on the face at the age of puberty; or, according to some writers, from *Ἀ*, priv., and *κνέω*, to itch, because there is an absence of irritation), or gutta rosacea, or copper-nose, is a chronic pustular affection; characterized by small isolated pustules, with deep-red bases. These pustules, after suppura-

ting and bursting, leave behind them minute hard red tumors, the seat of which appears to be the sebaceous follicles of the skin.

Willan describes three varieties of this disease—acne simplex, acne indurata, and acne rosacea; the characteristic distinctions of which are indicated by their names. Acne simplex and acne indurata are most common about the period of puberty, appear on the forehead or sides of the cheeks, are very protracted in their duration, and frequently leave indelible cicatrices. Acne rosacea attacks the nose, is often connected with some stomach or liver disease, and is mostly seen in persons of advanced years, especially if they have been *bons vivants*, &c. In the *treatment* of either of these forms, the diet must be restricted, stimulants of all kinds abstained from, and milk laxatives occasionally employed. Arsenic (F. 52) is the only remedy which I have found of any service in obstinate cases. The uterine functions ought to be attended to in women. The iodide of sulphur ointment sometimes does good in acne indurata; and so does warm bathing.

4. Lupus.—Lupus (*Lupus*, a wolf) is a most formidable affection. Dr. Burgess, in his excellent translation of Cazenave,* says that it commences with violet-red spots, or more frequently with livid indolent tubercles, the chief character of which is their tendency to end in destructive ulceration of the surrounding parts. There are two varieties of this disease, *lupus non-exedens*, and *lupus exedens*—or *noli me tangere*. In the *first* there is no ulceration, yet the tubercles leave deep cicatrized pits behind them; while when it spreads rapidly and superficially, the skin is left crossed by white scar-like ridges and bands. The *second* is very destructive; and it attacks the nose more frequently than any other region of the body, though why it does so is unknown. The extent of parts which it destroys varies; sometimes the whole nose being eaten away, sometimes only the point.

A prolonged course of the liquor hydriodatis arsenici et hydrargyri (F. 51), or of the liquor arsenicalis (F. 52), or of the red iodide of mercury (F. 54), or of iodide of potassium in decoction of sarsaparilla or in bark (F. 31), is necessary in both varieties. At the same time, cod-liver oil and a very nourishing diet ought to be given.

As a local remedy in lupus non-exedens, Mr. Erasmus Wilson recommends the occasional application of the acetum cantharidis, made with strong acetic acid. In lupus exedens, either chloride of zinc, or potassa fusa, or nitric acid, may perhaps be used to destroy the ulcerated surface, and to excite the capillaries to a more healthy action.

5. Framboesia.—Framboesia (*Framboise*, a raspberry), or pian, or yaws, is a disorder rarely met with in Europe, but is common in Africa, parts of America, and the West Indies. Without any precursory symptoms, portions of the skin—especially about the face, scalp, axillæ, or genital organs—are found covered with small dusky-red spots, which gradually become converted into larger tubercles, isolated at their summits, but collected together at their bases, and often resembling raspberries or mulberries in their color and form. The tubercles are generally hard, covered with dry scales, and are sometimes inflamed. If the inflammation spreads, ulceration soon sets in; a yellow sanious discharge

* Manual of Diseases of the Skin. Second Edition, p. 343. London, 1854.

resulting, which forms scabs around the tumors. The disease continues for years, or even for life.

6. Keloid.—Keloid (according to some authorities from *Κήλη*, a tumor; *εἶδος*, like), kelis, cheloidea, or cancroide, was first described by Alibert under the above names; owing to the disease presenting a flattish raised patch of integument resembling the shell of a tortoise (*Χέλυς*, a tortoise; terminal *-ides*). This affection consists of small, flat, tender excrescences or cuticular folds, one or more inches in diameter, raised a few lines above the level of the skin, having irregular forms with slight depressions in their centres, and being covered with wrinkled epidermis. Sometimes the excrescence resembles a cicatrix left by a burn; which, though soft and velvety on the surface, communicates a sense of density and resistance on pressure. There may be only one tumor, while occasionally there are several. The disease is developed slowly, rarely ends in ulceration, sometimes disappears spontaneously, merely leaving a cicatrix, is usually found on the chest between the mammæ, and is very uncommon. It has no analogy with cancer. Arsenic (F. 52) seems to be the only remedy which exerts any beneficial effect upon it. Pressure has been recommended, but it will probably prove worse than useless if tried.

7. Vitiligo.—This is a rare disease, which received its name from Willan, owing to his belief that it produced a glistening veal-like appearance of the skin (*Vitulus*, a calf; terminal *-igo*). It is characterized by the formation of "smooth, white, shining tubercles, which rise on the skin, sometimes in particular parts, as about the ears, neck, and face; and sometimes over nearly the whole body, intermixed with shining papulæ. They vary much in their course and progress: in some cases they reach their full size in the space of a week (attaining the magnitude of a large wart), and then begin to subside, becoming flattened to the level of the cuticle in about ten days: in other instances they advance less rapidly, and the elevation which they acquire is less considerable; in fact, they are less distinctly tubercular. But in these cases they are more permanent; and as they gradually subside to the level of the surface, they creep along in one direction, as, for example, across the face or along the limbs, chequering the whole superficies with a vealskin appearance."* The eruption destroys the hairs in its progress: it never advances to ulceration.—Drs. Addison and Gull speak of two varieties, —the *vitiligoidea plana* and *tuberosa*, which may occur separately or combined. In the former, irregular yellow patches are observed, slightly elevated and hard; in the latter, there are isolated or confluent tubercles, ranging from the size of a pin's head to that of a large pea. In some of the cases which have been treated at Guy's Hospital there has appeared to be some connection between this skin disease and derangement of the liver.

Vitiligo is sometimes confused with lepra alphoides, sometimes with lupus non-exedens. Other writers seem to regard the appearances which are produced as merely due to a diminution of pigment, without any change of texture; thus making it of the same nature as leucoderma. No remedy for the disease is at present known.

* A Practical Synopsis of Cutaneous Diseases, by Thomas Bateman, M.D. Seventh Edition, edited by Dr. Anthony Todd Thomson, p. 834. London, 1829.

PART XIV.

DISEASES OF THE APPENDAGES OF THE SKIN, &c.

I. DISEASES OF THE HAIR.

The diseases of the hair which are due to the presence of a parasitic fungus having been already described, it only remains to notice those that arise from general causes. Like other structures, these horny appendages of the skin are affected by the health of the bearer; marked examples of which influence are seen in the production of gray hair from mental anxiety, premature decay, and old age. Numerous diseases also—such as fever, syphilis, phthisis, &c.—produce loss of hair, by interfering with the nutrition of the hair-bulbs and the tissues in their immediate neighborhood. Many cases are known where the hair has become quite gray from the effect of depressing circumstances; and yet, when the condition has improved, the hair as it has grown has been developed of the color natural to the individual.

Every single hair may be supposed to have a life of its own, and hence to pass through the three stages of growth, maturity, and decay. Each one, likewise, seems liable to disease and premature death. But our philosophy fails to teach us why the hairs of certain regions are so much more prone to early decay than those of other parts. Why, for example, should we so frequently find a man of forty with a bald scalp independently of any local disease, while the vigor of the hairs upon his chin, eyebrows, and pubes remain uninterfered with? If this change be due, as some assert, to a diminution of the subcutaneous fat, why are not women affected more frequently? But, in fact, many men are bald whose scalps appear thick, and where the adipose tissue is present in proper quantity. Moreover, it is difficult to give any satisfactory explanation of the fact that in some regions more than others the fall of the hair is attended with destruction of the follicles. When an eyelash dies and is thrown off, the follicle soon produces a successor; but this is not as constantly the case with regard to the hairs of the scalp. It is, however, very difficult to say from the appearance of a part whether the hair follicles and bulbs have been destroyed or not. No greater degree of baldness can be shown than is present in cases of tinea decalvans, the affected spots being perfectly white and smooth and polished. Yet by proper treatment the follicles can be stimulated so as to produce a new crop of healthy hair. And even in the baldness of old age, when the follicles and bulbs are obliterated, it is possible that a new set may be developed. "We are aware," says Dr. Graves, "that the least highly organized tissues are capable of being reproduced after having been destroyed: now many facts have come under

my notice which seem to authorize the conclusion, that when the original stock of bulbs has been destroyed in the scalp, a new stock is frequently developed by the powers of nature, and thus an entirely new crop of hair arises."* As affording presumptive evidence of the soundness of this view Dr. Graves cites the histories of several individuals, who at an advanced age, have had their failing sight completely restored; as well as others in which, after the three score years and ten have been attained, a new set of teeth has been cut.

Loss of hair, or *baldness*, or *alopecia* (*Ἀλώπηξ*, a fox,—because this animal is said to be liable to baldness), may be partial or general, will occur at any period of life, may be temporary or permanent, and is much more commonly observed in the male than in the female sex. In a few rare instances there has been a congenital absence of hair, owing to some imperfect development of the apparatus which secretes this appendage. Senile calvities (*Calvus*, bald) usually takes place gradually, the hair first becoming thinner on the crown, or on the temples and forehead. It is a consequence of the general loss of power, the hair follicles—like the other organs—participating in the general weakening of the nutritive functions; while as the follicular apparatus is destroyed, the loss is generally irremediable. But in the baldness which occurs from debility, hemorrhages, fevers and other acute diseases, tuberculosis, syphilis, &c., the organs which secrete the hair usually remain entire though inactive; and then by giving tone, locally and generally, a cure may be effected. The remedies therefore must consist of such agents as will aid the digestion of nourishing food, as well as of steel and quinine and cod-liver oil; while stimulants are used locally to excite the capillary circulation through the scalp. Amongst the latter agents may be mentioned brushing, kneading, and friction of the scalp; the occasional application of the liniment of cantharides, diluted in proportion to the effect which it is desirable to produce; with the use of embrocations which irritate without blistering (F. 287). An ointment of iodide of sulphur, or of creasote, or of iodine, or of Peruvian balsam will also be found useful. In addition, the hairs which have not fallen ought to be cut short, those especially which appear withered and split being clipped close to the skin; while the scalp is to be well brushed, care being taken not to injure the new downy hairs (*lanugo*).

Hirsuties (*Hirsutus*, hairy), or *an augmented growth of hair*, is sometimes observed in association with constitutional debility. The hair of the head is often very long, and the eyelashes thick, in strumous and phthisical subjects. Hair, in small quantity, may also be developed in unusual situations, as on the surface of the mucous membrane of the mouth, intestinal canal, bladder, vagina, &c. Women advanced in life, especially perhaps if they have never borne children, frequently have hair developed on the chin and upper lip.—Moles, mother's marks, or nævi pilosi (*Pilus*, a hair) consist of dark-colored patches, covered with hair. They are formed by irregular deposits of pigment, with enlargement of the hair follicles and bulbs; the capillary vessels being normal, instead of increased in number and size as in vascular nævi. Pilous nævi are often about the size of a sixpence, but occasionally they are

* Studies in Physiology and Medicine, by the late Robert James Graves, F.R.S., p. 338. London, 1863.

seen of much greater extent. In a case mentioned by Alibert, the skin of nearly the whole body was studded with black moles which were covered with dark and thick woolly hair.

A loss of the color of the hair, or *canities* (*Canus*, gray hair), may depend upon disease or on advanced age, while it may also arise from deep mental emotion. In a few instances partial canities is congenital, one or more patches of the whitest hair being found surrounded by locks of a dark color. In the Albino the whole of the hair seems deprived of coloring matter. Bichat has particularly noticed the influence of the different passions of the mind upon the internal structure of the hair, its color being often changed by grief in a short period; and he speaks, from personal knowledge, of five or six examples in which the loss of color was complete in less than eight days, while in one instance the hair became almost entirely blanched in a single night. The cases of Marie Antoinette, Mary Queen of Scots, Sir Thomas More, &c., are well known to students. In senile canities, the grayness occurs gradually, white hairs being found amongst those of the ordinary color; the number of the former steadily increasing until the latter have been quite supplanted. This change often commences in men shortly after the age of forty.

The hair may grow in a wrong direction. Thus, the points of five or six eyelashes—especially those of the upper lid—may project on to the surface of the eyeball, giving rise to very considerable irritation and annoyance. *Trichiasis* (θρὶξ, τρίχὸς, the hair) is to be cured by slowly and steadily removing each eyelash with broad-pointed and well-grooved forceps, and then dabbing the part frequently with spirits of wine to destroy the follicle. In *distichiasis* (Δὶς, double; στίχος, a row) the tarsus has a supernumerary row of cilia, the points of which irritate the eye, as in trichiasis.

A peculiar disease of the hair, known as *Plica Polonica* (*Plico*, to twine together), or *Trichonosis plica* (θρὶξ, the hair; νόσος disease), is endemic in Poland, and in some parts of Russia and Tartary. It is characterized by considerable tenderness and inflammation of the scalp; the hairs become swollen and imperfectly formed; while the hair-follicles secrete a large quantity of viscid reddish-colored fluid, which glues the hairs together, and unites them into tufts or felt-like masses. When the disease is of long standing, two cryptogamic plants—the Tricophyton tonsurans and Tricophyton sporuloides—have been detected by a minute examination. Sometimes, the matted hairs are loaded with pediculi. This Polish disease is not confined to the scalp, but may involve the hairs on any part of the integument. The odor from the affected parts is said to be most disgusting.

II. DISEASES OF THE NAILS.

The nails may be described as horny shields, originating in a fold of the cutis vera, and so placed as to protect the ends of the fingers and toes. In very rare cases there is a congenital absence of one or more

of these appendages; while equally seldom we find supernumerary nails, or a nail is developed in an unusual situation—as on the stump of an amputated finger. Occasionally these organs are shed with some degree of regularity; a new one being formed which gradually loosens and throws off the old structure placed above it. The nail may also be cast off in consequence of a whitlow, when the inflammation has commenced near the matrix. As the growth of the nails, both in length and thickness, is regulated by the rate of general nutrition, so during sickness their development is retarded. This point of retardation is generally shown by one or more transverse ridges, owing to the part secreted during illness being thinner than that formed in health; and hence it has been said that the nail presents a sort of register of the state of nutrition during its existence. A curving of the nails, with clubbing of the last phalanges, has been sometimes observed in phthisis, cyanosis, &c. The thumb nail probably takes about twenty weeks in growing from its root to the free margin.

In-growing of the nail, or *onyxis* (Ὄνυξ, a nail or hoof), is a painful condition which not unfrequently occurs on the outer part of the great toes, and which is usually produced by ill-fitting boots. The side of the nail is pressed into the flesh at its margin; the pressure and irritation being increased by walking, so that inflammation and ulceration are soon set up. The ulcer becomes covered with flabby and sensitive granulation, and there is an unhealthy discharge. A cure may often be effected by removing the pressure; by rest, with the leg elevated; and by scraping the side of the nail very thin, softening it by soaking in warm water, and then separating it from the sore with a little pellet of cotton-wool carefully inserted under the edge. Where this treatment fails, as it will when the case has been neglected and the fungous granulations are prominent, the offending half of the nail had better be removed. As this operation is very painful, congelation must be employed or the patient should be placed under the influence of chloroform. The blade of a pair of strong sharp-pointed scissors is thrust up under the nail to the matrix, and the strip of nail drawn out with the forceps. The subsequent use of water dressing, or of the common red lotion (F. 264) if the granulations are indolent, will quickly heal the sore.

Disease of the matrix, or *onychia* (Ὄνυξ, a nail), consists of a tedious ulceration about the root of the nail. It may arise, as it not very unfrequently does in children, from a depraved state of the constitution; or it is sometimes caused by a mechanical injury—especially by a severe crush or bruise. There is pain and swelling at the root of the nail, and about the surrounding skin; on pressure, a sanious discharge exudes at the sides; the nail gets raised, is turned upwards, and finally becomes detached so as to expose a foul ulcer; while this ulcer becomes glazed and irritable, and perhaps extends in all directions. Occasionally, the distal phalanx becomes necrosed. When the disease is severe it is often improperly spoken of as *onychia maligna*. Supposing that the nail is merely loose, it ought to be removed, so as to allow of the ulcerated surface being dressed with black wash or red lotion. The patient must be fed well, and should take cod-liver oil. In obstinate cases, a mixture of arsenic and chlorate of potash and steel (F. 402) will prove very serviceable. In onychia associated with constitutional syphilis, local

fumigation with calomel is deserving of trial; while the red iodide of mercury (F. 54) may be administered internally.

A peculiar condition termed *psoriasis of the nails* has been met with every now and then. In many instances it appears to be the consequence of an old syphilitic taint. The nails first become discolored, thickened, and rough; then they get raised, and assume the appearance of a coarse scab; while at last they crack, and crumble away, and separate at their roots, leaving an unhealthy fissure. Arsenic (F. 52) is the only remedy which exerts any influence upon this chronic affection. Where there is a history of syphilis, Donovan's triple solution (F. 51) should be employed. Local remedies are usually of little service. The application of a mixture of equal parts of the calomel and creasote ointments might perhaps assist the cure.

Hypertrophy of the nails can scarcely be called a disease. It is often met with in bedridden persons, as the consequence of neglect. The nail of the great toe may attain an extravagant length and thickness; while by curving inwards, and pressing into the flesh of the foot, it will produce much pain and inconvenience. A nail thus altered can usually be easily removed. It is only necessary to grasp it firmly with the ordinary dressing forceps, and then with a little tact evulsion may quickly be accomplished.

III. WARTS, CORNS, AND HORNS.

Warts, or *vegetations*, or *verrucæ* (*Verruca*, a wart), consist of collections of hypertrophied cutaneous papillæ; each papilla being separate and merely covered with thin cuticle, or a bundle of papillæ being bound together by an excess of dry and hard scaly epithelium. Both varieties are equally common; they may occur singly or in groups; they are especially frequent in children and young people; the hands and fingers are their most common seats, though they may be met with on the scalp and on the face and on other parts of the body (see p. 202); and they may be caused by anything which irritates the skin, particularly if there be any hereditary tendency to them. The warty growths which form upon the face in elderly people, those which are produced by soot on the scrotum in chimney-sweeps, and those which rarely occur on old cicatrices, are forms of epithelial cancer. The secretion from simple warts is probably contagious; but there is no reason for believing in the popular theory that the blood from a wart will produce a similar growth wherever it is applied. Attention to cleanliness, and the employment of some caustic, will generally cure the common warts. Nitrate of silver, glacial acetic acid, the acid solution of nitrate of mercury, may be applied on two or three occasions; or the growth may be snipped off with a pair of curved scissors, and the wound dressed with any simple astringent lotion.

The hypertrophied and condensed masses of epidermis which are known as *corns* are produced upon prominent parts of the body by pressure. Thus they are most frequently met with on the toes owing to the

irritation of badly-made boots, or on the soles of the feet; while they also occasionally form on the elbows and knees, or on the extremities of the fingers in those who play upon stringed instruments. Some corns are more painful than others; the annoyance and suffering being often considerable when the callosity is seated on a deformed toe. Where there is acute bending of the phalanges from extreme contraction of the flexor tendon, a prominent site is offered on which a corn frequently grows; and I have known so much suffering thus produced that the patient has willingly submitted to amputation of the toe, after finding that the subcutaneous division of the tendon has been useless. The pain arises not so much from the pressure of the hardened epidermis as from the prolongation of one or more of its fibres (commonly known as the roots) into the true skin.

Soft corns are formed between the toes, and more frequently on the outer side of the fourth than on any other toe. They are kept soft or spongy by the warm exhalations from the sweat-glands of the adjoining tissues. Occasionally, an irritable wart is mistaken for a soft corn.

Corns can only be cured by the removal of the pressure which produces them. The boots or shoes must be made with thin upper leathers (particularly avoiding patent leather), and so shaped as to fit the foot properly. The socks ought also to be light, and not unnecessarily loose. Then the sufferer must regularly attend to his feet, carefully cutting each corn with a sharp knife about every fourteen days; it being better to soak the feet in warm water for some fifteen minutes previously. In some cases a small piece of amadou plaster, with a whole punched out of its centre, may be applied with advantage. Should suppuration take place beneath a corn, the foot ought to be well bathed, and the pus early let out by a small puncture.

A *bunion* consists of an enlargement and thickening of a bursa,—generally of that over the metatarsal joint of the great toe. It may be, but not necessarily, accompanied by distortion of the articulation. Occasionally the bursa suppurates, a fistulous opening being very commonly left after the evacuation of the pus. A very painful bunion is sometimes formed over the instep,—on the scaphoid bone; but it is less frequently met with than it used to be when men punished themselves with tightly-fitting Wellington boots. The only remedy for an ordinary bunion is a boot made so large, that the toes are not crowded together in a bunch. In bad cases, the use of buckskin, or of the material known as "pannus corium," is preferable to common leather.

Horns are made up of condensed and dried layers of epithelium, with or without a core composed of greatly hypertrophied papillæ. Their bases are freely supplied with blood. As they increase in size by the continual formation of new layers of epithelium, a tendency to become curved or spiral is usually manifested; so that they may assume the appearance presented by the small horns of the ram. These structures are but seldom met with in the human subject. They most frequently grow from the scalp; but not uncommonly they are seated on the face or trunk. Frequently, a horn may be cleanly separated from its attach-

ment to the skin by a gentle wrench; but where there are firm papillary prolongations into the growth, it may be necessary to make a couple of oval incisions. If the horn arise from the interior of a sebaceous cyst, as it may do on the scalp, the sac should be cleanly dissected out.

IV. PHTHIRIASIS.

Phthiriasis (*Φθείρ*, a louse), or lousiness, may be described as that condition in which lice develop themselves on the surface of the body; a fitting soil being supplied by filth, by the morbid secretions in cutaneous affections, as well as by constitutional disease. The human body may be infested with three kinds of lice—viz.: the *Pediculus corporis*, vel *vestimentorum*, the *P. capitis*, and the *P. pubis*. All are oviparous, the eggs being known as *nits;* the sexes are distinct; while the young are hatched in five or six days, and in eighteen days are capable of reproduction.

The *body* or *clothes louse* is of a dirty white color, and from one to two lines in length. Its head is irregularly oval, with two antennæ, and prominent eyes: the abdomen is thrice as broad as the thorax; and from the latter three legs are developed on each side. It seems to live in the clothing, attacking the skin for its nourishment. The irritation which it produces is very great, while the scratching resorted to for relief gives rise to a pruriginous rash.—The *head louse* is smaller than the preceding, and is never found anywhere but on the scalp, where it multiplies abundantly. Its body is flattened and rather transparent; of a gray color, or of a red hue when full of food; and its thorax—one-fourth the length of the abdomen—has three limbs on each side.—The *pubic* or *crab louse* attaches itself especially to the hairs about the sexual organs: but it is also found on those of the axillæ, and even on the eyebrows. It never invades the head or beard. It resembles the other lice save that its body is large and flat, without any defined separation between the thorax and abdomen. It clings to the roots of the hairs, and deposits its nits on these structures.

In some very rare instances there appears to be a constitutional condition favoring the development of pediculi, or at all events of the soil which is congenial to them; so that the statements of old authors "that divers persons have come to their ends, being devoured by lice," are not so very improbable. Dr. Whitehead relates an instance, which I shall here abbreviate, in confirmation of this statement:* R. S., æt. forty-three, a farmer, strong, of sanguine complexion, contracted a virulent form of syphilis in April, 1840, for which he was chiefly treated with ioduretted sarsaparilla. Seven months afterwards he suffered severely from secondary symptoms; when he was placed on a course of mercurial medicine and was salivated, with great relief to his disease. At the end of 1841 he again sought advice, stating that for several weeks past he had been annoyed by the presence of lice about his person, chiefly on the

* On the Transmission from Parent to Offspring of some forms of Disease, and of Morbid Taints and Tendencies. Second Edition, p. 173. London, 1857.

trunk. He was scrupulously clean in his habits, and had never before been troubled in a similar way. No lice were found about the head: what little hair he had was clean, fine, and silky. The vermin so increased in number, and produced such mental distress, that fears began to be entertained for the integrity of his intellect. On examining his skin, a multitude of irritable-looking points were detected on the front and sides of the chest, from which the nits could be detached by lateral pressure. At this period the generation of the insects was so considerable, that the flannel vest put on clean in the morning was crowded with them by the end of twenty-four hours. For some time remedies were unavailing; sulphur, oxymuriate of mercury, white precipitate, and hellebore were freely tried with little or only temporary benefit. At length, by mere chance, a mixture of iodide of potassium and prussic acid in full doses was given; and in a few days, after taking sixteen or eighteen draughts, the cure was permanently completed.—Dr. Whitehead has also favored me with the account of another case in which the quick generation of the body louse was remarkable. The patient was a young lady, a member of a highly respectable family, in whose skin, mostly below the margin of the mammæ, the nit was formed in a small pimple, which gave exit to its contents like a pustule in acne. She had been troubled with these lice for several years.—Mr. Bryant has reported a somewhat similar case: A patient who had been a governess, and who was 30 years of age, was admitted into Guy's Hospital. The whole of her body was literally covered with lice; the irritation and scratching having given rise to excoriations and scabs. She was put into a warm bath, and all her clothes were taken away. Every precaution was adopted to remove all the insects, but two hours afterwards her body was again covered with them, although she lay in a clean bed. She was again thoroughly washed, but the vermin reappeared immediately. All the remedies employed proved useless.*—Bernard Valentin has also related the history of a man who suffered from intolerable itching on all parts of his body, while his skin was covered with tubercles. On incising these, each was found filled with lice.—Bremser once met with a mass of lice in a tumor on the head.—And Jules Cloquet observed some thousands of these insects in a subcutaneous cavity.†

The presence of lice is easily determined by a careful examination. The irritation produced by these disgusting insects can scarcely be mistaken for that caused by the Common Flea (*Pulex hominis*, vel *P. irritans*); by the Chigoe or Jigger (*Pulex penetrans*), which is so annoying to the residents of Guiana and Brazil; by the Harvest Bug (*Leptus autumnalis*, vel *Acarus autumnalis*); by the stinking Common Bug (*Cimex lectularius*); or for that set up by the Musquitos and Common Gnats (*Culex pipiens*), the bites of which are so intolerable in warm countries as well as in Lapland.—The Pimple mite (*Acarus folliculorum*) rarely gives rise to any itching or discomfort. This acarus has a worm-like form, and a length varying from the fiftieth to the hundredth part of an inch; it inhabits the ducts of the sebaceous glands, and especially those about the alæ of the nose; while it is probably to be found in the great

* Quoted from The Parasitic Affections of the Skin, by T. McCall Anderson, M.D., p. 108. London, 1861.

† Moquin-Tandon's Elements of Medical Zoology, translated by Robert T. Hulme, F.L.S., p. 295. London, 1861.

majority of persons, only becoming troublesome by excessive increase. In such a case, these arachnida may be destroyed by rubbing in calomel, or by washing the affected part with a weak solution of corrosive sublimate.

To remove lice, free washing with yellow, or soft, soap and hot water must first be employed. Where the body louse is present, the clothing ought either to be destroyed, or exposed to a temperature of 180° F., or well fumigated with sulphur. Then these insects are generally destroyed, without difficulty, by sulphur fume or water baths; or by the application of mercurial ointment, the mercurial vapor bath, free dusting with calomel, or the use of a lotion of corrosive sublimate (two grains to each ounce of water); or by free inunction with the officinal cocculus ointment. The nits, if not killed by these remedies, may be combed away, after washing the hairs thoroughly with vinegar or with spirits of wine.

V. TRICHINIASIS.

Trichina disease, or Trichiniasis (θρὶξ, τριχὸς, a hair) is a peculiar febrile helminthic affection, somewhat resembling typhoid fever in its general symptoms. Zenker, in the year 1860, first proved the existence of this disease, in the case of a girl who died at Dresden, and showed that it was due to trichinal infection.

The small nematode worm which has been recently attracting so much attention was discovered by Professor Owen, in the year 1835, in a portion of the muscles of a male subject sent to him by Mr. Wormald. A peculiar speckled appearance of the voluntary muscles had attracted the attention of this gentleman; and these specks were found by Mr. Owen—as Tiedemann and Mr. John Hilton had previously shown to be the case in similar instances—to consist of minute encysted entozoa. For this parasite Mr. Owen proposed the name of *Trichina spiralis*, owing to its hair-like and spirally-coiled form. Since this period it has been frequently discovered in the dissecting-room by German and English anatomists; although, prior to 1860, it was regarded as an interesting curiosity, rather than as the cause of a serious disease. If a muscle infested by trichinæ be examined, it will generally be found to present a peppered appearance, owing to the presence of small and grayish-white gritty granules. These specks or granules are the round or oval, and more or less calcified, cysts. They contain the immature worm, or worms; and each capsule generally measures the $\frac{1}{60}$ of an inch in its longitudinal direction, and the $\frac{1}{100}$ of an inch in the transverse diameter. The young trichina, when extracted from the cyst, is usually disposed in two, or in two and a half, coils; while on being straightened out it is found to be about the $\frac{1}{30}$ of an inch in length, and the $\frac{1}{700}$ of an inch in diameter (Owen). Trichinæ may, however, exist abundantly in muscular tissue—though only to be recognized by means of the microscope—without any cysts or capsules being present; the latter being only abnormal formations, according to Leuckart. The fully developed and sexually-mature male trichina measures the $\frac{1}{18}$, and

the adult female $\frac{1}{8}$ of an inch (Cobbold); the increased size of the latter being due to the great development of the ovaries and oviducts.

An excellent account of the trichina was published by Leuckart, at Heidelberg, in 1860; and though some of his conclusions have been disputed by subsequent observers, yet generally they are believed to be correct. He sums up the results of his labors in sixteen propositions, which are as follows:

(1) The trichina spiralis is the juvenile condition of a small nematode worm hitherto unknown, to which the genus name "trichina" has also to be given. (2) The sexually developed trichina inhabits the intestinal canal of numerous warm-blooded animals, particularly mammals, and of man, and always in great numbers. (3) Already, on the second day after immigration, does the intestinal trichina attain its full sexual maturity. (4) The eggs of the female trichina are developed in the uterus of the mother into filaria-like very minute embryos; which, beginning from the sixth day, are born without any covering derived from the egg. (5) The newly-born trichinæ soon commence a migration. They penetrate the walls of the intestines, and pass through the abdominal cavity directly into the muscles of the animal in which they are bred, where they are developed into the well-known form, provided the conditions are favorable. (6) The direction in which they move is marked out by the intermuscular cellular tissue. (7) The majority of embryos remain in the group of muscles surrounding the abdominal cavity, particularly the small muscles with much connective tissue. (8) The embryos pierce into the interior of the single primitive muscular fibres, and here they attain within a fortnight the size and organization of the well-known trichina spiralis. (9) The infected muscular fibre loses its original structure soon after the entrance of the parasite. The fibrillæ are transformed into a finely granular matter, while the nuclei of the sarcolemma are metamorphosed into oval nucleated cells. (10) The infected muscular fibre retains its original shape until the young trichina is fully developed, while afterwards its sarcolemma is thickened, and contracts from both ends towards the middle. (11) The spot inhabited by the coiled-up parasite is converted into a spindle-shaped dilatation, round which the sarcolemma is thickened and hardened by the deposition of calcareous particles, producing the lemon- egg- or ball-shaped cyst. (12) The migration and development of embryos is also effected by the transfer of pregnant trichinæ into the intestine of a new suitable animal. (13) The development of muscular trichinæ into sexually ripe animals is quite independent of the presence or absence of the calcareous membrane, and begins whenever the former are fully developed. (14) Male and female individuals can already be distinguished in the juvenile state. (15) The immigration of great numbers of young trichinæ causes a very dangerous, and, under circumstances, fatal disease. (16) The mere eating of trichinous flesh may (without immigration of young trichinæ) cause more or less dangerous or even fatal conditions.

The *symptoms* of trichiniasis vary in degree, being mild or severe according as only a few or many of the worms have been swallowed, as well as in proportion to the number of the progeny and the extent of their migrations. Thus, Dr. Althaus remarks that in the epidemic of Burg, near Magdeburg, a woman who had eaten a quantity of raw pork

with bread, fell ill and died: her child, who had sucked a spoon used by the mother, suffered slightly and recovered. According to the accounts given by most authors, the earliest symptoms are loss of appetite and general malaise; to which succeed nausea, prostration, diarrhœa, a sense of thorough indisposition, and a painful stiffness of the arms and legs. This pain is due to the immigration of the young trichinæ into the muscles; and it is accompanied with high fever, and an œdematous swelling about the face. The pulse is frequent, and there are copious offensive perspirations; but although the temperature of the body is raised, it does not reach the same height as in typhus and typhoid fever. For some days the stiffness of the limbs continues to increase; while all the muscles seem to be painful and swollen and very sensitive to the touch. The movements of the intercostal muscles in respiration are attended with suffering, so that repose is impossible; while there will be troublesome hiccup if the diaphragm be invaded, with hoarseness and loss of voice where the laryngeal muscles get inhabited. When a large quantity of trichinous meat has been eaten, so that the immigration of the trichinæ into the muscles is great, the patient may lie almost paralyzed in a state of great exhaustion. The facial œdema generally lasts about a week, its disappearance being followed by swelling of the feet and legs, and ultimately of the trunk. There is no effusion, however, into any of the cavities; nor does the urine become albuminous, although it is always lessened in quantity, and may become loaded with urates. About the beginning of the fourth week the patient is in a pitiable condition. The pulse and respirations are very frequent, the tongue is red and dry, the pain is severe, the sweating is profuse, the mouth can scarcely be opened, no sleep can be obtained, and there is great anxiety or delirium; death not unfrequently occurring with all the symptoms of profound exhaustion. Such complications as pneumonia, peritonitis, and pleurisy with effusion, are not uncommon. In favorable cases, however, the pain and swelling and diarrhœa abate; the oppression of the chest passes off; sleep is obtained; a desire for nourishing food is evinced; the power of the limbs is regained; and there is only left great anæmia, with a falling off of the hair, &c. The parasites have taken up their abode in the muscles, and become encysted.

The *diagnosis* of trichiniasis is not difficult, especially if the symptoms come on shortly after very underdone or raw pork, ham, or sausages have been eaten. In the early stages, the trichinæ may be discovered in the stools; but the necessary microscopic examination will often occupy some hours. Subsequently, the worms can be found by taking out a small piece of an affected muscle and minutely examining it. In this way, the fact that the disease has been present may be ascertained long after recovery. Dr. Althaus quotes from Dr. Griepenkerl the following confirmation of this opinion: From 1859 to 1862, an epidemic occurred in Blankenburg, in the Duchy of Brunswick, which was believed to be of the nature of gastro-rheumatic fever. Some time afterwards, when attention had been directed to the occurrence of trichina disease in other parts of Germany, the similarity of the latter distemper and the epidemic just mentioned, struck the doctors of Blankenburg; and a gentleman who had fallen ill there in 1859, but had recovered after a protracted illness, was informed that he had probably suffered from trichiniasis. He, therefore, offered to have a small piece of muscle

cut out, and the specimen being examined by the microscope revealed no less than seven encysted trichinæ. It was thus shown that the Blankenburg epidemic, in which no less than 278 soldiers, and a corresponding number of civilians had been attacked, was in fact the flesh-worm disease.

The results of *treatment* have not been very satisfactory. The cases are not seen in the earliest stage, when emetics and purgatives would do much good; these remedies, however, being comparatively useless after the fourth day from that on which the trichinous food has been consumed. Nevertheless, if diarrhœa and vomiting be absent during the first two or three weeks, it will be advisable to produce purging by full doses of calomel, so as to remove any intestinal trichinæ which may remain. Moreover, where there is diarrhœa, it seems unadvisable to attempt to check it. The sleeplessness and copious sweats were found by Dr. Rupprecht to be best relieved by the wet-sheet packing; the different preparations of opium proving injurious. With regard to any special remedies for destroying the muscular trichinæ, nothing satisfactory is known. The picro-nitrate of potash and benzole are those agents which seem to be the most promising, but further experiments are needed before they can be recommended.*

VI. DRACONTIASIS.

Dracontiasis (*Δράκων*, a serpent) may be described as a singular helminthic disease, produced in the human body by the presence of the Guinea-worm.

The Dracunculus medinensis, Filaria medinensis, or Guinea-worm, has a slender cylindrical body, sometimes nearly as thick as a crow-quill, and varying in length from one to ten or twelve feet. It is endemic in some parts of Asia and Africa, especially in marshy districts; while persons returning from these countries occasionally bring this nematode helminth back with them. According to Küchenmeister it is probable,

* The reader who wishes to investigate this subject more fully should study Professor Owen's essay on the Entozoa,—Cyclopædia of Anatomy and Physiology, vol. ii, p. 111: Dr. Cobbold's treatise,—Entozoa: an Introduction to the Study of Helminthology, p. 334: a pamphlet by Dr. Althaus,—On Trichinosis, or Fleshworm Disease: the work of Dr. W. Abbotts Smith,—On Human Entozoa, p. 201: Dr. Lankester's translation of Küchenmeister, on Animal and Vegetable Parasites of the Human Body, vol. i, p. 333: and the really admirable report by Dr. J. L. W. Thudichum on the Parasitic Diseases of Quadrupeds used for Food, in the Seventh Report of the Medical Officer of the Privy Council (1864), p. 348.

In the above section, the severe mischief which an animal parasite can set up is shown. The extensive destruction which may result from the propagation of the lowest form of vegetable life (the *Fungi Cryptogamia*) is well seen in the case of the *Fungus Foot of India*. The mucedinous fungus (named by the Rev. Mr. Berkeley as the *Chionyphe Carteri*) in this affection eats its way into the metatarsal and tarsal bones, and ultimately into the extremities of the tibia and fibula to just above the ankle; producing numerous fistulous channels, which become filled with rounded black masses of fungus. The disease has been named *Mycetoma* (Μύκης, ητος, the Mushroom) by Dr. H. V. Carter, of Bombay: it has only been observed in the natives of India who go about with naked feet: the sporules of the fungus get introduced beneath the cuticle through some scratch or abrasion, whence they rapidly spread and multiply: while hitherto amputation has seemed to be the only remedy of any avail.

that the "fiery serpents" which "bit the people, and much people of Isreal died," were dracunculi; so that Moses is the first writer who has referred to these worms. At all events, it is impossible to doubt that Plutarch describes the dracunculus in the eighth book of his "Symposiacon," where he makes Agatharchides of Cnidos, who probably wrote about B.C. 140, narrate "that the people taken ill on the Red Sea suffered from many strange and unheard-of attacks; amongst others worms, like little snakes, came out upon them, which gnawed away their legs and arms, and when touched again retracted themselves, coiled themselves up in the muscles, and there gave rise to the most insupportable pain."—At present we are chiefly familiar with the adult female dracunculus, which reproduces viviparously; the active embryos being found in stagnant pools, in the soil forming the foundations of artificial reservoirs, as well as in damp mould or mud.

The common seat of the Guinea-worm, in the human body, is the subcutaneous areolar tissue, and especially that of the extremities. In an analysis of 181 cases by Sir James McGrigor, it appears that the feet and legs were affected in 157. The impregnated worm probably perforates the sweat-ducts of the skin, and effects a lodgment. It may give rise to no symptoms for some months; and then the first indication is usually a feeling of irritation in the affected part, where a cord-like ridge can often be felt. There may also be much constitutional disturbance, such as fever, headache, nausea, colic, and debility; or sometimes only local pain is complained of. A kind of boil usually forms, in the centre of which a black point will perhaps be seen; while on the pustule breaking, the head of the worm may protrude. If the latter be injured, a milky fluid may be discharged, which will be found, on a microscopic examination, to be loaded with minute dracunculi. When the head protrudes, a thread may be placed around it and rolled upon a small stick or piece of bougie; and then day by day the worm is to be gently drawn out, and wound round the stick, until the extraction is complete. Where the worm does not protrude, but can be felt as a firm catgut-like swelling under the skin, an incision may be made so as to expose it; the parasite being at once removed in a loop, or being partially lifted up so as to admit of the insertion of a wedge of wood, round which it is to be daily coiled until the whole can be withdrawn without any fracture. As prophylactic measures all individuals travelling in districts where the Guinea-worm is found should take care to have the feet well covered; to dry the skin thoroughly after bathing or wading through pools, marshes, &c.; and to avoid lying on the damp ground with any part of the body exposed to the soil. In the native country of the worm English officers suffer very much less frequently than the private soldiers, inasmuch as they do not go about with bare feet and arms.

PART XV.

DISEASES OF THE BLOODVESSELS.

I. AORTITIS.

AORTITIS (*Ἀορτή*, the great artery; terminal *-itis*) or acute inflammation of the aorta, is such a very rare affection that some physicians almost doubt the possibility of its occurrence. On all hands it is allowed that the mode of origin of the inflammation is unknown. It can only be said that aortitis is probably a blood disease; being perhaps allied to rheumatism, like pericarditis and endocarditis.

The symptoms are so obscure, that aortitis is seldom diagnosed. In the recorded cases there seems principally to have been great general uneasiness, rigors followed by fever, orthopnœa with a frequent sense of suffocation, pain and violent pulsation of the vessel, and great palpitation of the heart. In a very interesting case reported by Dr. Parkes,* a loud, rough, systolic bruit, due to the passage of the blood over a surface roughened by a deposit of lymph, was heard from the third dorsal vertebra down into the lumbar region; while the pulse was irregular and small, though this arose from the aortic orifice of the heart being diseased. The pulse is often unaffected.

The appearances found after death are great vascularity, with a thickened pulpy state of the inner and middle coats of the artery. Lymph has sometimes been effused on the internal tunic. From the few cases on record it would seem that inflammation of the aorta is very seldom associated with endocarditis,—less frequently indeed than with pneumonia or pleurisy.

The coats of the aorta may undergo structural changes, either as the result of chronic inflammation or of a simple degeneration of the tissues. Mineral or ossific, amyloid, and atheromatous or fatty degenerations, are most frequently met with in advanced life, although they may occur at an earlier period. Andral found ossific plates in the aorta, on five or six occasions, in the bodies of individuals between 18 and 24 years of age. These degenerations are either limited to the aorta—especially to the ascending and transverse portions of the thoracic division of this vessel—or the whole arterial system is affected. The atheromatous and bony deposits are also found in patches of variable size, or the entire calibre of one or more vessels is involved; in either case the walls being deprived of their tone and elasticity, while they are rendered rigid and thick and brittle. Fortunately, these changes progress slowly. At first the deposits lessen the calibre of the vessel, in proportion to their thick-

* Medical Times. London, 23d February, 1850.

ness; but at a more advanced period dilatation results, the contractile power of the outer arterial coats being diminished. The other consequences of atheroma and ossification are,—the formation of aneurisms; rupture of all the tunics of the affected vessel; occlusion of the arterial trunk, owing to the deposition of fibrin on the roughened lining membrane; and occasionally gangrene of the tissues beyond the obstructed vessel. In the amyloid degeneration, the tissues supplied with blood by the diseased vessels become involved in the morbid process; as is well seen in the case of the liver, kidneys, spleen, and lymphatic glands.

Returning to the subject of acute aortitis, it is only necessary to say that when the existence of this disease is suspected, warm baths, dry cupping over the spine, counter-irritation by means of blisters, and the administration of iodide of potassium and opium, are the measures to be resorted to. Colchicum might perhaps do good; while ether could be tried to relieve the orthopnœa.

II. AORTIC PULSATION.

Aortic pulsation is a peculiar functional affection, characterized by violent throbbing, usually most observable in the abdominal portion of the vessel. It causes annoyance rather than pain; but at times produces sickness and syncope. The pulsation may frequently, in thin subjects, be seen at the epigastrium, and sometimes at the umbilicus. On applying the hand, a jerking, quick, strong forward impulse is felt; which is synchronous with the heart's systole. Auscultation will possibly detect a systolic bellows murmur; such being due to anæmia, or to the compression exerted by a tumor lying over the vessel, or to displacement of the artery by disease of the vertebræ, or to simple pressure with the stethoscope. The diagnosis between functional and aneurismal pulsation is somewhat difficult, particularly if any cancerous or non-malignant growth be situated over the vessel.—I have found this pulsation not uncommon in cases of uterine disease. It has been frequently noticed in hypochondriacs, in those whose digestive organs are deranged, in structural affections of the stomach and duodenum, in gouty patients, in chlorotic females, &c. Certain foods may also give rise to it, especially strong green tea and tobacco.

The treatment must be directed to the removal of the cause. In a case which was under my care during the year 1853, in the Hospital for Women, the pulsation produced so much sickness and distress, that it was frequently necessary to control it by the application of ice to the abdomen, and by the administration of morphia. Hahnbaum, who suffered for some years from this disease in connection with dyspepsia, says that he derived the greatest relief from the use of the aperient waters of Carlsbad, change of air, and complete relaxation from his professional duties. In most cases considerable benefit will arise from the use of quinine and steel, or from phosphate of zinc and nux vomica; from attention to the functions of digestion; from friction along the spine with a liniment containing belladonna; as well as from sea-bath-

ing. The diet ought to be nourishing; substituting dry sherry or brandy and water for beer, and milk or cocoa made with milk for tea and coffee.

III. CONTRACTION AND OBLITERATION OF THE AORTA.

That contraction of the aorta, sometimes going on to complete obliteration, may occasionally occur near the termination of the arch of the vessel (about the point where the ductus arteriosus is united with it), has been well known since M. Reynaud recorded an example of the kind in 1828.

From an elaborate analysis of forty cases by Dr. Peacock,* it appears that the aorta gradually diminished in size, or the contraction commenced abruptly; that when abrupt, the vessel often looked as if a piece of string had been tied round it; that the internal tunics were frequently more contracted and thickened than the external and that in ten instances the obliteration of the canal was complete, while in the remainder the contraction varied, so that in some only a probe could be passed through the stricture, while in others the little finger might be introduced. The ascending portion of the arch was generally dilated, whilst the coats were thickened or atheromatous or osseous; but below the seat of stricture the vessel was often dilated, and then became contracted. Although the blood had been conveyed imperfectly, or not at all, by the trunk of the aorta from the upper into the lower portion of that vessel, yet the circulation had been maintained with considerable freedom in the lower parts of the body by a compensatory collateral circulation; the collateral channels, however, affording a less free passage than would the healthy vessel. Hence, the changes produced in the heart consisted chiefly of hypertrophy and dilatation of the cavities, such as might arise from any form of aortic obstruction. The patients were of all ages, from a child twenty-two days old, to a man who was ninety-two; and the defect was more common in males than females. Death occurred, in one set of cases, from acute or chronic diseases, having little or no connection with the morbid condition of the vascular system; in a second set, the death was sudden, and traceable to the condition of the aorta; while in the largest proportion, the patients sank with symptoms of cardiac asthma and dropsy, sometimes complicated by pneumonia, bronchitis, pericarditis, erysipelas, sloughing, purpura, &c. Dr. Peacock agrees with those writers who regard the stricture as originating in, or being connected with, some error in the original conformation of the vessels.

IV. ANEURISM OF THE AORTA.

Three principal forms of Aneurism (*Ἀνευρύνω*, to dilate) are usually described. *True* aneurism, in which all the coats of the artery dilate

* British and Foreign Medico-Chirurgical Review, vol. xxv, p. 467. London, 1860.

and unite in forming the walls of the pouch; *false* aneurism, in which the inner and middle arterial tunics being ruptured, the walls are formed by the cellular coat and contiguous parts; and *mixed* or *consecutive false* aneurism, in which the three coats having at first dilated, the inner and middle ones subsequently rupture as the distension increases. When the two inner tunics are ruptured, and the blood forces its way between them and the outer coat by a kind of false passage, so as to form a spreading diffused tumor, the disease is known as a *dissecting* aneurism. And, lastly, *varicose* aneurisms are those where a communication has formed between the aorta and either of the venæ cavæ, or between the aorta and one of the auricles, or between this vessel and the right ventricle, or between the aorta and the pulmonary artery.* The latter is much more common than either of the other varicose aneurisms.

Aneurism is more common in men than in women. Thus, according to the Registrar-General's Returns, there were in the year 1862, in England, 294 deaths from aneurism in males, and only 79 in females. The average annual mortality from this disease, in both sexes, for the the ten years 1853 to 1862, was 344.

Aortic aneurism is a disease of advanced periods of life rather than of youth: it often results from ossific or calcareous deposits, or from atheromatous or fatty degeneration of the coats of the vessel, and consequently other vessels are not uncommonly found affected at the same time: when the tumor is small, its existence frequently goes undetected; and death generally results from hemorrhage owing to rupture of the sac, or it may also occur suddenly without any rupture (as from suffocation), or it may take place gradually from exhaustion caused by the long-continued suffering, or it may be due to debility brought about by the repeated escape of small quantities of blood, or it may happen from coexistent tubercular consumption.

1. Aneurism of the Thoracic Aorta.—This is chiefly met with in the ascending portion, or in the transverse part of the arch.

The general *symptoms* are very obscure, partly in consequence of their similarity to those arising from disease of the heart. In cases where the tumor is of considerable size and has been quickly developed, there is usually disturbed action of the heart, with some modification of the radial pulse; the superficial veins of the chest and neck are turgid; one or both upper extremities are œdematous; there is dulness on percussion around the portion of the vessel from which the aneurism springs; and there is cough, wheezing, dyspnœa, hæmoptysis, difficulty in swallowing, and pain about the chest and back. The latter is most constant and severe when erosion of the bones of the spine or sternum or ribs is going on; and it is often confined to one spot.—Supposing the aneurismal tumor becomes very large and pulsating, and rises out of the chest, producing protrusion or absorption of the sternum and ribs, then the diagnosis is altogether as easy as it was before difficult. When the sac

* For examples of all these forms of varicose aneurism the reader should refer to a paper by Mr. Thurnam in the Medico-Chirurgical Transactions, vol. xxiii, p. 323. London, 1840. In the same work (vol. xliv, p. 211, London, 1861), there is an account of a case of Aortic Aneurism, in which a Communication with the Pulmonary Artery was recognized during life, by Dr. Willoughby Francis Wade.

presses upon the trachea, there is much dyspnœa and cough; when on one or both recurrent laryngeal nerves, aphonia with troublesome cough, severe paroxysms of laryngeal suffocation, and pain which comes on at intervals; when on the œsophagus, dysphagia and symptoms of stricture; and when on the thoracic duct, inanition and engorgement of the absorbent vessels and glands. In those cases where an aneurism of the ascending aorta is in the immediate neighborhood of the heart, Dr. Gairdner has remarked that the patient suffers from angina pectoris; which he believes is probably to be referred to compression of the great plexuses of nerves ramifying on either side of the ascending aorta, and communicating freely with the cardiac ganglia and plexuses of the ventricles.

When a cervical or thoracic aneurism extends backwards deeply towards the vertebral column, so as to exert considerable pressure upon some parts of the ganglia or branches of the sympathetic, it may give rise—as Dr. W. T. Gairdner first pointed out—to permanent contraction of the pupil of the affected side. This contraction is probably due to paralysis of those muscular fibres which radiate from the edge of the pupil, and which by their contraction dilate the aperture in the iris, such fibres being supplied by the sympathetic. On the contrary, it has been shown by Dr. John W. Ogle that when the pressure is only sufficient to irritate the branches or trunks of the sympathetic, then the force merely acts as a stimulus to the dilator fibres of the pupil, enabling them to overbalance the resisting contractors, and so to produce a dilated pupil. Moreover, if the pressure continue slight, the dilatation will remain; but should it increase, then contraction of the pupil will ensue. As signs of aneurism, however, the value of these conditions is diminished by the circumstance, that any tumor which extends in a similar direction, and gives rise to the necessary pressure, will have the same effect.* —Dr. Kussmaul has proved that obstructing the flow of blood through the carotid artery, produces a contracted pupil; but this contraction only lasts for a short time, and is followed by dilatation.

Aortic aneurism is sometimes accompanied by a bellows-sound, sometimes not. If the tumor compress the heart, so as to impede the normal action of the valves, a systolic or diastolic bruit will result. Pressure on the aorta, or on the pulmonary artery, may also produce a murmur.

* The conclusions which Dr. Ogle believes may be drawn from his researches are these: "That certain movements of the iris (the contraction and dilatation of the pupil) are under the control of certain fibres of the sympathetic nerve emanating from the carotid and cavernous plexus, as are also frequently to some degree, at least in lower animals, the movements of the levator of the upper eyelid and the external rectus muscles of the eyeball. That these sympathetic nervous twigs are derived secondarily from the great sympathetic trunks in the neck, but primarily from certain parts of the spinal cord, by communication between these grand trunks and the spinal nerves. That consequently, the same effects produced upon the iris, the levator palpebræ, and external rectus, by interference with the sympathetic in the neck, will follow if the communications passing between it and the cervical part of the spinal cord, or the cord itself, be similarly affected. That, as a rule, paralysis of the dilator fibres of the iris (permitting contraction of the pupil), and, in many animals, partial paralysis of the levator palpebræ and external rectus muscle, follow section of, or extreme pressure upon, these parts of the nervous system; whilst mere irritation by electricity, and stimulating, chemical, and mechanical agents, induce a dilatation of the pupil.—Bearing in mind the results of the above-mentioned experiments upon healthy animals, it is to be expected that under disease any pressure or lesion of the cervical sympathetic or its ganglia, or its connections with the spinal cord, would tend to produce effects on the iris similar in kind at least to those arrived at by experiment."—Medico-Chirurgical Transactions, vol. xli, p. 411. London, 1858.

In false aneurism there is generally a murmur both with the entrance and exit of blood into the sac; or there may be one loud, prolonged, rasping bruit, from the passage of the blood over the roughened inner surface of the vessel. In true aneurism or mere dilatation of a part of the wall of the artery, murmurs are seldom audible. A small but free opening from the canal of the artery into the aneurismal sac, and a roughened state of the arterial tunics from degeneration or from atheromatous deposit, are, however, two conditions which will give rise to a bruit. In both forms, when a murmur exists, a peculiar thrilling or purring tremor will be felt on applying the hand over the sternum.

The aneurism may prove fatal by bursting externally, or into the pericardium, or into either pleural cavity, or into the trachea, or into one of the bronchial tubes. When some of the vertebræ have become eroded by the pressure of the sac, the hemorrhage has sometimes taken place into the spinal canal. It is curious that occasionally aneurismal patients expectorate blood, to the extent of several ounces, for weeks or months before death. Dr. Gairdner has directed the attention of the profession to a case in which the first gush of blood took place four years and eight months before the patient's death; blood being also expectorated in varying quantities at different times during this period.* In the well-known case of Mr. Liston (p. 74), five months elapsed between the first and only attack of hæmoptysis, when many ounces of arterial blood were brought up, and death.—Very rarely, a spontaneous cure is effected by the sac becoming filled with firm and thick layers of fibrin; a solid tumor resulting, which does not increase in size.

In many cases of aortic aneurism there is destructive inflammation of the lung, attended with violent cough, dyspnœa, pain, and perhaps hæmoptysis; the inflammation and gangrene being due either to compression of the pulmonary vessels cutting off the supply of blood, or perhaps to pressure on the pneumogastric nerve diminishing the nervous force and consequently interrupting the nutrition of the affected lung.

The *treatment* of these cases is the same as that required in aneurism of the abdominal aorta.

2. Aneurism of the Abdominal Aorta.—The aneurism often gives rise to acute pain in the lumbar region, occasionally shooting into either hypochondrium, and downwards into the thighs and scrotum. Constipation aggravates the pain, while lying on the face often affords remarkable relief. By careful examination, a tumor may generally be felt, which communicates a constant and powerful pulsation to the hand. On applying the stethoscope, a short, loud, abrupt bellows-sound will be heard.

In the *diagnosis* of aneurism it is necessary to remember that simple or malignant tumors having their seat over the artery, receive pulsation from it. Moreover, if such growths cause much pressure upon the aorta they may produce a murmur; if they press upon the trachea and œsophagus, there will be dyspnœa and dysphagia; whilst in either case we shall find dulness on percussion. Our diagnosis must be made by a consideration of the history; by noticing that aneurisms pulsate from

* Clinical Medicine: Observations recorded at the Bedside, with Commentaries, p. 509. Edinburgh, 1862.

the first, while tumors only appear to do so when they acquire some size; by remembering that tumors are hard and firm from the commencement, whereas aneurisms only become so subsequently; and by observing that gentle continued pressure will often diminish the size of an aneurism.

The *treatment* of aortic aneurism—whether thoracic or abdominal—must consist in the avoidance of all bodily and mental excitement; in the relief of pain, cough, dyspnœa, and other prominent symptoms; in the use of a generous reparative diet, with a little wine or brandy and water, but avoiding malt liquors of every kind; and in attention to the digestive, secreting, and excreting functions.

The method of cure proposed by Valsalva and Albertini, and which has been since often adopted until the present time, involves the bleeding of the patient frequently, and the keeping him upon the lowest possible diet compatible with the sustenance of life. By these means it was thought that the force and velocity of the blood would be diminished, and that coagulation would take place in the aneurism. Since, however, the coagulation of fibrin seems to be impeded by diminishing its quantity, and as the rapidity of the circulation and the throbbing of the arteries are increased by depletion, Valsalva's method would seem to produce effects the very opposite to those wished for; and such is the fact. Dr. Copland says he has seen cases "in which aneurismal tumors had existed for some time without any increase, so long as the patient avoided any marked vascular excitement and continued his accustomed diet; but when repeated depletions and vegetable or low diet were adopted, great augmentation of the tumor, and fatal results followed."

In advanced and aggravated cases we can only endeavor to palliate the various symptoms as they arise. Thus the pain and depression will always be moderated by opium, which may often be advantageously used in the form of subcutaneous injections; the harassing cough may generally be relieved by sedatives and expectorants; the paroxysmal attacks of laryngeal dyspnœa, when threatening the extinction of life, might be removed by the careful performance of tracheotomy; the dropsy can be often lessened by small doses of mercury, digitalis, squills, and other diuretics; while the heart's action may be regulated and moderated by assafœtida, camphor, digitalis in small doses, but particularly by aconite. In all cases, experience no less than common sense teaches us to avoid too debilitating a plan of treatment. This is especially proved by the fact, that of all the causes of aneurism, a degeneration of the arterial coats is the most common. Nevertheless, where there is much pulmonary congestion, a small venesection may often afford relief; the lowering effects of the loss of blood being compensated for by a liberal diet.

Since the fourth edition of this work was published three special methods of treating aneurismal tumors have been proposed. (1). The first plan consists in the introduction of a quantity of fine iron wire into the aneurism, with the object of affording an extensive surface upon which fibrin may coagulate. This practice was adopted by Dr. Murchison and Mr. Charles H. Moore in a case of saccular aneurism of the ascending aorta projecting through the anterior wall of the left side of the chest; upwards of twenty-six yards of wire being passed through a small pointed canula inserted into the tumor. Although the treatment

was unsuccessful—it was not adopted until it was clear that the patient could not live many days—yet the experiment showed that the principle was sound, and that further trial (with some modifications) was at least justifiable. The practice is only applicable to a sacculated aneurism, not to one which has two orifices, since fragments of fibrin would be broken off by the force of the current.*—(2). Dr. William Murray, of Newcastle-on-Tyne, has had the satisfaction of curing a case of aneurism of the abdominal aorta by compression of this vessel immediately above the tumor. The first attempt failed; but on the 19th April, 1864, the patient (a man twenty-six years of age) was kept under the influence of chloroform for five hours, during which time pressure was maintained by a properly constructed tourniquet. It was only, however, during the last hour that pulsation in the tumor was found to have almost ceased on the removal of the instrument; the tumor having become quite pulseless by the evening. Three months afterwards the man was at work as an engine-fitter; the tumor being scarcely appreciable, while the aorta and iliacs and femoral arteries were quite pulseless. This case proves that the aorta has been occluded without either temporary or permanent serious disorder, and that there must be a collateral system of vessels so complete as to carry on the circulation when the aorta is blocked.†—(3). Dr. William Roberts, of Manchester, has recorded a case of aneurism of the arch of the aorta making its way through the parietes of the chest, which was treated by iodide of potassium in doses of five, seven, ten, fifteen, and twenty grains three times a day, and with apparently most marked benefit. Several other cases are mentioned, in which similar results were manifest. Nélaton, Bouillaud, Andral, and Beau have recorded similar experiences, and from these Dr. Roberts collects and gives an account of twelve cases. In all of them, save one, striking relief of suffering followed the use of the drug; in eight, an undoubted diminution of the size of the sac took place; and in a few, complete subsidence of the swelling seems to have occurred. The cases of Dr. Chuckerbutty would appear to indicate that the beneficial effect of the iodide was owing to its power (hitherto wholly unsuspected) of increasing the coagulability of the blood. Dr. Wilkinson's case lends support to this view; for not only was the sac lined with layers of fibrin, but a very firm and decolorized fibrinous mass, attached on one side, floated in the cavity of the aneurism.‡

V. DISEASES OF THE PULMONARY ARTERY.

Although the diseases which affect the pulmonary artery are important, yet they have scarcely attracted as much attention as they merit. This is in some measure owing to their comparative rarity, and partly to the obscurity which clouds their diagnosis.

The pulmonary artery is an anomalous vessel; its coats being con-

* Medico-Chirurgical Transactions, vol. xlvii, p. 129. London, 1864.

† Ibid. p. 187. London, 1864. A further report of the case, showing that the cure was complete, is to be found in the Medical Times and Gazette, p. 383, 15th April, 1865.

‡ British Medical Journal, p. 83. 24th January, 1863.

structed like those of arteries in general, while its tissues are pliable and extensible like those of veins. It is about two inches in length, is about the same size as the aorta, is furnished with three semilunar valves at its origin from the left side of the right ventricle of the heart, and it terminates in two branches of equal size—the right and left pulmonary arteries. Its office is to convey the impure venous blood from the right side of the heart to the lungs.

Examples of *inflammation* of the coats of this vessel have occasionally been met with. The reports of many of these are, however, but of little value; since the cases occurred when our knowledge of the spontaneous coagulation of the blood during life was very imperfect, and when the presence of a fibrinous deposit in an artery (thrombosis) was regarded as a consequence of inflammation. In the very excellent work of Dr. Norman Chevers* it is stated that acute inflammation of the pulmonary artery is found to occur under the following circumstances: (1) As a sequence of phlebitis. (2) In cases of Bright's disease, and in persons habitually intemperate. (3) As a result of exposure to cold, and from rheumatism. And (4) as an accompaniment of certain forms of pneumonia. The chief sign which Dr. Chevers seems to rely upon as showing that inflammation has been present is the occurrence of *adherent* clots in the vessel; but it has been argued by Mr. Paget that diseased blood—such as that contaminated with urea—has a greater tendency to adhere to the walls of the vessels than blood which is healthy.

Morbid growths are very seldom found in the pulmonary artery. Dr. Chevers quotes the history of a case which occurred in the practice of Dr. Edmund L. Birkett. The patient was a poor woman, "inhabiting an ill-ventilated room in a badly-drained part of Bermondsey," 25 years of age, who had been frequently subjected to exposure to cold, and who in consequence had suffered from several attacks of thoracic inflammation. When visited, fourteen days after the commencement of her illness, her aspect was anxious and distressed; there was great dyspnœa, almost amounting to orthopnœa; slight cough without any expectoration; and a feeble, quick, sharp, vibrating pulse. She complained much of pain about the præcordial region, and of palpitation. The heart's action was tumultuous, its rhythm normal, and its impulse stronger than natural. The treatment consisted of local depletion, counter-irritation over the region of the heart, mercury, salines, and purgatives. Death took place on the 2d of April, 1846, about six weeks after Dr. Birkett first saw her. At the autopsy, there were found,—extensive old pleuritic adhesions, with congestion of the lungs; a smooth pericardium, white and opaque at parts; a large heart, with its nutrient vessels much gorged; while "within the pulmonary artery, at its point of division, was a circular space as large as a fourpenny-piece, surrounded by a ring of vegetations, to which was slenderly attached a mass of the size of a large walnut, of a yellowish color, and in substance resembling the roe of a mackerel."

The canal of the pulmonary artery may become *contracted* or *obstructed*. These conditions are generally due to the formation of a

* Collection of Facts illustrative of the Morbid Conditions of the Pulmonary Artery, p. 82. London, 1851.

fibrinous clot; or they may arise gradually owing to the pressure of a cancerous or innocent tumor, or to that exerted by an aortic aneurism, or to that produced by extensive thoracic effusion in double pleurisy. Dr. Barlow has especially directed attention to the cases of young patients, who from birth have suffered from an ill-developed condition of the respiratory apparatus, in connection with congenital narrowing of the pulmonary artery. Again, it has often been observed in examples of phthisis, that the heart's cavities are diminished in size, the calibre of the aorta and pulmonary artery being likewise lessened. In all such cases, dyspnœa—either constant or paroxysmal—is a prominent symptom. Dr. Chevers was the first to point out the distinctive circumstance that, in a large proportion of cases, individuals suffering from great narrowing of the pulmonary artery, select the recumbent position, either habitually or during the paroxysms of difficult breathing; while the subjects of any other form of obstruction to the circulation through the lungs, or through the left heart, breathe most freely when the shoulders are raised and the body is placed almost vertically. The reason why the horizontal posture is the easiest in narrowing of the pulmonary artery is, that the distress of breathing results from the insufficient access of blood to the lungs; and hence the recumbent position not only affords the aid of gravitation to the contractile efforts of the heart, but also renders the supply of arterial blood to the brain more free than it could otherwise be. The other symptoms of some impediment to the passage of blood through the pulmonary artery are,—a superficial systolic murmur, which is heard in the course of the vessel, and over the base of the right ventricle; an habitually small, rapid, regular pulse, usually with excessive action of the heart; together with a livid hue of the surface, where the obstruction is considerable.

The remaining morbid conditions of this vessel are,—*dilatation*, which generally follows hypertrophy of the right ventricle, the consequence of long-standing vesicular emphysema; *ulceration*, owing generally to the pressure exerted by an aneurismal tumor of the arch of the aorta; and *rupture*, either as the result of mechanical injury, or of a degeneration of the coats of the vessel. The occurrence of *aneurism* in this vessel has been very rarely observed. According to Dr. Chevers, the great dilatability of the ascending portion of the artery appears to be the principal cause of its immunity from this lesion; while its internal branches are still further protected by the elastic support afforded by the lung tissue.

VI. PHLEBITIS.

Phlebitis (*Φλὲψ, φλεβός*, vein: terminal *-itis*), or inflammation of the veins, depends upon, or is generally accompanied by, disease of the blood. Mr. Henry Lee has distinctly shown that the lining membrane of veins has a very slight tendency to inflammation; that the morbid action is much less mischievous than it used to be considered, unless it be accompanied by the admixture of decomposing fluids with the blood; and that the internal coat when inflamed does not exude lymph as a serous membrane does. Indeed it is now well known, from recent experiment

and observation, that the doctrines of the effusion of lymph from the lining membrane of veins, and the formation of pus by the same, are quite untenable. As Virchow has proved, the history of the affections of veins to which the term phlebitis has been hitherto applied, is really the history of the coagula (thrombi) formed within them, and of the metamorphoses through which these coagula pass.

The *symptoms* of phlebitis are,—pain which is increased on pressure, swelling, stiffness, and redness in the course of the vessel, generally spreading upwards towards the heart. When suppuration results, it is usually accompanied, or perhaps preceded, by rigors and flying pains in various parts of the body. The constitutional disturbance is always great. The result of the admixture of pus or other morbid fluids with blood is to cause the latter to coagulate: in this way a vein sometimes becomes filled with a coagulum, when, if the morbid matter is of such a nature that it ought to be eliminated, the areolar tissue around inflames, suppuration and abscess follow, the coats of the vein ulcerate, and the contained clot is discharged by means of the abscess. On the other hand, if the poison does not produce coagulation, it mixes with the circulating blood, affects the whole system, and is subseqnently deposited in distant parts—as in the lungs, liver, spleen, eye, joints, areolar tissue, &c.—giving rise to very serious consequences.

The *treatment* consists in rest, fomentations and poultices, and purgatives. When the system is low, stimulants and tonics will be necessary; especially good beef tea, port wine, or brandy, ammonia and bark, and opiates to relieve the restlessness.

Phlebolites (*Φλὲψ*, a vein; *λίθος*, a stone) are occasionally met with in the veins; and as they generally lie in dilatations, they do not obstruct the flow of blood. These bodies vary in size from that of a millet-seed to that of a pea. There may be only one or two, or a dozen or more. They are chiefly composed of phosphate of lime, carbonate of lime, and animal matter. Phlebolites are probably formed by calcareous deposits from the blood, round a small coagulum; as hepatic calculi are produced by depositions from the bile on fragments of cholesterine.

VII. AIR IN THE VEINS.

The very great danger which results from the entrance of an appreciable quantity of air into a vein during a surgical operation, has long been recognized. The important bearings of this subject, however, on the practice of obstetrics, as well as on the treatment of uterine diseases, have been less appreciated; though they are deserving of very serious attention.

The characteristic symptoms of this accident during an operation upon the breast, neck, shoulder, or axilla, are the following: Suddenly, while all seems going on well, a hissing, or gurgling, or bubbling sucking noise is heard; the countenance becomes pallid or livid, and sometimes intensely red at a later period; the pulse gets nearly or quite imperceptible, and the respiration labored; while perhaps there sets in violent and irregular action of the heart. The patient, when not under

the influence of an anæsthetic, complains of extreme faintness and oppression of the chest, or perhaps has merely time to exclaim, "I am dying;" and death often follows very quickly, perhaps with a convulsion, but frequently without a struggle. In the greater number of fatal cases, the autopsy has revealed the presence of air in the right cavities of the heart, the air being free, or mingled with the blood, which is thus rendered frothy; while sometimes bubbles of air have also been found in the larger veins, as well as in the branches of the pulmonary vessels. The cause of death is the mechanical interference of the air with the action of the heart, and the difficulty of forcing frothy blood through the pulmonary capillaries; severe syncope ensuing, owing to the deficient supply of blood to the brain. The warning symptom is the hissing noise; and directly it is heard, the surgeon should compress the wounded vein, so as to prevent the further ingress of air. The patient ought then to be placed in the recumbent posture; ammonia is to be held to the nose, and brandy administered by the stomach or rectum; artificial respiration is to be perseveringly and steadily employed; while the extremities may be rubbed upwards, so as to force on the circulation towards the brain. In very severe cases, the application of galvanism to the thoracic muscles must be tried. When death occurs, the quantity of air entering the heart has been considerable; the amount having probably been small in the instances where the dangerous symptoms have passed off and recovery ensued.

When the air enters the circulation through the uterine veins, the symptoms are as well marked as in the surgical cases. Attention seems to have been first directed to this occurrence by Legallois, in 1829; who, while watching a rabbit that had had two successive inversions of the uterus after parturition, noticed that she suddenly struggled convulsively and died in less than three minutes. The right auricle was found full of air-bubbles, while air was also discovered in the pulmonary artery, venæ cavæ, &c. This eminent physiologist also observed the same occurrence in two other animals; and Olivier in remarking upon these facts asks,—"Is it to a cause of this kind that we ought to attribute the sudden and unexpected death in women lately delivered, and where the autopsy disclosed nothing which could account for such a catastrophe?"*—In 1844, Professor Simpson saw a patient who had been delivered of twins an hour or two previously. There was hemorrhage, with alternate contractions and relaxations of the uterus; she had a very weak and rapid, almost imperceptible pulse; an extremely anxious countenance; while here and there was an evanescent scarlatinoid rash over the surface of the body. A few hours after death, the abdominal contents were exposed under water; the uterine and hypogastric veins and lower vena cava being found full of frothy blood, the air bubbling up through the water when these tubes were opened.† In 1850, Dr. Cormack read a paper on the entrance of air by the uterine veins before the Westminster Medical Society; in which he showed, amongst other points, that the communication between the cavity of the womb and the current of blood in the inferior vena cava is direct and easy, so that air once introduced into the uterine veins must soon be

* Dictionnaire de Médecine. Article "Air," p. 73. Paris, 1833.

† Physiological, Anatomical, and Pathological Researches. By John Reid, M.D., p. 579. Edinburgh, 1848.

carried to the right auricle; there, if in sufficient quantity, to cause frothing of the blood, aeriform distension of the right side of the heart, obstruction of the pulmonary artery, and congestion of the pulmonary capillaries.* And then, in 1857, Dr. George May, of Reading, collected the histories of eleven cases, in which death during or soon after labor had been more or less sudden, owing as he believed to the entrance of air through the uterine veins. In one of the cases which Dr. May saw himself, the labor had been natural and the patient had resumed her duties; when, on the eighth day after delivery, she was taken suddenly ill and expired. On the following day, frothy blood was seen on slicing the liver, there was air in the inferior vena cava and in the vena portæ, and the right side of the heart was distended with frothy blood.†

Again, not only has the entrance of air through the uterine veins caused death at the time of labor, but it has likewise proved fatal in disease. Thus, Professor Oppolzer has related an instance of uterine carcinoma, in the course of which air entered the circulation spontaneously, and caused death in about twenty-four hours.‡—Scanzoni has shown the great risk which attends upon making gaseous injections into the uterus. A woman who was pregnant, the pregnancy being masked by attendant circumstances, was about to have the neck of the uterus amputated. Her father, a physician, wished to practice injections of carbonic acid gas into the uterine neck, so as to produce contraction of the vessels and obviate hemorrhage. He tried a first injection with the aid of an elastic reservoir; but scarcely had two or three cubic inches of gas penetrated the gaping mouth of the cervix, when the patient cried out that she felt air entering the abdomen and head and neck. Immediately afterwards she was seized with general tetanic convulsions; respiration became laborious and stertorous; the pulse got rapid and small; the extremities grew cold; and death followed at the end of an hour and three-quarters. The autopsy revealed nothing but considerable pulmonary œdema.§—In a paper read before the Obstetrical Society of London by Dr. Robert Barnes, this gentleman stated that several cases in which death has speedily followed the injection of fluids into the cavity of the non-pregnant uterus are known; and he remarked that unless great care be taken, some air is very apt to be thrown up with the water by any of the ordinary syphons or pumping syringes. He quoted also an instance reported by Dr. Guillier, in which injections of water being ordered to cleanse the vagina of a woman wearing a pessary, death almost suddenly followed their employment.‖

The treatment of these cases must be conducted on the same principles as guide the surgeon when air enters a vein during an operation. Unfortunately, however, there is greater difficulty in following out the indications. Thus, to prevent the further ingress of air we can only plug the vagina, an operation which cannot be performed in a few seconds. Still, stimulants may be administered, and artificial respira-

* London Journal of Medicine, vol. ii, for the year 1850, pp. 589 and 928.

† British Medical Journal, 6th June, 1857. Also in the Half-Yearly Abstract of Medical Sciences, vol. xxvi, p. 232. London, 1858.

‡ British and Foreign Medico-Chirurgical Review, vol. xxx, p. 550. London, 1862.

§ Ibid., vol. xxiv, p. 274. London, 1859.

‖ Transactions of the Obstetrical Society of London, vol. iii, p. 118. London, 1862.

tion had recourse to; while warmth can be applied to the extremities, cold water dashed over the face and chest, and the patient kept absolutely quiet in the recumbent posture. To prevent the occurrence of such an accident as has now been described, the use of uterine injections, whether of fluids or of carbonic acid gas, ought to be abandoned.

VIII. PHLEGMASIA DOLENS.

Phlegmasia dolens (*Φλέγω*, to burn; *doleo*, to be in pain), milk-leg, or white-swelling, may be defined as a brawny, non-œdematous, painful swelling of one or both lower extremities, attended with depression of the vital powers. It probably depends upon the spontaneous coagulation of blood within the internal or external iliac and femoral veins; the coagulation being due to the reception within these vessels of some poisonous or acrimonious fluid, or merely to a cachectic state of the system. The disease commences for the most part—especially in puerperal women—in the uterine branches of the hypogastric veins. It has been termed obstructive phlebitis, by those who contend for its inflammatory origin. It is most likely that the lymphatics are also involved in the morbid action, and that they become obstructed.

Phlegmasia dolens is very common after parturition, especially in women who have been much weakened by flooding, or other causes; while it is rarely met with after first labors. It also occurs not unfrequently towards the termination of uterine cancer. The left leg is said to be more frequently attacked than the right.

Symptoms.—The disease commences generally, in from one to five weeks after labor, with fever, headache, thirst, nausea, and pain. Sometimes it begins with a chill or rigor. At the end of twenty-four or thirty-six hours, there is swelling, and loss of motor power in one of the lower extremities (both limbs are very seldom affected); the swelling often commencing about the foot or lower part of the leg and extending upwards, though sometimes it begins at the upper part of the thigh and proceeds downwards. The limb is unnaturally hot, tender, not œdematous, but swollen perhaps to twice its natural size; it is of a pale white color, and is tense and elastic; while it has also a glazed or shining appearance. The acute stage generally lasts about fourteen or twenty-one days; but the limb frequently remains swollen and feeble, or almost useless, for many weeks or even months.

Prognosis.—This is generally favorable, the disease very rarely proving fatal. As the general health is improved, the swelling and tenderness decrease; although some tumefaction, with diminished power and sensibility of the limb, may continue for a few months. When a woman has once suffered from phlegmasia dolens after parturition, great care should be taken to maintain her health during subsequent pregnancies and labors.

Pathology.—Dr. Mackenzie rejects the opinion that this disease arises from phlebitis, but believes that it is due to a vitiated state of the blood, giving rise to *irritation* of the nerves, muscles, lymphatics, lining membrane of veins, and areolar tissue of the limb; owing to which there results the tense elastic swelling, pain, loss of the power of motion,

affection of the lymphatics, and obstructed condition of the veins, constituting the pathognomonic symptoms. Hence, this gentleman asserts that phlegmasia dolens is a blood disease, the affection of the veins being of secondary importance, since it is merely an effect of the disorder.* Dr. Robert Lee—in a paper published in the same volume as Dr. Mackenzie's—gives the results of his last twenty-four years' experience. His cases, he says, "prove in the most conclusive manner that inflammation of the iliac and femoral veins is the proximate cause of the disease; and that in puerperal women, the inflammation commences in the uterine branches of the hypogastric veins. It has likewise been demonstrated by morbid anatomy, that phlegmasia dolens is a disease which may take place in women who have never been pregnant, and in the male sex, and that, under all circumstances, the proximate cause is the same."

The latest writer on this disease is Dr. Tilbury Fox, whose essay is well deserving of careful study.† I can only give this gentleman's conclusions, which are as follows: In phlegmasia dolens both veins and lymphatics are obstructed. The obstruction may either be due simply to extrinsic pressure; or to inflammatory changes in the coats of the vessels leading to coagulation (this depends upon virus action), which except during epidemics of puerperal fever is not so common as is supposed. It being generally admitted that rapid ingress of abnormal fluid suddenly, and in large amount, will cause instantaneous coagulation of blood; and it being also allowed that large drains from the system are followed by rapid and compensatory absorption;—there is good reason for believing that these conditions are amply fulfilled, in conjunction with the presence of wound (facilitating absorption) in a great many cases, prior to the occurrence of phlegmasia dolens, and that the latter is frequently thus evolved. These different modes of evolution may be more or less conjoined.

Treatment.—Dr. David Davis, who paid much attention to this affection, recommended the local abstraction of blood by leeches, the application of blisters, the use of evaporating lotions, free and constant exposure to the action of the atmosphere, and the internal exhibition of digitalis and blue pill.—Dr. R. Lee seems to place most reliance on the repeated application of leeches above and below Poupart's ligament.—In the cases which have been under my own observation, the patients have invariably been in a feeble state of health, and consequently such remedies as venesection, leeches, calomel, and digitalis have not been thought of. I have generally at first employed warm sedative fomentations, perfect rest, simple diet, and opiates to relieve the pain. Subsequently, great benefit has seemed to accrue from attempts to improve the condition of the blood; as by the use of wine, brandy, milk and raw eggs, animal food, ammonia and bark, &c. Where there has been any offensive vaginal discharge, injections of simple warm water, or of some weak disinfectant solution, have been used every night and morning.

Blisters, stimulating liniments, and bandages to the limb, are useful when all the acute symptoms have subsided; at which stage I have seen much good from the employment of the iodide of iron, cod-liver oil, and temporary change of residence to the sea-side.

* Medico-Chirurgical Transactions, vol. xxxvi, p. 169. London, 1853.

† Transactions of the Obstetrical Society of London, vol. ii, p. 201. London, 1861.

PART XVI.

DISEASES OF THE ABSORBENT SYSTEM.

The absorbent or the lymphatic (*Lympha*, water) system includes the superficial and deep lymphatic vessels, the glands through which these ramify, and the lymphatics of the small intestines—the extremely delicate lacteal or chyliferous tubes. The lymphatic vessels are distributed through almost every vascular organ and tissue in the body. Their presence has not, however, been demonstrated in the brain and spinal cord; although the membranes of these nervous centres are supplied with them. The lymphatic or absorbent glands are found in the neck, axilla, front of the elbow, groin, and popliteal space; in the thorax, about the anterior and posterior mediastina; and in considerable numbers in the abdomen—in the mesentery, as well as by the side of the aorta, vena cava, and iliac vessels.

I. INFLAMMATION OF THE LYMPHATICS.

Inflammation of the lymphatic vessels, or angeioleucitis (Ἀγγεῖον, a vase or vessel; λευκὸς, white; terminal *-itis*), may result from external injury, or from the absorption of some deleterious matter. The vessels are seldom, if ever, attacked, without the glands being involved in the morbid action; though the glands occasionally become inflamed while the vessels remain healthy.

The best examples of angeioleucitis are seen in the case of punctured dissection-wounds, with the absorption of corrupting animal matter; in carbuncles and abscesses, from the absorption of unhealthy pus; as well as in those accidents where the injured part assumes an erysipelatous character. The course of the inflammation is shown by the formation of bright red streaks, which run upwards from the wound in the direction of the absorbents, along the previously healthy surface as far as the glands in which the vessels are merged; these streaks or lines being tender to the touch and hard like little cords, while they are the seat of stinging burning pains. The glands in connection with the affected vessels quickly become involved, and get swollen and acutely painful; while the whole limb is rendered puffy and tender. The constitutional disturbance is always great; there being in many instances chills or rigors, nausea and constipation, fever, prostration, restlessness, and considerable mental depression.—The inflammation may terminate in resolution; or it may end in suppuration, with the formation of large

abscesses, or with infiltration of matter around the lymphatics and ganglia; or it may pass into a chronic stage, causing induration which will probably remain for months; or it may actually lead to fatal exhaustion, or to death from ichorhæmia. Not unfrequently also, inflammation of the lymphatics becomes complicated with erysipelas, or with phlebitis, or even with both.

The remedies for this affection are few, but they require to be promptly employed. Any wound which may be present should be bathed and poulticed, while the whole limb is to be assiduously fomented. Considerable relief will be afforded by freely painting the inflamed lines with extract of belladonna, before applying the fomentation flannels. Care is to be taken that the air of the sick-room is pure and cool. The patient is to be abundantly supplied with refreshing drinks, or he may be allowed plenty of ice. The diet is to consist of milk, and strong beef tea; while the depression which early sets in is to be combated by the administration of wine or brandy. The bowels are to be cleared out by a dose of jalap, or by stimulating enemata. Then no drug, as a general rule, proves so useful as the carbonate of ammonia; which may be given in oft-repeated doses, in bark or some bitter infusion (F. 371). When urgent typhoid symptoms, with clammy sweats and delirium, set in, care must be taken that the blood is not overcharged with ammonia (p. 156); for if it be so, the hydrochloric acid (F. 357) ought to be prescribed, while brandy is to be administered at short intervals. If suppuration, diffused or circumscribed, take place, the pus must be evacuated by free incisions.

II. INFLAMMATION OF THE LYMPHATIC GLANDS.

Inflammation of the lymphatic glands, or adenitis (*Ἀδήν*, a gland; terminal *-itis*), is not only an accompaniment of angeioleucitis, but it may occur independently of such an affection. Thus, in children recovering from one of the eruptive fevers, particularly scarlatina, the cervical glands are apt to become swollen and tender, the inflammation not unfrequently ending in suppuration. Again, in strumous subjects adenitis is a very common disorder; though in such the inflammation is seldom of a simple character, but is due to the insidious deposition of tubercle in the gland.

The commencement of acute adenitis is often indicated by a feeling of malaise, followed by slight chills and symptomatic fever. Then, one or more glands become swollen, hot, hard, tender, and painful; the swelling being chiefly due to infiltration of the areolar or connective tissue of the gland. As the tumefaction increases, the skin over it becomes reddened or livid; while if the convoluted tubes get obstructed, the surrounding tissues will be rendered œdematous. Unless resolution occur, or unless the acute symptoms gradually subside into chronic inflammation, there will be suppuration in a few days; an abscess forming in the interior of the gland, or in the areolar tissue which surrounds it. The latter event is not uncommon; and it may be recognized by finding that the tumor is no longer circumscribed and movable, as it remains when the pus forms only in the interior of the gland.—In cases

where the morbid action is chronic or subacute from the commencement, or where the acute merges into the chronic form, we find induration with persistent enlargement; the pain and heat being slight, while the skin retains its natural color, and the areolar tissue remains unaffected, so that the gland is movable.

Strumous enlargement and inflammation is usually chronic; the glands of the neck, and those about the base and angle of the lower jaw, being more frequently affected than any others. The subjects of this form are especially young children, though it is not a rare affection of delicate adults—of such as manifest a strumous diathesis. There are no premonitory symptoms, as a rule; the first indication of the disease being a swelling of one or more glands. If the mischief increase, however, and especially if there be a tendency to suppuration, the system will suffer considerably; and the already weakened patient becomes irritable and restless, his tongue gets furred, his pulse is rendered quick and feeble, the bowels are costive, the appetite fails, while the urine will be found scanty and loaded with urates. Where the general health is very bad, the inflamed glands rapidly undergo disorganization; and the surrounding areolar tissue and skin getting involved, extensive indolent ulcers result. When the lymphatic glands of the mesentery are affected with strumous inflammation, a special form of disease is set up which will be described in a subsequent section.

The treatment of simple acute adenitis is much the same as that required in angeioleucitis. In the strumous variety we have especially to improve the general health, and consequently such remedies as quinine and iron (F. 380), iodide of ammonium and bark (F. 38), the so-called chemical food (F. 405), and cod-liver oil are all valuable remedies. The diet must be nourishing, with a full allowance of milk; while no treatment will be of permanent advantage unless the patient has the benefit of pure air. Local applications are of comparatively little value; but in the early stages of the inflammation water-dressing soothes the irritable glands better than poultices. When all inflammatory action, however, has subsided, and the glands merely remain indurated, friction with the red iodide of mercury ointment diluted with lard will often produce absorption. As a rule, enlarged glands are not to be extirpated.

The nature and treatment of adenitis of a venereal origin has already (p. 207) been described. It is also unnecessary to speak here of the diseases of these glands from cancerous infiltration; such disease being much more commonly a secondary than a primary formation.

III. DILATATION OF THE LYMPHATICS.

A partially hypertrophied and varicose state of the lymphatic vessels has been observed by many authors. The dilatation is sometimes congenital; or it may be due to some obstruction of the convoluted tubes in the glands; or it has arisen from the pressure of an aneurismal or other tumor on the trunks in which the vessels terminate.

Dr. Carswell mentions the remarkable case of a young man about twenty-six years of age, who was seized with severe abdominal pains and

vomiting. There was a swelling in each groin, nearly as large as an orange, and the cause of suffering was therefore attributed to strangulated hernia. Owing to the great prostration, no operation could be attempted. After death, the only remarkable circumstance observed was enormous dilatation of the lymphatics from both groins upwards, including the thoracic duct. The two swellings in the groins, which had actually been treated as double herniæ, a truss having been worn from boyhood, were found to be produced by great dilatation of the lymphatics of the inguinal glands. As no obstacle could be detected in the course, or at the termination, of the thoracic duct to account for the dilatation of the lymphatics, it was concluded that the condition was a congenital malformation.*

Dr. Grainger Stewart has recorded the history of a man who died at the age of sixty from heart disease. On examining the small intestine, a number of whitish-yellow patches were seen, varying in size from that of a pin-head to that of a small bean, scattered throughout its coats. Some of these patches were granular on the surface, and evidently connected with the mucous membrane; others were smooth, rounded, and lobulated like little fatty tumors, and evidently lay in the submucous layer, for by a little careful dissection they could be separated from the mucous membrane on the one side, and from the muscular layer on the other; a third set, again, much less frequent, consisted of a combination of the other two. On microscopic examination, those of the *first* kind were found to be made up of groups of villi greatly distended, as in the process of digestion—they were dark and opaque. On tearing them, a milk-like fluid escaped, which presented microscopically the characters of milk or chyle. The villus then collapsed, and there was no appearance of the bloodvessels having been distended; and it seemed obvious that the whole enlargements depended upon the presence of the milk-like fluid. Those of the *second* kind resembled small fatty tumors, and were situated between the mucous and muscular coats. Some consisted of a single lobule, others of several. On pricking any of them, a milk-like fluid containing aggregations of fatty granules flowed out, and the walls of the particular lobule collapsed.—Dr. Stewart also quotes a corresponding case from Rokitansky, the chief features in which were these: The body of a man who died at the age of sixty-two, presented œdema of the subcutaneous areolar tissue, and very considerable effusion of a milk-like fluid, in both the pleural and peritoneal cavities; dilatation and hypertrophy of the heart, with thickening and shortening of the mitral valves; thickening of the mucous membrane of the stomach in the pyloric half, and a white and swollen condition of the intestinal walls; while the subpleural lymphatic vessels were distended, and still more the chyle vessels and the thoracic duct. They presented, from the bowel to the first series of lymphatic glands, knot-like dilatations, full of a white soapy or greasy-looking matter, which became diffused in water. It consisted of fatty granules, crystals of margarin, and some apparently nucleated cells. In individual places the mass was more yellow, and adhered to the walls of the vessels. In the lymphatic glands there were similar small deposits, and in the thoracic duct there were some dilatations.†

* Pathological Anatomy. Article "Hypertrophy." London, 1838

† Edinburgh Medical Journal, p. 448. November, 1863.

Dilatation of the lymphatics appears occasionally to lead to a rupture of their coats, in the same way that varicose veins sometimes give way. Dr. Carter's cases of chylous urine, in which there was probably a leakage from the lacteals into some part of the urinary track, have been already referred to (p. 540). The same gentleman has also published some facts, which appear to indicate a close connection between a varicose state of the lymphatic system and Elephantiasis Arabum attacking the scrotum.*

IV. TABES MESENTERICA.

Tabes Mesenterica (*Tabes*, from *tabeo*, to melt away, *Μεσεντέριον*, the membrane which connects the intestines together,—*μέσος*, *ἔντερον*) is the name given to a tubercular or strumous degeneration of the mesenteric glands. It might appropriately be termed abdominal phthisis.

To understand the *pathology* of mesenteric disease, it is necessary to remember that the tubercular matter becomes effused into the glands themselves, more or less destroying their structure, and of course preventing the passage of the chyle through the convoluted lacteals which traverse them. Consequently there is impaired nutrition, varying in grade according to the extent of lymphatic obstruction. The glands are found enlarged, and affected in different degrees; in some the abnormal product being tough and almost fibrous, in others degeneration having so far advanced that it is soft and pulpy, while in a third class there is only a calcareous deposit, owing to the albuminous portion having been absorbed. Mesenteric disease particularly affects infants and young children; but it is by no means as frequent as the old authors believed, who regarded every child with a swollen belly as a victim of it.

The *symptoms* which are indicative of this affection are chiefly the following: There is pain in the bowels, more or less constant, sometimes severe, causing the child to keep his legs drawn up towards his belly. The lips are of a deep red color, and the angles of the mouth are covered with small ulcers, or the whole lip is fissured. The bowels are variable, though generally relaxed; the motions being often unhealthy, and extremely fetid. The abdomen is swollen and tense; while the other parts of the body waste away, owing to the obstruction of the chyle-ducts, until an extreme degree of emaciation exists. There is great pallor and general debility, the weakness increasing rapidly. Symptoms of pulmonary consumption may supervene, or the brain may become implicated, or the child may die worn out by the abdominal disease. Recovery does sometimes occur, however, when treatment is resorted to before the functions of the glands are much impeded. In these favorable cases the period of convalescence will be very slow, and great caution must be employed to prevent any relapse.

The *diagnosis* is not always very easy, and there are two or three disorders with which this disease may be confounded. Thus, strumous

* Transactions of the Medical and Physical Society of Bombay. New Series, vol. vii, p. 186. Bombay, 1862.

infants not unfrequently suffer from very obstinate diarrhœa, as a sequela of some exhausting disease; or a looseness comes on owing to insufficient nourishment, or to being kept in a damp offensive atmosphere, &c. The evacuations also are not only very numerous, but unhealthy; consisting of greenish mucus, with undigested food. The countenance becomes anxious and aged; the skin is harsh, the breath offensive, the tongue dry and aphthous, and the stomach irritable; while the little patient is restless and very fretful. If removal of the cause, and the use of such remedies as milk and lime-water, logwood and opium; ipecacuanha and catechu, port wine or brandy, &c., fail to effect a cure, extreme exhaustion sets in which soon ends fatally. After death the mucous membrane of the alimentary canal will be found quite normal, while the mesenteric glands may be merely swollen and congested—probably as the consequence of the irritation, although possibly as its cause.

Again, hydrocephalus in its early stages somewhat resembles strumous disease of the abdomen. But in the former the cerebral oppression is greater, sickness is more troublesome and constant, the mind is duller, there is strabismus, and the abdomen is found flattened rather than distended.

In tuberculization of the bronchial glands there is greater disturbance at an earlier period than when the mesenteric glands are alone diseased; owing to the fact that in enlargement of the former the air-tubes soon become compressed and their vital functions interfered with, the unyielding walls of the thorax offering a marked contrast to the flexible parietes of the abdomen. The general character of the symptoms is the same in both cases.

Tubercular peritonitis is hardly to be distinguished from the disease under consideration, with which indeed it is often combined (p. 513). Fortunately the distinction is unimportant.

The *treatment* must consist in the use of mild nourishing food adapted to the child's age and strength; asses' milk, goats' milk, soda-water with milk, and farinaceous preparations being very useful. Port wine and beef tea are valuable agents. Cod-liver oil will be of much service in many cases; especially when given with tonics, and sometimes with small doses of iodide of potassium and the ammonio-citrate of iron (F. 31, 32, reduced in strength according to the patient's age). In several instances I have seen great benefit from the employment of "chemical food" (F. 405); as well as from small doses of the hypophosphite of soda and bark. Raw meat, minced very fine, is not unfrequently taken greedily by children with mesenteric disease, marked improvement resulting. Where the motions are very offensive, a few small doses of mercury and chalk combined with a grain or two of the powder of ipecacuan and opium, or with the aromatic powder of chalk and opium, prove serviceable. Astringents to check the diarrhœa, frictions over the abdomen with the common soap or opiate liniments, hot linseed poultices to relieve pain, warm clothing, and the employment of a flannel bandage around the body, will frequently be necessary. Care must also be taken that the air of the child's apartments is kept healthy; it being especially necessary that the sleeping-room should be of a good size, and properly ventilated.

The invigorating influence of sea-air is as clearly apparent in the

early stages of tabes mesenterica, as it is in other forms of tuberculosis. Children who have refused both food and medicine, and who would pine and die in the unhealthy courts and narrow streets of large cities, seem to imbibe a new life with the inspiration of a pure air, loaded with saline particles. Materials which the stomach previously refused to digest become converted into healthy chyme; the blood circulates with renewed activity through the enfeebled frame; and while nutrition becomes stimulated, the secretions from the various glands gradually appear of a more healthy character, the little patient ceases to be irritable and fretful, and the muscles lose their soft flabby feel. After a few days' residence at Margate, Folkestone, Brighton, Scarborough, &c., when the child is becoming acclimatized, bathing may be tried; commencing with warm salt-water baths every morning, and gradually lowering their temperature until a healthy glow follows quickly upon the use of tepid water. As a rule, strumous children seldom derive any benefit from cold bathing; while a dip in the open sea produces a greater shock than they can well bear. Moreover, to force a timid and delicate child into the water is a piece of cruelty to which no medical practitioner should give his consent.

The preceding remarks show that the great aim of treatment in mesenteric disease is to improve and fortify the constitution. All remedies which interfere with this object are most injurious. The use of salines, aperients, calomel, mercurial liniments, and leeches, can only be productive of mischief. Our main reliance, in short, must be placed on food which can be assimilated, cod-liver oil, and sea-air.

APPENDIX OF FORMULÆ.

In prescribing a medicine, attention must be paid to the following points: Age, Sex, Temperament, Habit, Condition of System, Climate, and Season of the Year. The operation of most drugs is materially influenced by the form in which the medicine is given, the purity of the preparation, the time of day at which the dose is taken, and the condition of the stomach as regards the presence or absence of food. The succeeding formulæ are for Adults, unless the contrary is stated. The doses may, except in the case of mercurials and narcotics, be reduced by attention to this table:

For an adult, suppose the dose to be			1	or gr. 60.
Under 1 year, will require only			1-12th	or gr. 5.
" 2 "		"	1-8th	or gr. $7\frac{1}{2}$.
" 3 "		"	1-6th	or gr. 10.
" 4 "		"	1-4th	or gr. 15.
" 7 "		"	1-3d	or gr. 20.
" 14 "		"	1-half	or gr. 30.
" 20 "		"	2-3ds	or gr. 40.

Above 21, the full dose.
" 65, the dose must be diminished in the inverse gradation of the above.

Children bear as large doses of mercury as adults; but they are much more susceptible to the influence of opiates. Consequently, opium must be given in very minute doses to them. Females, also, from their more delicate organization and greater sensitiveness, require smaller quantities of powerful medicines than males. This is particularly the case during the periods of menstruation, pregnancy, and lactation.

The skill of the physician is shown by the administration of the proper remedy, in the proper quantity, at the proper time. A druggist's apprentice can tell what agents will purge, vomit, or sweat; but a man must be practically conversant with disease to be able rightly to apply his therapeutical resources to the exigencies of any particular case. Instead of introducing medicines into the system by the stomach it is often more advisable to do so by the rectum, or by the skin, or by the lungs, or by injection into the areolar tissue. Absorption takes place from the rectum as speedily and surely as from the stomach; and hence purgatives, emetics, narcotics, tonics, and nutrients may be admirably administered as enemata. The skin offers a mechanical impediment to absorption; but still poultices and fomentations, plasters, liniments and ointments, and medicated vapor or water baths are all valuable remedies. If the cuticle be removed by a blister, and the medicine applied to the denuded dermis in its pure state or incorporated with lard or mucilage, its action will be rapid. The system is quickly and thoroughly affected by the inhalation of medicated vapors, or of substances reduced to an impalpable powder. Subcutaneous injections must be employed with great caution; since by this plan none of the medicine is lost, neither is it altered or diluted by the contents of the stomach, as happens when drugs are taken by the mouth.—In only exceptional cases can there be any advantage in procuring absorption through the conjunctiva, the nasal or pituitary membrane, or the mucous coat of the vagina; but in these exceptional cases the benefit is often very great.—Injection into the veins is too dangerous to allow of its being practised except as a last resource in grave diseases,—such as epidemic cholera, &c.

The practitioner will do well to bear in mind the following rules: 1. When a disease is progressing favorably towards recovery, it is unwise to interfere with the efforts of Nature by the administration of drugs. The end and aim of treatment is not only to restore health, but to do so safely, speedily, and pleasantly.—2. Where drugs are needed, and there is a choice of remedies, employ that one which will be the least distressing at the time, and subsequently the least injurious to the constitution.—

3. Put the medicine in that form in which it can be most easily taken. When possible—especially with children—cover the disagreeable taste of the draught by syrups, &c.—4. If there be an idiosyncrasy with respect to any special medicine—such as mercury, opium, turpentine, &c.—avoid administering it. That a peculiarity of constitution, causing an extreme susceptibility to the influence of certain drugs, food, and odors sometimes exists, cannot be disputed. It is as certain that it can seldom be safely combated.—5. Attend to the condition under which the patient will be at the period of the medicine's action; *e.g.*, it will be worse than useless to give a sudorific to an individual obliged to be in the open air soon after taking it.—6. Be careful that the various agents in the prescription are not incompatible with each other, unless it be desired to form some new or particular compound. Chemical incompatibility, however, is by no means synonymous with therapeutic inertness; for experience tells us that certain unchemical compounds—bichloride of mercury and tincture of bark, gallic acid and tincture of opium, calomel and Dover's powder, &c., are all valuable preparations in curing diseases.—7. Remember that if a disease be incurable, it may still admit of great alleviation. Hence it is cruel to give up any case; although, at the same time, the patient is not to be deceived by false promises.—8. Never order, or sanction the use of, a quack medicine; *i.e.*, one, the composition of which is kept a secret.—9. Bearing in mind the weakness of human nature, and the prejudices and superstitions which are current, it is not only necessary to give good advice, but pains must be taken so to impress the patient and attendants that the necessary treatment may be thoroughly carried out. *Hope* and *confidence* are no mean remedial agents; and in many chronic diseases at least, the individual who has *faith* will recover more speedily, cæteris paribus, than he who is shy of belief.—10. Simply to prescribe drugs, without regulating the diet and general management of the patient, is to omit a most important duty. In acute diseases plain directions must be given as to the ventilation and warmth of the sick-room, the amount of light, the position of the bed (not to be placed in a corner), the degree of quiet to be maintained, the cleanliness of the sufferer, and the nature and quantity and times for administration of food. In cases of long illness, when the patient can be moved without risk, it is often desirable to have two beds in the room,—one to be occupied during the day, the other at night. Every precaution must be taken to prevent the spread of infectious disorders. And, in all instances, the evacuations ought to be passed in a bed-pan or night-stool containing some disinfectant fluid.—11. While it is allowed that the following formulæ may often be employed unaltered with great advantage, yet it is not supposed that they will usually be prescribed with servile exactness; for it must never be forgotten that all medicines of any power have to be adapted to the requirements of the special case under treatment. It has been quaintly but truly observed, that a bundle of ready-made receipts in the hands of a routine practitioner, is but a well-equipped quiver on the back of an unskilful archer.—And 12. In watching the restoration of a sick man to health, do not attribute the improvement too confidently to the action of the medicine prescribed; for it may not have been taken, or it may not have been absorbed, or its properties may have been destroyed by adulteration, or it may have even proved injurious—recovery occurring in spite of it.

The succeeding formulæ have been written in accordance with the rules, preparations, &c., of the British Pharmacopœia. For the sake of convenience they are arranged in twenty classes, running thus:

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I. ALIMENTS.

Formula 1. *Extract of Beef.*

Take one pound of rumpsteak, mince it like sausage meat, and mix it with one pint of cold water. Place it in a pot at the side of the fire, to heat very slowly. It may stand two or three hours before it is allowed to simmer, and then let it boil gently for fifteen minutes. Skim and serve. The addition of a small tablespoonful of cream to a teacupful of this beef tea renders it richer but more nourishing. Sometimes it is preferred when thickened with a little flour or arrowroot.

2. *Restorative Soup for Invalids.*

Take 1 lb. of newly killed beef or fowl, chop it fine, add eight fluid ounces of soft or distilled water, four or six drops of pure hydrochloric acid, 30 to 60 grs. of common salt, and stir well together. After three hours the whole is to be thrown on a conical hair sieve, and the fluid allowed to pass through with slight pressure. On the flesh residue in the sieve pour slowly two ounces of distilled water, and let it run through while squeezing the meat. There will be thus obtained about ten fluid ounces of cold juice (cold extract of flesh), of a red color, and possessing a pleasant taste of soup; of which a wineglassful may be taken at pleasure. It must not be warmed (at least, not to a greater extent than can be effected by partially filling a bottle with it, and standing this in hot water); since it is rendered muddy by heat or by alcohol, and deposits a thick coagulum of albumen with the coloring matter of blood.—If, from any special circumstance (such as a free secretion of gastric juice) it is deemed undesirable to administer an acid, the soup may be well prepared by merely soaking the minced meat in simple distilled water.—Children will frequently take the raw meat simply minced, when they are suffering from great debility. One teaspoonful of such meat may be given every four hours.

This modification of Liebig's formula is very valuable in cases of continued fever, in dysentery, and indeed in all diseases attended with great prostration and weakness of the digestive organs. When the flavor is thought disagreeable, it may be concealed by the addition of spice, or of a wineglassful of claret to each teacupful of soup.

3. *Essence of Beef.*

Take one pound of gravy-beef, free from skin and fat, chop it up as fine as mince-meat, and pound it in a mortar with two tablespoonfuls of soft water. Then put it into a covered earthen jar with a little salt, cementing the edges of the cover with pudding paste. Place the jar in an oven, or tie it tightly in a cloth and plunge it into a pot of boiling water for three hours. Strain off the liquid essence, which will amount to about two ounces in quantity. Give two or more teaspoonfuls frequently.

In great debility, exhaustion from hemorrhage, &c.

4. *Liebig's Food for Infants and Invalids.*

Half an ounce of wheaten flour (that called "seconds" is the most suitable), an equal quantity of malt flour, 7½ grains of bicarbonate of potash, and an ounce of water, are to be well mixed. Add five ounces of cow's milk, and put the whole on a gentle fire. When the mixture begins to thicken it is to be removed from the fire, stirred for five minutes, heated and stirred again till it becomes quite fluid, and finally made to boil. After separating the bran by passing the mixture through a sieve, it is ready for use.

To save the trouble of weighing, it may be remembered that a tablespoonful (heaped up) of wheaten flour weighs nearly half an ounce, and a heaped dessertspoonful of malt flour is equal to the same. This soup is as sweet as milk; and after boiling, may be kept for 24 hours without undergoing any change.—This is an excellent food for infants who cannot be suckled. It is slightly aperient; so that children under one year of age can seldom take more than two meals of it in the day. Where there is a tendency to diarrhœa, twenty grains of prepared chalk may be substituted for the potash. The proportion of blood-forming and heat-producing elements is the same as in women's milk (1 : 3.8); while the quantity of alkali is equivalent to that in human milk.

The solid parts of this food are sold, ready mixed in packets, by Mr. Hooper, of Pall-mall East and Grosvenor Street, Mr. Cooper, of 26 Oxford Street, as well as by many other chemists.

5. *Eggs, Cream, and Extract of Beef.*

Wash two ounces of the best pearl sago until the water poured from it is clear. Then stew the sago in half a pint of water until it is quite tender and very thick: mix with it half a pint of good boiling cream and the yoke of four fresh eggs, and mingle the whole carefully with one quart of good beef tea, which should be boiling. Serve.

This nourishing broth is very useful in many cases of lingering convalescence after acute disease.

6. *Mutton or Veal Broth—Beef Tea.*

Take of mutton or veal or beef one pound and a half, cold water one quart, a little salt, and rice two ounces. Simmer for four hours, boil for a few minutes, strain and serve. Another excellent plan for making beef tea is as follows: Take one pound of beef minced very fine, and put it into a common earthenware teapot with a pint and a half of cold water. Stand the pot on the hob, so that it may simmer for at least three hours. About three-quarters of a pint of good beef tea will be thus obtained.

Beef tea as ordinarily made, and preserved meat-juice of all kinds, are palatable but not very nutritive drinks. A pint of fine beef tea contains scarcely a quarter of an ounce of anything but water. Nevertheless, if these fluids are of small value as mere nutrients, perhaps the osmazome and salts they contain may possess the property (like tea and coffee) of diminishing the waste of the tissues. It has been proved that dogs die slowly if fed on bread and gelatine alone; but when greatly reduced by this diet they soon regain flesh and strength if two ounces of meat-tea be daily added to it.

Gruel and beef tea is nourishing. It is made thus: Take two tablespoonfuls of oatmeal with three of cold water, and mix them thoroughly. Then add a pint of strong boiling beef tea (or of milk); boil for five minutes, stirring well to prevent the oatmeal from burning; and strain through a hair sieve.

An excellent simple restorative during convalescence from acute disease before solid food can be taken.

7. *Spruce Beer.*

The essence of spruce is prepared by boiling down to concentration the young branches of the Black Spruce Fir (Abies Nigra). Take of this essence half a pint; bruised pimento and ginger, of each four ounces; water three gallons. Boil for five or ten minutes; then strain, and add eleven gallons of warm water, a pint of yeast, and six pints of molasses. Mix, and allow the mixture to ferment for twenty-four hours.

It is an admirable antiscorbutic, and is an agreeable and wholesome drink in warm weather. This drink was found very efficacious by Captain Cook. Dr. Robert Barnes suggests that it should be used in the Merchant Service instead of rum, which has no antiscorbutic virtue.

8. *Tapioca and Cod Liver.*

Boil a quarter of a pound of tapioca till tender, in two quarts of water; drain it in a cullender, then put it back in the pan; season with a little salt and pepper, add half a pint of milk, and put over one pound of fresh cod liver cut in eight pieces. Set the pan near the fire to simmer slowly for half an hour, or a little more, till the liver is quite cooked. Press on it with a spoon, so as to get as much oil into the tapioca as possible. After taking away the liver, mix the tapioca. If too thick, add a little milk, then boil it a few minutes; stir round, add a little salt and pepper, and serve. —Alexis Soyer.

Tapioca thus cooked is nourishing and easily digested.

9. *The Bran Loaf.*

The formula used by Mr. Camplin, in *Diabetes*, is as follows: Take a sufficient quantity (say two or three quarts) of wheat bran, boil it in two successive waters for ten minutes, each time straining it through a sieve, then wash it well with cold water (on the sieve), until the water runs off perfectly clear; squeeze the bran in a cloth as dry as you can, then spread it thinly on a dish, and place it in a slow oven—if put in at night let it remain until the morning, when, if perfectly dry and crisp, it will be fit for grinding. The bran thus prepared must be ground in a fine mill, and sifted through a wire sieve of sufficient fineness to require the use of a brush to pass it

through: that which does not pass at first ought to be ground and sifted again, until the whole is soft and fine.

Take of this bran-powder three ounces troy, three fresh eggs, one ounce and a half of butter, and rather less than half a pint of milk; mix the eggs with part of the milk, and warm the butter with the other portion; then stir the whole well together, adding a little nutmeg and ginger, or any other agreeable spice. Immediately before putting into the oven, stir in first thirty-five grains of sesquicarbonate of soda, and then three drachms of dilute hydrochloric acid. The loaf thus prepared should be baked in a basin (previously well buttered) for about an hour or rather more.

Biscuits may be prepared as above, omitting the soda and hydrochloric acid, and part of the milk, and making them of proper consistence for moulding into shape.

If properly baked, the loaves or biscuits will keep several days, but should always be preserved in a dry place, and not be prepared in too large quantities at a time.

10. *White Wine Whey.*

To half a pint of boiling milk, add one or two wineglassfuls of sherry or Madeira. The curd is to be separated by straining through a fine sieve or piece of muslin. Sweeten the whey with refined sugar.

11. *Caudle.*

Beat up one egg with a wineglassful of sherry, and add it to half a pint of fine hot gruel. Flavor with sugar, nutmeg, and lemon-peel.

In insomnia with debility.

Beat up two tablespoonfuls of cream in a pint of thin cold gruel. Add to this one tablespoonful of curaçoa or noyeau, and a wineglassful of sherry. Flavor with sugar-candy, and let half a tumblerful be taken, cold, at intervals.

12. *Ferruginous Chocolate.*

Spanish chocolate 16 oz.; carbonate of iron half an ounce. Divide into one-ounce cakes. One to be dissolved in half a pint of hot milk, and taken night and morning.

In anæmia, amenorrhœa, &c.

13. *Iceland Moss and Quinine Jelly.*

Take of Iceland moss (Cetraria), and Irish Moss (Chondrus crispus, Carragheen), each one ounce. Boil slowly for three-quarters of an hour in a pint and a half of milk, strain through muslin, and add three ounces of white sugar dissolved in one ounce of the compound tincture of quinia (equal to eight grains of the salt). A dessertspoonful to be taken frequently in the course of the day.

In phthisis, tabes mesenterica, &c.

14. *Lime-water and Milk.*

℞. Liquoris calcis, Lactis, āā fl. oz. iij. Mix.

This compound will sometimes be retained when all other food is ejected. As a variety, milk and soda-water, in equal proportions, may also be ordered.

It may be well to remember that the addition of grs. 15 of Bicarbonate of Soda to the quart of milk not only prevents it from turning sour, but renders it more digestible.

15. *Artificial Ass's and Goat's Milk.*

Take half an ounce of gelatine, and dissolve it in half a pint of hot barley water. Then add an ounce of refined sugar, and pour into the mixture a pint of good new cow's milk.

Chop an ounce of suet very fine, tie it lightly in a muslin bag, and boil it slowly in a quart of new milk. Sweeten with white sugar, or a glass of any liqueur.

An excellent aliment in some cases of tabes mesenterica, &c., where the unpleasant odor of goat's milk prevents it being taken.

16. *Milk, Flour, and Steel.*

Beat up carefully one tablespoonful of flour, one raw egg, and about twenty grains of the saccharated carbonate of iron, with half a pint of new milk: flavor with nutmeg and white sugar. To be taken for lunch with a biscuit.

In the early stages of tuberculosis the author has found this mixture very valuable.

17. *Brandy and Egg Mixture.*

Take the whites and yolks of three eggs and beat them up in four ounces of plain water. Add slowly three or four ounces of brandy, with a little sugar and nutmeg. This form is preferable to that in the London Pharmacopœia for 1851. Two tablespoonfuls should be given every four or six hours. In some cases of great prostration the efficacy of the mixture is much increased by the addition of one drachm of the tincture of yellow cinchona to each dose.

18. *Bread Jelly.*

Take a quantity of the soft part of a loaf, break it up, cover it with boiling water, and allow it to soak for some hours. The water—containing all the noxious matters, with which the bread may be adulterated—is then to be strained off completely, and fresh water added; place the mixture on the fire, and allow it to boil for some time until it becomes smooth; the water is then to be pressed out, and the bread on cooling will form a thick jelly. Mix a portion of this with sugared milk and water, for use as it is wanted.—Dr. Churchill.

A good food for infants at the time of weaning, for children with acute disease, &c.

19. *Nutritious Demulcent Drinks.*

Mix together half a pint of Mucilago Acaciæ, Mistura Amygdalæ, and pure milk; sweeten with sugar-candy or honey; and add one large tablespoonful of any liqueur. Allow the whole to be taken during the day.—Or, a large pinch of isinglass may be boiled with a tumblerful of milk, half a dozen bruised almonds, and two or three lumps of sugar. To be taken warm once or twice in the day.

These drinks are very grateful in cases of tonsillitis, ulceration of the pharynx, &c.; also in some cases of debility with irritability of the stomach, and a tendency to diarrhœa.

20. *Indian Sarsaparilla and Barley Water.*

℞. Syrupi Hemidesmi, fl. oz. ij: Glycerini, fl. oz. j; Decocti Hordei, fl. oz. ix. Mix, and direct two tablespoonfuls to be taken frequently. An agreeable demulcent, slightly alterative, and diaphoretic mixture.

Useful in the eruptive fevers, and in inflammations of the mucous membranes.

21. *Beef Tea and Cream Enemata.*

An excellent nutritious enema may be made by mixing together from four to eight ounces of strong beef tea, an ounce of cream, and half an ounce of brandy or an ounce and a half of port wine. It may be administered twice or thrice in the course of twenty-four hours.

In cases of acute gastritis, carcinoma of the stomach, obstinate vomiting, &c., where it is necessary to avoid giving food by the mouth.

Another form may run thus: Take four or six ounces of restorative soup (F. 2), one ounce of cream, two teaspoonfuls of brandy, ten or fifteen minims of liquid extract of opium, and ten grains of citrate of iron and quinia.

22. *Cod-Liver Oil and Bark Enema.*

Take four ounces of essence of beef (F. 3), two ounces of port wine, an ounce of cod-liver oil, two drachms of tincture of yellow cinchona, and twenty minims of liquid extract of opium. Mix. To be administered every twelve hours.

23. *Quinine and Beef Tea Enema.*

Take one tablespoonful of brandy, five grains of sulphate of quinia, one teaspoonful of glycerine, two tablespoonfuls of cream, and from four to eight ounces of strong

beef tea. Mix. This enema may be administered every six or eight hours. Where the rectum is very irritable, or it is necessary to relieve pain, from fifteen to twenty minims of the liquid extract of opium may be advantageously added.

II. ALTERATIVES AND RESOLVENTS.

24. *Compound Pill of Calomel and Opium.*

℞. Pilulæ Calomelanos Compositæ, gr. 5; Extracti Opii, gr. ½. Make a pill, and direct it to be taken every night, or night and morning.

In disorders dependent on a venereal taint.

25. *Calomel and Opium.*

℞. Calomelanos, gr. 2; Pulveris Opii, gr. ¼; Confectionis Rosæ Gallicæ, sufficient to make a pill. To be taken every four hours.

As an alterative, when we wish to get the system quickly under the influence of mercury.

26. *Mercury and Conium.*

℞. Hydrargyri cum Cretâ, gr. 2; Extracti Conii, gr. 3. Mix, and form a pill to be taken three times a day.

In syphilitic tubercular diseases.

27. *Corrosive Sublimate.*

℞. Hydrargyri Corrosivi Sublimati, gr. 1; Ammoniæ Hydrochloratis, gr. 5; Extracti Sarsæ Liquidi, fl. drs. xij; Decocti Sarsæ Compositi, ad fl. oz. xij. Mix. Direct: "Two small tablespoonfuls to be taken three times a day."

In confirmed constitutional syphilis; as well as in some forms of eczema, prurigo, follicular vaginitis, chronic metritis, &c.

℞. Hydrargyri Corrosivi Sublimati, gr. 1; Glycerini, fl. oz. j; Tincturæ Cinchonæ Compositæ, ad fl. oz. iij; Olei Menthæ Piperitæ, min. xxv. Mix. Direct,—"One teaspoonful in a wineglassful of water three times a day."

In constitutional syphilis, and some forms of hemorrhage.

℞. Hydrargyri Corrosivi Sublimati, gr. 1; Extracti Opii, gr. 3—6; Guaiaci Resinæ, gr. 100; Glycerini, sufficient to make a mass. Divide carefully into twenty-four pills, and order two to be taken three times a day.

In some varieties of chronic rheumatism.

28. *Mercury, Squills, and Digitalis.*

℞. Pilulæ Hydrargyri, gr. 3; Pulveris Digitalis, gr. ½; Pulveris Scillæ, gr. 1½. Mix, and form a pill to be taken twice or three times a day.

As an alterative and diuretic, in some cases of dropsy.

29. *Bromide of Mercury and Sarsaparilla.*

℞. Hydrargyri Bromidi, gr. ½; Extracti Sarsæ Liquidi, fl. drs. ij; Decocti Sarsæ Compositi, ad fl. oz. iss. Mix. To be taken three times a day.

In syphilitic lepra, and secondary syphilitic eruptions.

30. *Podophyllum Peltatum, or May-Apple.*

℞. Podophylli Resinæ, gr. ⅛—⅓; Pulveris Ipecacuanhæ, gr. ½; Extracti Gentianæ, gr. 3. Mix. Make a pill, to be taken twice or thrice daily.

In syphilis, scrofula, jaundice from suppression, skin diseases, &c. As a simple alterative it is perhaps as valuable as mercury, without possessing any injurious qualities. One or two grains of quinine may be advantageously added to each pill, where there is general debility. See F. 160.

31. *Iodide of Potassium Mixtures.*

℞. Potassii Iodidi, gr. 20—30; Tincturæ Serpentariæ, fl. drs. iij; Misturæ Guaiaci, ad fl. oz. viij. Mix. One-sixth part to be taken three times a day.
Valuable in chronic rheumatism, and in acute tonsillitis.

℞. Potassii Iodidi, gr. 20; Liquoris Potassæ, fl. drs. ij; Tincturæ Hyoscyami, fl. drs. iij; Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part three times a day.
In chronic rheumatism with abundance of lithates in the urine; as well as in some cases of eczema, &c.

℞. Potassii Iodidi, gr. 2; Vini Colchici, min. xv; Tincturæ Aconiti, min. iij—viij; Infusi Rhei, fl. oz. j. Make a draught, to be taken three times a day.
In chronic gout.

℞. Potassii Iodidi, gr. 3—5; Spiritûs Ammoniæ Aromatici, min. xxx; Tincturæ Belladonnæ, min. v—xv; Tincturæ Cinchonæ Compositæ, fl. drm. j; Aquæ Menthæ Piperitæ, ad fl. oz. iss. Make a draught, to be taken three times a day.
In some cases of asthma the author has found remarkable benefit from this formula.

℞. Potassii Iodidi, gr. 15—30; Vini Colchici, fl. drs. iss; Tincturæ Hyoscyami, fl. drs. ij; Magnesiæ Sulphatis, gr. 220; Infusi Anthemidis, ad fl. oz. viij. Mix. One-sixth part three times a day.
In some instances of gout with fever and constipation, and in chronic pleurisy with effusion. Also in cases of lead and mercurial poisoning occurring in gouty subjects.

℞. Potassii Iodidi, gr. 40; Tincturæ Rhei, fl. oz. j; Extracti Sarsæ Liquidi, fl. oz. ij. Mix. Label,—"A small teaspoonful in a wineglassful of water three times a day."
In follicular inflammation of the pharyngo-laryngeal mucous membrane, &c.

℞. Potassii Iodidi, gr. 18—30; Glycerini, fl. oz. j; Vini Ipecacuanhæ, fl. drs. iss; Succi Taraxaci, fl. drs. vj; Decocti Sarsæ Compositi, ad fl. oz. viij. Mix. One-sixth part three times a day.
In gonorrhœal rheumatism, secondary syphilis, bronchocele, scrofulous sores, &c.

℞. Potassii Iodidi, gr. 15; Tincturæ Assafœtidæ, fl. drs. iss; Tincturæ Senegæ, fl. drs. iij; Syrupi Mori, ad fl. oz. iij. Mix. Label,—"One teaspoonful every two, three, or four hours."
For a child about two years old, suffering from croup. Also in cases of infantile pneumonia.

32. *Iodide of Iron Mixtures.*

℞. Ferri Iodidi, gr. 6—18; Glycerini, fl. drs. xij; Infusi Calumbæ, ad fl. oz. viij. Mix. One-sixth part three times a day.
In the early stages of tuberculosis, and in strumous ulcers, where the stomach will not tolerate cod-liver oil.

℞. Potassii Iodidi, gr. 30; Ferri et Ammoniæ Citratis, gr. 60; Aquæ Destillatæ, fl. drs. ij; Glycerini, fl. drs. vj; Olei Menthæ Piperitæ, min. x; Olei Morrhuæ, ad fl. oz. vj. Mix. One tablespoonful after the two chief meals of the day.

℞. Potassii Iodidi, gr. 12; Ferri et Quiniæ Citratis, gr. 30; Tincturæ Aconiti, min. xxv; Infusi Chiratæ, fl. oz. vj. Mix. One-sixth part three times a day.
In chronic rheumatism with debility, &c.

℞. Tincturæ Ferri Perchloridi, Tincturæ Iodi, āā min. x; Aquæ Camphoræ, fl. oz. j. Make a draught, to be taken three times a day.
Useful in strumous affections of the cervical glands, mesenteric disease, and some cutaneous disorders.

℞. Syrupi Ferri Iodidi, Extracti Sarsæ Liquidi, āā fl. oz. j. Mix. Direct,—"One teaspoonful in two tablespoonfuls of water three times a day."
In chronic rheumatism, old-standing venereal affections, &c.

℞. Potassii Iodidi, gr. 3—6; Ferri et Ammoniæ Citratis, gr. 20; Syrupi Papaveris, fl. drs. iij; Infusi Quassiæ, ad. fl. oz. iv. Mix. One tablespoonful three times a day.
For children with tabes mesenterica. Useful also for strumous subjects who have had ascarides.

33. *Iodide of Potassium and Mercury.*

℞. Ammoniæ Carbonatis, gr. 30; Potassi Iodidi, gr. 20; Tincturæ Aconiti, min. xxx; Tincturæ Cinchonæ Flavæ, fl. drs. vj; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. Direct,—"One-sixth part three times a day, viz.: at 9 a.m., 2 p.m., and 7 p.m."

℞. Hydrargyri Iodidi Viride, gr. 2; Extracti Opii, gr. 1; Extracti Hyoscyami, gr. 6. Mix, divide into two pills, and order one to be taken every night at 11 o'clock as long as the mixture is continued.

Very useful in many forms of constitutional syphilis.

34. *Mercury, Chalk, and Dover's Powder.*

℞. Hydrargyri cum Cretâ, Pulveris Ipecacuanhæ cum Opio, āā gr. 5. Mix, and make a powder to be taken every eight or twelve hours.

In diarrhœa with unhealthy secretions, and in mild dysentery.

35. *Mercury, Chalk, and Soda.*

℞. Sodæ Bicarbonatis, Hydrargyri cum Cretâ, āā gr. 2; Magnesiæ Carbonatis, gr. 5. Mix, and make a powder to be taken every other night.

An alterative and aperient for children, where there is great acidity of the secretions.

36. *Tar Pills and Capsules.*

℞. Picis Liquidæ, oz. 1; Pulveris Aromatici, oz. ½. Mix, divide into five-grain pills, and order two or three to be taken three times a day.

Tar Capsules are made, each containing about six grains. Two or three may be taken for each dose.

In some chronic skin diseases, pruritus of the anus, and chronic catarrhal affections.

37. *Bromide of Ammonium.*

℞. Ammonii Bromidi, gr. 12—60; Infusi Aurantii, fl. oz. viij. Mix. Direct,—"One-sixth part to be taken three times a day, an hour before meals."

Recommended by Dr. Gibb for diseases in which the nervous system is functionally involved,—as epilepsy, &c. It is a valuable absorbent in glandular enlargements, and in excessive corpulency; while it has also a peculiar soothing influence upon the mucous membranes.

38. *Iodide of Ammonium.*

℞. Ammonii Iodidi, gr. 1—6; Infusi Cinchonæ Flavæ, fl. oz. ss—iss. Make a draught, to be taken twice or thrice daily before food.

Very valuable in strumous enlargement of the absorbent glands. The dose is to be graduated according to the patient's age. At the time this medicine is given internally, an ointment of the iodide of ammonium (gr. 60 to lard oz. 1) should be rubbed into the swellings night and morning.

39. *Iodide of Sodium.*

℞. Sodii Iodidi, gr. 60; Decocti Sarsæ Compositi, fl. oz. viij. Mix. One-sixth part three times a day.

As an antisyphilitic where the iodide of potassium disagrees. Moreover, it will sometimes effect a cure after the latter has failed to be of use.

40. *Benzoate of Ammonia.*

℞. Ammoniæ Benzoatis, gr. 10—30; Aquæ, fl. oz. iss. Mix. To be taken three times a day.

In chronic bronchitis, chronic inflammation of the bladder with alkaline urine, and in cases attended with the copious excretion of phosphates.

41. *Creasote.*

℞. Creasoti, min. xx; Pulveris Aromatici, gr. 80; Mucilaginis Acaciæ, sufficient to form a mass. Divide into twenty pills and order one or two to be taken three times a day.

In some forms of neuralgia, chronic bronchitis, and obstinate vomiting unconnected with inflammation or organic disease—such as sea-sickness. After taking creasote for a short time, the urine occasionally assumes a dirty or brownish-black color. Inunction with tar may give rise to the same effect. Under these circumstances, creasote has been obtained from the urine by distillation.

In the officinal MISTURA CREASOTI the unpleasant flavor is tolerably well disguised by the Spirit of Juniper. Dose, fl. oz. j—ij. See F. 90.

42. *Bromide of Potassium.*

℞. Potassii Bromidi, gr. 3—8; Aquæ, fl. oz. j. Mix. To be taken three times a day.

Efficacious, according to the late DR. ROBERT WILLIAMS, in reducing enlarged spleens.

℞. Potassii Bromidi, gr. 30—60; Tincturæ Valerianatæ Ammoniatæ, fl. drs. vj; Aquæ Camphoræ, vel Infusi Chiratæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In hysteria, epilepsy due to ovarian irritation, functional disturbance of the uterine functions, spermatorrhœa, &c.

℞. Pulveris Guaiaci, gr. 40; Potassii Bromidi, gr. 30; Magnesiæ Carbonatis, gr. 60. Mix. Divide into six powders, and order one to be taken three times a day.

Useful in cases where it is required to exert a sedative action on the sexual organs.

43. *Guaiacum Mixtures.*

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. iv; Tincturæ Aconiti, min. xxx; Mucilaginis Tragacanthæ, Aquæ Cinnamomi, āā fl. oz. iv. Mix. Two tablespoonfuls, twice or three times a day.

In the chronic rheumatism of old and weak people. Also in some skin diseases where there is a strumous taint.

℞. Extracti Opii Liquidi, min. xxx; Tincturæ Quinæ Compositæ, fl. drs. vj; Misturæ Guaiaci, ad. fl. oz. viij. Mix. One-sixth part three times a day.

In chronic skin diseases. Guaiacum has also been highly extolled in tonsillitis.

℞. Sulphuris Sublimati, oz. 2; Potassæ Tartratis Acidæ, oz. 1; Pulveris Rhei, gr. 120; Guaiaci Resinæ, gr. 60; Mellis, lb. j; Myristicæ, unum in pulverem redacti. Mix thoroughly, and order two teaspoonfuls to be taken night and morning until the whole is consumed.

This compound was formerly in much repute for the cure of chronic rheumatism; being said to be especially useful in old-standing cases, when the skin is inactive and the intestinal glands, &c., torpid. It was well known under the name of the "Chelsea Pensioner."

44. *Quinine and Ipecacuan.*

℞. Quiniæ Sulphatis, gr. 8; Pulveris Ipecacuanhæ, gr. 24; Pulveris Ipecacuanhæ cum Opio, gr. 30; Glycerini sufficient to form a mass. Divide into sixteen pills, and order two to be taken every three or four hours.

In subacute dysentery, occurring in tropical regions. See F. 384.

45. *Quinine and Belladonna.*

℞. Quiniæ Sulphatis, gr. 2; Extracti Belladonnæ, gr. ⅛; Extracti Opii, gr. ½—1; Extracti Hyoscyami, gr. 2. Make a pill, to be taken every six or eight hours.

In neuralgia, pruritus of the vulva, carcinoma, &c. See F. 383.

46. *Colchicum, &c.*

℞. Calomelanos, Extracti Colchici Acetici, Extracti Aloes Barbadensis, Pulveris Ipecacuanhæ, āā gr. 1. Make a pill, to be taken every four hours until the bowels are well acted upon.

In gout, with congestion of the liver.

℞. Extracti Colchici Acetici, Extracti Aconiti, āā gr. 1; Pilulæ Hydrargyri, gr. 3. Make a pill, to be taken every night at bed-time.

In gout, with deficient action of the liver.

℞. Potassæ Citratis, gr. 120; Vini Colchici, fl. drs. j—ij; Liquoris Morphiæ Hydrochloratis, fl. drm. j; Aquæ Camphoræ, ad. fl. oz. viij. Mix. One-sixth part every six hours.

In some forms of gout, where there is but little constitutional depression.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. vj; Vini Colchici, fl. drs. ij—iv; Tincturæ Aurantii, ad fl. oz. ij. Mix. Direct,—"One teaspoonful in half a bottle of soda water, three times a day."

47. *Oxide of Silver.*

℞. Argenti Oxidi, gr. 1—2; Pulveris Aromatici, gr. 2; Extracti Cannabis Indicæ, gr. ½; Glycerini sufficient to make a pill. To be taken three times a day.

Of doubtful efficacy in dyspepsia, pyrosis, hæmoptysis, menorrhagia, &c.

48. *Sulphite of Soda, &c.*

℞. Sodæ Sulphitis, gr. 30—60; Infusi Quassiæ, fl. oz. iss. Mix, and make a draught to be taken three times a day.

Dr. Jenner.—In diseases of the stomach, accompanied by the formation of the sarcinæ ventriculi. The patient should eat unfermented bread while taking this medicine.

The Sulphite of Magnesia may be given in the same way, with the object of neutralizing blood-poisons. It is richer in sulphurous acid than the sulphite of soda, is more stable, and has a much more agreeable taste. This salt has been strongly recommended by Dr. Polli (see p. 46) in cases of pyæmia, typhus, puerperal fever, hospital gangrene, dissecting wounds, glanders, cholera, &c.

49. *Benzoic Acid.*

℞. Acidi Benzoici, gr. 3—20; Theriacæ sufficient to form one or more pills.

Administered in proper doses, three or four times a day, this remedy is useful in jaundice from suppressed action of the liver, and in uræmia. It has also been recommended in some cases of incontinence of urine in children. See F. 246.

50. *Turpentine Mixtures.*

℞. Olei Terebinthinæ, fl. oz. j; Vitelli Unius Ovi; beat together and add gradually Misturæ Amygdalæ, fl. oz. iv; Syrupi Aurantii, fl. oz. ij; Tincturæ Lavandulæ Compositæ, fl. drs. iv; Olei Cinnamomi, guttæ iv. Mix. Two tablespoonfuls to be taken three times a day.

Carmichael.—Recommended in iritis, where the use of mercury is contra-indicated.

℞. Spiritûs Ætheris, fl. drs. ij; Olei Terebinthinæ, fl. drs. iss.; Mucilaginis Acaciæ, fl. oz. iij; Aquæ Cinnamomi, ad fl. oz. vj. Mix. Direct,—"One-sixth part three times a day."

To prevent the formation of gall-stones, or to aid in dissolving them. The utility of this mixture is doubtful.

℞. Olei Terebinthinæ, fl. drs. iss—iij; Syrupi Limonis, fl. drs. vj; Mucilaginis Tragacanthæ, fl. oz. iij; Aquæ, ad fl. oz. vj. Mix. Direct,—"One-sixth part every four or six hours."

Useful in some forms of hæmatemesis, hæmoptysis, epistaxis, purpura hæmorrhagica, &c. Its effects must be watched, so that it may be discontinued directly any unpleasant results—such as strangury or severe vomiting—arise.—If the symptoms are very urgent, the first dose of the turpentine may consist of fl. drs. iv—vj, beaten up with mucilage; the succeeding doses being according to the formula. In some cases the turpentine may be advantageously given with gallic acid, or the tincture of the perchloride of iron, or with the acid infusion of roses, or with the dilute nitric acid. A drop of creasote with each dose materially lessens its tendency to cause nausea.

℞. Terebinthinæ Chiæ, gr. 2; Pulveris Rhei, gr. 3; Saponis duri, sufficient to make a pill. To be taken twice a day. See F. 102.

51. *Donovan's Triple Solution.*

℞. Liquoris Hydriodatis Arsenici et Hydrargyri, min. xx—xxx; Tincturæ Zingiberis, fl. drm. j; Aquæ, fl. oz. j. Make a draught, to be taken twice a day, directly after meals.

Useful in lepra, psoriasis, &c.

52. *Arsenical Mixture.*

℞. Liquoris Arsenicalis, min. iij; Tincturæ Lupuli, min. xxx; Infusi Quassiæ, fl. oz. j. Make a draught, to be taken three times a day, directly after meals.

Very useful in many obstinate cutaneous diseases. In ague the quantity of arsenic must be trebled. Under any circumstances, the dose should be diminished directly the tongue gets thoroughly coated with a silvery-looking fur, or the conjunctivæ become irritable, or diarrhœa sets in, or gastric pain is complained of.

℞. Liquoris Sodæ Arseniatis, m. iij—v; Vini Colchici, min. x; Tincturæ Cinchonæ Compositæ, fl. drm. j; Tincturæ Aconiti, min. v; Aquæ, ad fl. oz. j. Mix. To be taken three times a day, directly after meals.

In some forms of chronic rheumatism.

℞. Quiniæ Sulphatis, gr. 20; Liquoris Arsenici Chloridi (Phar. Lond. 1851), fl. drs. iij—iv; Acidi Sulphurici Aromatici, fl. drs. ij; Syrupi Zingiberis, ad fl. oz. iij. Mix. Label,—"One teaspoonful in two tablespoonfuls of water directly after breakfast, dinner, and tea."

In severe neuralgia, chorea, chronic rheumatism, asthma, hay-fever, and intermittent fever. See F. 381, 399.

℞. Liquoris Arsenicalis, min. xxx; Tincturæ Cantharidæ, fl. drm. j; Tincturæ Aurantii, fl. drs. vj; Potassi Iodidi, gr. 18—30; Infusi Aurantii, ad fl. oz. vj. Mix. One-sixth part directly after the two chief meals.

Valuable in some inveterate cutaneous diseases, as lupus, lepra, psoriasis, &c.

℞. Liquoris Sodæ Arseniatis, fl. drs. iss; Succi Scoparii, fl. oz. iij. Mix. One teaspoonful three times a day, in a wineglassful of water.

In some cases of dropsy from chronic renal disease.

℞. Acidi Arseniosi, gr. 1; Pulveris Zingiberis, gr. 40; Extracti Jalapæ, gr. 20; Pulveris Tragacanthæ Compositi, gr. 30; Confectionis Rosæ Caninæ, gr. 10. Mix very intimately, divide into twenty pills, and order one to be taken three times a day, immediately after meals.

In psoriasis, chronic eczema, and other cases where it is desirable to administer arsenic in a solid form.

53. *Green Iodide of Mercury.*

℞. Hydrargyri Iodidi Viride, gr. 12; Extracti Lupuli, gr. 60; Extracti Opii, gr. 2—5. Mix. Divide into twenty-four pills, silver them, and order one to be taken three or four times in the day.

The green iodide of mercury (Syn. Iodide of Mercury) will cure some of the pustular and tubercular diseases of the skin, as well as certain secondary venereal ulcerations, when all other means fail. See F. 33.

℞. Hydrargyri Iodidi Viride, gr. 6; Extracti Conii, gr. 30. Mix. Divide into six pills, and order one to be taken every night at bed-time.

In small secondary syphilitic ulcers about the tongue.

54. *Red Iodide of Mercury.*

℞. Hydrargyri Iodidi Rubri, gr. 2—3; Morphiæ Hydrochloratis, gr. 1; Extracti Gentianæ, vel Extracti Conii, gr. 40. Mix. Divide into twelve pills, and order one to be taken twice a day. A couple of ounces of the Compound Decoction of Sarsaparilla may be taken with each pill, or an ounce of the Guaiac Mixture.

Useful in the same cases as demand the green iodide of mercury. The red iodide (Syn. Biniodide of Mercury) is, however, less likely to cause gastric irritation.

℞. Hydrargyri Corrosivi Sublimati, gr. 1; Ammoniæ Hydrochloratis, gr. 5; Potassii Iodidi, gr. 40; Aquæ, fl. drs. ij; Extracti Sarsæ Liquidi, ad fl. oz. ij. Mix. Label,—"A small teaspoonful in a wineglassful of water three times a day."

This formula gives a convenient extemporaneous mode of exhibiting the red iodide of mercury in a fluid form.

℞. Hydrargyri Iodidi Rubri, gr. 3; Potassii Iodidi, gr. 60—120; Spiritûs Vini Rectificati, fl. drm. j; Syrupi Zingiberis, fl. drs. iv; Aquæ Destillatæ, fl. oz. iss. Mix. Label,—"Thirty drops three times a day in a wineglassful of water."

Mr. Langston Parker says, and I can confirm the remark, that this remedy, used in conjunction with the mercurial vapor bath, produces excellent results in some obstinate forms of tubercular disease of the skin; as well as in secondary venereal ulcerations, proving intractable after the employment of other remedies.

55. *Red Iodide of Mercury and Arsenic.*

℞. Hydrargyri Iodidi Rubri, gr. 1; Potassii Iodidi, gr. 120; Liquoris Arsenicalis, fl. drs. iss; Tincturæ Lavandulæ Compositæ, fl. oz. ij; Spiritûs Chloroformi, fl. drs. iv; Aquæ, ad fl. oz. xij. Mix; and direct,—"One tablespoonful to be taken three times a day, immediately after food."

In psoriasis, and some inveterate tubercular and ulcerous affections of the skin.

56. *Puccoon and Iodide of Arsenic.*

℞. Sanguinariæ Canadensis, gr. 12; Arsenici Iodidi, gr. 2; Extracti Conii, gr. 40. Mix carefully, divide into twenty-four pills, and order one to be taken three times a day.

Said to be beneficial in cases of cancer.

57. *Chloride of Bromium.*

℞. Bromidi Chloridi, guttæ iij—iv; Pulveris Glycyrrhizæ, gr. 60. Mix intimately, and divide into twenty pills, one to be taken twice or thrice daily.

Recommended by Landolfi in cancer.

58. *Bael and Spirit of Chloroform.*

℞. Extracti Belæ Liquidi, fl. oz. ij; Spiritûs Chloroformi, fl. oz. j. Mix. Direct,—"One teaspoonful in a cup of barley-water three or four times a day."

Has been found useful in diarrhœa and dysentery.

59. *Nitrate of Silver.*

℞. Argenti Nitratis, gr. 1; Extracti Hyoscyami, gr. 3. Make a pill, to be taken every twelve hours, on an empty stomach, for about ten days.

In cases of idiopathic jaundice dependent upon gastro-duodenal disturbance rather than on disease of the liver.

60. *Hydrochlorate of Ammonia.*

℞. Ammoniæ Hydrochloratis, gr. 90; Syrupi Hemidesmi, fl. oz. j; Infusi Dulcamaræ, ad fl. oz. viij. Mix. Two tablespoonfuls every six hours.

In some forms of chronic rheumatism.

℞. Liquoris Ammoniæ Acetatis, min. xxx; Ammoniæ Hydrochloratis, gr. 15. Aquæ Camphoræ, fl. oz. ij. Make a draught, to be taken every four hours.

In some varieties of rheumatism, phlegmasia dolens, thrombosis, &c., where the fibrin of the blood is in excess. The efficacy of this remedy is increased by giving 120 or 200 grains of the Acid Tartrate of Potash (Syn. Bitartrate of Potash) in half a pint of water, early in the morning.

℞. Ammoniæ Hydrochloratis, gr. 20; Extracti Taraxaci, gr. 15; Tincturæ Gentianæ Compositæ, fl. drs. iss; Infusi Sennæ, ad fl. oz. ij. Make a draught, to be taken twice or thrice daily.

In some cases of ascites dependent on cirrhosis, in jaundice, in diminished secretion of bile, &c.

61. *Chlorate of Potash.*

℞. Potassæ Chloratis, gr. 120; Aquæ Camphoræ, vel Infusi Cinchonæ Flavæ, fl. oz. viij. Mix. One-sixth part three times a day.

In inflammatory affections of the mouth.

℞. Potassæ Chloratis, gr. 90; Spiritûs Ætheris, fl. drs. iij; Infusi Chiratæ, ad fl. oz. iv. Direct,—"One tablespoonful in a wineglassful of water, three times a day.'

III. ANTACIDS.

62. *Carbonate of Magnesia.*

℞. Magnesiæ Carbonatis, gr. 80; Extracti Opii Liquidi, min. xxx; Spiritûs Ætheris, fl. drs. iij; Aquæ Menthæ Viridis, ad fl. oz. vj. Mix. One-fourth part occasionally.

Useful where there is much oppression from flatulence.

℞. Magnesiæ Carbonatis, Sodæ Bicarbonatis, āā gr. 15; Infusi Serpentariæ, fl. oz. iss. Make a draught, to be taken twice or thrice daily.

In chronic urticaria.

63. *Ammonia and Chiretta.*

℞. Ammoniæ Carbonatis, gr. 5; Tincturæ Aurantii, fl. drm. j; Infusi Chiratæ, fl. oz. j; Aquæ, ad fl. oz. ij. Make a draught, to be taken night and morning.

A good remedy in dyspepsia, with acid eructations and debility.

64. *Preparations of Lithia.*

℞. Lithiæ Carbonatis, gr. 3—6; Aquæ, fl. oz. j. Make a draught, to be taken twice a day. It is an improvement to add it to a bottle of soda water.

Dr. Garrod speaks highly of this remedy in cases of the uric acid diathesis, and in chronic gout. Where uric acid gravel is being voided, it causes a marked improvement. The carbonate of lithia exists in many of the continental springs—as Carlsbad, Marienbad, Kreuznach, Aix-la-Chapelle, Kissingen, Ems, Vichy, Baden-Baden, &c.

℞. Lithiæ Citratis, Magnesiæ Carbonatis, āā gr. 10. Make a powder, to be taken twice daily.

In chronic gout.

65. *Bismuth, with Magnesia or Soda.*

℞. Bismuthi Albi, Magnesiæ Carbonatis, āā gr. 10. Make a powder, to be taken in half a bottle of soda water three times a day.

℞. Bismuthi Albi, gr. 15; Sodæ Bicarbonatis, gr. 12; Pulveris Tragacanthæ Compositi, gr. 60. Make a powder, to be taken twice or thrice in the twenty-four hours, in a wineglassful of brandy and water.

℞. Liquoris Bismuthi, fl. drm. j; Infusi Quassiæ, fl. oz. j. Make a draught, to be taken three times a day. One drachm of the solution of bismuth is equal to twenty grains of the powder.

These preparations are very useful in pyrosis, gastrodynia, and many diseases of the stomach, cæcum, &c. See also F. 112.

66. *Chalk Mixture and Hops.*

℞. Tincturæ Lupuli, fl. drs. vj; Tincturæ Cardamomi Compositæ, fl. drs. iv; Vini Ipecacuanhæ, fl. drs. ij; Extracti Opii Liquidi, min. xxv; Misturæ Cretæ, ad fl. oz. vj. Mix. One tablespoonful every three or four hours.

In diarrhœa due to acidity of the primæ viæ.

67. *Potash and Ammonia.*

℞. Potassæ Bicarbonatis, gr. 120; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Tincturæ Aconiti, min. xxx; Infusi Lupuli, ad fl. oz. viij. Mix. One-sixth part three times a day.

In gastrodynia.

68. *Ammonia, Potash and Bark.*

℞. Ammoniæ Carbonatis, gr. 30; Potassæ Chloratis, gr. 90; Extracti Opii Liquidi, min. xxx; Decocti Cinchonæ Flavæ, fl. oz. viij. Mix. One-sixth part three times a day.

In debility with acid secretions.

69. *Solution of Potash and Buchu.*

℞. Liquoris Potassæ, min. x—xv; Tincturæ Hyoscyami, min. xx; Infusi Bucco, fl. oz. iss. Make a draught, to be taken three times a day.

In catarrh and irritability of the bladder.

70. *Soda, Morphia and Dilute Hydrocyanic Acid.*

℞. Sodæ Bicarbonatis, gr. 15; Liquoris Morphiæ Hydrochloratis, min. xv; Acidi Hydrocyanici Diluti, min. v; Infusi Cascarillæ, fl. oz. j. Make a draught, to be taken immediately.

In gastrodynia, &c., after the stomach has been emptied by an emetic.

71. *Potash and Aloes.*

℞. Potassæ Bicarbonatis, oz. ½; Tincturæ Chiratæ, fl. drs. ij; Decocti Aloes Compositi, fl. oz. viij. Mix. Take one-sixth part early every morning.

In chronic gout.

72. *Bicarbonate of Potash.*

℞. Potassæ Bicarbonatis, gr. 30; Aquæ, fl. oz. iss. Make a draught, to be taken every two hours.

In acute rheumatism, continuing the medicine until the joints are free from pain. It generally renders the urine alkaline in twenty-four hours.

73. *Potash and Lime Water.*

℞. Liquoris Potassæ, min. xv—xlv; Liquoris Calcis, fl. oz. iss. Mix. To be taken in double the quantity of beef tea, or in milk, two or three times a day.

IV. ANTISEPTICS.

74. *Artificial Disinfectants.*

The most useful agents are—chloride of lime, quick lime, and permanganate of potash. In certain cases the perchloride of iron, sulphate of iron, ammonia, iodine, and chloride of zinc are applicable; or chlorine gas, or sulphurous acid gas (obtained by burning a couple of ounces of flowers of sulphur in a pipkin), may be employed; or powdered charcoal can be tried.

No night-stool or bed-pan should be used, especially in hospitals, without its containing the solution of permanganate of potash, or some chloride of lime, or chloride of zinc. The first is the best, as it is not corrosive.—To remove quickly any unpleasant smell from the sick-room, dried lavender or cascarilla bark may be burnt, while the window is opened.

To disinfect linen and washing apparel they should be soaked in a mixture of two ounces of the solution of permanganate of potash to the gallon of water. Woollens, bedding, or clothing may be thoroughly purified by exposing them for about two hours, in an oven, to a temperature of 220° F.

75. *Chlorine Gas.*

As a fumigating agent, antiseptic and disinfectant, chlorine stands unrivalled. The ingredients for producing it should be contained in saucers placed in the higher parts of the room, as the gas which is developed will descend by its density, and soon become mixed with the surrounding air. Dr. Faraday adopted the following method at the Millbank Penitentiary: One part of common salt was intimately mixed with one part of the black or binoxide of manganese, and placed in a shallow earthen pan; two parts of oil of vitriol, previously diluted with two parts by measure of water, were then poured over it, and the whole stirred with a stick. Chlorine continued to be liberated from this mixture for four days.

Another plan for causing the free evolution of chlorine gas is the addition of half

a pint of hydrochloric acid mixed with a quarter of a pint of water, to a quarter of a pound of finely powdered black oxide of manganese. Whichever mode is adopted for producing this disinfectant, it is necessary while employing it that the doors, windows, and chimney of the room be kept carefully closed for some hours.

The Chlorides of Lime and Soda, when exposed to the air gradually absorb carbonic acid and give off chlorine. Hence either of these salts can be used as disinfecting agents. Cloths, dipped in an aqueous solution of chloride of lime, may be hung up in an inhabited room to fumigate it; the quantity of chlorine given off being too small to be mischievous. It was probably in reference to these salts, that Abernethy said of disinfectants,—"They are sometimes very useful, very useful indeed; for they make such an abominable stink that the patient is obliged to have the windows opened."

76. *Solution of Chlorinated Soda.*

℞. Liquoris Sodæ Chloratæ, fl. drs. ij—iij; Extracti Opii Liquidi, min. xxx; Aquæ Camphoræ, ad fl. oz. viij. Mix. Two tablespoonfuls three times a day.

In gangrene of the lung, low fever, &c. It not only relieves the fetor, but acts as an alterative, &c. If necessary, the opium can be omitted.

77. *To prepare Chlorine for Internal Administration.*

Put eight grains of chlorate of potash in a strong pint bottle, and pour upon them one drachm of strong hydrochloric acid. Close the mouth of the bottle until the violent action ceases, when add one ounce of water and agitate well; add another ounce, again shake, and continue this process until the bottle is full. One or two tablespoonfuls may be taken frequently according to the age. An adult may use the whole pint in one day.

The dose of the officinal Liquor Chlori is from min. xxx to fl. drs. ij in a wineglassful of water several times daily.

Useful in scarlet fever, typhus, diphtheria, chronic affections of the liver, &c.

78. *Permanganate of Potash.*

The permanganate of potash is an excellent disinfectant, and is the basis of Condy's Antiseptic Fluid. The latter is double the strength of the officinal Liquor Potassæ Permanganatis.

From fl. drs. j—vj of the solution of permanganate of potash in one pint of water, may be applied to all kinds of suppurating sores. I have frequently ordered such a lotion with great benefit to destroy the horribly offensive odor of a malignant ulcer; or for the same purpose in suppurating scalds and burns. The solution should be made only of such a strength as to be borne without any pain or even uneasiness. It must be frequently syringed over the sores, since contact with lint and sponges decomposes it. Linen is stained by it, but the discoloration may be removed by sulphate of iron. As a wash for stinking feet, or for the removal of offensive odors from the hands, after handling morbid specimens, &c., the liquor ought to be used in the proportion of one fluid drachm to the ounce of distilled water. As an injection in cancer of the uterus, the strength ought not to be greater than half a fluid ounce to one pint of water. To deprive night-chairs of offensive odor, a wineglassful of Condy's fluid should be mixed with two pints of fresh or salt water, and put into the pan previous to its use.

79. *Chloride of Zinc.*

This substance is a most powerful caustic, which has long been used to destroy cancerous and other growths. It has been administered internally—dose gr. 1, largely diluted—but without any benefit. It forms, however a valuable disinfectant gargle—gr. 10 to water fl. oz. viij; or in still larger proportions it is a most efficacious antiseptic. Sir W. Burnett's Disinfecting Fluid consists of gr. 25 of this salt to water fl. drm. j. For use, about one ounce of this solution is added to two pints of water. To disinfect a sick-room, a piece of flannel three or four feet square is to be moistened with a solution thus made, and frequently waved through the air. Some of it should also be placed in the close-stools and bed-pans.

80. *Chlorinated Lime.*

℞. Calcis Chloratæ, gr. 60; Sacchari Albi, oz. 4; Amyli, oz. 1; Olei Menthæ Piperitæ, fl. drm. j; Pulveris Tragacanthæ Compositi, gr. 120; Aquæ Menthæ Piperitæ, sufficient to form a mass. To be divided into lozenges of twenty grains each.

One may be taken frequently to remove fetor of the breath, whether due to mercury or other causes.

81. *Iodine.*

This agent has been recommended for disinfecting and deodorizing purposes by Wynn Williams, Campbell de Morgan, Nunn, and Richardson. Two hundred grains are placed in a common chip box and suspended over the patient's bed, or they may be put into a cup or saucer on the mantel-shelf. If desired, the metal may be at once volatilized and the vapor diffused through the apartment, by placing it on a heated fire-shovel. In rooms occupied by small-pox patients the air may be kept free from smell by using iodine in this manner,—probably the strongest proof which could be adduced of the value of this simple and manageable remedy.

82. *Extract of Logwood.*

℞. Extracti Hæmatoxyli, oz. 1; Butyri Cacao, Adipis, āā oz. ½. Mix.

This is an excellent disinfectant when applied to malignant sores or suppurating wounds. The remedy is equally efficacious when used as a lotion or powder. If any hæmostatic be needed, the logwood may be combined with tannin or perchloride of iron.

83. *Chlorate of Potash.*

℞. Potassæ Chloratis, gr. 150; Balsami Tolutani, gr. 35; Spiritûs Vini Rectificati, sufficient to make a solution. Then add Sacchari Albi, oz. 10; Mucilaginis Acaciæ, sufficient. The paste thus made is to be divided into 50 lozenges, each of which will contain three grains of chlorate of potash, and nearly one of balsam of tolu.

Twelve or fifteen may be taken in the course of the day, to remove foulness of the breath. These lozenges are useful also in healing ulcerations of the gums.

84. *Bark and Camphor.*

℞. Spiritûs Camphoræ, min. xx; Spiritûs Rectificati, fl. drm. j; Infusi Cinchonæ Flavæ, ad fl. oz. iss. Make a draught.

To be taken every six or eight hours by a nervous attendant in a sick-room. Its efficacy may be increased by the occasional addition of a glass of port wine.

V. ANTISPASMODICS.

85. *Ether Mixtures.*

℞. Spiritûs Ætheris, min. xl—fl. drm. j; Extracti Opii Liquidi, min. x—xv; Tincturæ Castorei, fl. drm. j; Aquæ Menthæ Piperitæ, ad fl. oz. iss. Make a draught.

To be taken occasionally when oppressed with flatulence or spasms.

℞. Spiritûs Ætheris, Spiritûs Chloroformi, āā fl. drs. iij; Tincturæ Cardamomi Compositæ, fl. drs. vj; Spiritûs Myristicæ, fl. drs. ij; Olei Carui, min. xij; Mucilaginis Tragacanthæ, fl. oz. iij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. Two or three tablespoonfuls occasionally, when oppressed with flatulence.

℞. Spiritûs Ætheris, fl. drs. iss; Spiritûs Ammoniæ Aromatici, fl. drs. ij; Tincturæ Camphoræ cum Opio, fl. drs. iss; Aquæ Camphoræ, ad fl. oz. iv. Mix. Label, —"Two tablespoonfuls every half-hour, until the pain is relieved."

In spasmodic diseases, angina pectoris, &c.

86. *Ammonia Mixtures.*

℞. Spiritûs Ammoniæ Aromatici, fl. drm. j; Acidi Hydrocyanici Diluti, min. iij —v; Syrupi Zingiberis, fl. drm. j; Aquæ Carui, ad fl. oz. iss. Make a draught, to be taken twice or thrice a day if oppressed with flatulence or languor.

In dyspepsia, or debility with irritable stomach. See F. 67, 68.

℞. Tincturæ Assafœtidæ, fl. drs. ij; Ammoniæ Carbonatis, gr. 20; Aquæ Camphoræ, ad fl. oz. iv. Mix. One or two tablespoonfuls occasionally when feeling languid or hysterical.

℞. Spiritûs Ammoniæ Aromatici, min. xxx; Magnesiæ Carbonatis, gr. 20; Spĭritûs Chloroformi, fl. drm. j; Aquæ Menthæ Piperitæ, ad fl. oz. iss. Make a draught, to be taken occasionally.

In severe colic.

87. *Valerian Draught.*

℞. Tincturæ Valerianæ Ammoniatæ, min. xl; Infusi Valerianæ, fl. oz. j. Make a draught, to be taken occasionally.

In hysteria.

88. *Lobelia, Ether, &c.*

℞. Tincturæ Lobeliæ Æthereæ, fl. drs. iij; Vini Ipecacuanhæ, fl. drs. ij; Misturæ Ammoniaci, ad fl. oz. vj. Mix. Two tablespoonfuls every six hours.

In the dyspnœa of asthma, when there is vesicular emphysema.

89. *Assafœtida and Chiretta.*

℞. Tincturæ Assafœtidæ, fl. drs. ij; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Tincturæ Chiratæ, fl. drs. vij. Mix. Direct,—"Sixty drops in a wineglassful of water every two or three hours, until the paroxysms cease."

In hysteria.

90. *Aconite and Creasote.*

℞. Tincturæ Aconiti, min. xlv; Misturæ Creasoti, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some cases of obstinate sickness, such as occur during pregnancy and in hysteria. See F. 41.

91. *Nitric Acid Mixture.*

℞. Acidi Nitrici Diluti, fl. drs. xij; Tincturæ Cardamomi Compositæ, fl. drs. iij; Syrupi, fl. oz. iiiss; Aquæ, fl. oz. j. Mix. One or two small teaspoonfuls every two hours.

Dr. Gibb states that nitric acid is a specific in the treatment of hooping-cough, curing the disease in from two to fifteen days. He recommends this formula.

92. *Sulphate of Zinc and Belladonna.*

℞. Zinci Sulphatis, gr. 8; Extracti Belladonnæ, gr. 2; Aquæ, fl. oz. iv. Mix. Half an ounce four times a day.

Dr. Fuller.—For a child above three years of age with hooping-cough. Every other day the strength of the mixture may be augmented in the proportion of one dose. The belladonna may be thus gradually increased to doses of five grains without any mischief.

93. *Valerianate of Quinia.*

℞. Quiniæ Valerianatis, gr. 12; Extracti Gentianæ, gr. 40. Divide into twelve pills, silver them, and order one to be taken three times a day.

In hysteria, and analogous nervous disorders.

94. *Stramonium, Colchicum, and Digitalis.*

℞. Potassæ Citratis, gr. 120; Tincturæ Stramonii, fl. drm. j; Tincturæ Colchici Seminis, fl. drs. ij; Infusi Digitalis, fl. oz. iij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In irregular gout, with dyspnœa or violent palpitation, and a full pulse.

95. *Sumbul and Ether.*

℞. Sumbulii Radicis, gr. 240; Spiritûs Ætheris, fl. oz. iv. Macerate in a stoppered bottle for seven days, and then filter. Dose, min. xx—xxx.
In neuralgia, hysterical fits, &c.

VI. ASTRINGENTS.

96. *Rhatany Mixtures.*

℞. Tincturæ Rhei, fl. drs. iij; Infusi Krameriæ, fl. oz. viij. Make a mixture, and order one-sixth part to be taken every six or eight hours.
A valuable astringent in common diarrhœa.

℞. Extracti Krameriæ, gr. 20; Aquæ, fl. oz. iss. Make a draught, to be taken three times a day.
In hæmaturia, passive intestinal hemorrhage, &c.

℞. Potassæ Chloratis, gr. 60; Tincturæ Krameriæ, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.
In relaxation of the buccal mucous membrane, sponginess of the gums, &c.

97. *Catechu Mixtures.*

℞. Tincturæ Catechu, fl. drs. iij—vj; Pulveris Cretæ Aromatici, gr. 90; Olei Menthæ Piperitæ, min. vj; Extracti Opii Liquidi, min. xxx; Misturæ Cretæ, ad fl. oz. viij. Mix. One-sixth part after every relaxed motion.
Efficacious in checking simple diarrhœa. In some instances half an ounce of castor oil should be given four hours before commencing this mixture.

℞. Tincturæ Catechu, fl. drm. j; Acidi Sulphurici Aromatici, min. xv; Olei Menthæ Piperitæ, min. j; Infusi Catechu, fl. oz. j. Mix. To be taken three times a day.

℞. Tincturæ Catechu, drs. iij; Spiritûs Chloroformi, fl. drs. vj; Infusi Maticæ, ad fl. oz. vj. Mix. Two tablespoonfuls to be taken three or four times a day.
In chronic diarrhœa and dysentery.

℞. Pulveris Catechu Compositi, gr. 30; Pulveris Cretæ Aromatici cum Opio, gr. 20. Make a powder to be taken night and morning.

98. *Vegetable Charcoal.*

℞. Carbonis Ligni, Theriacæ, āā oz. 1. Mix. Direct one teaspoonful to be taken three or four times a day.
In some cases of chronic diarrhœa, when the irritation is kept up by fecal fermentation. In fœtid eructations. The charcoal should be recently prepared. Charcoal biscuits are also useful.

99. *Tannin and Nitric Acid.*

℞. Acidi Tannici, gr. 30; Acidi Nitrici Diluti, fl. drm. j; Tincturæ Lupuli, fl. drs. iv; Infusi Gentianæ, ad fl. oz. viij. Mix. Direct,—"One-sixth part three times a day."
To restrain secretion in chronic bronchial catarrh, in phthisis when the cavities are large and the walls throw out considerable quantities of purulent matter, in nervous debility, and in most cases where an astringent is required. When a ferruginous tonic is indicated, the above mixture may be given night and morning, and some preparation of steel in the middle of the day.

100. *Aromatic Sulphuric Acid and Opium.*

℞. Acidi Sulphurici Aromatici, fl. drs. ij; Tincturæ Camphoræ cum Opii, fl. oz. j; Aquæ Cinnamomi, ad fl. oz. viij. Mix. Label,—"One-sixth part three times a day, about an hour before each meal."

101. *Perchloride of Iron.*

℞. Tincturæ Ferri Perchloridi, min. xv; Acidi Hydrochlorici Diluti, min. x; Olei Menthæ Piperitæ, min. j; Infusi Quassiæ, fl. oz. iss. Make a draught, to be taken every six hours.

In some cases of epistaxis, hemorrhage from the stomach, &c.

102. *Oil of Turpentine.*

℞. Olei Terebinthinæ, min. x—xx; Misturæ Amygdalæ, fl. oz. j. Make a draught, to be taken every hour.

In severe hæmoptysis, especially where the individual is weak and cachectic.

℞. Mucilaginis Acaciæ, fl. drs. iv; Sodæ Bicarbonatis, gr. 10; Olei Terebinthinæ, min. x; Olei Onethi, min. j; Aquæ Destillatæ, ad fl. oz. iss. Make a draught, to be taken thrice daily.

In passive hæmatemesis. See F. 50.

103. *Gallic Acid.*

℞. Acidi Gallici, gr. 10—15; Aquæ Destillatæ, fl. oz. iss. Make a draught, to be taken every four hours.

℞. Acidi Gallici, gr. 4; Extracti Cannabis Indicæ, gr. ½; Confectionis Rosæ Gallicæ, gr. 1. Make a pill, to be taken every night at bedtime.

To check the night-sweats in phthisis.

℞. Acidi Gallici, gr. 8; Morphiæ Hydrochloratis, gr. ¼; Confectionis Rosæ Gallicæ, sufficient to make two pills. Label,—"To be taken every night at bedtime."

In the night-sweats of phthisis.

℞. Acidi Gallici, gr. 15—25; Acidi Sulphurici Aromatici, min. xv—xx; Tincturæ Cinnamomi, fl. drs. ij; Aquæ Destillatæ, ad fl. oz. ij. Make a draught, to be taken every four hours until the bleeding ceases.

In profuse menorrhagia, hæmoptysis, hæmatemesis, &c.

℞. Acidi Gallici, gr. 12; Pulveris Ipecacuanhæ cum Opii, gr. 5. Make a powder, to be taken every eight or twelve hours.

A valuable astringent in hemorrhage from the lungs, stomach, intestines, or kidneys.

104. *Cinnamon Mixtures.*

℞. Tincturæ Cinnamomi, fl. drs. vj; Acidi Nitrici Diluti, fl. drs. ij. Mix and label,—"Thirty drops in a wineglassful of water every two hours."

Useful in passive hemorrhages from the kidneys, bladder, uterus, &c.

℞. Tincturæ Cinnamomi, fl. drs. iv; Spiritûs Ammoniæ Aromatici, fl. drs. ij; Decocti Hæmatoxyli, ad fl. oz. vj. Mix. One-fourth part after every relaxed motion.

℞. Tincturæ Cinnamomi, fl. drs. ij; Aquæ Cinnamomi, fl. oz. j. Make a draught, to be taken thrice daily.

In menorrhagia especially, but also in other varieties of passive hemorrhage. See a paper by the author, "Lancet," 15th October, 1853.

105. *Matico and Rhatany.*

℞. Tincturæ Krameriæ, fl. drs. xij; Syrupi Papaveris, fl. drs. vj; Infusi Maticæ, ad fl. oz. viij. Mix. One tablespoonful every three or four hours.

In the diarrhœa of phthisis.

106. *Sulphate of Copper and Opium.*

℞. Cupri Sulphatis, Extracti Opii, āā gr. ¼; Extracti Gentianæ, gr. 3. Make a pill, to be taken three times a day.

In obstinate diarrhœa.

107. *Nitrate of Silver and Opium.*

℞. Argenti Nitratis, gr. ½; Extracti Opii, gr. 2. Make a pill, to be taken night and morning.

In very obstinate diarrhœa where opium agrees with the system. See F. 59.

108. *Kino and Logwood.*

℞. Tincturæ Kino, fl. drs. vj; Vini Ipecacuanhæ, fl. drs. ij; Decocti Hæmatoxyli, ad fl. oz. viij. Mix. One-sixth part three times a day.

In chronic dysentery, diarrhœa, &c.

109. *Cascarilla and Squills.*

℞. Tincturæ Scillæ, fl. drs. iss—ij; Acidi Sulphurici Aromatici, fl. drm. j; Liquoris Morphiæ Hydrochloratis, min. xxx; Infusi Cascarillæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In chronic bronchitis with profuse expectoration.

110. *Alum and Syrup of Red Poppy.*

℞. Aluminis Exsiccati, gr. 16; Syrupi Rhœados, fl. drs. iij; Aquæ, ad fl. oz. ij. Mix. One teaspoonful every two or three hours.

In the catarrh of infants, where the secretion from the bronchial tubes is excessive.

111. *Oxide of Zinc.*

℞. Zinci Oxidi, gr. 12; Extracti Conii, vel Hyoscyami, gr. 18. Make a mass, divide into six pills, and order one to be taken every night at bedtime.

For the relief of night-sweats in phthisis and other exhausting diseases, there are few remedies more serviceable than the foregoing.

℞. Zinci Oxidi, gr. 2; Morphiæ Hydrochloratis, gr. ⅛; Extracti Anthemidis, gr. 3. Make a pill, to be taken night and morning.

112. *White Bismuth.*

℞. Bismuthi Albi, gr. 60; Syrupi Papaveris, fl. drs. iv; Mucilaginis Tragacanthæ, fl. oz. iv; Aquæ, ad fl. oz. viij. Mix. One-sixth part every six or eight hours.

Useful in checking the diarrhœa of phthisis.

℞. Bismuthi Albi, gr. 80; Pulveris Kino cum Opio, gr. 30; Tincturæ Cinnamomi, fl. drs. iij; Mucilaginis Tragacanthæ, fl. oz. ij; Aquæ, ad fl. oz. vj. Mix. One-sixth part every four hours.

℞. Bismuthi Albi, gr. 10; Pulveris Ipecacuanhæ cum Opio, gr. 5. Make a powder, to be taken every night at bedtime.

As a sedative and astringent in the diarrhœa of phthisis. See F. 65.

113. *Astringent Enemata.*

℞. Olei Terebinthinæ, min. xxx; Tincturæ Kino, fl. drs. ij; Extracti Opii Liquidi, min. xxv; Mucilaginis Amyli, fl. oz. ij. Make an enema.

To check the purging in typhoid fever. It may be employed twice or thrice in the twenty-four hours, if necessary.

℞. Bismuthi Albi, gr. 20; Tincturæ Catechu, fl. drm. j; Liquoris Morphiæ Hydrochloratis, min. xxx; Mucilaginis Amyli, fl. oz. ij. Mix.

To check the purging of phthisis, fever, &c. It may be administered every twelve hours.

114. *Chloroform, Opium, and Castor Oil.*

℞. Chloroformi, min. vj—xij; Tincturæ Camphoræ cum Opio, fl. drs. ij; Olei Ricini, fl. drs. iij; Mucilaginis Tragacanthæ, fl. drs. iij. Make a draught, to be taken immediately.

In choleraic diarrhœa.

115. *Alum and Sulphuric Acid.*

℞. Aluminis Exsiccati, gr. 60; Syrupi Rhœados, fl. drs. vj; Infusi Rosæ Acidi, ad fl. oz. viij. Mix. Two tablespoonfuls every six hours.

In passive hemorrhage. Also in some cases of lead colic.

116. *Iron Alum.*

℞. Ferri Ammonio-Sulphatis, gr. 30—60; Aquæ Destillatæ, fl. oz. viij. Mix. One-sixth part every six or eight hours.

An excellent astringent in some forms of hæmatemesis, hæmoptysis, &c.

117. *Lead and Acetic Acid.*

℞. Pilulæ Plumbi cum Opio, gr. 4, To be taken every two or three hours, with the following draught: ℞. Acidi Acetici Diluti, fl. drs. ij; Aquæ Cinnamomi, fl. drs. vj. Mix.

In severe hæmoptysis. The acetate of lead is inferior to gallic acid as an astringent.

118. *Cold, as a Local Astringent.*

The best and cheapest freezing mixture is made with ice and common salt in equal parts. Any of the following, however, will prove useful:

MIXTURES.	PARTS.	THERM. SINKS.
Hydrochlorate of Ammonia,	5	From 50° to 10°
Nitre,	5	
Water,	10	
Nitrate of Ammonia,	1	From 50° to 4°
Water,	1	
Snow,	2	From 32° to —4°
Common Salt,	1	
Snow or Ice,	12	From 18° to —25°
Common Salt,	5	
Nitrate of Ammonia,	5	

VII. BATHS.

119. *Temperature of Simple Baths.*

BATH.	WATER.	VAPOR.	AIR.
The Cold,	33° to 65° F		
" Cool,	65° to 75°		
" Temperate,	75° to 85°		
" Tepid,	85° to 92°	90° to 100°	96° to 106°
" Warm,	92° to 98°	100° to 115°	106° to 120°
" Hot,	98° to 112°	115° to 140°	120° to 170°

120. *Nitro-Hydrochloric Acid Baths.*

℞, Acidi Nitrici, fl. oz. iss; Acidi Hydrochlorici, fl. oz. j—iij; Aquæ Calidæ, C. xxx. Mix. To be prepared in a wooden bath. The patient should remain in it for from ten to twenty minutes.

Useful in cases where the liver is inactive,—as in invalids from tropical climates.

℞. Acidi Nitrici, fl. drs. iv; Acidi Hydrochlorici, fl. oz. j; Aquæ Calidæ, C. iv. Mix, for a footbath.

In dyspepsia, with derangement of the liver and constipation. To be used in a wooden or earthenware vessel.

121. *Alkaline Bath.*

℞. Sodæ Carbonatis, lb. 1; Aquæ Ferventis, C. xxx. Mix.
In the lithic acid diathesis, chronic squamous diseases of the skin, chronic rheumatism, &c.

122. *Conium and Starch Bath.*

℞. Extracti Conii, gr. 120; Pulveris Amyli, lb. 1; Aquæ Ferventis, C. xxx. Mix, for a bath.
In certain skin diseases, attended with great irritability.

123. *Creasote Bath.*

℞. Creasoti, fl. drs. ij; Glycerini, fl. oz. ij; Aquæ Ferventis, C. xxx. Mix.
In squamous diseases of the skin.

124. *Iodine Bath.*

℞. Iodinii, gr. 60; Potassii Iodidi, oz. ½; Liquoris Potassæ, fl. oz. ij; Aquæ Calidæ, C. xxx. Mix.
In scrofula, chronic rheumatism, secondary syphilis, and certain skin diseases.

125. *Sulphur Bath.*

℞. Potassæ Sulphuratæ, oz. 4; Aquæ Calidæ, C. xxx. Mix.
Useful in scabies, lead colic, paralysis from lead, &c.

126. *Compound Sulphur Bath.*

℞. Potassæ Sulphuratæ, oz. 4; Sodæ Hyposulphitæ, oz. 1; Acidi Sulphurici, fl. drm. j; Aquæ Calidæ, C. xxx. Mix.

127. *Tepid Salt-water Sponging Bath.*

℞. Salis Marini (vulgo, "Bay-salt"), lb. ½; Aquæ Tepidæ, C. iv. Mix. Make a sponge-bath, to be used every morning.
In general debility, chronic rheumatism, &c. The surface of the body should be thoroughly rubbed with a flesh-brush.

128. *Sea-water Bath.*

℞. Salis Marini, lb. 2; Magnesiæ Sulphatis, oz. 3; Potassii Iodidi, gr. 120; Liquoris Calcis Chloratæ, fl. oz. iss; Aquæ, C. xxx. Mix.

129. *Borax Bath.*

℞. Boracis, oz. 4; Glycerini, fl. oz. iij; Aquæ Calidæ, C. xxx. Mix.
In some squamous and other irritable diseases of the skin.

130. *The Turkish Bath.*

The general effect of a hot air bath is to increase the force and rapidity of the circulation, and to induce free perspiration; but if too hot or too prolonged the determination of blood to the skin and lungs becomes so great, that the brain suffers. There is then consequently a lowering of the circulation, with depressed nervous power. A temperature varying from 120° to 165° will usually suffice; while if the perspiration is efficient and continuous, and the sensation agreeable, the patient may remain in the calidarium for from forty to sixty minutes.—The bath is *useful* in removing local congestions, in clearing the pores and in inducing a healthy condition of the skin and mucous membranes, in eliminating noxious matters from the blood, and in imparting a sense of elasticity and vigor to the system. It is *injurious* when there is any obstruction to the circulation, or when the heart or vessels are affected with fatty degeneration, or when there are any symptoms of disease of the nervous centres, or when there is a tendency to vertigo or syncope, and in advanced life. Women who are pregnant, or who are menstruating, ought not to have recourse to it.

131. *Mercurial Vapor Bath.*

The patient is seated on a chair, and covered with an oil-cloth lined with flannel, which is supported by a proper framework. Under the chair are placed a copper bath, containing water, and a metallic plate on which is put from sixty to one hundred and eighty grains of the bisulphuret of mercury, or the same quantity of the gray oxide, or the red oxide of this metal. In syphilitic affections of the skin, testes and bones, from five to thirty grains of the green iodide of mercury may be employed; or a mixture of twenty grains of the green iodide with ninety grains of the bisulphuret often proves efficacious. Under the bath and plate, spirit-lamps are lighted. The patient is thus exposed to the influence of three agents—heated air, steam, and the vapor of mercury. At the end of five to ten minutes perspiration commences, which becomes excessive in ten or fifteen minutes longer. The lamps are now to be extinguished; and when the patient has become moderately cool he is to be rubbed dry. He should then drink a cup of warm decoction of guaiacum or sarsaparilla, and repose for a short time.—Langston Parker. In constitutional syphilis when mercury is indicated. This method of introducing mercury into the system may also be adopted with benefit in other diseases, in place of administering the metal by the mouth.

Mr. Henry Lee's mode of proceeding is more simple, and is the one which I have frequently adopted with great success. A convenient apparatus is used, made by Savigny & Company, which consists of a kind of tin case, containing a spirit-lamp. In the centre, over the flame, is a small tin plate, upon which from fifteen to thirty grains of calomel are placed; while around this is a sort of saucer filled with boiling water. The lamp having been lighted, the apparatus is placed under a common cane bottomed chair, upon which the patient sits. He is then enveloped, chair and all, in one or more double blankets; and so he remains, well covered up, for about twenty minutes, when the water and mercury will be found to have disappeared. About five minutes afterwards he may put on his shirt and go to bed; but it is better not to use a towel, since it can only be disadvantageous to wipe off the calomel deposited on the skin.

132. *Gelatine Bath.*

Take of Gelatine, or Common Glue, lb. 1; dissolve in a little boiling water, and then add twenty gallons of hot water to form a bath.

In eczema and other irritable cutaneous affections.

133. *Mustard Foot Bath.*

℞. Pulveris Sinapis, oz. 2—4; Aquæ Calidæ, C. iv. Mix, for a foot bath.

In congestions of the head and chest, in some cases of amenorrhœa, &c.

134. *Cold Affusion.*

The patient is seated in an empty bath, and from four to six buckets of cold water (about 40° F.) are poured over his head and chest from a height of two or more feet. He is then quickly dried and replaced in bed. The colder the water and the greater the height from which it is poured, the more stimulating the effect. Affusion, as thus practised by Dr. Currie, proved very valuable in the treatment of typhus. It may be resorted to when the temperature of the body is permanently above its normal (about 98.4° F.) standard, when there is no feeling of chilliness, when the body is not wholly bathed in sweat, when there is not much irritability of the nervous system, and when there is great stupor. The effect is to lower the temperature, to lessen the frequency of the pulse and respiration, to render the tongue moist and soft, to diminish or remove the stupor, to procure sleep, and sometimes to produce a critical perspiration. It may be used every twenty-four hours, if necessary.

When it is desirable to apply a *douche-bath* to one or more of the joints, it is only necessary to affix two or three yards of large-sized India-rubber tubing to the tap of a cistern. The patient must sit in an empty bath, into which the water may fall as it plays upon the limb.

135. *The Shallow Bath.*

The patient sits in a bath some six feet long, with a depth of water (temperature 60° to 80° F.) varying from eight to twelve inches. The extremities and trunk are

well rubbed by an assistant, while water is gently poured over the head. The duration of the bath ought to vary from five minutes to three-quarters of an hour, until the temperature of the body is lowered. The colder the water and the shorter the stay in it, the more stimulating and less sedative will be the effect. This bath is less exciting than the cold affusion, and is chiefly indicated where the latter would be improper,—*i. e.*, where there is much nervous irritability. It is also better for women, who seldom bear the cold affusion.

As a substitute for the shallow bath the *dripping sheet* is sometimes used. The patient stands upright in an empty bath, while the attendant, placed at his back, suddenly envelops him in a sheet dipped into water. The surface of the body is quickly rubbed by the servant's flat hands for some three minutes, until the bather is in a glow; when a dry sheet is quickly substituted for the wet one, and the rubbing continued. The whole process should be over in five or six minutes.

136. *Wet-sheet Packing.*

The patient is closely enveloped in a sheet which has been dipped in cold or tepid water and well wrung out. He is then carefully wrapped in a blanket, covered with three or more blankets, and a down coverlet is tucked over all. He should remain thus for 30, 45, or 60 minutes, lying on his side, or in a semi-recumbent position; the duration being timed by the sedative effect produced. The sweating is not generally excessive. But the water, urea and chloride of sodium of the urine are slightly increased; this increase being considerable when the sheet is continued for four hours. At the conclusion the shallow bath may be used for two or three minutes, as a tonic.

The *wet-compress* consists merely of a roll of flannel or calico, dipped in cold water and wrung out, and then applied around the seat of pain. Over this a piece of waterproof cloth is to be worn.

137. *The Warm Bath as a Cooling Agent.*

The warm bath at a temperature of 95° F. must prove a cooling agent to the body of a fever patient at 100° or 105° F. The immersion should continue from fifteen minutes to an hour or longer. Its sedative effects render it valuable where the nervous system is irritable.

In cases of delirium tremens with high fever, *cold superfusion* may be used while the patient is held in the warm bath. From ten to thirty buckets of cold water are to be poured slowly over the head; hot water being continually added to the bath to maintain its heat at 95° F. This treatment generally produces sound sleep.

138. *Acid Sponging.*

One part of vinegar is to be added to two or three of cold water, and the body well sponged with the mixture. Simple tepid water may sometimes be advantageously used. The patient being weak and unable to move, the sponging must be done by degrees: *i. e.* the arms, chest, back, and legs are to be rapidly washed and dried.

In many cases of fever, inflammation, scarlatina, &c.

VIII. CATHARTICS AND ANTHELMINTICS.

139. *The Common Black Draught.*

℞. Magnesiæ Sulphatis, gr. 120; Mannæ, gr. 160; Tincturæ Sennæ, fl. drs. ij; Infusi Sennæ, ad fl. oz. iss. Make a draught, to be taken early in the morning.

140. *Calomel, Jalap, and Epsom Salts.*

℞. Calomelanos, gr. 5; Pulveris Jalapæ, gr. 15. Make a powder, to be taken immediately; with the following draught three hours afterwards:

℞. Magnesiæ Sulphatis, gr. 120; Mannæ, gr. 60; Tincturæ Jalapæ, fl. drs. ij; Aquæ Carui, ad fl. oz. iss. Mix.

A good active purgative in head affections, &c., as well as at the commencement of many acute diseases.

141. *The White Mixture of Hospitals.*

℞. Magnesiæ Sulphatis, oz. 1½; Magnesiæ Carbonatis, gr. 120; Aquæ Menthæ Piperitæ, fl. oz. viij. Mix. One-sixth part early every morning.

142. *Epsom Salts and Sulphuric Acid.*

℞. Magnesiæ Sulphatis, oz. 2; Acidi Sulphurici Diluti, fl. drs. iss; Tincturæ Hyoscyami, fl. drs. iij; Infusi Quassiæ, ad fl. oz. viij. Mix. One-sixth part two or three times a day.

In painter's colic.

℞. Magnesiæ Sulphatis, oz. ½; Infusi Rosæ Acidi, fl. oz. ij. Make a draught, to be taken early in the morning.

In mild febrile affections with constipation.

143. *Glauber's Salts and Sulphuric Acid.*

℞. Sodæ Sulphatis, gr. 120; Ferri Sulphatis, gr. 3; Acidi Sulphurici Diluti, min. xv; Tincturæ Hyoscyami, min. xx; Infusi Calumbæ, fl. oz. ij. Make a draught to be taken the first thing in the morning.

In obstinate constipation with debility.

℞. Sodæ Sulphatis, gr. 240; Acidi Sulphurici Diluti, fl. drm. j; Infusi Gentianæ Compositi, fl. oz. vj. Mix. Three tablespoonfuls to be taken daily after luncheon or dinner.

In habitual constipation with flatulence.

144. *Glauber's Salts and Taraxacum.*

℞. Sodæ Sulphatis, gr. 120; Succi Taraxaci, fl. drs. iss; Decocti Taraxaci, fl. oz. ij. Make a draught, to be taken every morning before breakfast.

In constipation with defective secretion of bile. See F. 148.

145. *Aloes, Senna, and Jalap.*

℞. Tincturæ Sennæ, Tincturæ Jalapæ, āā fl. drs. ij; Infusi Sennæ, fl. oz. ij; Decocti Aloes Compositi, fl. oz. vss. Mix. Two tablespoonfuls to be taken night and morning.

146. *Rhubarb, Gentian, and Senna.*

℞. Tincturæ Rhei, fl. drs. ij; Infusi Gentianæ Compositi, Infusi Sennæ, āā fl. drs. vij. Make a draught, to be taken every morning an hour before breakfast.

A mild aperient in gouty dyspepsia.

147. *Nitric Acid and Gentian.*

℞. Acidi Nitrici Diluti, fl. drs. iss; Spiritûs Ætheris Nitrosi, fl. drs. ij; Succi Taraxaci, fl. oz. iss; Tincturæ Sennæ, fl. oz. iv; Infusi Gentianæ Compositi, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

In dyspepsia with debility and constipation. Also in passive hepatic congestion, in amenorrhœa with a loaded liver, &c.

148. *Alkaline Aperients.*

℞. Decocti Aloes Compositi, Infusi Gentianæ Compositi, āā fl. oz. iv; Liquoris Potassæ, fl. drs. ij. Mix. One-sixth part early every morning.

Useful in bilious headache.

℞. Sodæ Sulphatis, oz. 1½; Sodæ Phosphatis, oz. 1; Syrupi Zingiberis, fl. drs. vj; Aquæ, ad fl. oz. vj. Mix. Two large tablesponfuls immediately; the dose to be repeated after two hours, unless the bowels should be freely acted on.

℞. Sodæ Sulphatis, Sulphuris Præcipitati, āā oz. 1½. Mix. Label,—"One teaspoonful in a tumblerful of milk and water early in the morning."

In rheumatoid arthritis, chronic rheumatism, sciatica, &c.

149. *Phosphate of Soda and Aloes.*

℞. Extracti Rhei, gr. 10; Sodæ Phosphatis, gr. 60; Decocti Aloes Compositi, fl. drs. vj; Aquæ Menthæ Viridis, ad fl. oz. ij. Make a draught, to be taken at bed-time.

In some forms of chronic gout.

150. *Aloes, Senna, and Epsom Salts.*

℞. Vini Aloes, fl. drs. ij; Infusi Sennæ, fl. drs. xiv; Magnesiæ Sulphatis, oz. ½. Mix. Half of this mixture to be taken about 7 o'clock in the morning, and the remainder two hours after breakfast, if required.

151. *Jalap and Senna.*

℞. Tincturæ Senna, fl. oz. j; Tincturæ Jalapæ, fl. drs. ij; Vini Colchici, fl. drm. j; Aquæ Pimentæ, fl. oz. ij. Mix. Label,—"Half of this draught immediately, and the remainder in six hours, if necessary."

℞. Pulveris Jalapæ Compositi, gr. 30; Syrupi Sennæ, fl. drm. j; Aquæ Camphoræ, fl. drs. xj. Make a draught, to be taken early every morning.

In dropsy.

152. *Saline Purgative.*

℞. Vini Antimoniale, fl. drm. j; Magnesiæ Sulphatis, oz. ½; Liquoris Ammoniæ Acetatis, fl. drs. iv; Syrupi Papaveris, fl. drs. vj; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-eighth part two or three times in the twenty-four hours.

In hepatic congestion, &c.

153. *Sulphur and Magnesia.*

℞. Magnesiæ Carbonatis, gr. 20; Sulphuris Præcipitati, gr. 25; Sodæ Bicarbonatis, gr. 10; Pulveris Zingiberis, gr. 3. Make a powder, to be taken early in the morning in a tumblerful of milk.

A valuable aperient for delicate females subject to rheumatism. Also in some skin diseases.

154. *Steel and Aloes.*

℞. Ferri Sulphatis Granulatæ, gr. 2; Pilulæ Aloes et Myrrhæ, gr. 3. Make a pill, to be taken thrice daily after meals.

In amenorrhœa, chlorosis, hysteria with constipation and debility, &c. See F. 421.

155. *Pepsine and Aloes.*

℞. Pepsinæ Porci, gr. 32; Extracti Aloes Barbadensis, gr. 8; Glycerini, sufficient to make a mass. Divide into eight pills, silver them, and order one to be taken every day at dinner.

In dyspepsia, some diseases of the rectum, certain forms of suppressed menstruation, &c.

156. *Aloes and Galbanum.*

℞. Pilulæ Aloes et Myrrhæ, Pilulæ Assafœtida Compositæ, āā gr. 5. Make two pills, to be taken night and morning.

In hysteria with attacks of flatulent colic, and in some forms of amenorrhœa.

157. *Elaterium, or Wild Cucumber.*

℞. Liquoris Ammoniæ Acetatis, fl. drm. j; Spiritûs Ætheris Nitrosi, fl. drs. iv; Elaterii, gr. 1; Syrupi Zingiberis, fl. drs. iij. Mix. Direct,—"One small teaspoonful in a wineglassful of water every two hours, until the bowels are freely acted on."

In the early stages of acute dropsy with albuminuria.

℞. Elaterii, gr. 1½; Pulveris Capsici, gr. 9; Calomelanos, gr. 12; Extracti Hyoscyami, gr. 18. Make a mass, divide into twelve pills, and order two to be taken for a dose.

If a very active purgative is required, the quantity of elaterium may be doubled. The Capsicum prevents the nausea which elaterium often produces.

℞. Elaterii, gr. 1; Extracti Gentianæ, gr. 12. Divide into four pills, and order one to be taken every night.

In dropsical effusions, and where we wish to produce copious watery stools.

158. *Gamboge and Galbanum.*

℞. Pilulæ Cambogiæ Compositæ, Pilulæ Assafœtidæ Compositæ, āā gr. 5. Make two pills, to be taken every night at bedtime.

A good drastic hydragogue cathartic, acting chiefly upon the small intestines.

159. *Calomel and Jalap, &c.*

℞. Calomelanos, gr. 2—3; Pulveris Scammonii Compositi, gr. 4; Pulveris Aromatici, gr. 5. Mix, for a powder to be taken at bedtime.

A valuable purgative in the cerebral affections of children; also in cases of threadworm.

℞. Calomelanos, gr. 2; Extracti Jalapæ, gr. 8. Make into two pills, and order them to be taken at bedtime.

In cerebral affections, &c.

℞. Calomelanos, gr. 5; Pulveris Jalapæ Compositi, gr. 20—40. Make a powder, to be taken every night at bedtime.

A good hydragogue cathartic. The calomel increases the effect of the jalap and acid tartrate of potash (cream of tartar).

℞. Calomelanos, gr. 2; Pulveris Rhei, gr. 20; Pulveris Zingiberis, gr. 2. Mix. To be taken as a bolus, in a little wafer paper, at bedtime.

160. *Podophyllum Peltatum, or May-apple.*

℞. Podophylli Resinæ, gr. ½; Pulveris Rhei, gr. 5; Extracti Hyoscyami, gr. 3. Make two pills, to be taken every night at bedtime.

As a purgative in jaundice from suppression, in torpid liver, and in dropsy from cardiac or renal or hepatic disease. Podophyllin produces copious bilious stools; but is rather uncertain, and is apt to gripe unless combined with henbane.

℞. Podophylli Resinæ, gr. 6; Pulveris Zingiberis, gr. 20; Extracti Hyoscyami, gr. 24. Make a mass, divide into twelve pills, and order two to be taken every other night at bedtime.

As a drastic purgative in dropsy. See F. 30.

161. *Ammonia and Rhubarb.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iij; Tincturæ Rhei, fl. drs. iv; Infusi Rhei, ad fl. oz. vj. fl. Mix. One-sixth part to be taken night and morning.

162. *Gentian, Ether, and Rhubarb.*

℞. Tincturæ Rhei, fl. oz. j; Tincturæ Gentianæ Compositæ, fl. drs. iv; Spiritûs Ammoniæ Aromatici, Spiritûs Ætheris, āā fl. drs. iij; Aquæ Pimentæ, fl. oz. iv. Mix. Two tablespoonfuls to be taken occasionally.

In cases of colic, flatulence, nausea, or languor, where a warm stomachic aperient is needed.

163. *Hellebore and Colchicum.*

℞. Tincturæ Hellebori (Phar. Lond. 1851), min. xxx; Vini Colchici, min. xxv; Tincturæ Rhei, fl. drs. ij; Aquæ Camphoræ, ad fl. oz. iss. Make a draught, to be taken occasionally early in the morning.

Useful in gout, chronic rheumatism, &c.

164. *Castor Oil and Opium.*

℞. Mucilaginis Tragacanthæ, fl. oz. ij; Aquæ Cinnamomi, fl. oz. iij; Olei Ricini, fl. drs. xij; Tincturæ Rhei, Syrupi Auranti, āā fl. drs. vj; Tincturæ Opii, min. xxx. Mix. One-eighth part every three hours.

In dysentery, where there are scybala in the rectum. Also where an aperient with a sedative is indicated.

165. *Rhubarb and Magnesia, or Soda.*

℞. Magnesiæ Carbonatis, gr. 120; Pulveris Rhei, gr. 60; Pulveris Aromatici, gr. 40; Aquæ Menthæ Piperitæ, fl. oz. vj. Mix. Two tablespoonfuls to be taken every morning.

℞. Pulveris Rhei, Sodæ Bicarbonatis, āā gr. 20; Infusi Rhei, fl. oz. 1. Make a draught, to be taken early in the morning two or three times a week.
For gouty and rheumatic subjects.

The officinal Pulvis Rhei Compositus, in doses of 20 to 120 grains, is a valuable mild aperient where the intestinal secretions are deranged or diminished in quantity.
It is commonly known as Gregory's powder.

166. *Epsom Salts and Sulphate of Iron.*

℞. Magnesiæ Sulphatis, gr. 120; Ferri Sulphatis, gr. 4; Acidi Sulphurici Diluti, min. xv; Extracti Quassiæ, gr. 20; Aquæ Pimentæ, fl. oz. iss. Make a draught, to be taken early in the morning.
In constipation with general debility.

167. *Colocynth and Tartarated Antimony.*

℞. Pilulæ Colocynthidis et Hyoscyami, gr. 56; Antimonii Tartarati, gr. 4. Divide into twelve pills, and order one to be taken every night at bedtime.
A valuable purgative in the cerebral congestions of strong subjects.

168. *Croton Oil.*

℞. Olei Crotonis, min. j—ij; Olei Caryophili, min. ij; Micæ Panis, sufficient to make a pill. To be taken immediately, and repeated in two hours if necessary.

℞. Olei Crotonis, min. ij; Butyri Cacao, gr. 30. Make a suppository. To be introduced into the rectum early in the morning.

℞. Olei Crotonis, min. j—ij; Pilulæ Colocynthidis Compositæ, gr. 30; Pilulæ Assafœtidæ Compositæ, gr. 60. Make a mass, divide into eighteen pills and order three to be taken every night at bedtime.
In cases of sciatica, obstinate neuralgia, &c., with constipation.

169. *Seidlitz Powder.*

℞. Sodæ Bicarbonatis, gr. 40; Sodæ et Potassæ Tartratis, gr. 120. Mix, and make an effervescing draught with thirty-seven grains of Tartaric or Citric Acid dissolved in a tumblerful of water.

The Effervescent Citrate of Magnesia, in doses of a couple of teaspoonfuls, in a small tumblerful of water, is a very agreeable and mild aperient.

170. *Purified Ox Bile.*

℞. Ammoniæ Carbonatis, gr. 34; Fellis Bovini Purificati, gr. 36. Make a mass, divide into twelve pills, silver them, and order one to be taken three hours after each of the principal meals.
In dyspepsia with nausea, constipation, and a deposit of urates in the urine.

℞. Pulveris Rhei, gr. 24; Fellis Bovini Purificati, gr. 20; Olei Carui, min. x; Pilulæ Assafœtidæ Compositæ, gr. 18. Make a mass, divide into twelve pills, and order two to be taken every night two hours after supper.
To prevent an accumulation of fæces, when the large intestines are torpid. Also where there is a deficiency of bile.

℞. Pilulæ Colocynthidis et Hyoscyami, Fellis Bovini Purificati, Extracti Lupuli, āā gr. 20. Make a mass, divide into twelve pills, silver them, and order one to be taken every day three hours after dinner.
In constipation with flatulence and imperfect digestion of the food.

℞. Magnesiæ Carbonatis, gr. 30; Tincturæ Jalapæ, fl. drs. ij; Tincturæ Sennæ, fl. oz. j; Fellis Bovini Purificati, gr. 30; Aquæ Camphoræ, ad fl. oz. iv. Mix, and label,—"Half of this mixture immediately, and the remainder in three hours if necessary."

A valuable purgative when the rectum is blocked up by hardened fæces.

Capsules containing pig's bile, evaporated to dryness, have been prepared according to the directions of Dr. Harley. Each capsule contains five grains of prepared bile,—equal to one hundred grains of liquid bile fresh from the gall-bladder. Two or three are to be taken for a dose, about two hours after a meal; when stomachal digestion being nearly completed, the chyme is ready to pass into the duodenum. The capsules imbibe moisture in the stomach; and then in their soft swollen condition, generally get ruptured as they pass through the pylorus. In this way the bile is mingled with the chyme at the same time that this happens in the healthy organism.

In jaundice from long-continued obstruction. Also in some forms of duodenal dyspepsia arising from sedentary habits.

171. *Rhubarb and Blue Pill.*

℞. Pilulæ Hydrargyri, Pilulæ Rhei Compositæ, Extracti Hyoscyami, āā gr. 20. Mix, divide into twelve pills, and order two to be taken occasionally at bedtime.

Where a stronger purgative is required the compound colocynth may be substituted for the compound rhubarb pill.

172. *Sulphate of Manganese.*

℞. Manganesiæ Sulphatis, gr. 180; Vini Colchici, min. xv; Infusi Sennæ, Infusi Gentianæ Compositi, āā fl. oz. j. Make a draught, to be taken early in the morning.

In gouty or rheumatic habits, with a deficient secretion of bile.

173. *Colocynth and Assafœtida.*

℞. Pilulæ Colocynthidis et Hyoscyami, Pilulæ Assafœtidæ Compositæ, āā gr. 5. Mix into two pills. To be taken occasionally at bedtime.

In constipation with flatulence. A valuable purgative for hypochondriasis.

174. *Gamboge, Aloes, and Blue Pill.*

℞. Pilulæ Cambogiæ Compositæ, gr. 5; Pilulæ Hydrargyri, gr. 3. Make two pills, to be taken night and morning.

In dropsy from cardiac or hepatic disease, where a drastic purgative is required.

175. *Extract of Nux Vomica.*

℞. Extracti Nucis Vomicæ, gr. 3; Pulveris Ipecacuanhæ, gr. 6; Pilulæ Rhei Compositæ, vel Pilulæ Aloes et Assafœtidæ, gr. 40. Make a mass, divide into twelve pills, and order two to be taken every alternate night at bedtime.

In habitual constipation from atony of the coats of the bowel, with deficient secretion of intestinal mucus.

℞. Extracti Nucis Vomicæ, gr. 2; Extracti Aloes Barbadensis, gr. 6; Extracti Rhei, gr. 20. Mix, and divide into six pills. One to be taken every day at dinner.

In some diseases of the rectum, &c.

℞. Extracti Hyoscyami, gr. 40; Pilulæ Colocynthidis Compositæ, gr. 20; Extracti Nucis Vomicæ, gr. 3. Mix, and divide into twelve pills. Two to be taken every night.

In habitual constipation. They may be continued for about ten days. See F. 378, 387, and 409.

176. *Rhubarb and Magnesia for Infants.*

℞. Pulveris Rhei, gr. 15; Magnesiæ Carbonatis, gr. 60; Aquæ Anethi, fl. oz. iss. Mix, and order one teaspoonful to be taken every two hours until the bowels are freely acted on.

177. *Sulphate of Zinc.*

℞. Zinci Sulphatis, Extracti Gentianæ, āā gr. 5. Make into two pills, and order them to be taken three times a day.

Recommended by Mr. BALY, in habitual constipation, after the bowels have been cleared out with a purgative of calomel and colocynth. The pills should be taken immediately after meals, for two or three weeks.

178. *Quinine and Rhubarb.*

℞. Quiniæ Sulphatis, gr. 2; Extracti Lupuli, gr. 5; Pilulæ Rhei Compositæ, gr. 3. Mix into two pills, and order them to be taken every day at dinner.

Useful in some forms of dyspepsia.

179. *Ipecacuanha and Rhubarb.*

℞. Pulveris Ipecacuanhæ, gr. 1; Pulveris Rhei, gr. 3; Argenti Oxidi, gr. 1; Confectionis Rosæ Caninæ, sufficient to form a pill.

A good dinner pill where there is uneasiness and oppression after meals, the result of slow digestion.

180. *Steel, Glauber's Salts, &c.*

℞. Ferri Sulphatis Granulatæ, gr. 10; Sodæ Sulphatis, Magnesiæ Sulphatis, āā oz. 1; Sodii Chloridi, gr. 120; Aquæ, Oj. Mix. Four tablespoonfuls in a tumblerful of warm water early in the morning.

A rough imitation of the Cheltenham Waters. Useful in debility with constipation.

181. *Steel, Glauber's Salts, and Soda.*

℞. Sodæ Bicarbonatis, gr. 60; Sodii Chloridi, gr. 4; Sodæ Sulphatis, gr. 10; Magnesiæ Sulphatis, gr. 3; Ferri Sulphatis, gr. ¼—1; Aquæ, Oj. Mix. By adding forty grains of Citric Acid an effervescing water is produced.

A rough imitation of the Vichy Waters. In some forms of chronic gout, &c.

℞. Sodæ Sulphatis, gr. 120—240; Sodæ Carbonatis, gr. 20; Sodii Chloridi, gr. 15; Cretæ Preparatæ, gr. 10; Ferri Carbonatis Saccharatæ, gr. 15. Make a powder, and direct it to be taken early in the morning in half a pint of water.

An imitation of the Carlsbad Waters.

182. *Kamela, as an Anthelmintic.*

℞. Pulveris Kamelæ, gr. 60—180, vel Tincturæ Kamelæ, fl. drs. ij; Syrupi Auranti, fl. drs. ij; Mucilaginis Tragacanthæ, fl. oz. iss; Aquæ, ad fl. oz. iij. Make a draught, to be taken early in the morning. A purgative should be administered six hours afterwards. Kamela is an orange-red resinous substance found adhering to the capsules of the Rottlera tinctoria, and is imported from India.

Strongly recommended in tapeworm.

183. *Turpentine, as an Anthelmintic.*

℞. Olei Ricini, fl. drs. iv; Olei Terebinthinæ, fl. drs. iij; Mucilaginis Tragacanthæ, fl. drs. iv; Syrupi Zingiberis, fl. drm. j; Aquæ, fl. drs. iv. Make a draught, to be taken early in the morning.

In tapeworm, &c.

184. *Kousso, as an Anthelmintic.*

℞. Cusso, in pulvere, gr. 240; Mellis Depurati, sufficient to make an electuary. Label,—"Half of this electuary to be taken early in the morning, and the remainder six hours afterwards."

In tapeworm.

The officinal INFUSUM CUSSO may also be taken in the same way, in doses of fl. oz. iv.

185. *Santonin, as an Anthelmintic.*

℞. Santonini, gr. 2—6; Sacchari Lactis, gr. 15. Make a powder. To be taken early in the morning, suspended in a tablespoonful of cream. The patient ought to have fasted for twelve hours previously. The dose may be repeated for eight or ten days, if necessary; and its exhibition should be followed at the end of six hours by the administration of an ounce of the Compound Decoction of Aloes.

A specific for the ascaris lumbricoides. Less useful for the tænia solium and oxyuris vermicularis. The patient should be warned that after a few doses the sight sometimes becomes perverted, so that objects seem to acquire a blue or yellow or some other color.

186. *Pomegranate, as an Anthelmintic.*

℞. Spiritûs Ætheris, fl. drm. ss—j; Decocti Granati Radicis, fl. oz. j—ij. Make a draught, to be taken every three hours until four doses have been used.

℞. Granati Radicis Corticis, gr. 180; Pulveris Sabadillæ, gr. 6; Pulveris Aromatici, gr. 60. Mix, and divide into six powders. One to be taken every two hours, until the whole is consumed.

More active than the preceding. A saline purge should be given after the last dose.

187. *Male Fern, as an Anthelmintic.*

℞. Extracti Filicis Liquidi, fl. drs. j—ij; Syrupi Zingiberis, fl. drs. ij; Mucilaginis Tragacanthæ, fl. oz. j; Aquæ, ad fl. oz. iv. Make a draught, to be taken early in the morning. Four hours afterwards a purgative dose of castor oil or aloes should be administered.

Especially useful for destroying tapeworms.

188. *Simple Enemata.*

℞. Sodii Chloridi, oz. 1; Decocti Hordei, fl. oz. xij. Mix, to form an Enema.

In simple constipation, to destroy oxyurides, &c.

℞. Olei Olivæ, fl. drs. xij; Magnesiæ Sulphatis, gr. 220; Decocti Hordei, ad fl. oz. xij. Mix, for an Enema.

℞. Saponis Mollis, oz. 1; Aquæ Calidæ, fl. oz. xij. Mix, for an Enema.

189. *Castor Oil and Rue Enema.*

℞. Olei Rutæ, min. vj; Olei Ricini, fl. oz. j; Tincturæ Assafœtidæ, fl. drs. ij; Decocti Avenæ, fl. oz. vij. Mix.

Exceedingly useful in flatulent colic.

190. *Castor Oil and Turpentine Enema.*

℞. Olei Ricini, fl. drs. xij; Olei Terebinthinæ, fl. drs. iv; Tincturæ Assafœtidæ, fl. drs. ij; Decocti Avenæ, ad fl. oz. xij. Mix.

In obstinate constipation. It should be thrown up into the bowel by means of a long tube like that of the stomach-pump.

191. *Croton Oil Enema.*

℞. Olei Crotonis, min. vj; Olei Ricini, fl. oz. j; Olei Terebinthinæ, fl. drs. ij; Decocti Hordei, ad fl. oz. vj. Mix.

In obstinate constipation. It should be retained for three or four hours, if possible.

192. *Steel Enema.*

℞. Tincturæ Ferri Perchloridi, fl. drs. j—iij; Infusi Quassiæ, fl. oz. viij. Mix.

To destroy oxyurides. It has often seemed advantageous to the author to administer a dose of calomel and scammony at the same time.

193. *Tobacco Enema.*

℞. Tabaci Communis, gr. 15; Aquæ Bullientis, fl. oz. viij. Mix.
To be employed cautiously in some exceptional cases of strangulated hernia, obstinate constipation, &c.

194. *Purgative Electuaries.*

℞. Confectionis Sennæ, Potassæ Tartratis Acidæ, Succi Taraxaci, āā oz. 1. Mix. One teaspoonful to be taken occasionally, an hour before breakfast.
In constipation with inactive liver or hemorrhoids.

℞. Confectionis Piperis, Syrupi Sennæ, Confectionis Sulphuris, āā oz. 1; Pulveris Jalapæ, gr. 10. Mix. One teaspoonful every morning.
In constipation with chronic rheumatism.

℞. Confectionis Sennæ, Confectionis Scammonii, Syrupi Zingiberis, āā oz. 1; Ferri Carbonatis Saccharatæ, gr. 220. Mix. One teaspoonful early every morning.
In some forms of constipation with want of tone.

IX. CAUSTICS AND COUNTER-IRRITANTS.

195. *Acid Solution of Nitrate of Mercury.*

℞. Liquoris Hydrargyri Nitratis Acidi, fl. drs. ij; Pulveris Tragacanthæ Compositi, sufficient to make a mass.
Instead of this paste it is sometimes better to apply the caustic fluid itself, in certain cases of cancer or lupus. The solution may also be carefully used to sloughing ulcers, boils, small nævi, &c. It is to be very lightly painted on by means of a glass brush, or a glass rod.

196. *Chromic Acid.*

℞. Acidi Chromici, gr. 60; Aquæ, fl. drs. iv. Mix.
To destroy warts, small growths of epithelial cancer, &c.

197. *Chloride of Zinc, &c.*

℞. Bromii Chloridi, Zinci Chloridi, Auri Chloridi, Antimonii Chloridi, of each equal parts. Mix into a paste of sufficient thickness with flour or powdered liquorice.
To destroy cancerous growths. Commonly known as LANDOLFI'S paste.

℞. Sanguinariæ Canadensis, oz. ½—1; Zinci Chloridi, oz. ½—2; Aquæ, fl. oz. ij; Farinæ, sufficient to make a paste. Mix.
The paste thus formed should have the consistence of treacle. This is the caustic which was employed by DR. FELL.

℞. Zinci Chloridi, gr. 30—60; Farinæ, gr. 120; Aquæ Destillatæ, sufficient to form a mass. To be applied over the diseased surface.

198. *Super-sulphate of Zinc.*

Take half a fluid ounce of sulphuric acid, and saturate it with sulphate of zinc, previously dried and powdered. DR. SIMPSON recommends that this caustic should be used by dipping a pen in it, and then drawing lines across the tumor, so as to eat through the skin in a few minutes. The fissures thus made are to be filled with the paste; renewing the scratching and caustic every day or two. In this way, five or eight days may suffice for the removal of a good-sized tumor. By this combination also we can penetrate deeply without hardening the parts, and without fear of producing hemorrhage.
This is a very valuable caustic, and has been found particularly useful by the author for the removal of cancerous tumors of the breast, &c. The pain which it produces will be best mitigated by employing the subcutaneous injection of morphia (F. 314) at each application.

199. *Arsenical Mucilage.*

℞. Acidi Arseniosi, Pulveris Acaciæ, āā oz. 1; Aquæ, fl. drs. v. Mix.

Dr. Marsden speaks highly of this caustic in epithelioma. The affected part is to be painted over with it night and morning; taking care rigorously to limit the application to the diseased parts, and not to let it extend over more than one superficial inch at a time. As the part sloughs, its separation is to be aided by bread-and-water poultices; and when all the disease has been got rid of by the repeated applications of the mucilage, a carrot poultice is to be applied during the night, and a weak black-wash (calomel gr. 60 to lime-water Oj) during the day until the part is healed.

200. *Lime and Arsenic Powder.*

℞. Calcis recentis, oz. ½; Arsenici Sulphureti Flavi, gr. 20; Pulveris Amyli, gr. 180. Mix, to form a powder.

To be used very cautiously as a depilatory powder.

201. *Red Oxide of Mercury Powder.*

℞. Hydrargyri Oxidi Rubri, Aluminis, āā gr. 60. Make a powder.

To be sprinkled over exuberant and spongy granulations.

202. *Carbonate of Copper Ointment.*

℞. Cupri Carbonatis, gr. 60; Adipis Preparati, oz. ½. Mix, to form an ointment.

Devergie. In chronic eczema and impetigo of the scalp where stimulating applications are required.

203. *Dupuytren's Arsenic and Calomel Powder.*

℞. Acidi Arseniosi, gr. 12; Calomelanos, oz. 1. Mix.

In ulcerated lupus. Must be cautiously used.

204. *Vienna Caustic.*

℞. Potassæ Hydratis, Calcis, āā oz. 1. Mix thoroughly.

This paste is diluted with alcohol, and applied with a spatula over a small surface. It is identical with the Potassa cum calce of the London Pharmacopœia.

205. *Iodine Paint.*

℞. Iodinii, gr. 40—60; Potassi Iodidi, gr. 30; Spiritûs Vini Rectificati, fl. oz. j. Mix.

To be applied with a camel's-hair pencil. Very useful in many chronic pains, &c.

℞. Iodinii, Potassi Iodidi, āā grs. 20; Collodii, fl. oz. j. Mix.

The officinal Linimentum Iodi may also be used, but it must be diluted with from three to six parts of spirit or glycerine.

206. *Tartar Emetic Embrocation.*

℞. Antimonii Tartarati, gr. 40; Aquæ Rosæ, fl. oz. ij. Mix, and then add Tincturæ Cantharidis, fl. oz. j. Make an embrocation.

To be employed if the Unguentum antimonii tartarati (Phar. Brit.) fails to produce the required eruption.

207. *Croton Oil Liniment.*

℞. Olei Crotonis, min. xxx; Olei Olivæ, fl. drs. ijss. Mix, for a liniment.

To produce rubefaction and a pustular eruption, where counter-irritation is required to relieve diseases of internal organs. The officinal liniment is only 1 part to 7, and is scarcely strong enough.

208. *Blistering and Epispastic Papers.*

These papers of M. Albespeyre have long been used in this country with great advantage, though they are less appreciated than in France.

They consist of—an epispastic paper for dressing blisters; a dulcifying paper for issues, causing neither smell nor pain; and blisters formed of an adhesive cloth without a plaster.

The Epispastic Paper, for dressing blisters, is prepared of four degrees of strength, under the designation of No. 1 feeble, No. 1, No. 2, and No. 3. No. 1 feeble possesses the least strength, and is suitable as a dressing for persons of irritable temperament, and for children. No. 1 has rather more salve spread upon it, and is adapted for patients whose blisters have risen well. No. 2 is employed for those whose blisters do not draw sufficiently, and require stimulating. Whilst No. 3 possesses a still stronger power, and is used only in cases where the blister has a tendency to dry up. They all maintain an abundant discharge, without pain or heat; prevent the formation of false membranes; produce no irritation of the urinary passages; and cause no disagreeable smell.

The blisters—applied by the adhesive black side—readily adhere to the skin, producing vesication in a few hours (twelve at the furthest); and, if necessary, the same piece put on four or five times always produces the blistering effect.

X. DIAPHORETICS AND DIURETICS.

209. *Nitre and Ipecacuan.*

℞. Potassæ Nitratis, gr. 60, vel Potassæ Citratis, gr. 120; Vini Ipecacuanhæ, fl. drs. iss; Syrupi Hemidesmi, fl. oz. j; Decocti Hordei, ad Oj. Mix. One teacupful to be taken every two or three hours.

In severe catarrh with sore-throat.

210. *Antimony and Opium.*

℞. Vini Antimoniale, fl. drs. j—ij; Liquoris Ammoniæ Acetatis, fl. drs. iv; Extracti Opii Liquidi, min. xxx; Aquæ Camphoræ, ad fl. oz. vj. Mix. One-sixth part three times a day.

Each fluidrachm of the wine contains one-quarter of a grain of antimony.

211. *Citrate of Potash and Ammonia.*

℞. Potassæ Citratis, gr. 120; Liquoris Ammoniæ Acetatis, fl. drs. iv; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Aquæ, ad fl. oz. viij. Mix. One-sixth part every four or six hours.

In pneumonia, and many other acute inflammations. Sometimes it is preferable to give only the Solution of Acetate of Ammonia diluted with water (one fluidrachm to two ounces).

212. *Ether and Ammonia.*

℞. Potassæ Nitratis, gr. 30—60; Spiritûs Ætheris Nitrosi, fl. drs. iij; Liquoris Ammoniæ Acetatis, fl. drs. iv; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-sixth part three or four times a day.

In the early stages of many febrile and inflammatory disorders.

℞. Ammoniæ Carbonatis, gr. 18—30; Spiritûs Chloroformi, fl. drs. vj; Vini Colchici, min. xxx; Liquoris Ammoniæ Acetatis, fl. drs. iij—vj; Mucilaginis Tragacanthæ, fl. oz. iv; Aquæ, ad fl. oz. viij. Mix. One-sixth part every four hours.

Valuable in some forms of pneumonia, &c.

213. *Dover's Powder and Antimony, &c.*

℞. Pulveris Ipecacuanhæ cum Opio, gr. 5; Antimonii Tartarati, gr. ¼. Mix, and make a powder to be taken every six hours.

℞. Pulveris Opii, Pulveris Ipecacuanhæ, āā gr. 1; Potassæ Nitratis, gr. 8. Make a powder, to be taken every night at bedtime.

An improvement on the ordinary Dover's powder.

214. *Senega and Guaiac.*

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. iij—vj; Mucilaginis Tragacanthæ, fl. oz. iij. Mix thoroughly together, and then add,—Infusi Senegæ, ad fl. oz. viij. Three tablespoonfuls to be taken thrice daily.

Useful in the latter stages of bronchitis, tonsillitis, &c. The action is diaphoretic, diuretic, stimulant, and expectorant.

℞. Tincturæ Guaiaci Ammoniatæ, fl. drs. ij; Vitelli Ovi, 1. Beat thoroughly together, and then add,—Misturæ Amygdalæ, fl. oz. iv. Direct, one-half to be taken twice a day.

In chronic rheumatism.

215. *Benzoate of Ammonia.*

℞. Ammoniæ Benzoatis, gr. 60—120; Syrupi Hemidesmi, fl. oz. j; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

As a diuretic in dropsy and gout. Also in catarrhal inflammation of the bladder with alkaline urine.

216. *Ipecacuan and Syrup of Poppies.*

℞. Vini Ipecacuanhæ, fl. drs. ij; Syrupi Papaveris, fl. drs. iij; Mucilaginis Tragacanthæ, fl. oz. j; Aquæ, ad fl. oz. iij. Mix. One teaspoonful every two or three hours.

An infantile cough mixture.

217. *Antimony and Ipecacuan.*

℞. Vini Antimoniale, fl. drs. iss; Vini Ipecacuanhæ, fl. drs. ij; Syrupi Rhœados, fl. drs. iij; Liquoris Ammoniæ Acetatis, fl. drs. ij; Aquæ, ad fl. oz. vj. Mix. A small tablespoonful every two hours.

A depressing mixture for children two or three years of age.

218. *Ipecacuan and Syrup of Poppies.*

℞. Vini Ipecacuanhæ, fl. drs. ij; Syrupi Papaveris, fl. drs. iij; Liquoris Ammoniæ Acetatis, fl. drs. ij; Spiritûs Ætheris Nitrosi, fl. drm. j; Aquæ, ad fl. oz. ij. Mix. One teaspoonful every two or three hours.

In the early stage of infantile fever, severe catarrh, bronchitis, and pneumonia.

219. *Squills, Digitalis, Broom Tops, &c.*

℞. Potassæ Acetatis, gr. 120; Syrupi Scillæ, fl. drs. vj; Spiritûs Ætheris Nitrosi, fl. drs. iij; Tincturæ Digitalis, min. xxx—fl. drm. j; Succi Scoparii, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part every six or eight hours.

As a diuretic in dropsy dependent upon disease of the heart, liver, or peritoneum.

℞. Tincturæ Scillæ, fl. drs. ij; Tincturæ Camphoræ cum Opio, fl. drs. iv; Liquoris Ammoniæ Acetatis, fl. drs. iv; Decocti Scoparii, ad fl. oz. viij. One-sixth part three times a day.

Diuretic and diaphoretic. In dropsies unaccompanied by inflammation, and not due to renal disease.

℞. Spiritûs Juniperi, fl. drs. ij; Potassæ Tartratis Acidæ, oz. 1; Decocti Scoparii, ad fl. oz. xij. Mix. One-sixth part three times a day.

Diuretic and laxative.

℞. Pulveris Scillæ, gr. 6; Pulveris Digitalis, gr. 8—12; Pilulæ Hydrargyri, gr. 30. Make a mass, divide into twelve pills, and order one to be taken night and morning with a wineglassful of the Decoctum Scoparil. See F. 224.

220. *Solution of Potash and Digitalis.*

℞. Liquoris Potassæ, fl. drs. j—ij; Spiritûs Ætheris Nitrosi, fl. drs. vj; Tincturæ Croci, fl. drs. iij; Infusi Digitalis, fl. drs. xij; Syrupi, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

A valuable diuretic in some forms of cardiac and hepatic dropsy.

221. *Nitre, Juniper, and Ether.*

℞. Potassæ Nitratis, gr. 60; Spiritûs Juniperi, fl. drs. j—ij; Spiritûs Ætheris Nitrosi, fl. drs. iij; Decocti Chimaphilæ (Phar. Lond. 1851), ad fl. oz. viij. Mix. One-sixth part every six hours.

A tonic and stimulating diuretic. In scrofula, atonic dropsies, catarrhal inflammation of the bladder, and some skin diseases.

222. *Buchu and Cream of Tartar.*

℞. Potassæ Tartratis Acidæ, gr. 180; Infusi Bucco, fl. oz. viij. Mix. One-sixth part three times a day.

Diuretic and laxative. In irritable conditions of the bladder owing to excess of uric acid in the urine. Also in chronic rheumatism, dropsy, and some cutaneous diseases.

223. *Buchu, Borax, and Pareira.*

℞. Boracis, gr. 40; Tincturæ Bucco, fl. drs. vj; Extracti Pareiræ, oz. ½; Decocti Pareiræ, ad fl. oz. viij. Mix. One-sixth part every six or eight hours.

In chronic catarrh of the bladder, calculous affections, &c.

224. *Digitalis, Squills, &c.*

℞. Potassæ Citratis, gr. 200; Tincturæ Scillæ, fl. drs. ij; Vini Colchici, fl. drs. iss; Liquoris Ammoniæ Acetatis, fl. drs. ij; Infusi Digitalis, fl. oz. iij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

Diuretic and sedative. In some forms of dropsy with disease of the mitral valve.

℞. Pulveris Digitalis, Pulveris Scillæ, āā gr. 12; Extracti Taraxaci, gr. 36. Make a mass, divide into twelve pills, and order one to be taken twice a day.

Valuable as a diuretic in mitral, but injurious in aortic disease. See F. 219.

225. *Urea.*

℞. Ureæ, gr. 5—15; Syrupi Aurantii, fl. drm. j; Aquæ, fl. oz. j. Make a draught, to be taken every six hours.

Recommended by the author as a diuretic in dropsy due to cardiac disease. See "Medical Times and Gazette," 8th May, 1852.

226. *Cantharides and Nitrous Ether.*

℞. Tincturæ Cantharidis, fl. drs. j—ij; Spiritûs Ætheris Nitrosi, fl. drs. iij; Spiritûs Juniperi, fl. drs. iv; Syrupi Zingiberis, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

May be cautiously tried in some cases of suppression of urine. Also in some skin diseases.

227. *Taraxacum and Nitric Acid.*

℞. Acidi Nitrici Diluti, fl. drm. j; Succi Taraxaci, fl. drs. vj; Decocti Taraxaci, ad fl. oz. viij. Mix. One-sixth part three times a day.

Laxative, alterative, and diuretic. Especially useful in disease of the liver unaccompanied by inflammation.

228. *Cream of Tartar and Taraxacum.*

℞. Potassæ Tartratis Acidæ, oz. 1; Extracti Taraxaci, gr. 30; Decocti Taraxaci, fl. oz. viij. Mix. One-sixth part three times a day.

In jaundice independent of hepatitis or obstruction of the duct of the gall-bladder.

229. *Oil of Juniper.*

℞. Olei Juniperi, min. xx; Syrupi Limonis, fl. drs. vj; Mucilaginis Acaciæ, fl. oz. iv; Aquæ, ad fl. oz. viij. Mix. One-sixth part every six or eight hours.

The oil of juniper has not only a diuretic action, but it is also a diaphoretic and an emmenagogue and a cathartic. In too large doses it may cause inflammation of the bladder.

230. *Conium, Digitalis, and Calomel.*

℞. Pulveris Digitalis, Calomelanos, āā gr. 5; Extracti Conii, gr. 60. Make a mass, divide into fifteen pills, and order one to be taken three times a day.

As a sedative and diuretic in dropsy from cardiac disease.

XI. EMETICS AND EXPECTORANTS.

231. *Depressing Emetics.*

℞. Antimonii Tartarati, gr. 1—2; Vini Ipecacuanhæ, fl. drs. ij; Aquæ, ad fl. oz. iss. Make a draught, to be taken immediately.

Its action should be aided by the free administration of warm water.

℞. Antimonii Tartarati, gr. 1; Pulveris Ipecacuanhæ, gr. 20. Make a powder, to be taken immediately.

℞. Vini Ipecacuanhæ, fl. oz. j. To be taken when it is desired to induce vomiting. For children one fluidrachm, in sweetened water, will generally suffice.

232. *Stimulant Emetics.*

℞. Pulveris Sinapis, oz. ½; Aquæ, fl. oz. iij. Make a draught, to be taken immediately.

℞. Cupri Sulphatis, gr. 10; Aquæ, fl. oz. iij. Make an emetic draught.

℞. Zinci Sulphatis, gr. 20—40; Aquæ, fl. oz. iij. Mix.

233. *A Warm Emetic.*

℞. Pulveris Ipecacuanhæ, Ammoniæ Carbonatis, āā gr. 20; Tincturæ Lavandulæ Compositæ, fl. drm. j; Aquæ, fl. oz. iss. Make a draught. After taking it, a tumblerful of infusion of Chamomile Flowers (Infusum Anthemidis) should be drank.

Suggested by a formula of Dr. Druitt's. In the incipient stages of fever, erysipelas, &c.

234. *Tartar Emetic Mixture.*

℞. Antimonii Tartarati, gr. 2; Syrupi Rhœados, Aquæ, āā fl. drs. iv. Mix and label,—"One teaspoonful every two hours, in a wineglassful of water, until there is nausea."

As a depressant to the circulating and nervous systems.

235. *Ammonia and Senega.*

℞. Ammoniæ Carbonatis, gr. 30; Spiritûs Ætheris, fl. drs. iij; Tincturæ Scillæ, fl. drs. iss; Tincturæ Camphoræ cum Opio, fl. drs. ij—iv; Tincturæ Lavandulæ Compositæ, fl. drs. vj; Infusi Senegæ, ad fl. oz. viij. Mix. Two tablespoonfuls every four hours.

In the chronic bronchitis of old people.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iv; Spiritûs Chloroformi, fl. drs. iij; Tincturæ Aconiti, min. xxx; Tincturæ Senegæ, fl. drs. vj; Aqua Camphoræ, ad fl. oz. viij. Mix. One-sixth part every six hours.

A valuable stimulating expectorant in some cases of bronchitis.

℞. Ammoniæ Carbonatis, gr. 12; Vini Ipecacuanhæ, min. xl; Tincturæ Senegæ, fl. drs. ij; Syrupi Rhœados, fl. drs. iij; Aquæ, ad fl. oz. iij. Mix. One dessertspoonful every two or three hours.

An excellent stimulating expectorant for young children recovering from croup.

236. *Squills, Nitric Acid, and Bark.*

℞. Syrupi Scillæ, fl. drs. vj; Acidi Nitrici Diluti, fl. drm. j; Tincturæ Hyoscyami, fl. drs. iij; Spiritûs Chloroformi, fl. drs. vj; Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

In chronic catarrh with debility and restlessness.

237. *Ammoniacum and Opium.*

℞. Tincturæ Scillæ, fl. drs. iss; Extracti Opii Liquidi, min. xx—xxx; Syrupi Tolutani, fl. drs. vj; Misturæ Ammoniaci, ad fl. oz. vj. Mix. One-sixth part three times a day.

A sedative and expectorant mixture in the chronic bronchitis of elderly people.

238. *Sarsaparilla and Squills.*

℞. Extracti Sarsæ Liquidi, Syrupi Scillæ, āā fl. drs. xij; Mix, and label,—"One teaspoonful in a teacupful of barley-water frequently during the day."

An agreeable demulcent and expectorant in inflammation of the mucous membranes about the throat and air-passages.

239. *Squills, Ammonia, and Morphia.*

℞. Syrupi Scillæ, fl. drs. vj; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Liquoris Morphiæ Hydrochloratis, fl. drm. j (equivalent to half a grain of the salt); Infusi Serpentariæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice a day.

In chronic catarrh.

240. *Antimony and Ether.*

℞. Vini Antimoniale, fl. drs. iss; Spiritûs Ætheris, fl. drs. iij; Mucilaginis Tragacanthæ, fl. oz. iij; Aquæ, ad fl. oz. vj. Mix. One-sixth part every four hours.

The quantity of antimonial wine should be doubled when it is desirable to induce nausea.

241. *Ipecacuan and Indian Sarsaparilla.*

℞. Vini Ipecacuanhæ, fl. drs. ij; Syrupi Hemidesmi, fl. drs. iij; Mucilaginis Acaciæ, fl. oz. j; Aquæ, ad fl. oz. ij. Mix. One teaspoonful every two hours.

For children threatened with an attack of croup or bronchitis.

℞. Vini Ipecacuanhæ, fl. drs. ij; Syrupi Hemisdesmi, fl. oz. j; Infusi Lini, ad fl. oz. viij. Mix. One-sixth part every four hours.

An emollient and expectorant in catarrh.

242. *Indian Tobacco and Hemlock.*

℞. Tincturæ Lobeliæ Æthereæ, fl. drs. iij; Syrupi Papaveris, fl. drs. vj; Tincturæ Conii Fructus, fl. drs. ij—iv; Misturæ Amygdalæ, ad fl. oz. vj. Mix. One-sixth part every four hours.

In spasmodic cough, and some forms of asthma.

243. *Squills and Hemlock.*

℞. Pilulæ Scillæ Compositæ, Extracti Conii, āā gr. 30. Make a mass, divide into twelve pills, and order two to be taken every night at bedtime.

In chronic catarrh when opium is objectionable.

244. *Nitrous Ether, Ipecacuanha, and Hemlock.*

℞. Vini Ipecacuanhæ, fl. drs. iss; Spiritûs Ætheris Nitrosi, fl. drs. vj; Succi Conii, fl. drs. iij; Infusi Senegæ, ad fl. oz. viij. Mix. One-sixth part every six hours.

In chronic bronchitis, when an expectorant and sedative is required.

245. *Dulcamara and Stramonium.*

℞. Tincturæ Scillæ, fl. drs. ij; Tincturæ Stramonii, fl. drs. iss; Infusi Dulcamaræ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In chronic catarrh and rheumatism, especially where the secretions of the skin and kidneys are deficient.

246. *Benzoic Acid and Squills.*

℞. Acidi Benzoici, gr. 40; Syrupi Scillæ, Syrupi Rhœados, āā fl. oz. iss. Make a linctus, of which one small teaspoonful is to be taken every four hours.

In chronic bronchial affections with suppressed action of the liver. See F. 49.

247. *Opium and Squills.*

℞. Syrupi Scillæ, Syrupi Papaveris, Syrupi Limonis, Mucilaginis Tragacanthæ, āā fl. drs. iv. Make a linctus, of which a teaspoonful is to be taken frequently.

℞. Syrupi Scillæ, fl. drs. xij; Tincturæ Camphoræ cum Opio, fl. drs. iv. Make a linctus, of which one teaspoonful may be taken when the cough is troublesome.

XII. GARGLES AND INHALATIONS.

248. *Hydrochloric Acid Gargle, &c.*

℞. Acidi Hydrochlorici Diluti, fl. drs. iij; Mellis Depurati, oz. 1; Infusi Rosæ Acidi, ad fl. oz. viij. Mix.

In tonsillitis after the acute stage, and in relaxed sore throat.

249. *Zinc and Rhatany Gargle.*

℞. Zinci Sulphatis, gr. 20; Syrupi Mori, fl. drs. iv; Glycerini, fl. oz. j; Infusi Krameriæ, ad fl. oz. viij. Mix.

For relaxation of the uvula and fauces.

250. *Borax Gargles.*

℞. Boracis, gr. 160; Tincturæ Myrrhæ, fl. oz. j; Aquæ, ad fl. oz. viij. Mix.

Useful in aphthæ and ulcerations about the fauces.

℞. Boracis, gr. 120; Glycerini, fl. oz. j. Mix. To be painted over the gums, tongue, &c., with a camel's hair pencil.

In aphthæ. It is preferable to the officinal Borax Honey, as the sugar of the latter favors the formation of fungi.

℞. Boracis, gr. 60; Glycerini, fl. drs. xij; Aquæ Rosæ, ad fl. oz. iv. Mix.

To be painted over the tongue in some forms of ulceration, fissure, &c.

℞. Boracis, gr. 180; Syrupi Scillæ, fl. oz. j; Aquæ, ad fl. oz. viij. Mix.

As a gargle in chronic inflammation of the fauces.

251. *Tannin Gargle.*

℞. Acidi Tannici, gr. 20; Spiritûs Vini Gallici, fl. oz. j; Aquæ Camphoræ, ad fl. oz. viij. Mix.

252. *Alum and Myrrh Gargle.*

℞. Aluminis Exsiccati, gr. 120; Tincturæ Myrrhæ, fl. oz. j; Aquæ, ad fl. oz, viij. Mix.

In mercurial salivation, ulceration about the mouth and fauces, &c.

253. *Opium and Belladonna Gargle.*

℞. Tincturæ Opii, fl. drs. ij; Tincturæ Belladonnæ, fl. drm. j; Aquæ Camphoræ, ad fl. oz. viij. Mix.

To be used frequently in acute tonsillitis.

254. *Chlorinated Soda Gargle.*

℞. Liquoris Sodæ Chloratæ, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix.

In ulcerated sore throats, profuse salivation, &c. It may also be used as a lotion to foul gangrenous ulcers.

255. *Creasote Gargles.*

℞. Creasoti, min. xx; Mucilaginis Tragacanthæ, fl. oz. iij; Aquæ, ad fl. oz. viij. Mix.

℞. Creasoti, min. xx; Tincturæ Lavandulæ Compositæ, Tincturæ Myrrhæ, āā fl. drs. iv; Syrupi Limonis, fl. drs. xij; Aquæ, ad fl. oz. viij. Mix.

In chronic inflammation of the throat, dysphonia clericorum, &c.

256. *Corrosive Sublimate Gargles.*

℞. Hydrargyri Corrosivi Sublimati, gr. 2; Acidi Nitrici Diluti, min. xxx; Tincturæ Myrrhæ, fl. oz. j; Aquæ, ad fl. oz. viij. Mix.

℞. Hydrargyri Corrosivi Sublimati, gr. 3; Glycerini, fl. oz. j; Extracti Conii, gr. 60; Aquæ, ad fl. oz. viij. Mix.

Useful in syphilitic affections of the tongue and throat. The patient must use one tablespoonful at a time, and should be cautioned against swallowing it.

257. *Capsicum and Alum Gargles.*

℞. Aluminis Exsiccati, gr. 120; Tincturæ Capsici, fl. drs. ij; Syrupi Mori, fl. oz. j; Aquæ Rosæ, ad fl. oz. viij. Mix.

In hoarseness, sore throat, &c., with relaxation of the uvula or tonsils.

258. *Sulphite of Soda.*

℞. Sodæ Sulphitis, gr. 60; Aquæ Destillatæ, fl. oz. j. Mix. To be frequently applied by means of a camel's hair pencil to the mucous membrane of the mouth and fauces.

In cases of aphthæ.

259. *Iodine Inhalation.*

℞. Tincturæ Iodi, min. xxx; Aquæ Calidæ, fl. oz. iv. Mix. The vapor is to be cautiously inhaled.

In some cases of laryngeal phthisis.

260. *Turpentine Inhalation.*

℞. Olei Terebinthinæ, fl. oz. j; Aquæ Calidæ, ad fl.oz. vj. Mix.

In chronic bronchitis with excessive secretion.

261. *Creasote Inhalation.*

℞. Creasoti, min. xxx; Aquæ Bullientis, fl. oz. viij. Mix.

In ozœna and other affections of the nostrils, pharynx, &c.

262. *Hydrocyanic Acid Inhalations.*

℞. Acidi Hydrocyanici Diluti, min. xx; Tincturæ Hyoscyami, Tincturæ Lupuli, āā fl. oz. j; Aquæ Calidæ, ad fl. oz. viij. Mix.

In phthisis, ulceration of the larynx, &c.

℞. Acidi Hydrocyanici Diluti, min. xv; Spiritūs Chloroformi, fl. drs. iij; Aquæ Bullientis, fl. oz. viij. Mix.

In laryngitis, œdema of the glottis, &c.

XIII. LOTIONS, LINIMENTS, COLLYRIA, AND OINTMENTS.

263. *Hydrocyanic Acid Lotions.*

℞. Acidi Hydrocyanici Diluti, fl. drs. iij; Plumbi Acetatis, gr. 60; Spiritûs Rectificati, fl. oz. j; Aquæ Sambuci, ad fl. oz. viij. Mix.
In impetigo, prurigo, &c.

℞. Liquoris Potassæ, fl. drs. ij; Acidi Hydrocyanici Diluti, fl. drs. iss; Glycerini, fl. oz. j; Aquæ Rosæ, ad fl. oz. viij.
In some cases of pityriasis.

℞. Liquoris Ammoniæ Acetatis, fl. oz. j; Acidi Hydrocyanici Diluti, fl. drs. iss; Infusi Tabaci (made with sixty grains of Bird's-eye tobacco), ad fl. oz. viij. Mix.
To be sponged twice or thrice daily over the seat of irritation.
In pruritus about the anus, vulva, &c.

℞. Hydrargyri Corrosivi Sublimati, gr. 3; Acidi Hydrocyanici Diluti, fl. drs. iss; Misturæ Amygdalæ, ad fl. oz. viij. Mix.
To check the irritation in prurigo and other skin diseases.

264. *Astringent Lotions.*

℞. Glycerini, fl. oz. j; Liquoris Plumbi Subacetatis, fl. drs. ij; Spiritûs Rectificati, fl. drs. iv; Aquæ Rosæ, ad fl. oz. viij. Mix.
In eczema, ecthyma, pityriasis, &c.

℞. Zinci Sulphatis, gr. 16; Spiritûs Rosmarini, Tincturæ Lavandulæ Compositæ, āā fl. drs. ij; Aquæ, ad fl. oz. viij. Mix.
The common "Red Lotion" of Hospitals. Very useful for strumous and other ulcers.

℞. Potassæ Chloratis, gr. 80; Aquæ, fl. oz. viij. Mix.
For many ill-conditioned ulcers.

265. *Anodyne Lotions.*

℞. Tincturæ Aconiti, fl. oz. iss; Aquæ, ad fl. oz. iv. Mix.
In acute superficial pain, hyperæsthesia of skin, pruritus, &c.

℞. Tabaci Communis, gr. 120; Aquæ Bullientis, Oj. Infuse for an hour, and strain.
To be freely used in pruritus of the anus.

℞. Tincturæ Belladonnæ, fl. oz. j; Spiritûs Chloroformi, fl. oz. ij; Aquæ Destillatæ, ad fl. oz. viij. Mix.

℞. Extracti Belladonnæ, gr. 120; Glycerini, fl. oz. j. Mix.
To be painted over the seat of pain in neuralgic diseases.

266. *Alkaline and Anodyne Lotions.*

℞. Liquoris Morphiæ Hydrochloratis, fl. oz. iss; Liquoris Potassæ, fl. drs. ij; Glycerini, fl. oz. j; Aquæ Laurocerasi, fl. oz. j; Aquæ Sambuci, ad fl. oz. viij. Mix.
For the relief of pruriginous affections.

℞. Potassæ Sulphuratæ, gr. 60; Liquoris Potassæ, min. xxx; Tincturæ Aconiti, fl. drs. iv; Aquæ Destillatæ, ad fl. oz. viij. Mix.

267. *Acid and Anodyne Lotion.*

℞. Acidi Acetici, fl. drs. iss; Morphiæ Acetatis, gr. 10: Vini Colchici, fl. oz. iij. Mix.
To be applied over the inflamed joint in gout, on a piece of lint covered with oiled silk.

268. *Borax and Glycerine Lotions.*

℞. Boracis, gr. 60—120; Glycerini, fl. oz. j; Aquæ Sambuci, ad fl. oz. viij. Mix.
An excellent local palliative in many of the squamous diseases of the skin.

℞. Boracis, gr. 200; Morphiæ Hydrochloratis, gr. 10; Glycerini, fl. drs. iv; Aquæ Rosæ, ad fl. oz. viij. Mix.
In obstinate pruritus of the vulva. The parts to be sponged twice or thrice in the twenty-four hours with this lotion, previously washing them with glycerine or honey soap and warm water.

269. *Soda and Glycerine Lotion.*

℞. Sodæ Carbonatis, gr. 120; Aquæ Sambuci, fl. oz. vij; Glycerini, fl. oz. j. Mix.
To allay the itching attendant on many skin diseases, healing ulcers, &c.

270. *Creasote, or Carbolic Acid, and Glycerine.*

℞. Creasoti, min. xxxv; Glycerini, fl. drs. xij; Aquæ, ad fl. oz. viij. Mix.
In pityriasis, &c.

℞. Acidi Carbolici, fl. drm. j; Glycerini, fl. oz. j; Aquæ, ad fl. oz. viij. Mix.
In pruriginous affections.

271. *Corrosive Sublimate Lotion.*

℞. Hydrargyri Corrosivi Sublimati, gr. 4—6; Aquæ Destillatæ, fl. oz. ij. Mix.
Useful in tinea favosa, and other parasitic skin diseases.

272. *Sulphurous Acid Lotion.*

℞. Acidi Sulphurosi, fl. oz. j; Aquæ Destillatæ, fl. oz. vij. Mix.
In skin diseases dependent on a parasitic plant.

273. *Cold Lotions.*

℞. Liquoris Ammoniæ Acetatis, fl. oz. j; Spiritûs Rectificati, fl. oz. ij; Aquæ Rosæ, ad fl. oz. viij. Mix.
As an evaporating lotion in inflammation of the membranes of the brain, after the scalp has been shaved.

℞. Ammoniæ Hydrochloratis, oz. ½; Spiritûs Rectificati, fl. oz. j; Acidi Acetici Diluti, fl. drs. xij; Aquæ, ad fl. oz. viij. Mix.

274. *Absorbent Lotions.*

℞. Zinci Oxidi, gr. 160. Aquæ Rosæ, ad fl. oz. viij. Mix.
Useful in impetigo, eczema, &c.

℞. Zinci Oxidi, gr. 160; Mucilaginis Tragacanthæ, Aquæ Destillatæ, āā fl. oz. iv. Mix.

275. *Solutions of Arnica.*

℞. Tincturæ Arnicæ, fl. drs. j—vj; Aquæ Destillatæ, ad fl. oz. viij. Mix.
As a lotion in sprains, contusions, and burns.

℞. Tincturæ Arnicæ, fl. drs. ij; Tincturæ Belladonnæ, fl. oz. j; Linimenti Saponis, ad fl. oz. viij. Mix, for an embrocation.

276. *Mercurial Liniments.*

℞. Linimenti Hydrargyri, fl. oz. ij; Linimenti Belladonnæ, Linimenti Opii, āā fl. oz. j. Mix.
In syphilitic tubercles, nodes, &c.

℞. Hydrargyri Corrosivi Sublimati, gr. 8; Aquæ Destillatæ, fl. oz. viij. Mix.
To be used every night in cases of chloasma.

℞. Unguenti Hydrargyri, oz. 1; Glycerini, fl. oz. j; Iodi, gr. 120; Olei Olivæ, fl. oz. ij. Mix.

277. *Rubefacient Liniment.*

℞. Pulveris Capsici, gr. 30; Olei Macis, min. xxx; Linimenti Camphoræ Compositi, ad fl. oz. viij. Mix.

As a liniment to the chest in some cases of bronchitis.

278. *Stimulating Liniment.*

℞. Linimenti Saponis, Linimenti Camphoræ Compositi, āā fl. oz. j; Tincturæ Arnicæ, fl. drs. ij. Mix.

To be applied round the throat in subacute tonsillitis, common sore throat, &c.

279. *Camphor Liniment and Opium, &c.*

℞. Linimenti Camphoræ Compositi, fl. oz. ij; Tincturæ Opii, Tincturæ Belladonnæ, āā fl. drs. iv. Mix.

To be rubbed over the scrobiculus cordis to check obstinate nausea and vomiting, pain, &c.

280. *Iodide of Potassium Liniment.*

℞. Potassii Iodidi, vel Ammonii Iodidi, gr. 40; Aquæ, fl. drs. iv. Mix, and add Glycerini, fl. oz. j.

Useful in some glandular enlargements, as well as for dispersing the chalk-stones of gout.

281. *Belladonna and Aconite Liniment.*

℞. Linimenti Belladonnæ, Linimenti Aconiti, āā fl. drs. iv; Linimenti Saponis, fl. oz. ij. Mix. The seat of pain to be rubbed with this liniment for ten minutes at bedtime.

In pleurodynia, chronic rheumatism, and painful nervous affections.

For the same class of cases a good liniment may be made with one part of belladonna liniment, one of opium liniment, and two of turpentine liniment.

282. *Chloroform, Belladonna, and Aconite Liniment.*

℞. Linimenti Chloroformi, Linimenti Aconiti, Linimenti Belladonnæ, Linimenti Opii, āā fl. oz. ss; Linimenti Saponis, fl. oz. j. Mix. To be rubbed into the painful part night and morning.

In neuralgic and rheumatic pains of great severity.

283. *Cod-Liver Oil Embrocations.*

℞. Olei Morrhuæ, fl. oz. iijss; Spiritûs Ammoniæ Aromatici, fl. oz. j; Tincturæ Opii, fl. drs. iv; Olei Lavandulæ, min. xxx. Mix. One-half to be well rubbed over the chest and abdomen, night and morning.

In phthisis and other cases where the use of cod-liver oil is indicated, but where the stomach will not bear it.

℞. Olei Morrhuæ, fl. oz. j; Olei Cajuputi, fl. drm. j. Mix. To be rubbed over the chest at bedtime.

The cajuput oil well disguises the smell of the embrocation.

284. *Caoutchouc Solution.*

Take some thin pieces of Indian rubber and dissolve them in chloroform. A good protective solution.

To be painted over superficial excoriations, threatened bed-sores, &c.

285. *Collodium Paints.*

℞. Collodii, fl. oz. j; Olei Palmæ, min. xx; Anchusæ Radicis, sufficient to give color. A good artificial cuticle, which when spread on the skin will not crack, may also be formed by mixing two parts of glycerine with one hundred of collodium. A similar preparation can be made with one part of collodium to two of castor oil.

Either preparation may be used as a varnish in various cutaneous affections, excoriations, or superficial burns.

286. *Glycerine and Lime-water.*

℞. Glycerini, fl. oz. j; Pulveris Tragacanthæ Compositi, gr. 120; Mellis Depurati, gr. 120; Liquoris calcis Saccharati, fl. oz. iss; Misturæ Amygdalæ, ad fl. oz. viij. Mix.

A good bland embrocation in cases of herpes, superficial burns, chapped hands, excoriations, &c.

The officinal Linimentum Calcis, consisting of equal parts of olive oil and lime-water, is also useful in some of the above-mentioned cases.

287. *Ammonia and Cantharides.*

℞. Spiritûs Ammoniæ Aromatici, Spiritûs Rosmarini, Glycerini, āā fl. oz. j; Tincturæ Cantharidis, fl. drs. iij—vj; Aquæ Rosæ, ad fl. oz. viij. Mix.

To be gently brushed into the scalp night and morning, when the hair is falling off after fever or any severe illness.

A more elegant embrocation may be made by adding two fluidrachms of Tincture of Cantharides to two ounces of Eau de Cologne. See also F. 212.

288. *Sulphate of Atropia.*

℞. Atropiæ Sulphatis, gr. 1; Aquæ Destillatæ, fl. drs. iv. Mix.

Dilatation of the pupil is effected most speedily and is longest maintained by a solution of this kind. A full drop must be placed in the eye by means of a camel's-hair pencil: the effect will be produced in from fifteen to twenty minutes, and will sometimes continue for seven or eight days.

The officinal Liquor Atropiæ contains half a grain of the alkaloid in each drachm. But the spirit which is used to keep it in solution causes considerable pain to the eyes when it is applied.

Discs of gelatine impregnated with atropine are prepared according to the instructions of Mr. Ernest Hart and Mr. Streatfeild. These discs dissolve and act very efficiently when placed in contact with the moist conjunctiva. A piece, one-fifth of an inch square, contains as much of the Sulphate of Atropine as a drop of the solution of two grains to the ounce of water.

289. *Alum Coagulum.*

Take the whites of two eggs, and shake them with fragments of alum to form a coagulum.

Useful when painted under the eyelid to produce contraction in trichiasis, entropion, &c.

290. *Sedative Collyria.*

℞. Extracti Belladonnæ, gr. 3—20; *Vel*, Extracti Opii, gr. 2—5; *Vel*, Acidi Hydrocyanici Diluti, min. x; *Vel*, Tincturæ Aconiti, min. v—xxx; Aquæ Destillatæ, fl. oz. j. Mix.

291. *Astringent Collyria.*

℞. Zinci Sulphatis, gr. 2—4; *Vel*, Aluminis Exsiccati, gr. 1—4; *Vel*, Tincturæ Arnicæ, min. v—xxx; *Vel*, Cupri Sulphatis, gr. 1—4; *Vel*, Argenti Nitratis, gr. 1—4; *Vel*, Liquoris Plumbi Subacetatis, min. x; Aquæ Destillatæ, fl. oz. j. Mix.

℞. Zinci Oxidi, gr. 60; Aquæ Rosæ, fl. oz. viij. Mix. For an eye-water, to be used night and morning.

292. *Iodide of Potassium Collyrium.*

℞. Potassii Iodidi, gr. 6—8; Aquæ Destillatæ, fl. oz. j. Mix.

To remove stains of nitrate of silver from the conjunctiva.

293. *Iodide of Lead Ointments.*

℞. Plumbi Iodidi, gr. 60; Unguenti Atropiæ, gr. 60—120 (each ounce contains eight grains of the alkaloid); Unguenti Simplicis, ad oz. 1. Mix.
In some malignant ulcerations.

℞. Plumbi Iodidi, gr. 90; Unguenti Cetacei, oz. 1; Linimenti Belladonnæ, *Vel*, Linimenti Aconiti, fl. drm. j. Mix.
For malignant and painful strumous ulcers.

294. *Sulphate of Zinc Ointment.*

℞. Zinci Sulphatis Exsiccatæ, gr. 120; Unguenti Simplicis, oz. 1. Mix.
Very useful in some forms of lupus, rodent ulcer, &c.

295. *Tar and Citrine Ointment.*

℞. Unguentum Picis Liquidæ (Phar. Lond. 1851), oz. 1½; Unguenti Cetacei, oz. 1; Unguenti Hydrargyri Nitratis, oz. ½. Mix.
In lepra, psoriasis, chronic eczema, &c.

296. *Aconitine Ointments.*

℞. Unguenti Aconitiæ, oz. ¼ (=to grs. 2 of the alkaloid); Unguenti Calomelanos, oz. 1—2. Mix.
In some forms of neuralgia.

℞. Aconitiæ, gr. 2; Spiritûs Rectificati, guttæ vj. Mix thoroughly, and add—Adipis Præparati, gr. 60.
Recommended by Dr. Turnbull for severe neuralgia. A small portion is to be painted over the nerve, but it must not be used where there is the slightest abrasion.

297. *Belladonna and Opium.*

℞. Extracti Belladonnæ, Extracti Opii, āā gr. 90; Glycerini, fl. drs. iv; Extracti Papaveris, oz. 1½. Mix.
To be painted over the seat of inflammation in pleurisy, peritonitis, &c. A fomentation flannel or hot linseed poultice is to be applied, being separated from the extracts by a sheet of tissue paper.

298. *Mercurial and Opiate Ointments.*

℞. Unguenti Hydrargyri, gr. 10; Pulveris Opii, gr. 2. Mix.
Recommended by Dr. Watson in cases of severe nocturnal pain around the orbit. It is to be rubbed into the temple just before the pain may be expected.

℞. Hydrargyri Corrosivi Sublimati, gr. 10; Pulveris Opii, gr. 10; Unguenti Simplicis, oz. 1. Mix.
In chloasma, &c.

299. *Mercurial and Belladonna Ointment.*

℞. Liniment Belladonnæ, fl. drs. ij; Unguenti Calomelanos, oz. 1. Mix.
In syphilitic tubercular diseases.

300. *Ammoniated Mercury and Sulphur.*

℞. Unguenti Hydrargyri Ammoniati, gr. 120; Unguenti Sulphuris, gr. 360. Mix.
A good antiparasitic ointment.

301. *Creasote and Red Oxide of Mercury.*

℞. Creasoti, min. x; Unguenti Hydrargyri Oxidi Rubri, gr. 120; Unguenti Simplicis, gr. 360. Mix.
In parasitic diseases of the skin, the ulcerations of rupia, &c.

302. *Red Iodide of Mercury Ointment.*

℞. Hydrargyri Iodidi Rubri, gr. 8; Unguenti Simplicis, oz. 1. Mix.
In chronic glandular tumors, a small portion rubbed in every night proves very useful. The officinal ointment is double the strength of the foregoing, and hence it causes pain and blistering.

303. *Croton Oil and Lard.*

℞. Olei Crotonis, min. xv; Adipis Præparati, oz. ½. Mix. One-fourth part to be rubbed into the skin every eight hours, until an abundant eruption is produced.
Useful as a counter-irritant.

304. *Veratria Ointment.*

℞. Unguenti Veratriæ, Unguenti Potassi Iodidi, āā oz. 1. Mix. In chronic rheumatism, chronic gout, &c.

305. *Diluted Citrine Ointment.*

℞. Unguenti Hydrargyri Nitratis, gr. 120; Unguenti Cetacei, gr. 240. Mix.
As a stimulant and alterative in chronic skin diseases. May be applied to the edges of the eyelids in ophthalmia to prevent their adhering at night.

306. *Compound Spermacetic Ointments.*

℞. Acidi Hydrocyanici Diluti, fl. drm. j; Unguenti Atropiæ, gr. 120; Unguenti Cetacei, oz. 1. Mix.
In cutaneous diseases attended with pain or itching.

℞. Balsami Peruviani, gr. 60; Unguenti Cetacei, oz. 1. Mix.
In slight excoriations.

℞. Balsami Peruviani, gr. 60; Unguenti Cetacei, oz. 2; Alkannæ Tinctoriæ Radicis, gr. 60; Olei Rosæ (Otto of Roses), min. x. Mix.
Useful as a lip-salve, and as an application to chapped hands and sore nipples.

307. *Belladonna and Iodide of Potassium.*

℞. Linimenti Belladonnæ, fl. drs. ij; Unguenti Potassii Iodidi, oz. 1. Make an ointment. The Liniment of Aconite may be substituted for the Belladonna, if desired.
In painful chronic tumors, neuralgia, &c.

308. *Iodine and Cod-Liver Oil Ointment.*

℞. Unguenti Iodi Compositi, Olei Morrhuæ, āā fl. drs. iv. Mix.
Useful when rubbed upon the throat in bronchocele; as well as when applied to strumous glands, unsuppurating buboes, and the tumid bellies of children with mesenteric disease.

309. *Bole Armeniac and Lead.*

℞. Boli Armenæ Rubræ, Plumbi Oxidi Semivitrei, āā gr. 30; Camphoræ, gr. 5; Ceræ Flavæ, gr. 180; Adipis Præparati, gr. 360. Mix. To be spread on thick linen.
Several German physicians speak of this as an efficacious application for preventing and curing bed-sores.

310. *Iodide of Sulphur Ointments.*

℞. Sulphuris Iodidi, gr. 20; Unguenti Simplicis, oz. 1. Mix.
In acne, applied thrice daily.

℞. Sulphuris Iodidi, gr. 12; Sulphuris Præcipitati, gr. 20; Olei Amygdalæ Amaræ, min. v; Adipis Præparati, oz. 1. Mix.

311. *Creasote and Sulphur Ointment.*

℞. Unguenti Creasoti, Unguenti Sulphuris, āā oz. ½. Mix.
In pityriasis, and some other chronic cutaneous affections.

312. *Cantharides and Castor Oil.*

℞. Balsami Tolutani, gr. 120; Olei Rosmarini, min. xx; Tincturæ Cantharidis, fl. drs. j—iij; Olei Ricini, fl. drs. iv; Adipis Præparati, oz. 1½. Mix.

A valuable pomade in cases of baldness following herpes, pityriasis, or tinea decalvans. It should be brushed into the scalp night and morning. See F. 287.

XIV. NARCOTICS AND SEDATIVES.

313. *Anæsthetics.*

The chief anæsthetics which have hitherto been used in the practice of medicine are chloroform, sulphuric ether, and amylene. As the employment of one or other of these agents is often indicated in neuralgia, delirium, convulsions, the paroxysmal dyspnœa of infantile laryngismus and diphtheria and croup, as well as in spasmodic diseases generally, a few words on their mode of administration may not be out of place.

The principal advantages of inhalation are these: That by means of the immense surface offered by the air-cells of the lungs for absorption, a deeper and more rapid effect is induced than it would be safe or easy to effect by other means. At the same time the digestive functions are less interfered with than when narcotics are given in the ordinary way.

In every form of inhalation the anæsthetic should be freely diluted with common air, and no attempt made to produce rapid narcotism; while the breathing ought to be allowed to go on quietly and naturally. The patient should be tranquil, fearless, and usually in the recumbent posture. And the administrator of the narcotic agent, while watching the respiration and the countenance, had better also keep his finger on the pulse. For if the breathing becomes stertorous, or if there is evidence that the circulation is getting weak and faltering, the inhalation must be suspended.

Chloroform was introduced into practice by Dr. Simpson, of Edinburgh, in November, 1847. The vapor of this hot, sweet, heavy liquid may be inhaled by individuals of all ages, from infants under one year to persons as old as ninety; and in almost all states of the system. The exceptional cases which preclude its employment, at all events in medical practice, are instances of marked blood-poisoning, of far-advanced cardiac or pulmonary or cerebral disease, and perhaps of habitual drunkenness. It is best administered from an apparatus such as the late Dr. Snow recommended; though Dr. Simpson always uses a simple napkin folded into the shape of a funnel. A crumpled handkerchief in a tumbler forms a convenient inhaler. But in whatever way it is exhibited care must be taken that it does not come into contact with the lips and nose; since it produces painful excoriations. Chloroform should also be given slowly and cautiously; and it acts best before breakfast, or when the patient's stomach is empty. If administered immediately after food, sickness is sure to result. According to Dr. Snow, about four cubic inches of vapor, or rather more than five grains of chloroform to each hundred cubic inches of air, is the proportion most suitable for causing insensibility to surgical operations; while in medical and obstetric cases it should only be used in a more diluted form. When an overdose has been given, artificial respiration, performed in the manner to be presently described, is the remedy to resort to; the success of which will depend upon the extent to which the heart and the muscles of respiration have been paralyzed by the chloroform. Dr. Snow gave this anæsthetic in 4000 or more cases, with the loss of only one person while inhaling it; and amongst these were patients with heart diseases, phthisis, and several who had suffered from apoplexy. It has been computed that during the Crimean war chloroform was administered 40,000 times, death resulting in only one case.

Æther (first used as an anæsthetic in September, 1846, by Dr. W. T. G. Morton, of Boston, Massachusetts), is thought to be a safer agent for inducing narcotism than chloroform; but although it is so, still it must be given with the same caution. About one fluid ounce is usually inhaled by an adult in becoming insensible; though not more than half this quantity is absorbed, the remainder being thrown back from the lungs, mouth, &c. An excellent anæsthetic for obstetric practice may be made with equal parts of ether and chloroform.

Amylene is made by distilling amylic alcohol (obtained from crude fusel oil, or oil of potato spirit) with chloride of zinc. In the present state of our knowledge, it is

not advisable to resort to this agent. Dr. Snow seems to have administered it in 238 cases, and to have had two deaths from it.

In apparent death from any anæsthetic *artificial respiration*, after the plan recommended by Dr. Silvester, ought to be tried. The body is to be laid on its back with the head and shoulders slightly raised. The mouth and nostrils are to be cleansed from mucus; and the tongue should be drawn firmly forwards so as to keep the tip well protruded at the side of the mouth. Then the operator is to compress, for two or three seconds, the front and sides of the chest by the patient's own arms. Thus the medicated vapor will be partly expelled from the lungs; while upon the pressure being suddenly removed, the elastic walls of the chest will expand, and give the primary impetus to respiration. To assist expansion to the utmost the ribs should be drawn upwards by means of the pectoral muscles. This is effected by the operator grasping the arms just above the elbows, and drawing them upwards until they nearly meet above the head. Then they must be lowered, and replaced at the sides; at the same time making moderate pressure with them, for a couple of seconds, against the chest-walls. This process is to be repeated fifteen times in the minute.

In some instances, galvanism of the phrenic nerve, diaphragm, and intercostal muscles would be useful in keeping up the movements of respiration; one pole of the battery being applied over the outer edge of the sterno-mastoid muscle just above the clavicle, while the other is pressed deeply into the seventh intercostal space. The diaphragm must be made to contract and relax alternately, by interrupting the currents at equal intervals.

While attempts are thus being made to oxygenate the blood, an assistant is to rub the limbs from the extremities towards the heart. If no respiratory efforts supervene, the face and chest are to be dashed with cold water, or with hot and cold water alternately. When success follows this plan, the temperature of the body must be maintained by friction, hot blankets, the warm bath, &c.

314. *Morphia for Hypodermic Injection.*

The solution of Acetate of Morphia as used for injection under the skin is generally made by mixing ten grains of this salt with one drachm of distilled water. Sufficient acetic acid is then added to dissolve the morphia; the fluid being afterwards neutralized by the addition of Liquor Potassæ until a cloud appears. Finally one or two drops of acetic acid are used to gently acidulate the mixture.

Each six minims of this solution will contain one grain of acetate of morphia. For first injections, not more than one minim and a half should be used; as it is certain that this narcotic acts more powerfully when thus employed, than when taken into the stomach. In diseases which are continuously painful the ease given by an injection will last for about twelve hours. To relieve the suffering of advanced cancer, &c., the injection may be advantageously given, night and morning, for many months.

315. *Morphia Draughts, &c.*

℞. Liquoris Morphiæ Hydrochloratis, min. xxx (= to gr. ½ of the salt); Syrupi Limonis, fl. drm. j; Aquæ Camphoræ, fl. oz. j. Mix. To be taken at bedtime.

In insomnia with pain.

℞. Liquoris Morphiæ Hydrochloratis, min. xv—xxx; Spiritûs Chloroformi, fl. drm. j (= to min. iij of chloroform); Spiritûs Ætheris, min. xxx; Tincturæ Belladonnæ, min. xx; Tincturæ Cardamomi Compositæ, fl. drm. j; Aquæ ad fl. oz. iss. Mix. To be taken every two hours (the patient being watched) until the pain ceases.

Useful in facilitating the passage of gall-stones.

℞. Liquoris Morphiæ Hydrochloratis, min. xl; Acidi Hydrocyanici Diluti, min. xx; Syrupi Scillæ, fl. drs. vj; Mucilaginis Acaciæ, ad fl. oz. vj. Mix. One tablespoonful every three or four hours.

In many irritable coughs.

316. *Chloroform and Opium.*

℞. Chloroformi, min. x—xv; Extracti Opii Liquidi, min. xv—xxx; Syrupi Rhœados, fl. drm. j; Mucilaginis Tragacanthæ, fl. oz. j. Mix for a night draught.

In severe colic and other spasmodic disorders.

317. *Morphia, Chloroform, and Indian Hemp.*

℞. Liquoris Morphiæ Hydrochloratis, min. xx; Chloroformi, min. x; Tincturæ Cannabis Indicæ, min. xx; Pulveris Tragacanthæ Compositi, gr. 30; Spiritûs Ætheris, min. xl; Acidi Hydrocyanici Diluti, min. iv; Aquæ, ad fl. oz. iss. Mix, for a night draught.

In many chronic diseases attended with pain or restlessness.

The medicine called CHLORODYNE probably consists essentially of chloroform, Indian hemp, morphia, and hydrocyanic acid. In the "Canada Lancet" (15th October, 1864), Dr. W. E. Bowman gives the following formula for its preparation: Take of Chloroform half a fluid ounce; Sulphuric Ether, ninety minims; Oil of Peppermint, eight drops; Resin of Indian Hemp, six grains; Capsicum, two grains. Mix, shake occasionally, and allow it to stand for a few days. Take of Muriate of Morphia, sixteen grains, dissolved by the aid of heat in two fluidrachms of water; to which, when cold, add of Scheele's Hydrocyanic Acid, sixty-five minims; Perchloric acid, one fluidrachm; Treacle, two fluidounces. Add this gradually to the first mixture, and then make the whole measure four fluidounces by the addition of treacle or water.—Each dose of thirty minims contains of chloroform min. iv, ether min. iss, extract of hemp gr. $\frac{1}{10}$, hydrochlorate of morphia gr. $\frac{1}{4}$, and of Scheele's acid min. j.

318. *Brandy and Egg Mixture, with Opium.*

℞. Misturæ Spiritûs Vini Gallici (see F. 17), fl. oz. j; Extracti Opii Liquidi, min. v—x; Spiritûs Chloroformi, min. xl. Mix. To be taken every four hours.

In exhaustion from pain.

319. *Tolu and Camphorated Opium.*

℞. Tincturæ Tolutanæ, fl. drs. ij; Syrupi Tolutani, fl. oz. j; Tincturæ Camphoræ cum Opio, fl. drs. iv (= to gr. 1 of opium); Mucilaginis Tragacanthæ, ad fl. oz. viij. Mix. Two tablespoonfuls three times a day.

For old people, where the mucous secretion from the bronchi is excessive.

320. *Cimicifuga Racemosa, or Black Snakeroot.*

℞. Tincturæ Acteæ Racemosæ, min. xxx—fl. drs. ij; Aquæ, ad fl. oz. j. Mix, for a draught. To be administered every three or four hours until nausea ensues or the pulse becomes lowered.

This drug possesses narcotic and eliminative properties, and is useful in chronic rheumatism, lumbago, chorea, obscure nervous pains, and in backache from uterine disturbance.

321. *American Hellebore.*

℞. Tincturæ Veratri Viridis (a saturated solution), min. v—x; Aquæ, fl. oz. j. Mix. This draught may be given every three hours, adding one drop of tincture to each dose, until the pulse becomes sufficiently lowered or nausea is produced. The latter is readily counteracted by small doses of morphia.

It is a valuable arterial sedative; and is particularly used by American physicians in inflammations of the lungs, pleura, or peritoneum, and in acute rheumatism.

322. *Lobelia and Ether.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. ij; Tincturæ Lobeliæ Ætheræ, fl. drs. iij—vj; Tincturæ Aconiti, min. xxx; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

As a sedative in some cases of asthma.

323. *Stramonium and Henbane.*

℞. Extracti Stramonii, gr. 3; Extracti Hyoscyami, gr. 20; Extracti Lupuli, gr. 40. Mix, and divide into twelve pills. One to be taken every four hours until relief is obtained.

In chronic disorders attended with suffering, in diseases of the nervous system accompanied with pain and restlessness, and in the dyspnœa of phthisis and emphysema.

℞. Tincturæ Stramonii, fl. drs. j—ij; Tincturæ Hyoscyami, fl. drs. ij; Tincturæ Cantharides, fl. drm. j; Spiritûs Chloroformi, fl. drs. iij; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some cases of asthma.

324. *Opium, Ipecacuanha, and Nitre.*

℞. Extracti Opii, Pulveris Ipecacuanhæ, āā gr. 1; Potassæ Nitratis, gr. 8; Glycerini, sufficient to make a mass. Divide into two pills, and order them to be taken at bedtime.

A good narcotic and diaphoretic. It is preferable to the officinal POWDER OF IPECACUAN AND OPIUM, as the nitrate of potash acts better than the sulphate.

325. *Henbane, Camphor, and Hop.*

℞. Extracti Hyoscyami, Camphoræ, Lupulinæ, āā gr. 20. Mix, divide into twelve pills, and order two to be taken every night at bedtime.

An excellent sedative for hysterical or hypochondriacal patients suffering from sleeplessness.

℞. Spiritûs Camphoræ, min. xxx; Tincturæ Hyoscyami, Tincturæ Lupuli, āā fl. drm. j; Mucilaginis Acaciæ, fl. oz. j. Mix, for a draught to be taken at bedtime.

326. *Camphor and Belladonna.*

℞. Camphoræ, gr. 5; Extracti Belladonnæ, gr. ½; Extracti Conii, gr. 4; Spiritûs Rectificati, sufficient to make two pills. To be taken every night at bedtime.

In spermatorrhœa; as well as in certain spasmodic affections of the air-passages.

327. *Camphor and Blue Pill.*

℞. Camphoræ, gr. 5; Extracti Opii, gr. 1; Pilulæ Hydrargyri, gr. 4. Mix, divide into two pills, and order them to be taken at bedtime.

In restlessness with congestion of the liver and irritability of the sexual organs. Also in venereal sores with nocturnal emissions.

328. *Codæia and Assafœtida.*

℞. Codeiæ, gr. ½; Pilulæ Assafœtidæ Compositæ, gr. 5. Mix into a pill, to be taken every night at bedtime.

Especially useful in attacks of spasmodic cough, dyspnœa, &c.

329. *Morphia and Assafœtida.*

℞. Morphiæ Hydrochloratis, gr. 2; Assafœtidæ, gr. 30; Camphoræ, gr. 20. Make a mass, divide into twelve pills, and order one to be taken at bedtime.

A good stimulant and antispasmodic.

330. *Aconite and Guaiacum.*

℞. Tincturæ Aconiti, min. xxx—fl. drm. j; Spiritus Ætheris, fl. drs. iv; Misturæ Guaiaci, ad fl. oz. viij. Mix. One-sixth part every six hours.

As an anodyne, stimulant, and alterative in chronic rheumatism, neuralgia, &c.

331. *Aconite and Mercury.*

℞. Extracti Aconiti, gr. 1—3; Pilulæ Calomelanos Compositæ, gr. 3. Make into a pill, and order it to be taken every night at bedtime.

In sleeplessness from a syphilitic taint.

332. *Belladonna and Sulphate of Zinc.*

℞. Extracti Belladonnæ, gr. 5; Zinci Sulphatis, gr. 30; Extracti Gentianæ, gr. 90. Make a mass, divide into twenty pills, and order one to be taken three times a day.

In cases where a sedative and tonic action is to be produced. Especially useful in some diseases attended with irritability of the urinary organs.

333. *Opium and Sugar of Milk.*

℞. Pulveris Ipecacuanhæ cum Opio, gr. 1; Sacchari Lactis, gr. 120. Mix, and divide into four powders. One to be taken every night, beaten up in a teaspoonful of cream.

A safe opiate for infants from two to six weeks old.

℞. Tincturæ Opii, min. j; Sacchari Lactis, oz. ½; Mucilaginis Tragacanthæ, Aquæ Anethi, āā fl. drs. iv. Mix. One teaspoonful twice or thrice in the twenty-four hours.

In the painful diseases of early life.

334. *Tincture of Digitalis.*

℞. Tincturæ Digitalis, fl. drm. j; Aquæ Anethi, fl. oz. viij. Mix. One-sixth part every four hours.

Recent experiments tend to prove that digitalis is a cardiac stimulant and tonic; and that it is therefore especially useful in diseases due to weakness of the muscular walls.

℞. Tincturæ Digitalis, fl. drs. j—ij; Tincturæ Cardamomi Compositæ, fl. drs. vj; Acidi Hydrocyanici Diluti, min. xx; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some forms of cardiac disease, with irritability of the stomach.

℞. Acidi Sulphurici Aromatici, fl. drs. ij; Tincturæ Digitalis, fl. drm. j; Extracti Opii Liquidi, min. xxx; Infusi Chiratæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

335. *Hemlock and Henbane.*

℞. Extracti Conii, Extracti Hyoscyami, Pilulæ Rhei Compositæ, āā gr. 3. Mix, and divide into two pills. To be taken at bedtime.

To relieve sleeplessness with constipation. In some forms of asthma.

℞. Extracti Conii, Extracti Hyoscyami, Pilulæ Hydrargyri, āā gr. 3; Pulveris Ipecacuanhæ, gr. 1. Mix, and divide into two pills. To be taken at bedtime.

336. *Hemlock and Dover's Powders.*

℞. Extracti Conii, gr. 24; Pulveris Ipecacuanhæ cum Opio, gr. 36. Mix, and divide into twelve pills. One to be taken every three or four hours.

To relieve the pain arising from malignant disease.

337. *Henbane and Indian Hemp.*

℞. Extracti Cannabis Indicæ, gr. ¼—1; Extracti Hyoscyami, gr. 4. Make into a pill, to be taken every night at bedtime.

338. *Opium and Ipecacuanha.*

℞. Vini Ipecacuanhæ, fl. drs. iss; Extracti Opii Liquidi, min. xxx; Syrupi Tolutani, fl. drs. v; Mucilaginis Tragacanthæ, fl. oz. j. Mix. One teaspoonful every two or three hours.

In chronic cough.

339. *Opiate Enemata.*

℞. Tincturæ Opii, min. xx—xxx; Vini Ipecacuanhæ, min. xxx; Mucilaginis Amyli, fl. oz. ij. Mix. The bowel should be washed out with warm water before the administration of this enema.

In diarrhœa, tenesmus, strangury, &c.

℞. Extracti Opii Liquidi, min. xx—fl. drm. j; Tincturæ Belladonnæ, min. xv—xxx; Mucilaginis Amyli, fl. oz. ij. Mix.

In cancer of uterus, rectum, &c.

340. *Opiate Suppositories.*

℞. Pulveris Opii, gr. 1—2; Saponis Duri, gr. 10. Mix, for a suppository.
To allay pain or irritation about the pelvic viscera.

℞. Extracti Opii, gr. 1—3; Extracti Belladonnæ, gr. ½; Butyri Cacao, gr. 20. Mix into a suppository.
Especially useful in diseases of the bladder and rectum.

341. *Lettuce Opium.*

℞. Lactucarii, gr. 8—10. To be divided into two pills, to be taken at bedtime.
A doubtful narcotic. Has been chiefly used as an anodyne in phthisis, or where opium cannot be borne.

342. *Indian Hemp, Aconite, and Ether.*

℞. Tincturæ Cannabis Indicæ, min. xx; Spiritûs Juniperi, min. xxx; Spiritûs Ætheris, min. xlv; Tincturæ Aconiti, min. x; Mucilaginis Acaciæ, ad fl. oz. iss. Mix, for a draught. To be taken at bedtime.
In neuralgic dysmenorrhœa, &c.

343. *Opium, or Morphia, and Henbane.*

℞. Extracti Opii, gr. 1—3, vel Morphiæ Hydrochloratis, gr. ¾—1; Extracti Hyoscyami, gr. 3. Make into a pill, to be taken at bedtime.
For the relief of severe pain, and to afford sleep in lingering diseases.

344. *Opium and Belladonna.*

℞. Extracti Opii, gr. 1—2; Extracti Belladonnæ, gr. ½; Extracti Gentianæ, gr. 3. Make into a pill, to be taken night and morning.
In cases where it is necessary to relieve severe pain without inducing constipation.

345. *Opium and Capsicum.*

℞. Extracti Opii, gr. 1—2; Pulveris Capsici, gr. 2; Extracti Hyoscyami, gr. 4. Make into two pills, to be taken every night at bedtime.
In those diseases where opium is needed, but where it is not well borne, owing to its producing headache, sickness, &c. The stimulating effect of the capsicum will often ward off these unpleasant results.

346. *Morphia and Squills Linctus.*

℞. Syrupi Scillæ, Syrupi Rhœados, āā fl. oz. j; Liquoris Morphiæ Hydrochloratis, fl. drm. j. Mix, and label,—"A small teaspoonful to be taken frequently, if the cough is troublesome."

347. *Compound Linctus.*

℞. Spiritûs Chloroformi, fl. drs. iv; Vini Ipecacuanha, fl. drs. ij; Liquoris Morphiæ Hydrochloratis, fl. drm. j; Acidi Hydrocyanici Diluti, min. xv; Syrupi Mori, ad fl. oz. iij. Mix, and label,—"One teaspoonful every two or three hours, until the cough is relieved."

XV. REFRIGERANTS AND SALINES.

348. *Saline Draughts.*

℞. Sodæ Bicarbonatis, gr. 20; Aquæ Laurocerasi, min. x; Syrupi Limonis, fl. drm. j; Aquæ, ad fl. oz. iss. Mix. An effervescing draught is to be made by the addition of a tablespoonful of lemon-juice, or of eighteen grains of citric acid. To be taken every four or six hours.
In fever with nausea.

℞. Spiritûs Ætheris Nitrosi, fl. drs. iv; Liquoris Ammoniæ Acetatis, fl. drs. vj; Vini Colchici, fl. drm. j; Aquæ Camphoræ, ad fl. oz. viij. Mix. Two tablespoonfuls every four hours.

℞. Syrupi Scillæ, fl. drs. vj; Spiritûs Ætheris Nitrosi, Tincturæ Hyoscyami, āā fl. drs. iij; Infusi Rosæ Acidi, ad fl. oz. viij. Mix. One-sixth part every six hours.
In influenza, catarrh, &c.

℞. Potassæ Nitratis, gr. 40, *vel*, Potassæ Citratis, gr. 100; Vini Antimoniale, fl. drm. j; Liquoris Ammoniæ Acetatis, fl. drs. iv; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-sixth part every four hours.

349. *Saline with Excess of Ammonia.*

℞. Liquoris Ammoniæ Acetatis, fl. drs. vj; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Syrupi Limonis, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part every four hours.
In the early stages of fever, tonsillitis, &c.

350. *Dr. Stevens' Saline Mixture.*

℞. Sodii Chloridi, gr. 20; Potassæ Chloratis, gr. 7; Sodæ Carbonatis, gr. 30; Aquæ, fl. oz. iss. Mix. To be taken every half hour.
In malignant cholera.

351. *Colchicum and Magnesia.*

℞. Vini Colchici, fl. drs. iss; Magnesiæ Carbonatis, gr. 120; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Tincturæ Hyoscyami, fl. drs. ij; Aquæ Camphoræ, ad fl. oz. viij. Mix. One-sixth part night and morning.
In slight cases of gout, &c.

352. *Colchicum and Chlorate of Potash.*

℞. Vini Colchici, fl. drs. ij; Potassæ Chloratis, gr. 120; Liquoris Ammoniæ Acetatis, fl. drs. vj; Aquæ Camphoræ, ad. fl. oz. viij. Mix. One-sixth part three times a day.
In gout with heat and dryness of the skin.

353. *Borax and Nitric Ether.*

℞. Boracis, gr. 80; Spiritûs Ætheris Nitrosi, fl. drs. iij; Syrupi Papaveris, fl. drs. vj; Infusi Lini, ad. fl. oz. viij. Mix. One-sixth part every six hours.

354. *Ammonia, Chlorinated Soda, and Serpentary.*

℞. Ammoniæ Carbonatis, gr. 30; Liquoris Sodæ Chloratæ, fl. drm. j; Infusi Serpentariæ, fl. oz. viij. Mix. One-sixth part every six hours.
As a diaphoretic and stimulant in the low stage of continued fever.

355. *Bicarbonate of Potash Drink.*

℞. Potassæ Bicarbonatis, oz. ½—½; Syrupi Limonis, fl. oz. j; Aquæ, ad O ij. Mix, for the day's drink.
Very useful in the uric acid diathesis, in acute rheumatism, &c. A drink called "Constitution Water" owes its efficacy to the bicarbonate of potash it contains.

356. *Cream of Tartar Drink.*

℞. Potassæ Tartratis Acidæ, oz. 1; Olei Limonis, min. xv; Sacchari Albi, oz. 2; Aquæ Bullientis, O ij. Mix. To be used, when cold, as a common drink.
In simple fever, with constipation and great thirst.

357. *Hydrochloric Acid Drink.*

℞. Acidi Hydrochlorici Diluti, fl. drs. ij—iij; Mellis Depurati, oz. 1; Decocti Hordei, O ij. Mix, for the daily drink.
In typhus, &c.

358. *Hydrochloric Acid and Chlorate of Potash Drink.*

℞. Acidi Hydrochlorici Diluti, fl. drs. ij; Potassæ Chloratis, gr. 180; Syrupi Zingiberis, fl. oz. j; Decocti Hordei, O ij. Mix.
A valuable drink in some cases of fever.

359. *Phosphoric Acid Drink.*

℞. Acidi Phosphorici Dilut, fl. drs. iij; Glycerini, fl. oz. j; Decocti Hordei, O ij. Mix.
An efficacious drink for assuaging thirst in some diseases, attended with nervous exhaustion. It was recommended by Drs. Paris and Watson as useful in diabetes; but according to Griesinger it positively increases the quantity of sugar excreted.

360. *Chlorate of Potash Drink.*

℞. Potassæ Chloratis, gr. 60; Syrupi Hemidesmi, fl. oz. j; Aquæ, O j. Mix.
In the eruptive fevers, some inflammations, &c.

℞. Potassæ Chloratis, oz. 1; Potassæ Bicarbonatis, oz. 2. Mix, and divide into eight powders. One to be dissolved in a pint of barley water for the day's drink.
In acute rheumatism.

XVI. STIMULANTS.

361. *Ammonia and Bitters.*

℞. Ammoniæ Carbonatis, gr. 30; Spiritûs Myristicæ, fl. drs. ij; Tincturæ Cardamomi Compositæ, fl. drs. vj; Infusi Caryophylli, ad fl. oz. viij. Mix. One-sixth part three times a day.
In debility with nausea and flatulence. Also in erysipelas, scarlet fever, &c.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iij; Tincturæ Lupuli, fl. drs. vj; Tincturæ Gentianæ Compositæ, fl. oz. j; Infusi Sennæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.
In phosphuria with constipation.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iij; Aquæ Laurocerasi, fl. drm. j; Sodæ Bicarbonatis, gr. 60; Tincturæ Calumbæ, fl. drs. vj; Aquæ Anethi, ad fl. oz. viij. Mix. One-sixth part two or three times a day.
To relieve nausea, or vomiting, with heartburn.

362. *Ammonia in Effervescence.*

℞. Ammoniæ Carbonatis, gr. 120; Acidi Hydrocyanici Diluti, min. xx; Tincturæ Cardamomi Compositæ, fl. drs. vj: Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part to be made into an effervescing draught with one tablespoonful of fresh lemon-juice, or with eighteen grains of citric acid. To be taken twice or thrice daily.
In irritability of the stomach, with depression.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iv; Potassæ Bicarbonatis, gr. 120; Spiritûs Chloroformi, fl. drs. iij; Tincturæ Hyoscyami, fl. drs. iij; Infusi Cascarillæ, ad fl. oz. viij. Mix. One-sixth part every four hours, made into an effervescing draught with one tablespoonful of lemon-juice.
In irritable stomach with undue acidity of the secretions.

363. *Ammonia, Valerian, and Rhubarb.*

℞. Tincturæ Valerianæ Ammoniatæ, fl. drs. iij; Tincturæ Rhei, fl. drs. vj; Tincturæ Lavandulæ Compositæ, fl. oz. j; Aquæ Pimentæ, fl. oz. viij. Mix. One-sixth part when oppressed with languor or faintness.

In hypochondriasis and hysteria.

364. *Ammonia and Ether.*

℞. Ammoniæ Carbonatis, gr. 30; Spiritûs Ætheris, fl. drs. iij; Infusi Caryophylli, ad fl. oz. viij. Mix. One-sixth part three times a day.

In debility with flatulence.

365. *Hydrochloric Acid and Ether.*

℞. Acidi Hydrochlorici Diluti, fl. drm. j; Spiritûs Ætheris, fl. drs. iij; Syrupi Aurantii, fl. drs. vj; Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part every six hours.

In continued fever, and in cases where the respired air is ammoniacal.

366. *Cajuput Oil and Cloves.*

℞. Olei Cajuputi, min. v; Pulveris Tragacanthæ Compositi, gr. 60; Aquæ Destillatæ, fl. drs. ij. Beat thoroughly together, and add Infusi Caryophylla, fl. drs. x. Mix. To be taken occasionally.

In hysteria, flatulent colic, and many spasmodic diseases.

℞. Olei Cajuputi, min. iv; Sacchari Lactis, gr. 120. Beat up thoroughly, and add Decocti Aloes Compositi, fl. oz. iss. Mix. To be taken occasionally, early in the morning.

As a stimulant and laxative, where there is flatulence and a loaded rectum.

367. *Ether and Brandy.*

℞. Spiritûs Ætheris, fl. drs. iij; Spiritûs Vini Gallici, fl. drs. xij; Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part every four or six hours.

At the commencement of convalescence from many acute diseases.

℞. Spiritûs Chloroformi, fl. drs. vj; Misturæ Spiritûs Vini Gallici (F. 17), fl. oz. viij. Mix. One-sixth part every six hours.

In the low stages of fever with restlessness.

368. *Solution of Chlorinated Soda.*

℞. Liquoris Sodæ Chloratæ, fl. drs. i—ij; Syrupi Tolutani, fl. oz. j; Tincturæ Serpentariæ, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part every six hours.

In low fever this mixture will clean the tongue, promote the action of the skin and kidneys, correct the offensive state of the evacuations, and rouse the patient.

℞. Liquoris Sodæ Chloratæ, fl. drm. j; Tincturæ Cinchonæ Compositæ, fl. drs. vj; Spiritûs Vini Gallici, fl. drs. xij; Aquæ, ad fl. oz. viij. Mix. One-sixth part every three or four hours.

In low fever, with great prostration.

369. *Sumbul and Hop.*

℞. Tincturæ Sumbulis, fl. drs. vj; Infusi Lupuli, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some cases of hysteria, epilepsy, threatened delirium tremens, &c., where a stimulant and antispasmodic is needed.

370. *Quinine, Rhubarb, and Hop.*

℞. Tincturæ Quiniæ Compositæ, Tincturæ Rhei, Tincturæ Lupuli, āā fl. drs. iv. Mix. One teaspoonful in a wineglassful of water twice a day.

In dyspepsia from weakness of the digestive organs, and constipation. See F. 385.

XVII. TONICS.

371. *Bark and Ammonia.*

℞. Ammoniæ Carbonatis, gr. 30; Tincturæ Lavandulæ Compositæ, fl. oz. j; Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Ammoniæ Carbonatis, gr. 30; Tincturæ Aconiti, min. xl; Tincturæ Cinchonæ Compositæ, fl. drs. vj; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Ammoniæ Carbonatis, gr. 30; Extracti Opii Liquidi, min. xxx; Spiritûs Ætheris, fl. drs. iij; Decocti Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In cases where it is feared that a deposition of fibrin has taken place in the heart or one of the large vessels.

℞. Spiritûs Ammoniæ Aromatici, Spiritûs Chloroformi, āā fl. drs. vij; Liquoris Morphiæ Hydrochloratis, fl. drs. ij; Extracti Cinchonæ Flavæ Liquidi, fl. drs. iv; Tincturæ Cinchonæ Flavæ, ad fl. oz. iij. Mix. Direct,—"One teaspoonful in a wineglassful of Port wine three times a day."

In certain cases of phthisis this mixture is very useful, especially in conjunction with cod-liver oil and a liberal diet.

372. *Ammonia, Bark, and Rhubarb.*

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iv; Extracti Cinchonæ Flavæ Liquidi, fl. drs. iss; Tincturæ Rhei, fl. drs. iv; Infusi Rhei, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

In nervous depression, &c., with constipation.

373. *Bark and Liquor Potassæ.*

℞. Liquoris Potassæ, fl. drs. iij; Tincturæ Cinchonæ Compositæ, fl. drs. vj; Decocti Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

In debility attended with the lithic acid diathesis.

374. *Bark and Serpentary.*

℞. Tincturæ Cinchonæ Compositæ, fl. oz. j; Tincturæ Aconiti, min. xxx; Tincturæ Serpentariæ, *vel* Tincturæ Acteæ Racemosæ, fl. drs. iij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some cases of chronic rheumatism, lumbago, and rheumatoid arthritis.

375. *Bark and Hemlock.*

℞. Tincturæ Cinchonæ Compositæ, fl. drs. vj; Succi Conii, fl. drs. iv; Aquæ Pimentæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In chronic diseases attended with debility and pain.

376. *Acid Mixtures with Bark.*

℞. Acidi Sulphurici Aromatici, fl. drs. ij; Syrupi Aurantii, fl. oz. j; Tincturæ Cinchonæ Compositæ, fl. drs. vj; Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily, on an empty stomach.

Especially useful in depressing disorders accompanied with occasional attacks of hemorrhage.

℞. Acidi Phosphorici Diluti, fl. drs. iss; Tincturæ Aconiti, fl. drm. ss; Tincturæ Cinchonæ Compositæ, fl. oz. j; Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day.

In debility, with nervous irritability.

℞. Acidi Nitrici Diluti, *vel* Acidi Phosphorici Diluti, fl. drs. ıss; Tincturæ Nucis Vomicæ, fl. drm. j; Extracti Cinchonæ Flavæ Liquidi, fl. drs. ij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day, two hours before each meal.

In general weakness, with nervous exhaustion.

377. *Acid Mixtures with Calumbo, &c.*

℞. Tincturæ Calumbæ, fl. drs. vj; Acidi Sulphurici Aromatici, fl. drs. iss; Syrupi Aurantii, fl. oz. j; Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day, when the stomach is empty.

℞. Acidi Hydrochlorici Diluti, fl. drs. iss; Acidi Hydrocyanici Diluti, min. xx; Infusi Chiratæ, ad fl. oz. viij. Mix. One-sixth part three times a day, immediately before the meals.

As a stomachic, especially in the dyspepsia of gouty subjects.

℞. Succi Limonis Recentis, fl. drs. xij; Syrupi Limonis, fl. oz. j; Infusi Chiratæ ad fl. oz. viij. Mix. One-sixth part three times a day.

Where there is debility with a threatening of rheumatic fever.

378. *Nitro-Hydrochloric Acid Mixtures.*

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. iss—iij; Tincturæ Chiratæ, fl drs. iij; Tincturæ Aconiti, min. xxx; Syrupi Aurantii, fl. oz. j; Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day, an hour before each meal.

In oxaluria, dyspepsia, rheumatoid arthritis, &c.

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. ij; Acidi Hydrocyanici Diluti, min. xxv; Tincturæ Arnicæ, fl. drm. j; Tincturæ Gentianæ Compositæ, fl. oz. j; Infusi Sennæ, ad fl. oz. viij. Mix. One-sixth part twice or thrice daily.

In dyspepsia, with sluggish action of the liver.

The efficacy of this mixture may often be increased by giving with each dose a pill containing one or two grains of sulphate of zinc and four of extract of gentian.

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. ij; Liquoris Strychniæ, min. xxx —fl. drm. j; Spiritûs Chloroformi, fl. drs. vj; Tincturæ Zingiberis, fl. drs. iij; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In any form of functional paralysis after all the appreciable causes are remedied. Also in obstinate debility, hypochondriasis, diabetes insipidus, alkaline urine, &c. (See F. 175, 409.)

℞. Acidi Nitro-Hydrochlorici Diluti, fl. drs. iss; Tincturæ Belladonnæ, fl. drm. j; Extracti Pareiræ Liquidi, fl. drm. j. Decocti Pareiræ, ad fl. oz. viij. Mix. One-sixth part every six hours.

In incontinence of urine, when the reaction of the latter is alkaline.

379. *Quinine Mixtures and Pills.*

℞. Quiniæ Sulphatis, gr. 12; Acidi Nitrici Diluti, *vel* Acidi Phosphorici Diluti, *vel* Acidi Sulphurici Aromatici, fl. drs. iss; Tincturæ Lupuli, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

Amongst other purposes, this mixture may be used to check the night-sweats in phthisis.

℞. Tincturæ Quiniæ Compositæ, fl. drs. xiv; Tincturæ Aconiti, fl. drs. ij; Glycerini, fl. oz. j. Mix. One teaspoonful in a wineglassful of water three times a day.

In neuralgia, nervous irritability, weakness, &c.

℞. Quiniæ Sulphatis, gr. 18; Extracti Lupuli, gr. 40. Make a mass, divide into twelve pills, and order one to be taken three times a day.

℞. Quiniæ Sulphatis, gr. 4; Acidi Phosphorici Diluti, min. xx; Syrupi Aurantii, fl. drs. iv; Aquæ, ad fl. oz. iv. Mix. One small tablespoonful three times a day.

In strumous ophthalmia and other cases of debility in children.

℞. Quiniæ Sulphatis, gr. 64; Acidi Sulphurici Diluti, min. x; Aquæ, fl. drs. iv. Mix. From fifteen minims to half a drachm (gr. 4—8) may be carefully injected into the subcutaneous areolar tissue.

In intermittent fever, &c.

380. *Quinine and Steel.*

℞. Quiniæ Sulphatis, Ferri Sulphatis, āā gr. 12; Liquoris Strychniæ, min. xxx; Acidi Sulphurici Aromatici, fl. drs. iss; Infusi Quassiæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

The black stools, which are passed while any preparation of steel is being taken, are due to the combination of the metal with part of the sulphur of the food,—forming sulphuret of iron.

℞. Quiniæ Sulphatis, gr. 9: Acidi Hydrochlorici Diluti, fl. drm. j; Tincturæ Arnicæ, min. xxx—fl. drm. j; Tincturæ Ferri Perchloridi, fl. drs. iss; Infusi Caryophylli, ad fl. oz. viij. Mix. One-sixth part three times a day.

In general debility, diphtheria, erysipelas, &c.

℞. Quiniæ Sulphatis, gr. 12; Tincturæ Ferri Perchloridi, fl. drs. ij; Tincturæ Nucis Vomicæ. fl. drm. j; Tincturæ Lupuli, fl. drs. vj; Magnesiæ Sulphatis, oz. 1; Infusi Lupuli, ad fl. oz. viij. Mix. One-sixth part daily, three hours after breakfast.

In habitual constipation with debility.

℞. Quiniæ Sulphatis, Ferri Sulphatis Exsiccatæ, āā gr. 20; Extracti Hyoscyami, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day.

In debility with irritability of the nervous system.

℞. Quiniæ Sulphatis, gr. 12; Ferri Redacti, gr. 30; Extracti Aconiti, gr. 12; Glycerini, sufficient to form a mass. Divide into twelve pills, and order one to be taken an hour after dinner and supper.

In neuralgia, rheumatoid arthritis, painful chronic affections with debility, &c.

℞. Ferri et Quiniæ Citratis, gr. 30; Tincturæ Chiratæ, fl. drs. iss; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

An excellent tonic where there is exhaustion, with a weak and irritable stomach. If the strong bitter is objectionable, Tincture of Calumbo may be substituted for the Chiretta.

381. *Quinine, Steel, and Arsenic.*

℞. Tincturæ Quiniæ Compositæ, fl. oz. j; Liquoris Arsenicalis, min. xviij; Ferri et Ammoniæ Citratis, gr. 30; Aquæ Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day, after meals.

In diseases of the skin, &c., with impoverished blood.

℞. Quiniæ Sulphatis, gr. 9; Acidi Phosphorici Diluti, Tincturæ Ferri Perchloridi, āā fl. drs. iss; Liquoris Arsenici Chloridi (Phar. Lond., 1851), min. xxx—fl. drm. j; Syrupi Zingiberis, fl. drs. vj; Aquæ, *vel* Infusi Quassiæ, ad fl. oz viij. Mix. One-sixth part directly after breakfast, dinner, and supper.

In many skin diseases, rheumatoid arthritis, carbuncular inflammations, &c.

382. *Quinine and Iodide of Iron.*

℞. Tincturæ Quiniæ Compositæ, fl. oz. j; Syrupi Ferri Iodidi, fl. drs. iij—vj; Infusi Calumbæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In debility with a strumous taint, chronic rheumatism, goitre, &c.

383. *Quinine and Belladonna.*

℞. Quiniæ Sulphatis, gr. 24; Extracti Belladonnæ, gr. 4; Camphoræ, gr. 30; Confectionis Rosæ Gallicæ, sufficient to make a mass. Divide into twelve pills, silver them, and order one to be taken twice or thrice daily.

In some painful diseases (neuralgia, cancer, dysmenorrhœa, &c.) where a sedative and tonic are needed. See F. 45.

384. *Quinine and Ipecacuanha.*

℞. Quiniæ Sulphatis, gr. 12; Pulveris Ipecacuanhæ, gr. 12—24; Extracti Gentianæ, gr. 24. Mix. Divide into twelve pills, and order one to be taken every day at dinner.

An excellent remedy in cases of slow digestion. See F. 44.

385. *Quinine and Rhubarb.*

℞. Quiniæ Sulphatis, gr. 24; Pulveris Rhei, gr. 36; Glycerini, sufficient to form a mass. Divide into twelve pills, and order one to be taken night and morning.

386. *Quinine and Ammonia.*

℞. Tincturæ Quiniæ Compositæ, fl. oz. j; Glycerini, fl. drs. vj; Spiritûs Ammoniæ Aromatici, Spiritûs Ætheris, āā fl. drs. iij; Extracti Opii Liquidi, min. xxx; Infusi Aurantii, *vel* Infusi Cinchonæ Flavæ, ad fl. oz. viij. Mix. One-sixth part every six hours.

In great exhaustion, with low muttering delirium and restlessness.

387. *Quinine and Nux Vomica.*

℞. Quiniæ Sulphatis, gr. 18; Extracti Nucis Vomicæ, gr. 3—6; Extracti Gentianæ, gr. 35. Mix, and divide into twelve pills. One to be taken night and morning.

In debility with constipation. See F. 175, 409.

388. *Substitutes for Quinine.*

℞. Beberiæ Sulphatis, gr. 30; Acidi Sulphurici Aromatici, min. xl; Syrupi Aurantii, fl. oz. j; Aquæ Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day.

In neuralgic affections assuming a periodic character; as well as in intermittent and remittent fevers. It does not produce cerebral disturbance and headache like quinine. This sulphate of an alkaloid is said to be an ingredient of WARBURG'S Fever Drops.

℞. Salicini, gr. 60; Extracti Sarsæ Liquidi, fl. drs. vj; Infusi Gentianæ Compositi, ad fl. oz. viij. Mix. One-sixth part three times a day.

During convalescence from acute disorders of the digestive organs. The antiperiodic properties of salicin render it useful in intermittent and some other fevers.

℞. Salicini, gr. 120; Glycerini, fl. oz. j; Tincturæ Aurantii, ad fl. oz. iij. Mix. One teaspoonful in a wineglassful of water night and morning.

Where the stomach is easily nauseated and cannot digest quinine, this formula will be useful.

389. *Cod-Liver Oil.*

The oil most commonly used is of a pale straw color, the dose varying from a teaspoonful to a large tablespoonful twice or thrice daily. It should be taken immediately after meals; floating it on milk, coffee, beef tea, orange wine, brandy and water, cherry brandy, &c. Chewing a piece of lemon-peel or cinnamon, or a few cloves previously, will disguise the flavor. Sometimes it is preferred made into an emulsion; which may be done by beating it up with an equal proportion of lime-water, or of milk, or with the yolk of an egg and some compound tincture of cardamoms. DR. DE JONGH'S oil is pure, and is prescribed by many practitioners.

Cod-liver oil may be impregnated with various drugs,—such as any of the essential oils, morphia, arsenic, iodine, mercury, quinine, zinc, iron, &c. Too large a quantity of the solution must not be made at a time, as the oil soon becomes rancid. Combined with ozone (an allotropic modification of oxygen—ἄλλος, another, and τρόπος, manner of existence) it has been found to lessen considerably the frequency of the pulse in phthisis. The dose of ozonized oil, according to DR. E. SYMES THOMPSON, is from two to four drachms, two or three times a day. See F. 22, 32, 283, 390, and 418.

390. *Iodide of Iron and Cod-Liver Oil.*

℞. Syrupi Ferri Iodidi, fl. drs. iv; Mucilaginis Tragacanthæ, fl. oz. j; Olei Morrhuæ, fl. oz. ivss. Mix. One tablespoonful twice or thrice daily.

In some forms of scrofula, phthisis, mild constitutional syphilis, &c.

℞. Potassii Iodidi, gr. 3—5; Glycerini, fl. drs. ij; Vini Ferri, fl. drs. iv; Olei Morrhuæ, fl. drs. vj. Mix, and make a draught to be taken twice a day.

In chronic rheumatism, tertiary syphilis, strumous skin diseases, &c.

391. *Steel and Cocoa-nut Oil.*

℞. Olei Cocos Nucis, fl. drs. ij; Spiritûs Ammoniæ Aromatici, min. xxx; Ferri et Ammoniæ Citratis, gr. 5; Aquæ Menthæ Piperitæ, ad fl. oz. j. Mix, and make a draught to be taken twice or thrice daily.

Deserving of trial when cod-liver oil causes nausea.

392. *Steel and Glycerine.*

℞. Tincturæ Ferri Perchloridi, fl. drs. iss—ij; Tincturæ Calumbæ, fl. drs. vj; Glycerini, fl. oz. j; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some cases it is better to omit the glycerine from this mixture; administering cod-liver oil instead, after one or two of the chief meals of the day.

℞. Spiritûs Ammoniæ Aromatici, fl. drs. iv; Ferri et Ammoniæ Citratis, gr. 40; Infusi Quassiæ, fl. oz. viss; Glycerini, fl. oz. j. Mix. One-sixth part three times a day.

393. *Griffith's Mixture with Aloes.*

℞. Misturæ Ferri Compositæ, Decocti Aloes Compositi, āā fl. oz. iv; Zinci Sulphatis, gr. 12. Mix. One-sixth part twice a day.

In anæmia, hypochondriasis, general debility with constipation, &c.

394. *Steel and Pepsine.*

℞. Ferri Redacti, gr. 36—60; Pepsinæ Porci, gr. 36; Zinci Phosphatis, gr. 18; Glycerini, sufficient to make a mass. Divide into twenty-four pills, silver them, and order two to be taken every day at dinner.

In anæmia, &c., with weakness of the digestive organs.

℞. Ferri et Ammoniæ Citratis, gr. 30; Spiritûs Vini Gallici, fl. oz. j; Vini Pepsinæ, fl. drs. iv; Aquæ, ad fl. oz. vj. Mix. One-half to be taken every day at dinner. See F. 420.

395. *Steel and Hemlock.*

℞. Pilulæ Ferri Carbonatis, gr. 60; Extracti Conii, gr. 36—60. Mix, and divide into twenty-four pills. Two to be taken twice or thrice daily.

In incipient phthisis, and in many diseases attended with cough and debility.

396. *Steel Electuary.*

℞. Ferri Peroxidi, Mellis Depurati, āā oz. 2. Mix. One teaspoonful twice a day.

In chorea, &c.

397. *Steel and Hydrochloric Acid.*

℞. Tincturæ Ferri Perchloridi, fl. drs. iss; Acidi Hydrochlorici Diluti, fl. drs. ij; Tincturæ Hyoscyami, fl. drs. iij; Aquæ Camphoræ, ad. fl. oz. viij. Mix. One-sixth part three times a day.

398. *Steel and Gentian.*

℞. Ferri Sulphatis Granulatæ, Extracti Gentianæ, āā gr. 30. Mix, divide into twelve pills, and order one to be taken three times a day.

In chlorosis, &c.

399. *Steel and Arsenic.*

℞. Vini Ferri, fl. oz. iv; Liquoris Arsenicalis, min. xx; Syrupi Zingiberis, fl. oz. ij. Mix. One-sixth part, with two tablespoonfuls of water, three times a day, immediately after meals.

For cases of purpura. In reduced doses as a tonic and alterative in some of the skin diseases of children. See F. 52.

℞. Syrupi Ferri Phosphatis, fl. oz. ij; Liquoris Sodæ Arseniatis, min. xxx. Mix. One teaspoonful in a wineglassful of water directly after dinner and supper.

In some forms of spleen disease, &c.

400. *Steel and Cantharides.*

℞. Tincturæ Cantharidis, fl. drs. iss; Glycerini, fl. oz. j; Misturæ Ferri Compositæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In debility of the generative organs, some forms of incontinence of urine, &c.

℞ Tincturæ Cantharidis, Tincturæ Ferri Perchloridi, āā fl. drm. j; Tincturæ Capsici, fl. drs. iss; Syrupi Aurantii, fl. oz. j; Infusi Aurantii, ad fl. oz. viij. Mix. One-sixth part three times a day.

401. *Steel and Ammonia.*

℞. Ferri Tartarati, gr. 60; Spiritûs Ammoniæ Aromatici, fl. drs. iij; Infusi Quassiæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In chlorosis, leucorrhœa from relaxation of vaginal mucous membrane, &c.

℞. Ferri et Ammoniæ Citratis, gr. 40; Ammoniæ Carbonatis, gr. 30; Tincturæ Cascarillæ, fl. drs. iij; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

402. *Steel and Chlorate of Potash.*

℞. Tincturæ Ferri Perchloridi, fl. drs. iss; Potassæ Chloratis, gr. 120; Liquoris Arsenicalis, min. xv; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day, in a wineglassful of water.

In certain skin diseases, onychia, &c. Also in anæmia dependent on a syphilitic taint, omitting the solution of arsenic from the mixture.

403. *Steel and Citrate of Potash.*

℞. Ferri Ammoniæ Citratis, gr. 60; Spiritûs Ammoniæ Aromatici, fl. drs. iv; Potassæ Bicarbonatis, gr. 120; Infusi Calumbæ, ad fl. oz. viij. Mix. One-sixth part to be taken twice a day with one tablespoonful of lemon-juice.

As a tonic where there is nausea and dyspepsia.

404. *Steel and Aloes.*

℞. Ferri Carbonatis Saccharatæ, gr. 40; Infusi Anthemidis, fl. oz. viij. Mix. One-sixth part twice a day. The following draught is also to be taken every other morning before breakfast: ℞. Sodæ Phosphatis, gr. 120; Extracti Rhei, gr. 10; Decocti Aloes Compositi, fl. drs. iv; Aquæ Carui, fl. oz. j. Mix.

Useful for atonic gouty subjects.

℞. Ferri Redacti, gr. 30; Pilulæ Aloes et Myrrhæ, gr. 24—40; Extracti Nucis Vomicæ, gr. 4. Make a mass, divide into twelve pills, and order one to be taken three times a day.

In anæmia with constipation. See F. 393.

405. *Phosphate of Iron.*

℞. Ferri Phosphatis, gr. 40; Acidi Phosphorici Diluti, fl. drs. iss; Syrupi Aurantii, fl. oz. j; Mucilaginis Tragacanthæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In scrofula, cancer, low nervous vigor, &c.

℞. Ferri Phosphatis, gr. 20; Pulveris Myrrhæ, gr. 15; Sacchari Albi, gr. 30. Mix, and divide into six powders, One to be taken night and morning.

In rickets, and other strumous diseases of children.

A syrup of the Phosphates of Iron, Lime, Soda, and Potassa has been prepared by Mr. Parrish, of Philadelphia. It may be obtained from most London chemists; being known as "Chemical Food." The dose for a child ten years of age, is one teaspoonful in water after the two principal meals of the day.

This preparation is of great value in all forms of strumous disease, and general debility.

406. *Steel and Manganese.*

℞. Ferri Phosphatis, gr. 120; Manganesii Phosphatis, gr. 90; Tincturæ Calumbæ, fl. oz. j; Syrupi Zingiberis, fl. oz. ij. Mix. One teaspoonful in a wineglassful of water three times a day.

In chlorosis, scrofula, &c.

407. *Acetate of Strychnia.*

℞. Strychniæ Acetatis, gr. 1; Acidi Acetici, min. xx; Alcoholis, fl. drs. ij; Aquæ Destillatæ, fl. drs. vj. Mix. Ten drops (= to gr. $\frac{1}{60}$) to be taken in water three times a day.

Recommended by Dr. Marshall Hall as a tonic in cases of nervous exhaustion.

℞. Strychniæ, gr. 1; Pulveris Zingiberis, gr. 40; Extracti Gentianæ, gr. 60. Mix very thoroughly, divide into twenty pills, and order one to be taken night and morning.

In partial paralysis, amaurosis, &c., when the acute symptoms have subsided.

408. *Strychnia and Steel.*

℞. Ferri et Ammoniæ Citratis, gr. 40; Liquoris Strychniæ, fl. drm. j (= to gr. $\frac{1}{2}$); Infusi Quassiæ, ad fl. oz. viij. Mix. One-sixth part twice a day.

In chronic nervous affections with debility.

℞. Ferri Redacti, gr. 40; Zinci Valerianatis, gr. 20; Strychniæ, gr. 1; Glycerini, sufficient to make a mass. Divide into twenty pills, silver them, and direct one to be taken three times a day, after food.

In hypochondriasis, great nervous depression, &c.

409. *Zinc and Nux Vomica.*

℞. Zinci Sulphatis, gr. 24; Extracti Nucis Vomicæ, gr. 6; Extracti Rhei, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day.

In weakness of the muscular system, atony of intestinal walls, &c. See F. 175, 387.

410. *Valerianate of Zinc.*

℞. Zinci Valerianatis, gr. 12—24; Extracti Belladonnæ, gr. 3—6; Extracti Gentianæ, gr. 24. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day.

In some nervous disorders, in cases of habitual constipation, and in spasmodic contraction of the sphincter ani.

℞. Zinci Valerianatis, Zinci Phosphatis, āā gr. 18; Extracti Rhei, gr. 24. Make a mass, divide into twelve pills, and silver them. Order one to be taken three times a day.

For epilepsy, neuralgia, hysteria, &c. The valerianate of quinine, of soda, of ammonia, and of steel, may be employed in the same manner. In some cases of neuralgia as many as ten or twelve grains of valerianate of ammonia in infusion of calumba have been given every four hours.

411. *Valerianate of Zinc and Quinine.*

℞. Zinci Valerianatis, gr. 12; Quiniæ Sulphatis, gr. 6; Pilulæ Rhei Compositæ, Extracti Anthemidis, āā gr. 20. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day.

In hysteria, neuralgia, &c.

412. *Valerianate of Zinc and Savin.*

℞. Ferri Valerianatis, gr. 24; Olei Sabinæ, min. xxiv; Pilulæ Assafœtidæ Compositæ, gr. 30. Make a mass, divide into twelve pills, and silver them. One to be taken three times a day.

In anæmia, hysteria, and neuralgia with amenorrhœa.

413. *Sulphate of Zinc.*

℞. Zinci Sulphatis, gr. 24; Extracti Aconiti, gr. 12; Extracti Quassiæ, gr. 24. Make a mass, divide into twelve pills, and order one to be taken three times a day.

In epilepsy with neuralgic pains, lumbago, pleurodynia, &c. Its efficacy is much increased by giving cod-liver oil at the same time.

℞. Zinci Sulphatis, gr. 12—24; Extracti Conii, gr. 36. Make a mass, divide into twelve pills, and order one to be taken three times a day.

In the chronic bronchitis of old people, as a tonic and sedative, &c.

414. *Phosphate of Zinc, &c.*

℞. Zinci Phosphatis, gr. 20—40; Acidi Phosphorici Diluti, fl. drs. iss; Tincturæ Cinchonæ Flavæ, fl. drs. vj, *vel* Tincturæ Ferri Perchloridi, fl. drs. iss; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In some affections of the nervous system with debility.

415. *Oxide of Zinc.*

℞. Zinci Oxidi, gr. 24—40; Extracti Anthemidis, gr. 30. Make a mass, divide into twelve pills, and order one to be taken twice a day.

In chronic alcoholism (?), chorea, hysteria, &c. Dr. Golding Bird entertained an opinion that zinc has a specific influence on the nervous system, just as iron has on the blood. The dose may be gradually increased until twenty or even thirty grains of the zinc are taken in the day. It may sometimes be advantageously combined with opium.

416. *Zinc, Bark, and Glycerine.*

℞. Zinci Sulphatis, gr. 12—20; Tincturæ Cinchonæ Compositæ, fl. oz. j; Glycerini, fl. drs. xij; Aquæ Menthæ Piperitæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

During convalescence from acute disease, especially where there is emaciation and great nervousness and constipation.

417. *Phosphorus Pills.*

℞. Micæ Panis, gr. 60; Aquæ Destillatæ, sufficient to make a mass. Then add Phosphori, gr. 1. Mix thoroughly, divide into twenty pills, and order one to be taken thrice daily.

In extreme debility and mental depression. After cholera, &c.

418. *Phosphorus and Oil.*

℞. Phosphori, gr. 1; Olei Morrhuæ, fl. oz. vj. Mix. One or two teaspoonfuls three times a day, immediately after food.

In tuberculosis, rickets, scrofula, &c.

℞. Phosphori, gr. 1; Olei Amygdalæ, fl. oz. iij. Mix. One teaspoonful in a wineglassful of barley water three times a day.

419. *Hypophosphite of Soda.*

℞. Sodæ Hypophosphitæ, *vel* Calcis Hypophosphitæ, gr. 30—80; Infusi Chiratæ, fl. oz. viij. Mix. One-sixth part three times a day.

In phthisis, tabes mesenterica, &c.

℞. Sodæ Hypophosphitæ, gr. 80—240; Spiritûs Ætheris, fl. oz. j; Tincturæ Sumbulis, fl. oz. ij. Mix. One teaspoonful in a large wineglassful of water three times a day.

In epilepsy, hysteria, neuralgia, some forms of hypochondriasis, &c., this mode of administering phosphorus may be useful. The dose at first should be moderate and gradually increased. In very obstinate or severe cases of neuralgia, a cure may perhaps be effected by the hypophosphite of soda in forty or even sixty grain doses, repeated thrice daily, when the ordinary quantities have no effect. Where no appreciable benefit ensues in eight or ten days, the remedy will probably prove useless however long it may be continued.

420. *Preparations of Pepsine.*

The physician is sometimes hindered in the administration of tonics and animal food by the inability of the stomach to digest them. And this frequently happens where these restoratives are most needed,—in lingering illness, and during convalescence from acute disease.

The food is subjected in the stomach to the action of the gastric juice; a secretion consisting of water, probably of lactic and hydrochloric acids, and of an azotized substance having the nature of a ferment—pepsine. When, from any cause the secretion

of the gastric glands is deficient or arrested, recourse may be had to the use of artificial pepsine with great advantage. This substance is usually prepared from several rennet bags (the fourth stomach of the ruminants) by washing them, and scraping off the mucous membrane. The latter is then reduced to a pulp, macerated in distilled water for twelve or twenty-four hours, and filtered. A sufficiency of acetate of lead is added to the liquor, the precipitate is collected, and a current of sulphuretted hydrogen passed through it. Then it is again filtered, evaporated at a low temperature, and the dry residue (pepsine) powdered. The chief symptoms which call for the use of this agent, are—imperfect or slow digestion, with flatulence, acid eructations, nausea, low spirits, and lassitude; diarrhœa, with portions of undigested food in the evacuations; phthisis, cancer, and other diseases attended with great debility; and affections of the stomach itself,—as gastric ulcer, malignant disease of the pylorus, &c. It is also beneficial in anæmia, want of appetite, offensive breath, dilated stomach, morbidly fetid stools, and sometimes in the sickness of pregnancy.

Pepsine should be given alone, or it may be mixed with certain medicines without its properties becoming deteriorated. Thus, when severe pain follows the ingestion of food the sixth of a grain of morphia can be added to each dose; when there is pyrosis, fifteen grains of the white bismuth; when the peristaltic movements are sluggish, the twentieth or twenty-fifth part of a grain of strychnia; and when there is anæmia, some preparation of steel—particularly the reduced iron, or the citrate of iron and quinia. It is a common occurrence for patients to tolerate ferruginous tonics and cod-liver oil by the aid of pepsine, who cannot do so without.

There are several preparations of this agent which may be used. In BOUDAULT'S *Poudre Nutrimentive*, as purchased from MR. SQUIRE, the pepsine is mixed with starch in such proportions, that one part of the powder so formed will have the power of digesting four parts of fibrin at a temperature of 98° F.—Thus, fifteen grains of it will probably cause the meat of a mutton chop to be digested in the stomach. This, then, is the ordinary dose; and it should be taken at the commencement of the meal, either between two pieces of bread, or in a tablespoonful of lukewarm soup.

MORSON'S *Pepsine wine* is obtained from the gastric juice of the calf's stomach. It is an agreeable, slightly acidulous wine; the dose being one teaspoonful in water. The *Pepsine Lozenges* prepared by the same chemist are convenient and agreeable.

BULLOCK and REYNOLDS' *Pepsina Porci* is procured, as its name implies, from the stomach of the pig. In a short series of experiments its action was found superior to that of most other kinds. The dose is from two to five grains, made into a pill with glycerine.

And, lastly, there is the *Rennet* or *Pepsine Wine* of DR. ELLIS, of Dublin, the preparation of which is thus described. Take the stomach of a calf fresh from the butcher; and cut off about three or four inches of the upper or cardiac extremity, which, containing few glandular follicles, may be thrown away. Slit up the organ longitudinally; and wipe it gently with a dry napkin, taking care to remove as little of the clean mucus as possible. Then cut it into small pieces (the smaller the better), and put all into a common wine bottle. Fill up the bottle with good sound sherry, and let it remain corked for a fortnight; at the end of this time it is fit for use. The dose is a teaspoonful in a wineglassful of water immediately after meals. Dr. Ellis also suggests this test for pepsine: Put a small cup containing milk in a vessel of hot water until the milk becomes bloodwarm. Then add a teaspoonful of rennet wine; and if it be genuine, the milk in two or three minutes will become as solid as blancmange.—See F. 394.

XVIII. UTERINE THERAPEUTICS.

421. *Ferruginous Emmenagogues.*

℞. Potassii Iodidi, gr. 18—30; Ferri et Ammoniæ Citratis, gr. 40; Tincturæ Nucis Vomicæ, fl. drm. j; Infusiæ Quassiæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

In amenorrhœa with a torpid circulation.

℞. Syrupi Ferri Iodidi, Glycerini, āā fl. oz. j; Olei Limonis, min. x. Mix. One teaspoonful in a wineglassful of water three times a day. See F. 32.

℞. Pilulæ Ferri Carbonatis, gr. 30; Pilulæ Cambogiæ Compositæ, gr. 15; Olei Sabinæ, min. xij. Make a mass, divide into twelve pills, and order two to be taken twice a day.

In amenorrhœa with anæmia and habitual constipation.

℞. Ferri Valerianatis, gr. 18; Olei Sabinæ, min. xxiv; Pilulæ Assafœtidæ Compositæ, gr. 36. Mix thoroughly, and divide into twelve pills. One to be taken three times a day.

In amenorrhœa with hysteria. See F. 412.

℞. Tincturæ Ferri Perchloridi, fl. drs. iss; Potassæ Chloratis, gr. 60; Tincturæ Acteæ Racemosæ, fl. drs. iv; Infusi Serpentariæ, ad fl. oz. viij. Mix One-sixth part three times a day.

In debility, with imperfect menstruation, pains in the back, and an irritable condition of the buccal or gastric mucous membrane. See F. 320.

422. *Stimulant Emmenagogues.*

℞. Extracti Ergotæ Liquidi, fl. drs. iij; Tincturæ Serpentariæ, fl. drs. vj; Decocti Aloes Compositi, ad fl. oz. viij. Mix. One-sixth part early every morning.

In amenorrhœa dependent on simple atony of the uterine organs.

℞. Potassii Bromidi, gr. 60; Tincturæ Cantharidis, fl. drs. iss; Tincturæ Cinnamomi, fl. drs. vj; Aquæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Olei Rutæ, min. xv; Extracti Ergotæ Liquidi, fl. drs. ij; Mucilaginis Tragacanthæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Boracis, gr. 60; Tincturæ Ergotæ, fl. dr. iv; Aquæ Cinnamomi, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Tincturæ Hellebori, fl. drs. iij; Syrupi Zingiberis, fl. drs. vj; Infusi Sennæ, ad fl. oz. viij. Mix. One-sixth part once or twice a day.

In amenorrhœa with torpid action of the bowels.

℞. Liquoris Strychniæ, fl. drm. j; Tincturæ Ferri Perchloridi, fl. drs. iss; Tincturæ Acteæ Racemosæ, fl. drs. iv; Infusi Quassiæ, ad fl. oz. viij. Mix. One-sixth part three times a day.

℞. Podophylli Resinæ, gr. 6; Extracti Hyoscyami, gr. 24; Pilulæ Aloes et Myrrhæ, gr. 30. Mix, and divide into twelve pills. One to be taken at bedtime for three or four nights in succession.

Where the menstrual flow is scanty, and the liver sluggish.

423. *Medicated Vaginal Pessaries.*

℞. Plumbi Iodidi, gr. 80; Extracti Belladonnæ, gr. 24—40; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix, and melt into a mass with gentle heat. Divide into eight pessaries, and order one to be introduced into the vagina every night or every other night.

In chronic inflammation and induration of the labia uteri, in ovaritis, in pelvic cellulitis, and in chronic cystitis.

For an account of the advantages of cocoa butter over other materials in making these pessaries the reader is referred to a paper by the author in the "Obstetrical Transactions," Vol. 4, p. 205, London, 1863.

℞. Unguenti Hydrargyri, gr. 80—120; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries. Where there is tenderness of the cervix uteri, or of the ovaries, thirty grains of Extract of Belladonna or eighty grains of Extract of Conium should be added to the mass.

℞. Extracti Aloes Socotrina, gr. 60; Olei Sabinæ, fl. drm. j; Butyri Cacoa, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries, and order one to be introduced into the vagina every night.

As an emmenagogue and purgative.

℞. Plumbi Acetatis, gr. 20; Extracti Opii, gr. 24; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries, and order one to be used every night.

In chronic leucorrhœa, acute and follicular vaginitis, &c.

℞. Zinci Oxidi, gr. 60; Extracti Belladonnæ, gr. 40; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries.

In the same cases as the preceding. Also in cancer of the cervix uteri, and irritability of the bladder.

℞. Potassii Iodidi, gr. 40; Extracti Conii, gr. 120; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries. One to be used every night.
In induration of the labia uteri in strumous subjects.

℞. Acidi Tannici, gr. 120; Pulveris Catechu, gr. 60; Butyri Cacao, oz. 1; Olei Olivæ, fl. drs. ij. Mix. Divide into eight pessaries, and order one to be used twice a week.
In prolapsus uteri with relaxation of the vaginal tissues, and in menorrhagia.

424. *Medicated Uterine Pessaries.*

℞. Acidi Tannici, Butyri Cacao, āā oz. ½. Mix. Divide into eight pessaries, each having the diameter of an ordinary stick of nitrate of silver.
In menorrhagia with a patulous condition of the os uteri, one of these pessaries may be introduced up the canal of the uterus and left there. It soon dissolves and coats the lining membrane with the tannin.

℞. Aluminis, gr. 80; Zinci Sulphatis, gr. 40; Butyri Cacao, oz. ½. Mix. Divide into eight pessaries, as in the preceding formula.

℞. Unguenti Hydrargyri, Butyri Cacao, āā gr. 200. Mix, and divide into eight pessaries, as in the first of these formulæ.

425. *Vaginal Injections.*

℞. Extracti Hæmatoxyli, oz. 1; Aluminis, gr. 120; Aquæ, fl. oz. ij. Mix, and label,—"To be added to one pint of cold water to form an Injection."—It is to be used with a vulcanized India-rubber syphon-syringe, a pint or more of plain water being first thrown up.
In diseases attended with an offensive discharge. The patient should be cautioned that the fluid will dye linen, &c., soiled with it.

℞. Zinci Sulphatis, oz. 1; Aluminis, oz. 3. Mix. Label,—"One teaspoonful to be mixed with a pint of tepid or cold water to form an Injection."
In leucorrhœa, gonorrhœa, &c.

℞. Zinci Chloridi, gr. 80; Aquæ, fl. oz. iss. Mix. Label,—"One teaspoonful to be mixed with a pint of cold water to form an Injection."
In gonorrhœa.

℞. Liquoris Plumbi Subacetatis, fl. oz. vi; Extracti Papaveris, oz. 2. Mix, and label,—"One large tablespoonful to be mixed with a pint of warm or tepid water to form an Injection."
In cases of leucorrhœa, with an irritable condition of the os uteri or vagina; as well as in rodent ulcer of the uterus.

℞. Extracti Papaveris, oz. 1½; Tincturæ Belladonnæ, fl. drs. iv. Mix, and label, —"Two teaspoonfuls to be added to one pint of linseed tea, to form an Injection."
As a soothing remedy in cancer of the cervix uteri, when there is but little tendency to hemorrhage.—It may be employed twice or thrice in the twenty-four hours.

426. *Sponge-Tents, &c.*

For the purpose of dilating the mouth and cavity of the uterus, the female urethra, a strictured rectum, or a contracted orifice of the male prepuce, nothing can be better than the sponge-tents introduced into obstetric practice by Dr. Simpson. These instruments are of a narrow conical form, and of various sizes. They are made by dipping a piece of sponge into water, and then compressing it around a central wire with whip-cord. After drying, the cord is removed; the surface of the tent being then coated with a mixture of lard and wax, while three or four inches of tape are fastened to its base. The tents which the author has generally used have been made by Duncan and Flockhart, of Edinburgh, and they are perfect. A metallic director, somewhat resembling the uterine sound with a sharp point, is needed for their introduction up the uterine canal; while their removal is accomplished by pulling the tape. A fresh tent must be introduced every twenty-four or forty-eight hours, until the tissues are sufficiently dilated to allow the finger to explore the cavity of the uterus.
Dr. Sloan, of Ayr, has suggested the use of the dried stem of the sea-tangle (Laminaria digitata) as a substitute for sponge. The stem of this common marine

plant is cylindrical, soft, flexible, firm, and capable of being greatly reduced in size by drying. On subsequently being supplied with sufficient moisture it dilates to at least three or four times its size. The tangle-tents produce equable dilatation, are in all respects very efficient, are cleanly, and ought to be cheap. They are more easily introduced into the uterus than the sponge-tents, but they are also more liable to slip out again when the pressure of the finger is removed. In employing these tents it seems best to dip them in hot water just prior to introducing them; avoiding the use of oil, as it interferes with their absorbing power.

Tents may also be made of gentian and of elm bark; but the author has had no experience with these kinds, having been perfectly satisfied with the sponge and sea-tangle.

427. *Galactophora and Galactophyga.*

α. GALACTOPHORA (Γάλα, milk, and φέρω, to bear), or GALACTAGOGUES (Γάλα, and ἄγω, to drive out), are remedies which increase the secretion of milk. Defective lactation is not common amongst healthy mothers, but with the weak and delicate it is very frequent. When it arises amongst the first class it is generally due to over-feeding; when amongst the second, anæmia is its cause. In either class, a torpid condition of the mammary gland may be its source.

Defective lactation from plethora will be best treated by purgatives, the most efficient being castor oil. All kinds of beer, wine, and spirits are to be prohibited. Animal food is to be allowed; with vegetables, bread, tea, &c. A mixture of milk and soda-water, in equal parts, forms an excellent drink in these cases. The patient is not to be weakened; but she should be cautioned against the vulgar error, that a large quantity of food is necessary simply because she is nursing.

Defective lactation from anæmia is not uncommon. When the weakness is not such as to forbid suckling, the health ought to be improved by animal food; by a fair allowance of ale or porter; and by taking milk, or cocoa made with milk, instead of tea or coffee. A raw egg beaten up in a tumblerful of milk, once or twice a day, will do good. Then ammonia and bark (F. 371) may be given, or some non-astringent ferruginous tonic (F. 403, 405), or cod-liver oil.

Defective lactation from torpor of the mamma is the most frequent variety. In these cases benefit will be derived from irritating the gland and nipple,—as by the careful use of the breast pump; by drawing out the nipple several times with the fingers, before the infant is applied; by passing an electric current through the gland, for fifteen or twenty minutes daily, for several days in succession; or by the application of a carrot poultice, during some hours daily. The breasts are to be kept warm. Moderate sexual intercourse is also useful. Beef and mutton, game and poultry, white fish, oysters, stewed eels, potatoes, parsnips, lettuce, carrots, turnips, &c., will increase the secretion. There is no objection to stout, or to any other kind of malt liquor, provided the stomach can digest it; while from one to two pints of cow's milk should be allowed daily. With regard to drugs perhaps the most efficacious is a decoction of the leaves and stalks of the *Ricinus communis*, or *Castor-oil plant*. DR. ROUTH recommends the administration of a strong decoction of this plant or of an extract; the dose of the former being from one to two drachms daily in water, or of the latter five grains. The castor-oil leaves may also be applied over the breasts, or an infusion of them may be used with lint and oiled silk. Amongst other remedies reputed to possess galactagogue properties may be mentioned,—*Aqua Anethi*, or *Dill water*, and *Oleum Anethi; Aqua Anisi* or *Aniseed water*, and *Oleum Anisi;* and particularly *Aqua Fœniculi* or *Fennel water*, and *Oleum Fœniculi*. The dose of either of these waters is from two to four ounces, and of the oils about five minims on a lump of sugar, twice or thrice daily. The value of such agents as the *Malva Sylvestris* or *Marsh mallow*, of the *Saponaria vaccaria* or *Cow basil*, of the juice or decoction of *Broom-tops*, and of the infusion of *Althæa root*, is very doubtful.

Sore nipples may indirectly be the cause of defective lactation. Slight excoriations, as well as chaps and fissures, may generally be healed by the use of the dilute solution of subacetate of lead, or by the liniment of lime, or by an ointment of balsam of Peru, or by a lotion containing borax and glycerine. Frequently drying the nipple with a soft rag, and then dusting it with spermaceti which has been finely powdered by the aid of a few drops of proof spirit, will be found exceedingly efficacious. Where the fissures are deep, light cauterization with nitrate of silver often answers well; or the painful spots may be painted with collodion, leaving the summit of the nipple free for the escape of the milk. A well-made shield, provided with an artificial nipple, will often enable a woman to suckle who would otherwise be unable to do so. The child's mouth must be looked to, so that if there are aphthæ they may be cured.

β. GALACTOPHYGA (Γάλα, milk, and φεύγω, to shun) are the remedies employed to arrest the secretion of milk.

Extract of Belladonna is, I believe, the most certain agent of this kind. Reduced to the consistence of treacle, by the addition of a little glycerine or water, it should be freely painted over each breast, night and morning; the parts being also covered with wet lint and oiled silk, or with a cold bread and water poultice. At the same time, one-quarter or one-third of a grain of the extract may be administered twice or thrice daily, if a speedy effect be desirable. Sometimes I have advantageously given it with quinine and camphor (F. 383).

Iodide of Potassium often succeeds, and is particularly useful if there be any painful engorgement of the glands. Six or nine grains daily, in divided doses, should be administered. Sometimes it may be better to give about ten minims of the tincture of belladonna with each dose; or the iodide may be combined with an active purgative salt, as the sulphate of magnesia (F. 31).

Colchicum has not succeeded well in my hands when given alone. But combined with the sulphate of magnesia, in the proportion of twenty minims to sixty grains, administered two or three times a day, it has appeared serviceable.

Camphor has been recommended. Three or four grains, with the same quantity of henbane, may be given in a couple of pills at bedtime; while frictions with the camphor liniment, or the compound camphor liniment, may be employed twice or thrice daily.

Tobacco acts in a similar manner to belladonna. An ointment, made by boiling half an ounce of fresh tobacco in eight ounces of lard, is to be kept continually applied. Or this remedy may be employed in the form of a fomentation.

Sage tea is a popular remedy, which can certainly do no harm.

428. *Aphrodisiacs and Anaphrodisiacs.*

α. APHRODISIACS (Ἀφροδίσια, venery) are medicines which excite or increase the sexual powers.

Many remedies have been supposed to act as sexual stimulants, but the majority of those which have been recommended merely have the property of exciting the imagination. This is especially the case with *Musk*, *Castoreum*, and *Ambergris;* extravagant substances which ladies may use as perfumes if they please, but which should be abolished from the Materia Medica. The volatile sulphurated or allyle oils, obtained from alliaceous and cruciferous plants (*Allium sativum*, *Allium ceva*, *Sinapis nigra*, *Cochlearia Armoracia*, &c.), have had some slight repute. *Indian hemp* and *Opium* have been used; but the latter, at least, generally exercises a contrary effect to that desired. *Cantharides*, *Turpentine*, and *Borax* probably possess no aphrodisiac powers, though popularly thought to do so. The only remedies which may truly be supposed to act as sexual stimulants are the various preparations of *Iron*, *Strychnia and Nux Vomica*, *Quinine*, and *Phosphorus*.

β. ANAPHRODISIACS (Ἀ priv., and ἀφροδίσια, venery) are generally believed to have the power of repressing the sexual feelings.

Nauseants (*Tartarated Antimony* and *Ipecacuanha*), drastic purgatives (*Elaterium*, *Jalap*, *Calomel*, &c.), *Camphor* in large doses, *Carbonate of Soda*, *Hemlock*, *Tobacco*, and *Alcoholic drinks*, probably possess anaphrodisiac properties.

XIX. CLIMATES FOR INVALIDS.

429. *General Observations.*

Notwithstanding the excellent writings of Sir James Clark, Edwin Lee, Granville, Burgess, Alexander Taylor, D. J. T. Francis, Scoresby-Jackson, and others, many invalids migrate every autumn to the south of France, Italy, Spain, &c., merely to find a grave. This happens partly because cases of far advanced disease are still sent abroad, when they ought to be kept at home; partly, because a situation unfavorable to the particular malady is selected, the laws of climate being ill understood; and, in some measure, because it is difficult to persuade the sick that simple change to another country is only one of the means by which they are to regain health. For although there can be no doubt that in change of air we have an efficient remedial agent, yet it is certain that this remedy, like all others, is not of indiscriminate application, but must be prescribed with judgment and discretion.

The diseases most likely to be cured or alleviated by the benign influence of change of climate are the following: pulmonary consumption; chronic laryngeal and bronchial affections; asthma; disorders of the digestive organs, with the various forms of dyspepsia; chronic gout and rheumatism; functional derangements of the sexual organs; affections of the kidneys; and hypochondriasis. It is beneficial to strumous delicate children; is invaluable as a restorative during convalescence from acute or prolonged disease; and especially is it one of the chief resources of "preventive medicine."

There is no model climate; no country can boast of being perfect. All that the physician's knowledge and tact will enable him to do is to select that situation which possesses the greatest advantages and the fewest drawbacks for the particular case he has in hand. Phthisis, for example, is prevalent and fatal in all countries, though more so in some than in others. Moreover, it must be remembered, that through the peculiar nature of zymotic (ζυμόω, to ferment) diseases, towns usually healthy are apt to be periodically visited by epidemics; and such places can only be avoided by consulting recent returns, or by instituting inquiries on the spot. In considering the sanative influence of any climate, attention must be paid to the aspect of the locality, its drainage, and its elevation above the sea-level; to the temperature and its equability; to the dryness or moisture of the soil and atmosphere, a degree of heat being often well borne when the air is dry, which is quite unbearable when it is moist; and to the nature of the prevalent winds. The amount of rain which descends in a season is not of such moment as the way in which it usually falls; a region liable to sharp heavy showers being much more favorable for the invalid, than one where it drizzles—like a Scotch mist—for days together. Luxuriant vegetation, though agreeable to the senses, may merely mean high temperature combined with moisture; conditions not favorable to the phthisical. So also the districts where marshy lands abound, or where occasional inundations occur, are notoriously unhealthy; for the evaporation of the water lowers the temperature, while the decaying vegetable matter becomes the source of malaria.

The beneficial effects of sea-air are due to its purity, to the equability of its temperature, to the iodine it contains, and to the constant presence of ozone. The latter —the most powerful oxidizing agent known—is a stimulant to all the vital functions; but if in excess, it causes great irritation, particularly of the organs of respiration. Ozone, found also in the air of mountainous and rural districts, has the property of decomposing iodide of potassium, uniting with the potassium and liberating the iodine, which latter body may be detected by starch. Hence test-papers saturated with a solution of iodide of potassium and starch are employed; the iodine, when freed by the ozone, uniting with the starch and forming blue iodide of starch (see F. 389). While sea-air has a certain amount of influence in preventing tuberculosis, it is by itself insufficient to cure this disorder. Mountain-air is also pure, has an average low temperature, and contains a large proportion of ozone.

Although a classification of climates can only be artificial, and merely useful as affording a rough view of their nature, yet those countries most resorted to by invalids may be arranged in four division, viz., the relaxing, sedative, exciting, and bracing.

1. In the *relaxing* climates (*e. g.* Pisa, Madeira, Torquay) there is an elevated temperature with an excess of communicable humidity. They are unfitted for cases where we wish to restore diminished tone—to build up shattered constitutions.
2. In the *sedative* climates (Rome, Pau, Cannes, Venice) we find a freedom from great dryness on the one hand, and from communicable humidity on the other. We should not select these where it is desirable to quicken a slow circulation, or where the secretions are too abundant.
3. In the *exciting* climates (Nice, Naples, Montpellier, Florence, Genoa, &c.) there is an excess of dryness, a highly electric state of the air, an excess of ozone, and during the early months of the year keen irritating winds. Such climates are injurious where there is nervous and vascular excitement, a tendency to inflammation, or where functional repose is needed.
4. In the *bracing* climates (Southport, Brighton, Mentone, Malaga, Algiers, &c.) the winter temperature while comparatively high is not oppressive, the air contains a moderate proportion of ozone, there is a certain amount of dryness, and the winds are less irritating than in the exciting class. They are generally to be avoided where there is a very sensitive state of the system, a tendency to apoplexy from hyperæmia, and in many affections of the heart or large vessels. But, as a general rule, they are more suited to cases of pulmonary consumption, and to renal and hepatic diseases than either of the others.

It would be of little practical use to introduce an extended table giving an approx-

imation to the death-rate of different countries. But it is interesting to shortly notice, that on an average of ten years (1851-60), the annual mortality from all causes stands thus:

For England and Wales,	population in	1861	being	20,066,224,	the deaths are	22	to each 1000 persons living.
" London,	"	"	"	2,803,989,	"	24	" "
" Bristol,	"	"	"	66,027,	"	27	" "
" Birmingham,	"	"	"	212,621,	"	27	" "
" Manchester,	"	"	"	243,988,	"	31	" "
" Liverpool,	"	"	"	269,742,	"	33	" "
" Dover,	"	"	"	31,575,	"	20	" "
" Hastings,	"	"	"	26,631,	"	18	" "
" Eastbourne,	"	"	"	10,721,	"	17	" "
" Brighton,	"	"	"	77,693,	"	22	" "
" Worthing,	"	"	"	18,921,	"	18	" "
" Isle of Wight,	"	"	"	55,362,	"	17	" "
" Scarborough,	"	"	"	30,425,	"	21	" "
For Paris,	population in	1862	numbering	1,696,141,	the deaths are	28	to each 1000 persons living.
" Berlin,	"	1861	"	547.571,	"	25	" "
" Vienna,	"	1861	"	512,000,	"	49	" "
" Turin,	"	1858	"	179,635,	"	26	" "
" St. Petersburg,	"	1858	"	520.131,	"	41	" "
" Moscow,	"	1858	"	386,370,	"	38	" "

When the locality to which an invalid is to resort has been decided upon, he should, on leaving home, be provided with a concise code of laws in writing; or he must be directed at once to consult a physician in practice at the town selected. His route had better be marked out for him; he should be cautioned as to the rate at which he is to travel; rules must be laid down as to the regimen he is to adopt; while he ought to be reminded that warm clothing, especially flannel, will be required. Frequently it will be better to have cheerful apartments, with a southern aspect, secured beforehand; so that at the end of his journey a few days' perfect rest may be enjoyed. The object of the tour ought to be clearly explained, while he is to be warned not to expect too much, especially at first. The physician in sending his patient abroad, is merely placing him in the position most favorable to recovery, but still where other remedies and general precautions will be indispensable. Foreign travel would be more agreeable to most men, could the plague of sight-seeing be dispensed with. But for the sick man to visit picture galleries, museums, damp old ruins, cold churches, &c., is frequently to frustrate the only object he should have in view, viz., the restoration of his health. In giving directions as to diet it must be recollected that travelling is very exciting and wearying to the invalid; that the organs of digestion almost always become more or less deranged; and that many articles of food which are taken with advantage in England, disagree in warmer latitudes.

In many instances the author has found it advantageous for the invalid leaving England for several months to carry with him a few pure drugs; together with a brief account of their properties, doses, and modes of combination. Not that he is to be encouraged to tamper with his health by playing the dangerous part of the amateur physician; but good advice cannot always be procured, or it may perhaps be had where only inferior drugs are obtainable for compounding the prescription. The medicines which are generally ordered are these:

Sulphate of Quinia, 1 oz.
Reduced Iron, 1 oz.
Liquid Extract of Yellow Cinchona, 4 fl. oz.
Spirit of Ether, 6 fl. oz.
Chloroform, 2 fl. oz.
Bicarbonate of Soda, 4 oz.
Compound Powder of Rhubarb, 6 oz.
Aromatic Powder of Chalk and Opium, 3 oz.
Liquid Extract of Opium, 2 fl. oz.
Sulphate of Zinc (for emetics, lotions, collyria, &c.), 3 oz.
Tincture of Arnica (for bruises, burns, &c.), 2 fl. oz.
Morphia and Ipecacuan Lozenges, ¼ to 1 lb.

Scales and weights: an ounce and a minim measure: a small spatula: an enema syringe, the cheaper and more simple the better: with lint and strapping, will complete the medical equipment. In certain special cases it may be well to substitute for some of the above drugs—blue pill, iodide of potassium, colchicum, gallic acid, pepsine prepared from the pig's stomach, and oil of peppermint. Two invaluable medicines—brandy and cod-liver oil—can be procured everywhere.

La Poudre Insecticide is sold in France, and is a very efficacious remedy against fleas. One or two teaspoonfuls, sprinkled over the sheets, serve to destroy these foes to comfort and sleep. Persian powder, made with the leaves of a kind of groundsel, will have a similar effect; and so will camphor, though in a less degree. Mosquito curtains may also be taken from England; for mosquitos are a serious nuisance to all but especially to the invalid, and they continue venomous in the South until the cold nights set in.

430. *Middlesex.*

α. LONDON.—This city, the largest and most healthy in the world, became the capital of England in 804, during the reign of Alfred the Great. In 1861 the area of London was 122 square miles,—giving about 23,000 persons to a square mile of surface. The mean annual temperature is about 51° F.: the average winter temperature being 38°, and that of the summer 63°. The nights especially are warmer than in the environs. The annual rain-fall is 2.16 inches; the average number of days, more or less wet, being 178.

Delicate invalids are often better in London during the winter and spring, than in the country, owing to its greater warmth, and the greater steadiness of its temperature from day to day. Asthma is such a capricious disease, that it is impossible to say beforehand what particular climate will suit any special example of it. But it is certain that very many asthmatics are better and more free from attacks in a large city, than in the clearer atmosphere of the country. Sufferers from this affection can especially apply to themselves the words of Bacon,—"The goodness of the air is better known by experience than by signs." Phthisical invalids will find BROMPTON or CHELSEA the most sheltered spots of the metropolis; but if they are benefited by a bracing air they must resort to the upper part of KENTISH TOWN or to HIGHGATE

β. HAMPSTEAD.—Many years ago, a mineral spring of repute in this village rendered it a fashionable watering-place. From the heath, upwards of 200 acres in extent, there are many fine views. The air is pure and bracing, and well-suited for children and convalescents. The low parts are damp, and should be avoided. Like GREENWICH, RICHMOND, LEWISHAM, SYDENHAM, &c., it often affords a convenient temporary residence for families driven from their town homes by the outbreak of some eruptive fever or other infectious disease.

431. *Kent.*

α. MARGATE.—The tonic and bracing air of this familiar locality renders it a very valuable temporary residence for many invalids. The atmosphere is extremely pure, the soil is dry and absorbent, and the water-supply good. Perhaps no place could be named which is more suitable for restoring the health of children and young people afflicted with any form of scrofula. The bathing is good; though the flatness of the sands may be a disadvantage to the adult.

The mortality among the residents is very low. For a long series of years (1838 to 1862) the average annual death-rate has been only 16 per 1000 for this class. The season lasts from May until the end of September. Being open to the north and east, the air is very bleak during the late winter and early spring months.

β. RAMSGATE.—Is much frequented in the summer, owing to its gayety, facilities for sea-bathing, &c. It is an excellent residence for delicate children during the months of October and November, when the crowds of visitors have left. The climate is warmer than that of Margate, and more bracing than that of the south-coast watering-places. BROADSTAIRS is about three miles from Ramsgate, and is an excellent and quiet sea-bathing place for children.

γ. DOVER.—This sheltered town is generally full in the summer and autumn. As a winter residence it is colder and more exposed to high winds than Hastings, but it is not therefore unsuitable for invalids who can bear a bracing air. The climate proves especially serviceable to those subject to chronic dyspepsia, nervous debility, congestion of the liver, &c.

δ. FOLKESTONE.—The beautiful country in the neighborhood, and the fine tonic air of this town, render it a most agreeable residence from the end of May until the beginning of November. Sufferers from dyspepsia, nervous irritability, and overwork will derive most benefit from this climate. SANDGATE, about two miles to the east, offers a milder winter climate, with an exemption from fogs. The mean winter temperature is 41–76°. Consumptive and dyspeptic invalids, who find Brighton too bracing and Hastings too relaxing, may well winter here, especially if they need quiet and seclusion.

432. *Sussex.*

α. HASTINGS AND ST. LEONARDS.—Situated about midway between Brighton and Dover, the climate of Hastings is very useful for invalids during the winter months. Well sheltered from cold winds, with lofty cliffs and undulating downs, a beautiful and cultivated country, a dry and absorbent soil of clay overlaid with sand, a pure

sea-air, and free from all sources of malaria, it may be regarded as a healthy sedative climate during six or eight months of the year. The bathing also is good in the summer. The mean annual temperature is 51°; that of winter being 40°; of spring 44°; of summer 60°; and of autumn 53°. The amount of rain in the year equals about 28.34 inches. South and southwesterly winds are most prevalent during the winter and spring, but unless high they cause but little discomfort. In the neighborhood are various springs impregnated with iron and carbonic acid, but they are not much used.

Hastings is suitable for cases of dyspepsia with loss of tone, chronic bronchitis, neuralgia, chronic rheumatism, gout, and scrofula. For the diseases of childhood it is a good locality. The author has not seen phthisical subjects derive much benefit from it, however; and sometimes he has thought that it seemed to induce hæmoptysis. Dr. Mackness (*Hastings considered as a Resort for Invalids*, London, 1842) has given a table of the causes of death during four years; from which it appears that the total number was 865, of these 254 being from chest affections, and of these latter 161 from consumption,—viz., 91 inhabitants and 70 visitors.

Although Hastings and St. Leonards now form one town, yet the former is the warmest and most protected, and hence best suited for very delicate invalids. Such as find Brighton agree with them from October until the end of December, may often advantageously spend January and February at St. Leonards.

β. Eastbourne.—Filling, as it were, a chasm between two cliffs, one of which is Beachey Head, this watering-place is rapidly increasing in importance. It is visited in the summer for sea-bathing; but it is a good residence for invalids requiring a bracing air from September until the beginning of January. Cases of scrofula, consumption, hydrocephalus, and tabes mesenterica often derive benefit here. It is also to be recommended in functional disorders of the heart and nervous system.

γ. Brighton.—The climate is bracing and restorative, and is especially beneficial to invalids during the autumn and early months of winter. Although the town is sheltered on the north and northeast by the South-downs, yet from the beginning of February until nearly the end of May cold north and easterly winds prevail, which prove very irritating, even to the healthy. The annual fall of rain is 25.6 inches. The western is milder but more damp than the eastern cliff; but the tonic air of the latter agrees admirably where the circulation is torpid.

Diseases of a nervous hypochondriacal type are much relieved by the invigorating atmosphere of Brighton. Great good is also experienced when the vital powers are sluggish, when there is anæmia, or when disease of the kidneys exists. Strumous children and convalescents from acute disorders may also be sent to this part of the coast. It is unsuitable for individuals of an irritable or plethoric habit, for such as have a dry harsh skin, and for those who have a tendency to asthma, inflammatory affections, hemorrhoids, &c.

δ. Worthing.—Lying twelve miles west of Brighton and with an aspect almost due south, this town is fully exposed to the sun's rays. It is sheltered from the hot winds of summer and the cold of winter by the South-down hills, which have an average height of 600 feet. Hence it is warm in winter until the middle of February, and cool in summer; the air being neither too bracing nor too sedative. The mean temperature for the year is about 51°. The rainy days are fewer, and the quantity of rain that falls is less, than at Ventnor or in the West of England. Occasionally, the east and northeast winds render the air very bleak. In summer the fine sands afford excellent bathing.

It is a good residence for convalescents; as well as for sufferers from lung diseases, hooping-cough, scrofula, chronic rheumatism, and renal affections.

433. *Hampshire.*

α. Southampton.—At the head of the Southampton-water, which stretches from the Solent and Spithead into the interior of Hampshire for some eleven miles, is the clean and handsome town of Southampton. The climate is said to be mild and humid, intermediate in character between that of Devonshire and Hastings. Though sheltered by the high grounds behind it, and by the New Forest, yet it is unsuited for most invalids, the temperature being variable. The effluvia from the river at low water are often very unpleasant.

A short distance from Southampton-water is Netley. Here has been built the *Royal Victoria Hospital;* which is especially intended for the reception of invalid soldiers from foreign stations, and which has become the head-quarters of the Army Medical School. The site seems to have been well chosen; while in most respects the arrangements of the building are excellent.

β. BOURNEMOUTH.—This favorite watering-place, situated within a fine bay, is about ten miles from the western extremity of the Isle of Wight. It is well-screened by hills and pine-woods from the north and northeast winds, but is exposed to the southwesterly gales. Owing to the nature of the soil, outdoor exercise is practicable immediately after rain; while there are great facilities for easy walking. The mean annual temperature is 51.00°; that of winter being 42.38, spring 49.11, summer 60.18, and autumn 51.71.

It may be recommended as a quiet healthy resort, during the winter, for such invalids as are not affected by moderate variations of temperature, for those who are weak without having actual organic disease, and for persons returning from tropical countries. The climate is mild but not relaxing. During the spring and early summer months' thick fogs and cold easterly winds are rather prevalent. In summer there is good sea-bathing; but the heat, and clouds of fine sand which rise when there is any wind, render Bournemouth unpleasant to many at this season.

434. *Isle of Wight.*

α. RYDE.—The towns on the north side of the islands—Ryde and Cowes—are more suitable for summer visitors requiring change of air and occupation, than for invalids needing a dry atmosphere and repose. Although the attractions of both localities are great, yet in neither is the bathing good.

β. THE UNDERCLIFF.—This is the best part of the island for a winter and spring residence. It extends from the village of Bonchurch to Black Gang Chine, a distance of six miles along the southeast coast. The scenery is romantic, sea-fogs are rare except towards the end of May and during June, and both soil and atmosphere are dry; while it is well protected, by a range of lofty chalk and sandstone hills, from the north, northeast, northwest, and west winds. It is raised some fifty or seventy feet above the level of the beach; and may therefore be represented, in the words of Sir James Clark, "as a lofty natural terrace, backed by a mountainous wall on the north, and open on the south to the full influence of the sun from his rising to his going down, during that season at least when his influence is most wanted in a northern climate." The mean annual temperature is 51.35°; that of winter being 41.89, spring 49.66, summer 60.63, and autumn 53.58. The mean annual fall of rain is 23.48 inches; whereas at Newport, in the centre of the island, it is 33.60. The best season is from the beginning of November until the end of May: between August and October it is too relaxing and humid.

The Undercliff may be resorted to by all those who need a genial and agreeable winter and spring climate. It allows the phthisical invalid to reoxygenate his frame by almost daily exercise in the open air, at a season when he would be unable to do so at most other parts of England. The air is mild, and yet of a bracing tonic character; and hence it differs from that of *Torquay*, which is of a more moist and relaxing nature. Patients with laryngeal and bronchial affections, hepatic and renal disease, atonic and nervous dyspepsia, and children with glandular swellings or strumous ulcers, do very well at this part of the island.

435. *Dorsetshire.*

α. POOLE.—Standing on a peninsula, this old-fashioned town is an agreeable place for such as have to be driven from books and business to quiet and idleness. Owing to geographical peculiarities in its position, the tides in Poole harbor ebb and flow twice in twelve hours.

β. WEYMOUTH.—This town, with the adjacent MELCOMBE-REGIS, is a favorite summer resort; the beautiful bay of the latter, with its fine sands, being well adapted for bathing. In the autumn and winter, the temperature is equable; whilst the air is so pure that it is suitable for invalids from various diseases. Indeed so healthy is the climate, that Dr. Arbuthnot is reported to have jocosely said,—"A physician could neither live nor die at Weymouth." As it is the nearest English port to Guernsey, seventy miles distant, it is the station of the mail boats.

436. *Devonshire.*

α. BUDLEIGH SALTERTON.—A quiet retired village, nearly five miles to the east of Exmouth, in a small open valley on the sea-shore. For invalids who can climb the neighboring hills it offers a mild and protected winter residence.

β. DAWLISH.—Resorted to in summer for bathing, Dawlish may be recommended as a winter resort for those needing a mild air. It is more humid than Torquay.

Protected from northerly and southwesterly gales, it is still unfavorable in the spring, owing to the biting east wind which finds access to the picturesque valley on either side of which this small town is placed.

γ. EXMOUTH.—The new portion of this town stands high, and is much exposed to wind from every quarter. The old part lies along the margin of the river and the base of Beacon Hill, and is damp; though it has the advantage of being protected from southwesterly and northerly gales. Invalids who require a bracing air may be benefited here; but the cold variable weather in winter makes it unsuitable for those with pulmonary complaints.

δ. SALCOMBE.—Well sheltered, this is said to be the warmest spot on the southwest coast. For such as need a mild and equable winter temperature this small spot would be useful were it not for the want of convenient ground for exercise.

ε. SIDMOUTH.—Recommended in summer and autumn for its bathing, Sidmouth is also a good situation for invalids requiring a mild relaxing air during winter. The mean annual temperature is 50.1°; that of winter being 40.3, of spring 48.1, of summer 60.3, and of autumn 51.6. The annual rain-fall is 22.68 inches, the average number of days on which rain falls in the year being 141. It is tolerably protected from the northwest and north.

ξ. TEIGNMOUTH.—The mean winter temperature is six degrees higher than that of London, while that of summer is five degrees lower. On account of its exposed position it is not suitable as a winter home for the sick.

η. TORQUAY.—The climate of this favorite locality, while mild and equable, is less humid than that of many other places on the southwest coast. It has a southern aspect, and is sheltered on all other sides by heights. Mean annual temperature 52.1°; the average for the winter being 44.0, spring 50.0, summer 61.2, and for the autumn 53.1. The annual amount of rain is 28.20 inches; and it falls on about 132 days in the year. The season is from September to May; and though it is not absolutely necessary for the invalid to leave during summer, yet it will be better for him to do so. November is generally very fine, being bright and sunny.

Torquay is useful in many cases of phthisis, chronic bronchitis, laryngeal affections, and rheumatism. In heart disease, when this organ is oppressed without much lowering of the vital powers; in inflammatory dyspepsia, with an over-irritable condition of the mucous membranes generally; and for invalids returning from tropical climates,—this town may be recommended.

The climate has a soothing influence upon the organs of respiration; but the effect upon the nervous, digestive, and muscular systems varies according to the situation which the invalid adopts for his residence. Dr. Radclyffe Hall recommends a feverish excitable consumptive patient to lodge in a sheltered part close to the sea, provided sea-air does not disagree. When the feverishness is less marked, and there is danger from a sinking of the powers of life, a situation part-way up the hills suits better; or the beautiful district of MEADFOOT, protected from the east and northeast by an extensive range of cliffs, may be selected if close proximity to the sea be desirable. After a residence at the sea-level for a time, removal to the houses on the southern faces of the hills often proves useful.

θ. EXETER.—This fine old city, though standing upon elevated ground is sheltered. Except during July and August (when it is close and relaxing) it offers an advantageous residence for invalids requiring a residence away from the sea. Its mean temperature in winter is 41.4°, spring 49.5, summer 62.0, and autumn 51.9. The average number of days on which rain falls in the year is 162, the annual amount being 31.90 inches.

Other neighboring inland towns are agreeable and healthy,—KINGSBRIDGE, TOTNES, NEWTON-ABBOTT, TIVERTON, CREDITON, CULLOMPTON, OTTERY, HONITON, &c. Of the moor towns, it need only be said the air is moist and misty. DARTMOOR is bleak and chilly, the mornings and evenings even of summer being cold.

437. *Cornwall.*

α. PENZANCE.—This seaport, on the northwest side of Mount's Bay, is about ten miles from the Land's End. The climate is mild but relaxing. It has a mean annual temperature of 51.8°; the mean for the winter being 44.0, for the spring 49.6, for the summer, 60.2, and for the autumn 53.3. As a winter residence for invalids it possesses the twofold advantages of warmth, and great steadiness of temperature during the day and night. The disadvantages are that it is much exposed to wind

and storm, and that it is humid—the annual rain-fall being 44.6 inches. It should be avoided in the spring.

Penzance may be useful in chronic bronchitis, in the earliest stage of consumption if there is a dry harsh cough with scanty expectoration, and in the case of aged invalids who derive benefit from a warm moist atmosphere. It is injurious in phthisis with relaxation of the mucous membranes and copious secretion, in cases of hemorrhage, in atonic dyspepsia, and in debility of a low nervous type.

β. Land's End.—The climate somewhat resembles that of South Devon, but as regards humidity and exposure to winds it is inferior. Invalids should not remain in this district during the winter and spring.

438. *Gloucestershire and Worcestershire.*

α. Bristol.—This city, situated chiefly in Gloucestershire but partly in Somersetshire, has nothing to recommend it to an invalid. A few years since, a gentleman who assured the author that he always suffered either from gout or asthma, remarked that in Bristol he was generally afflicted with the former, but never with the latter; though directly he left this spot his breathing became impeded. Of the two evils he preferred a smoky city with gout, to pure country air and asthma.

β. Clifton.—Built on the sides and summit of a precipitous limestone hill, about one mile west of Bristol. In former days invalids resorted to this spot on account of its hot well: now it is in repute for its mild winter climate. The mean temperature for the year is 51.26°; that for the winter being 39.91, spring 48.79, summer 63.87, and autumn 51.49. The annual rain-fall is 32.56 inches; and the number of rainy days about 169. The lower part of the town is much milder, and more humid than the upper; and hence while preferable during winter for many cases, is too relaxing in the summer. The loftier situations (such as York Crescent, with its southern aspect and sheltered sunny promenade) are beautifully situated and well adapted for invalids during the summer and autumn months.

The Hot Well lies at the foot of St. Vincent's Rock. It yields an abundant supply of water at about 75° F., containing small quantities of magnesia and lime, with an unusual amount of carbonic acid gas. Owing to the latter, it might perhaps be advantageously taken in dyspepsia with irritability of the gastric mucous membrane; but it is very rarely, if ever, employed medicinally.

γ. Malvern.—Perhaps there are few more healthy and pleasant spots in the kingdom for a summer residence than this. Built on the declivity of the Malvern Hills, situated eight miles S.S.W. of Worcester, the scenery is all that can delight the convalescent, or the man who has broken down from overwork. The air is pure and invigorating; and is well adapted for bracing the system of such invalids as can bear an elevated site. Owing to the eastern aspect of the village, the strong winds of the winter and spring are severely felt.

There are two springs in the neighborhood, which may be frequented for amusement. But the waters of St. Anne's Well and of the Holy Well are only pure and soft; the very small quantities of muriate of lime, sulphate of soda, and carbonate of lime which they contain, being useless in a medical point of view.

439. *Lancashire and Yorkshire.*

α. Southport.—On the west coast of Lancashire, between the mouths of the Mersey and the Ribble, this watering-place is eighteen miles from Liverpool and thirty-two from Manchester. The climate is bracing and sedative, the air dry but not irritating, fogs are very rare, and the atmosphere is light and pure. The temperature is variable, changes occur rapidly, while the mean for the year is 54°. The sea-bathing is good, the shore sandy, the water clear and pure, and the bay so well sheltered that it is seldom too rough.

As a summer and autumnal residence it is useful in laryngeal, bronchial, and pulmonary affections; in tuberculosis; in dyspepsia with constipation and flatulence; in chronic rheumatism; in some forms of paralysis; and in nervous depression after long illness.

β. Scarborough.—Built on the slopes of a beautiful bay on the Yorkshire coast, this town is resorted to in summer for its sea-bathing. The season extends from June to October. It is suitable for nervous and hypochondriacal patients, for such as have been overworked and need change of scene and amusement, and for convalescents requiring a bracing air.

A short distance from the town are two mineral wells,—the *North* or *chalybeate*,

and the *South* or *saline* spring. There is not much difference, however, between their waters; those of both being aperient, alterative, and slightly tonic. Their temperature is about 49°; and they yield nitrogen gas, carbonate of iron, chloride of sodium, sulphate of magnesia (most abundant in the South spring), sulphate of lime, and bicarbonate of lime. They may perhaps be useful in habitual constipation, torpidity of the liver, and scrofulous complaints.

γ. FILEY has most of the advantages of Scarborough, with the additional one for the invalid of quiet and retirement. It has also a saline chalybeate spring.

δ. WHITBY.—The air of this seaport town is bracing and pure, the sands are extensive and afford good bathing, while there is a chalybeate spring which is thought well of for its mild tonic properties. As at Filey, the season extends from the beginning of June until the end of September.

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440. *Ireland.*

α. KINGSTOWN.—This is one of the best frequented sea-bathing places in Ireland. Situated about seven miles southeast of Dublin, on the southern shore of the bay, the harbor is said to be one of the most splendid artificial ports in the United Kingdom.

The sharp and bracing air of Kingstown proves injurious, during the latter part of the winter and the early spring, to patients with disease of the lungs.

β. HOLYWOOD.—A small watering-place much used by the residents of Belfast, from which city it is about five miles distant. The beach is sandy, and good for bathing.

γ. QUEENSTOWN (Cove).—A town which consists of a series of terraces, built on the southern acclivity of Cove island, in Cork harbor. It is well sheltered from northerly winds; is exposed to the full influence of the sun; and the winter climate is admirable, being mild and equable. The mean temperature for the year is 51.9°; that for the winter being 44.1, spring 50.1, summer 61.3, and autumn 52.0. The annual rain-fall is 33.25 inches; the average number of days on which there is wet being 131. The invalid should settle here about the end of October; and he will scarcely have a day during the ensuing four or five months when he will be unable to take exercise in the open air. Owing to the way in which the houses are built at a variety of elevations, the exact locality chosen must depend upon the patient's malady and strength.

All diseases needing a sedative and slightly humid atmosphere may derive benefit at Queenstown. Laryngeal, bronchial, and pulmonary complaints are especially relieved by a winter residence here; and so also are dyspeptic, strumous, rheumatic, and cutaneous affections. It is admirably suited for delicate children; and functional disorders of the uterine system are often cured by it. In the summer there is excellent sea-bathing.

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441. *Scotland.*

The climate of Scotland is remarkably equable throughout the year; the summer heat and winter cold being mitigated by the ocean winds. The mean temperature for the year is about 47°; that for the northern counties being higher than for the eastern. The prevailing winds are from a westerly quarter; blowing, for more than two-thirds of the year, from between the southwest and northwest points. In spring and early summer cold east winds prevail. The atmosphere is moist, nearly 100 inches of rain falling annually in some of the mountainous parts; though along the southern shores of the Firth of Forth the amount is under 30, at Glasgow about 29, and at Musselburgh not more than 24 inches.

The air of EDINBURGH, though neither genial nor mild, is yet salubrious; and is said to be favorable to longevity, as well as to the development of the mental and physical powers. The elevated situation of the city renders it exposed to violent winds; but the effect of these is favorable, at all events to the inhabitants of the Old Town, by driving away many impurities. As a place of education, for youths needing a bracing climate, it has great advantages.

The old city of ST. ANDREWS, situated on a rocky promontory some fifty feet

above the level of the sea, has a wholesome genial climate. It should be avoided in the spring months, as it is then visited by a disagreeable chilly mist from the northeast; but from July until the end of October the air is pleasant and salubrious. Sufferers from rheumatism, or invalids with weak lungs had better not remain long in this city.

On the western coast there are several localities which seem to possess good winter climates for invalids. The island of BUTE, in the Firth of Clyde, has many advantages; the air being mild and equable, though rather humid. Its mean temperature for the year is 48.25°; that for winter being 39.62, spring 46.66, summer 58.06, and autumn 48.59. The annual rain-fall is 38.62 inches; there being more or less wet on about 150 days. Snow rarely falls in the winter, and there is a freedom from fogs. It is protected from the east winds of spring; and there are great opportunities for outdoor exercise. The climate being rather sedative, invalids needing a strong bracing air must seek it elsewhere.

Hypochondriacs, sufferers from habitual constipation or sluggish action of the liver, and young men with a predisposition to phthisis, are often much benefited by a summer or autumnal walk through the HIGHLANDS; and certainly for the overworked literary or professional laborer nothing can be more invigorating than such a tour. "I verily believe that I should die," said Sir Walter Scott, "if I did not see the heather every year."

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442. *The Channel Islands.*

All the Channel Islands are remarkable for their beautiful and varied scenery, for the temptations they offer to the zoologist and botanist, the mildness and humidity of their climates, the absence of great heat in summer and great cold in winter, and for the equability and duration of autumn. The violent east, northeast, and north winds which prevail in the spring, are exceedingly disagreeable and injurious.

The climate of the Channel Islands is generally favorable in chronic disease, for asthma, affections of the urinary organs, and to convalescents from acute inflammations of the organs of respiration. The old and the young also are benefited by it. It is unfavorable in chronic rheumatism, hepatic disorders, structural diseases of the uterus or ovaries, nervous dyspepsia, hypochondriasis, and in cases where there is a tendency to hemorrhage. Pulmonary consumption appears to be as common and fatal among the inhabitants as in most other localities. The most favorable time for a stay in either of the group is from August until the beginning of February. In some instances, a change, for a time, from one island to another, is productive of good.

These islands may be reached by steamers from Southampton, Weymouth, Plymouth, and Newhaven in about twelve hours. Invalids, especially ladies and children, should choose their day of sailing so as to avoid a rough passage across the English Channel; and so that they may not have to land in small boats. The packets can generally enter the harbor of St. Peter's Port in Guernsey, and that of St. Helier's in Jersey, except near low water on a receding tide.

GUERNSEY, the most westerly and exposed of the islands, has an average annual temperature of 51.50°; that for winter being 44.2, spring 47.7, summer 59.9, and autumn 53.8. Dense fogs prevail in May and June. The mean annual rain-fall is rather less than 35 inches, falling on 164 days, and more often in night than day.

JERSEY is the largest of the group of islands, and the most important; being about twelve miles long, with an average breadth of five miles. The surface of hill and dale is well wooded; the coast is rocky and precipitous; and it is exposed to the wind from every quarter. The mean yearly temperature is the same as for Guernsey; during three quarters of the year the average being higher, while it is lower in the winter. The daily range of the thermometer is small, but it is greater than in Guernsey. St. Helier's contains nearly half the population of the island; but it is more foggy and humid, and therefore less suited for invalids, than St. Aubin's, which lies three miles to the southwest of it. The sands are good for summer bathing.

The air of ALDERNEY and SARK is usually said to be drier and more bracing than that of Guernsey; while that of the latter is less relaxing than that of Jersey.

443. *South of France.*

α. Pau.—This, the chief town of the department of the Basses-Pyrénées, is about 125 miles south of Bordeaux and 56 miles east of Bayonne. It may be reached from London in 48 hours; and the season lasts from the beginning of October until the end of May. The mean annual temperature is about 56°. The average for September, October, and November, is 56.4; that for December, January, and February 42.8; while for March, April, and May it is 54.0. The annual rain-fall is about 43 inches, the rainy days numbering 119. Owing to the gravelly soil any quantity of moisture is readily absorbed. Dr. Playfair, quoted by Sir James Clark, sums up the nature of the climate, thus: "Calmness, moderate cold, bright sunshine of considerable power, a dry state of atmosphere and of the soil, and rains of short duration. Against these must be placed,—changeableness, the fine weather being as short-lived as the bad, rapid variations of temperature, within moderate limits. In autumn and spring there are heavy rains." The air in December, January, and February is dry, and out of the sun cold; but even in these months the rays of the latter are so powerful that the pedestrian ought to protect his head with an umbrella. There are very few days on which the invalid will be unable to take exercise between 12 and 3 o'clock.

Pau is not influenced by the west-northwest wind, the *Circius* of the ancients; nor by the north wind or *Bise* which produces a biting cold; nor by the northwest wind or *Mistral:* in fact, the climate is calm and soothing, high winds being rare. It is useful in cases with a scrofulous taint, in preventing generation of tubercle, and in checking softening of tubercle when formed. Indeed, as Dr. Taylor states, the predisposition to disease favorably influenced by this town may be summed up in one general principle, viz., wherever it depends upon increased nervous and arterial action, permanently produced, either by temperament or by some cause leading to more active disease.

The climate is sedative, modifying nervous and vascular irritation; and therefore beneficial in irritations of the mucous membranes of air-passages or alimentary canal. It is unsuitable where the powers of life are declining; in chronic catarrh or bronchitis of old people, with loss of tone and excessive expectoration; in chronic rheumatism or gout, with debility of digestive organs; in tendency to apoplexy from passive congestion; in chlorosis; and in disorders attended with congestion of the venous system and diminished nervous energy. In all these cases the climate of Nice is the remedy. In short, Pau is to be chosen when there is "functional derangement of a tonic irritable type, which paves the way to organic mischief." Acting on persons in health it lowers the tone, makes the sanguine phlegmatic, and the choleric melancholic.

β. Biarritz.—A fashionable sea-bathing village on the shores of the Bay of Biscay, some five miles southwest of Bayonne and sixty-five miles from Pau. The roads between the two places are excellent, and communication by diligence or omnibus very easy. It can be reached from London in about forty-eight hours. The air is warm, the temperature of the sea high, and there is always a soft invigorating sea-breeze. When benefit has been derived from a winter at Pau, it is often advisable to go to Biarritz for the summer; returning to Pau for a second winter. The sandy gently-shelving beach is well adapted for bathing, which is no slight luxury in water at a temperature of 75° F.

According to Dr. Henry Bennet, the climate not only renders Biarritz a favorite summer and autumn watering-place, but puts it among the eligible winter stations of the south. It is cheaper also in winter than summer, being then almost deserted by fashionable visitors. In cases of severe disease it is not equal to Pau, Ajaccio, or Mentone, the winter breezes from the Bay of Biscay being often very violent.

γ. Montpellier.—The reputation which this city formerly enjoyed as a winter residence for consumptive patients has entirely gone. The climate is dry, irritating, and changeable; and though the heat of the sun is great, yet the winter winds are cold and unbearable. Mean temperature of the year 59.5°, winter 44.2, and summer 76°. Phthisis is very prevalent amongst the native population. Invalids with relaxed mucous membranes and copious secretions sometimes find advantage from spending the autumn here.

δ. Marseilles.—This city, second only in importance to Paris, offers no residence for the invalid. Pulmonary consumption annually destroys a large number of young women and men. Catarrhs, pleurisy, and pneumonia are common; and so are cutaneous affections, diseases of the generative organs, and cancer.

Mean annual temperature 58.32°, winter 45.22, spring 55.91, summer 72·93, and autumn 59.21. Although these figures are high, yet the winter is sharp and cold,

the winds being high and prevalent, especially the mistral (northwest). In spring, the variations in temperature are sudden and dangerous, and there is much rain. During summer the heat and dust are intolerable.

ε. HYERES.—This little town is agreeably situated, about two miles from the shores of the Mediterranean, and an hour and a half's drive from Toulon. The climate is clear, pure, dry, and tolerably mild. The greater portion of the town is sheltered from north and east winds; while it is open to the south, benefiting by the influence of the sun and sea-breezes. But it is exposed to the mistral, as there are no protecting hills on the northwest; and this blows frequently during the first three months of the year. It has been thought one of the best localities in the south of France for the winter abode of invalids with pulmonary disease; as there is much fine weather, without great variations in temperature. The mornings and evenings, however, are cold; and hence, remembering too the prevalent winds, it should not be recommended. In summer, the heat and dust prove very annoying. The best season is during April or May, or from the beginning of September to the end of November.

ζ. CANNES.—An agreeable sea-port, on the shores of a small bay, well protected from cold winds. It has a climate more moist and sedative than Nice, and less so than Pau. The lower parts of the town should be avoided, as the drainage is bad. The overworked man of business, seeking fresh air, genial sunshine, and a locality possessing a combination of fine sea and mountainous scenery, may advantageously winter here. Cases of nervous dyspepsia are particularly benefited, and so are some forms of phthisis.

In the summer, Cannes is resorted to for sea-bathing, the extensive sands being well adapted for this purpose. Sand baths are sometimes used for the relief of rheumatic and paralytic affections of the limbs; the patients being immersed up to the chest in sand warmed by the sun. Like mud baths they may serve to amuse the invalid, while he is breathing pure air and living by rule.

η. NICE.—The reputation long enjoyed by Nice for salubrity has been found to have been greatly overrated. Protected towards the interior by the Maritime Alps and the Estrelles, cooled by the breezes of the Mediterranean, and with a mild, dry climate, it would seem to be a favorable locality for phthisical patients. But notwithstanding these advantages the valley is exposed, during winter and spring, to cold irritating winds from the east and northeast; and the Nisands then suffer much from catarrh, ophthalmia, skin eruptions, pneumonia, and irritable gastric affections. The mean temperature for the year is 59.01°; for winter 46.33, spring 55.92, summer 71.83, and autumn 61.52. The variations between the warmth of night and day, of sun and shade, are remarkable. The annual rain-fall is about twenty-six inches; most falling in October and November, leaving the other winter and spring months comparatively dry.

M. Carrière has compared the valley in which Nice is situated to an open fan, the arch of which is formed by the mountains, and the point by the shore, where the Var discharges itself into the sea. But the mountainous semicircle is indented in parts, and down these interruptions the winds blow from certain points, and injuriously affect consumptives. The mistral is "the scourge of the Mediterranean shores of France and Sardinia." It may continue one, three, seven, or more days at a time; in autumn and winter it blows frequently, and hence it is absurd for invalids requiring a mild temperature and calm atmosphere to winter at Nice. The southeast wind, or sirocco, so injurious on the continent of Italy, becomes changed into a mild beneficial breeze during its transit across the Mediterranean to Nice; it modifies winter cold, and summer heat and dryness. *La Croix de Marbre*, the suburb of Nice, inhabited by the English, is most unfavorable for pulmonary invalids; it is exposed to the libeccio (a relaxing southeast wind), and to the blighting influence of the mistral. The invalid, if he will go to Nice, should live at the foot of the heights, in one of the shady valleys open to the south. The brilliant sun entices him out of doors, and then the blighting piercing wind attacks him; no flannel will keep out the cold. The bills of mortality of the Nisands give one-seventh of the deaths from phthisis. That "Nice is one of the last places to which a foreigner laboring under tubercular phthisis should resort," is the opinion of Dr. Burgess. It is also unfavorable for nervous and susceptible invalids. The air may sometimes be beneficial in chronic rheumatism and gout; in uterine derangements connected with a relaxed and torpid state of the system; for delicate children of a strumous habit; and for invalids returning from tropical climates. The stay should extend from the middle of October until the end of April. The author has been told that there are well-conducted Pensions both at Nice and Cannes, which are preferable to the hotels as being more quiet and home-like.

θ. Villa Franca.—This little town, a short distance from Nice, has a climate somewhat warmer and drier, and is less exposed to the north and northwest winds. The vegetation is luxuriant and early.

ι. Mentone.—Lately a small Italian town, but annexed to France in 1860, Mentone offers one of the most sheltered stations in the south of Europe. It is situated on the northern shore of the Mediterranean, at the foot of the Maritime Alps, and twelve or thirteen miles to the east of Nice on the road to Genoa. The bay, in the centre of which the town is placed, is completely protected from the north, northwest, or mistral, and northeast winds by the mountains; while owing to the absence of fogs, the paucity of rain, and the great power of the sun, the air is very pleasant during the winter months. The mean temperature is a little higher than that of Nice.

From the beginning of November until the end of April the climate is genial and bracing. The invalid must not remain during the summer. A residence here is very useful in phthisis, when the disease has not passed beyond the first stage; and even when it has reached the second or third, provided the tubercular deposit be limited to a part of one lung. It is also beneficial in chronic cases of consumption; chronic bronchitis; and chronic gout and rheumatism. Strumous children improve remarkably. Some who visit Mentone prefer the eastern bay, some the western; but whichever be chosen, care must be taken to select rooms having a south aspect, and with the bedroom not on the ground floor. For the sake of those who are not overburdened with wealth, it may be as well to remember that Nice and Mentone are both extravagant places, while *San Remo* is much cheaper, and the air is just as good during the winter.

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444. *Corsica.*

This island, one of the most important in the Mediterranean, was ceded to France by the Genoese in 1768. Dr. Henry Bennet has recommended Ajaccio, on the west coast, as an admirable winter station for invalids. He describes it as a clean and cheerful little French town, with quiet sunny streets; and which, not being cramped in by walls, has spread itself out on the northwest side of a beautiful bay directed due south. This bay is protected from all winds but the southwest by its hemicircle of grand mountains in the distance. The climate is as warm as that of Nice (from which it is distant some eight or nine hours' sail by the mail-steamer), and it is unexceptionally healthy. Napoleon Bonaparte was born here 15th August, 1769.

Ajaccio is the only town of Corsica that appears thoroughly eligible as a winter residence. The climate of Bastia is warm and agreeable; but the town has a small tideless port, and is exposed both to southeast and northwest winds. Dr. Manfredi, the surgeon of the civil hospital at Bastia, states that nearly all surgical wounds heal at once by first intention, while purulent absorption is almost unknown. Corsica should be avoided in the autumn, on account of the malaria which then prevails in many parts.

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445. *Spain and Portugal.*

α. Alicante.—Lying along the shore of a bright open bay in the Mediterranean, is this healthy town. It is sheltered on the north and northwest sides by a limestone rock some 700 feet high, is free from malaria, and has a mild dry air with comparative immunity from high winds. The mean annual temperature is 63.7°, that for winter being 52.1. The rain-fall is very moderate. In summer the calm open sea, and sandy beach, afford good bathing. In winter, whatever may be the temperature of the morning air, the middle and after-part of the day will generally be mild and calm.

As a winter residence it may be recommended to such as need a dry and somewhat stimulating climate. It has been found useful in chronic bronchitis, with excessive secretion; as well as in atonic dyspepsia.

β. Barcelona.—This, the chief city of Catalonia and the second in importance of Spain, has a mild winter air. It is open to the sea on the south and southwest, and is partially protected from westerly and northerly winds by the hills at the back.

The mean annual temperature is 63.14°, that of winter being 50.18; while there is rain on some 69 days in the year. Invalids requiring a rather stimulating and dry climate may reside here, but it cannot be strongly recommended. April and May are the most uncertain months.

γ. CADIZ.—The semi-insular position of this commercial town, on the shores of the Atlantic, would seem to point it out as a suitable winter residence for those requiring sea-air. The climate is soft, humid, and relaxing; the winters are mild and the summer temperate; the weather is showery, especially in winter and autumn, but the soil being porous it soon dries; and there are few days during winter on which exercise cannot be taken in the open air. The mean annual temperature is 62.75°, that for winter being 52.80, though very often at this season the thermometer, in the shade, will stand at above 60. Rain falls on about 100 days in the year; but it generally comes in showers, with intervals of sunshine.

This town may be recommended in some irritable affections of the chest, and in certain cases of heart disease. Women with any tendency to ovarian or uterine disorders should avoid Cadiz. The stranger will find it best to reside in the central portion of the town,—as on the sunny side of the square of General Mina or San Antonio, or in one of the lesser plazas. The wall (Muralla del Mar) which nearly surrounds the town has on its summit an agreeable walk.

δ. MADRID.—The capital of Spain, situated nearly in the centre of the Peninsula, is perhaps an attractive city for the tourist; but the irritating and stimulating character of the climate renders it an unfavorable one for the English invalid. The mean annual temperature is 57°; but the range is so great that DR. FRANCIS has observed a thermometer pointing to below freezing a little after sunrise, stand at 106 at 3 o'clock P.M. The winters are raw and long, with hard frosts and piercing cold winds: in summer the heat is irritating and oppressive, so that even the Spaniards cannot stand it. "The subtle air," says FORD, in his Handbook, "which will not extinguish a candle, puts out a man's life. . . . . No wonder, according to Salas, that even the healthy of those born there live on physic."

ε. MALAGA.—DR. FRANCIS speaks very highly of *Malaga*, which, indeed, seems to be the El Dorado of cities; for he asserts that there is no place in Spain, nor in the whole of Europe, as far as our present information goes, that possesses a climate at once so mild and equable, with so little variation from day to day. This seaport city is situated on a bay of the Mediterranean, 65 miles east-northeast of Gibraltar. The mean annual temperature is 66.11°, that of winter being 54.41; the heat of January corresponding with that of May in London. The air is neither too moist, nor too dry; and a lofty mountain range forms a protecting background to the winter winds. The annual rain-fall is said to be only 16½ inches.

The longevity of the people is remarkable: persons aged from 80 to 90 being seen going about the streets in full possession of all their faculties. Though the ratio of mortality is 1 in 37, yet it must be remembered that this is larger than it would otherwise be; not only from the excessive mortality in early life (42.3 per cent. during the first five years) owing to the mothers not nursing their infants, but likewise from the presence in the town of a large garrison and a crowded convict establishment. The principal drawback seems to be the terral, a cold harsh wind from the northwest, which occasionally blows during the winter with great force. It causes restlessness, and oppression at the chest, where there is any pulmonary affection. The air is also unfavorable in diseases of the nervous centres.

The invalid who requires a warm, dry, and gently tonic climate, with constant sunshine, may well visit Malaga for the winter. A residence here is especially useful when phthisis seems to threaten, or even when it is present in an early stage. He should live in the newer part of the town, where the soil is sandy, and through the centre of which runs the Alameda, a fine broad promenade bordered by cheerful well-ventilated houses. The Spanish custom of taking a siesta in the middle of the day ought to be adopted. There is regular steam communication with Liverpool, the voyage lasting seven or eight days.

ζ. VALENCIA.—This city, built upon the great plain of Valencia, is about three miles from the sea. It may be reached in seven days from England, by way of Marseilles. The town is very clean, the climate unusually dry, though the water evaporated by the system of irrigation pursued impregnates the air with moisture; there are no cold fogs; the wind is soft and mild during winter, in summer refreshingly cool; and the mean annual temperature is 63.5°, that of winter being 49.7. The cold is often appreciable in early morning and after sunset during winter, but it is warm by mid-day. The spring-time is the best—from the middle of February till the beginning of May; autumn is to be avoided, owing to the miasmata from the rice plan-

tations. Consumption is not uncommon among the poor; but then in no part of Spain does the laborer work harder, or subsist on a more meagre diet.

Useful for the overworked man of business, semi-invalids, and hypochondriacs, men with impaired health, but no organic disease, gout and rheumatism, calculous affections, albuminuria, and nervous dyspepsia. There are several towns within easy reach of Valencia where the invalid may go for a short stay, such as *Alcira*, *Carcajente*, *Jativa*, *San Felipe*, &c.

ν. Seville.—The famous capital of Andalusia, and the city of Figaro, possesses a soft and tonic climate. It may be visited by the hypochondriac, by convalescents from lingering disease, &c., or the invalid who has wintered in Malaga might advantageously stay here during May. The best part of the year is from November to March. There is considerable rain in October, November, and April. Occasionally during the summer the sultry and irritating levante or east wind prevails, giving rise to fever, ophthalmia, mental irritability, and neuralgic affections.

θ. Aranjuez.—Situated twenty-four miles south of Madrid, on the left bank of the Tagus. The season consists of April and May, during which months the climate is soft and most agreeable. The water of the town contains a little sulphate of soda, and hence is sometimes aperient if taken largely.

ι. Lisbon.—The capital of Portugal has a dry and bracing climate; though the changes from sunshine to rain, from heat to cold, are sudden and remarkable. Hence it is not to be recommended for pulmonary invalids; while, moreover, phthisis is very prevalent among the inhabitants.

The mean annual temperature is about 62.00°; that for winter being 52.52, spring 59.66, summer 70.94, and autumn 62·48. The annual rain-fall is 23 inches, most wet days occurring in winter. The predominating winds are those from northeast to southeast, and to them is due the cold of winter.

Dr. Francis says that the best situation for an invalid who wishes to pass the winter in Lisbon is the upper part of the Val de Pereiro; a continuation of the valley in which the new part of the town and the public gardens lie. "Here, upon the southern slope of the hill, are a few villas in the midst of orange gardens, which are well sheltered, and afford choice views over the town and river. Those who prefer a country residence, may select the neighborhood of *Bemfica*, a village on the Cintra road, about a league from Lisbon. This place is in high reputation among the Portuguese physicians, for the purity of the air, and it is here they send their convalescents."

κ. Cintra.—A summer residence of the court and wealthy inhabitants of Lisbon, from which it is only sixteen miles distant. Frequent breezes, a humid soil, and an abundance of vegetation render the summer air cool and healthy. The winters are wet and cheerless.

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446. *Gibraltar.*

This strongly fortified portion of the British possessions occupies a mountainous promontory near the southern extremity of Spain, at the entrance of the Mediterranean. The town is built on the western aspect of the rock. It is unsuitable as a residence for invalids; for though the average winter temperature is 57.93°, yet the prevalence of the southeast wind—the levante—renders the locality cold, raw, and very unpleasant. Snow and ice are very rare, but there is considerable rain. Annual rain-fall 43 inches.

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447. *Italy.*

α. Lago Maggiore.—The largest of the lakes of Northern Italy. Along its shores are small towns resorted to by English invalids in summer. *Baveno*, *Arona*, and *Sesto* are the most frequented. But the climate, though clear and pure, is often marred by the violent thunderstorms which prevail in summer; there is a heavy dew at night, while the neighboring glaciers make it cold when the wind blows from that quarter. The air is injurious to phthisical invalids, but useful in general debility, in dyspepsia, and for such as need a cool tonic atmosphere.

β. Lake of Como.—Situated to the northeast of Milan, from which it is not far distant. The air is genial and mild, the temperature equable, and the heat not

oppressive, owing to the alternate play of the tivano or north wind during the night, and the breva or south wind in the day. For ordinary invalids in summer the best situations on the Lake are *Balbianino*, *Torno*, and *Bellagio;* but for the consumptive *Varena* is more suitable. *Cadenabbia* and *Tremezzine*, on the shore near the middle of the lake, are very beautiful spots; while according to Dr. Burgess, *Plinia-ana*, the most noted spot along these classic shores, the supposed residence of Pliny, will not yield precedence to either in climate or situation. The cold in the winter is great, especially at the northern extremity of the lake. No part of Italy, perhaps, is so suitable for the consumptive in summer as the Lake of Como. That dreaded disease, pellagra, a kind of leprosy, is not uncommonly seen here. From one-third to a fourth of the lunatics in the Lombardy Asylum are suffering from it, for it induces insanity; while many cases of it, in early stages, are to be found in the hospitals.

γ. Milan.—This city, the capital of the Lombardo-Venitian kingdom until 1859, when it was made over to Sardinia, is situated in a fertile plain between the Olona and Saveso rivers, at an elevation of 394 feet above the Adriatic. It is indifferently sheltered from the various winds, so that the climate is cold; snow and rain are frequent during the winter; while the sudden transitions from humidity to a dry harsh air render it an unfavorable locality for any but the strong. It is frequented by consumptives going to or returning from the south of Italy; but the shorter their stay the better. In 1831, official returns showed that, amongst the Milanese alone, 20,000 individuals were attacked by pellagra.

δ. Brescia, Pavia, Verona, and Mantua.—The principal towns of Lombardy are all particularly unsuitable for invalids. Agues, fevers, and inflammations are very common. The cold in winter is intense; the atmosphere is saturated with moisture; there are dense clouds and fogs; there are large quantities of rain, in the form of a fine continuous drizzle; and cold winds are very prevalent, especially the northeast.

ε. Venice.—This city, the queen of the Adriatic of the poets, is built on piles in the midst of a lagoon or large marsh, two miles from the mainland of the Continent. It would seem to be slowly crumbling to decay. The climate is mild and equable, the air being impregnated with emanations of bromine and iodine. Consumption is prevalent among the inhabitants. Invalids are not attracted to Venice by the climate, however, but by its historical associations, and many sickly persons are to be found on the favorite promenade—the Piazza of St. Mark. The mean temperature of winter is about 39° F., of spring 54, summer 73, and autumn 55. Drizzling rain sometimes falls for days together. The result of seven years' observation gave a mean of 5½ days of snow in winter. In Venice the dolce far niente practice is fully carried out, the climate being favorable to indolence and voluptuous ease. Contrary to what might be expected, ague is unknown. The tranquillity which prevails over the city is not unfavorable. As the climate is sedative and lowering, it is not fit for those who are depressed by disease; and except in the early stage it is injurious to phthisical patients. It is suitable for such as have a tendency to inflammation, hæmoptysis, &c. Invalids may remain here from the close of autumn to the end of spring; but it is most agreeable in the latter season.

ξ. Genoa.—This town, at the head of the Gulf of Genoa, is one of the last places for a consumptive to pass any time at. The vicissitudes of temperature are rapid and extensive; there are sudden gusts of wind; while the biting coldness of the tramontana or north wind, alternating with the warmth and humidity of the sirocco or southeast, the two prevailing winds of Genoa, proves very trying. The best time for a visit to Genoa (not by a consumptive) is about the autumn or the beginning of summer. Pneumonia, hæmoptysis, consumption, and catarrh, are amongst the most frequent diseases.

η. Florence.—The capital of Tuscany, a few hours' ride from Pisa, may be an agreeable residence for the very strong. But certainly in no part of England could a more unfavorable climate be found for consumptives. It is built in a deep ravine, almost surrounded by the Apennines, and intersected by a squalid river. It is one of the stations on the western zone of Italy, where it rains the most. Extreme cold in winter, great heat in summer, chilling northerly winds, occasional fogs, violent atmospheric and thermal variations; these are its chief peculiarities in a sanitary point of view. The nervous excitability of Florentines is explained by the topography of the city.

θ. Pisa.—The dismal aspect of this neglected city surpasses that of any other in Italy. The dreary solitude of the streets causes gloom and melancholy; while everything seems stricken with decay or death. It is often recommended for consumptive invalids; but the climate is mainly indebted to tradition—being mild, humid, and

relaxing. The sky is dull and often murky. Perhaps the high walls around Pisa assist in protecting portions of it from the cold winds, especially the Lung' Arno, or that quarter where the invalids reside. The mean temperature of winter is about 45°, spring 59, summer 74, and autumn 63. The winter is colder than at Rome. The air is moist from the great prevalence of southerly and Mediterranean winds. The climate is very depressing—causing general lassitude while it enervates the faculties. Many foreign invalids die within a few weeks of their arrival. Hæmoptysis frequently sets in where there is any tendency to phthisis.

ι. Rome.—Situated on marshy ground at the foot of a range of low hills, about fourteen miles from the sea, and divided by the Tiber into two unequal portions, Rome has not so much to recommend it to those really in search of health as many other places. The climate is mild, soft, and sedative; but malarious effluvia, in a greater or less degree, are never absent. The best time in the year is October and the first ten days of November. The mean annual temperature is 60.49°; that of winter being 46.75, spring 58.25, summer 74.24, and autumn 62.75. Owing to its exposure to cold winds, the variations in temperature are great and sudden. Northerly winds are common in the morning and evening, but in the middle of the day it blows from the south. The tramontana is cold and searching; but the prevalent wind is the sirocco from the southeast, which is hot, sometimes dry, and sometimes so moist as to render the streets slippery and damp. Under its influence the tissues relax, appetite fails, bowels become torpid, spirits flag, and the weakly get oppressed with lassitude and headache. If an invalid will go to Rome in the winter, let him spend as much time as he can in St. Peter's. No other public building can compare with this church as regards possessing a dry equable temperature all the year round. The mild genial air in its interior is so prized, that the sickly meet and promenade in St. Peter's when the weather will not permit of exercise in the open air.

Dr. Burgess entertains a very unfavorable opinion of the sanitary value of this city. And he points out that the popular feeling in favor of a mild and relaxing climate for consumption is altogether wrong, being based upon erroneous data, if not upon mere tradition. A cold climate, such as that of Norway or of Canada, and still air, are evidently more rational indications, if the formation of tubercle is the result of a relaxed state of the vital functions, involving impaired digestion, depraved nutrition, and degeneration of the blood. Nothing is more calculated to derange the digestive organs than the sedative influence of a malarious atmosphere. The mild climate allays bronchial irritation, at the expense of the general health and of disordered nutrition.

The most fitting localities in the city for the invalid with any bronchial irritation, chronic rheumatism, &c., are the north and west sides of the Piazza di Spagna, as having a southern exposure; or he may choose one of the streets running east and west from, and near to, the Piazza,—the Strada de' Condotti, Strada della Croce, Strada Frattina, &c., the north sides of which gain the southern sun, and all of which are on sheltered ground. The south side of the Strada del Corso should be avoided, as the Tiber frequently overflows in winter, generating low fever, &c. The Piazza del Popolo is also subject to damp fogs. In most cases the second and third floors of a house are preferable to the first; since, owing to the narrowness of the streets, they are more exposed to the sun. The higher and more exposed ground of the Monte Pincio, Via Sistina, Piazza Barberina, &c., is suitable for those with healthy chests, and who can bear a high wind.—The stay can extend from October till the end of May.

κ. Naples.—The climate somewhat resembles that of Nice, but is more variable and humid. Situated on the northern shore of the Bay of Naples, on the slopes of a range of hills, near the foot of Vesuvius, this city seems to offer all that is charming to the man in health, and everything that is pernicious to the invalid. The mean annual temperature is 60.26°; winter being 47.65, spring 57.56, summer 74.38, and autumn 61.46. Besides other winds it is exposed to the sirocco or southeast, which is enervating to both body and mind; as well as to the mistral or northwest, which brings raw piercing cold and damp. Catarrh, pneumonia, phthisis, rheumatism, ophthalmia, uterine disease, and cutaneous affections are common amongst the inhabitants. Eustace says, and apparently with reason,—"If a man be tired of the slow lingering process of consumption, let him repair to Naples; and the dénouement will be much more rapid."—So fatal is the climate to invalids with pulmonary disease, especially during the winter, that the proverb, "Vedi Napoli e po' mori," may be interpreted in a more literal sense than that intended.

λ. Baiæ and Pozzuoli.—Situated in the vicinity of Naples, these towns are recommended by M. Carrière as winter residences for invalids already sojourning in the Neapolitan territory. The air is humid and warm, and little disturbed by violent winds. But the undrained swamps in the neighborhood of Baiæ, and the fatality of

phthisis at Pozzuoli ought to deter any invalid from leaving England for these stations of classic renown, however anxious he might be to escape to them from Naples.

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448. *The Ionian Islands.*

This group of islands in the Mediterranean, off the west coast of Greece and Epirus, ceded to the Greeks by Great Britain in 1863, consists of *Corfu*, *Cephalonia*, *Zante*, *Santa Maura*, *Ithaca*, with many smaller islands. Their surfaces are mountainous and rugged, but in some of the larger islands are fertile plains. They vary but little in climate; the winters being stormy and wet with northerly winds, the springs warm, and the summers dry and hot. Intermittent and remittent fevers, dysentery and diarrhœa, phthisis and pneumonia are prevalent. As a tour for the hypochondriac a visit to these islands may be recommended.

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449. *Malta.*

Of an area not much exceeding that of the Isle of Wight, this island forms the chief station of the British fleet in the Mediterranean, and is daily called at by ships of all nations. The atmosphere is clear and bright, the annual rain-fall about 15 inches, the air mild and bracing in winter, and the temperature equable with a yearly average of about 64°. Heavy gales of wind are not very frequent, though the atmosphere is never entirely calm. The gregale or northeast wind is cold in winter, and often does damage in the harbor of Valetta; while the sirocco or southeast prevails especially in August and September, is hot and humid, and produces lassitude with debility.

The Rev. James Sherman, who suffered from consumption, writing from Malta on the 16th January, 1861, says,—"A blazing sun shoots his rays into my room, and a delicious breeze makes it sufficiently cool. I look out on a sort of Regent Square—people traversing up and down in crowds—a beautiful garden opposite my window, with hundreds of oranges on the trees—priests, beggars, and guides jostling one another in every direction—a side view of the ocean—a deep blue sky, without a cloud—and at night the stars looking so large, near, and brilliant, that I can scarcely believe I am only 4½ days from the frost and snow of England. The climate seems most delicious, and well adapted to invalids."

The weather is most agreeable from the middle of October until the end of January. Asthma connected with chronic bronchitis, atonic dyspepsia, strumous glandular swellings, and deranged health from overwork,—these are the cases which are most likely to be benefited by a stay in the cheerful bustling capital—Valetta.

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450. *Egypt.*

One of the earliest civilized localities in the world, this country has long been divided into the provinces of *Saïd* or *Upper Egypt*, *Vostani* or *Middle Egypt*, and *Bahari* or *Lower Egypt*. Upper and Middle Egypt are more healthy than the Delta. There are only two seasons in Egypt,—the temperate from October to March, and the hot from March to October. At *Cairo*, the capital, the climate is healthy, little variable, and dry; the mean temperature of the year being 72.2°, while that of winter is 58.5, and of summer 85.1. Taking the whole of Egypt the mean temperature in December, January, February, and March may be said to be about the same as that of this country in June, July, and August.

The invalid should leave England some time in October, so choosing his time of sailing by one of the Peninsular and Oriental Company's steamers as to be able to see the best spots on the south coasts of Spain and Portugal, Gibraltar, and Malta. This arrangement will usually be preferable to that of beginning the voyage at Marseilles. From Malta to Alexandria occupies only a few days: the traveller should arrive at the latter by the middle of November. Leaving this port as soon as "the Sights" are visited, he proceeds to Cairo by railway; whence he begins to ascend the Nile, so as to reach Thebes by the beginning of December. The climate of Thebes is all that the valetudinarian can desire; and hence he may either remain there, or proceed southerly in the direction of Nubia. But, however far his trip may extend,

he should be back in Cairo by the end of March; whence he may arrange his home journey, by way of Greece and Constantinople, so as to be in England by about the latter part of June.

The necessity for travelling by, and living in, boats after leaving Cairo has of course certain disadvantages, and is somewhat expensive. But with a dry balmy atmosphere, and a sky bright and cloudless, the invalid may find much that is most agreeable and exhilarating in the even progress of a Nile boat—a dahabeëh. The two chief annoyances to the traveller in Egypt are the dust and "Baksheesh." The former may be mitigated by suitable clothing,—mohair dresses for ladies, and flannel shirts with tweed suits for gentlemen; while the latter must be avoided by not exhibiting too much liberality, and by bargaining beforehand with dragomen, guides, coachmen, boatmen, &c. The climate may especially be recommended in the early stages of tuberculosis, in chronic bronchitis, some forms of humoral asthma, gout and rheumatism, renal diseases, dyspepsia, and affections of the nervous system.

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451. *Algiers.*

The city of Algiers, the capital of an extensive country of Northern Africa bordering on the Mediterranean, has been much resorted to by invalids. It can be reached easily in seven or eight days from London; by way of Folkestone, Paris, Lyons, Marseilles, and thence by steamer in forty-eight hours. About the end of October is the best time for the invalid's arrival on the coast of Africa; the great heat having then usually ceased, and the first rains having refreshed the lands, so that the country has the appearance of spring.

Speaking of this city, Dr. Mitchell says that with difficulty, if at all, will the European traveller find a spot on earth where natural beauties so combine with those of man's creation to please and interest him. One of the long sides of the oblong of which "the Place du Gouvernement" is formed, is open to the sea; commanding a view of the bay, the harbor, the site of the ancient Rusginium, the peaks of the distant Atlas, and the verdure of the Sahel slopes. The "Place" itself is filled with a strange mixture of all races; the Arab, the Moor, the turbaned Jew of Africa, the Maltese fisherman, the Spanish fruitseller, the veiled women of Moslem, the picturesque Jewess, the pretty Spaniard, &c., &c. The invalid will find objects of interest without seeking them, and will be gratified and amused merely by wandering in the open air. The mean annual temperature is about 66.50° Fahr. The mean temperature for each season is—winter, 56.91; spring, 67.60; summer, 77.73; and autumn, 63.80. Compared with other points on the Mediterranean, Algiers has a warmer and a less varying climate than Marseilles, Nice, Genoa, and Naples; while it more nearly approaches, but is still superior to Malta, Corfu, and Gibraltar. Dr. Mitchell also quotes the opinions of M. Odrultz, which are to the following effect: 1st, The climate of Algiers is opposed to the generation as well as to the evolution of tubercle in the lungs; 2d, This morbid production is observed but very exceptionally among the indigenous population; 3d, Europeans who do not bring the germ of the disease to Algiers almost never become phthisical; 4th, Those who do bring not only a predisposition, but actually crude tubercle, in greater or less quantity, in the lung, are often cured; or, in the worst cases, the progress is extremely slow; 5th, When the tubercle has softened, the climate is no longer favorable, but the reverse.

The climate is also beneficial in laryngeal and bronchial affections; in chronic heart disease; in gout and rheumatism; and in renal disorders. Nervous complaints, paralysis, epilepsy, and convulsions are aggravated by it. Cerebral congestions and a plethoric condition of the uterine organs are common in Algiers.

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452. *The Azores—Madeira—Canaries.*

a. The Azores or Western Isles.—This group of nine islands, belonging to Portugal, lies in the midst of the Atlantic Ocean. They are of volcanic origin, all possess similar features, and have mild equable climates. The atmosphere is saturated with moisture. A winter trip to the Azores may be recommended where a soothing relaxing climate is needed. Hence it is beneficial in inflammatory dyspepsia, bronchial irritation with scanty secretion, and in the premonitory stage of consumption. Sir James Clark thinks that a change from the Azores to Madeira, and from thence to Teneriffe, would in many cases prove more beneficial than a residence during the whole winter in any one of these islands.

β. MADEIRA.—Of the group of Madeira Isles the largest and most important is Madeira, about 120 miles in circumference. Funchal, its capital, has long enjoyed great reputation as a winter residence for the phthisical. The invalid who leaves this country about the middle of October can reach Madeira in from ten to fourteen days; where he will find himself in a tropical climate, with an unclouded sky, a glowing sun, a deep blue sea, a luxuriant and varied foliage, and beautiful hills which were covered with flourishing vineyards. Since the autumn of 1852, however, when the vine disease suddenly broke out, there has been a sad change; the plants still being destroyed by the deadly fungus. The return voyage should be undertaken about the beginning of June.

The climate of Madeira is mild, equable, and moist. There are occasional storms of wind and rain, and fires are often necessary in the mornings and evenings. The mean annual temperature is 64.9°; that for winter being 60.6, spring 62.3, summer 69.5, and autumn 67.3. The annual rain-fall is 29.23 inches; the days on which there is wet being about 70, whereas in London they number 178. The most injurious wind is the hot parching leste, from the east-southeast.

The invalid who cannot bear a dry irritating, but needs a mild and soft atmosphere, will obtain it here. Laryngeal, bronchial, and pulmonary diseases are soothed; and benefit may be derived by patients threatened with consumption. If he wish to spend a second winter in Madeira before returning home, a voyage may be taken to Teneriffe in June. and the stay prolonged there until the end of October.

γ. THE CANARY ISLANDS.—This group (Fortunatæ Insulæ) consists of seven principal islands, and several islets. The climate differs from that of the foregoing in being warmer, drier, and less relaxing. At *Santa Cruz*, the capital of *Teneriffe* (the only island possessing good accommodation for the valetudinarian), the mean annual temperature is 70.15°; that for winter being 64.85, spring 68.87, summer 76.68, and autumn 74.17.—Orotava or Laguna are sometimes preferred to Santa Cruz.

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453. *Cape of Good Hope—Natal.*

α. THE CAPE OF GOOD HOPE.—The climate is mild and healthy, but very dry. The seasons are the reverse of those in Europe; December and January being the warmest, while June and July are the coldest months. The mean temperature for the winter months of 1858, at Cape Town, was 57° F. The prevalent diseases appear to be rheumatism and dysentery. Invalids from India are often benefited by spending a season at the Cape or at Natal.

β. NATAL.—This British colony lies on the southeastern border of Africa, about 800 miles from the Cape of Good Hope. There may be said to be only two seasons, —the summer from October to March, and the winter from the beginning of April to the end of September. Even in the latter, during the coldest months of 1858, the temperature was occasionally 78° F., in the neighborhood of Maritzburg; while in the hottest months it was occasionally below 60°. ("The Colony of Natal." By Robert J. Mann, M.D., p. 48. London, 1860.) Notwithstanding its almost tropical position, and the frequent vicissitudes of temperature, Natal is very healthy. DR. MANN remarks, that while 480 soldiers die yearly out of every 1000 stationed at Sierra Leone, 121 in 1000 at Jamaica, 78 in 1000 in the West Indies generally, 48 in 1000 in the Madras Presidency, 28 in 1000 at Bermuda, 27 in 1000 in the Mauritius, 27 in 1000 at St. Helena, 21 in 1000 at Gibraltar, 16 in 1000 in Malta and Canada, and 14 in every 1000 in Nova Scotia and New Brunswick,—only 13 in 1000 die yearly in the western district of the Cape Colony, and only 9 in 1000 in the eastern district. During the Kafir war in 1835, not a single officer or man was invalided during the five months of active service. Newly-arrived settlers in Natal remain for months under canvas without the slightest injury.

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454. *Canada—New Brunswick—Nova Scotia—Newfoundland.*

α. CANADA.—This British colony of North America is divided by the Ottawa River into the provinces of Upper or West Canada (chief city, Toronto), and Lower or East Canada (chief city, Quebec). The climate is marked by extremes, the winters being excessively cold, while the summers are just as hot. The coldness of the winter is mitigated, however, by the dryness of the air and the absence of high winds;

while the way in which the Canadian protects himself with thick furs, and his house by well-managed stoves, enables him to set the frost at defiance. A gentleman, resident in Canada for six years, told the author that with the thermometer —20° he never felt the cold as raw and unpleasant as in London at the beginning of January, 1864. The climate is also much milder in Upper than Lower Canada; but that of both provinces is healthy and conducive to longevity.

β. New Brunswick.—The climate of this portion of British North America resembles that of Canada; the winters being very severe, and the summers excessively hot. The winter, however, is mitigated by the length and fineness of the autumn,—the "Indian summer."

γ. Nova Scotia.—This peninsula of North America, forming part of the British colonial territory, is separated from New Brunswick by an isthmus 14 miles across. The climate is remarkable for vicissitudes of temperature, prolonged falls of rain, and occasional fogs. The inhabitants, nevertheless, are said to enjoy a remarkable degree of health.

δ. Newfoundland.—This island, lying off the coast of Labrador, is separated from the mainland by the Strait of Belleisle, 12 miles across. The surface is mostly marshy, and the soil unfavorable to cultivation. The winters are less severe than in Upper Canada, but the summers shorter. Dense fogs prevail along its banks, sometimes for the greater part of the summer. The annual mortality, however, scarcely exceeds 12 per 1000 of the population, so that the climate must be favorable to the constitution.

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455. *West Indian Islands.*

Invalids should not be sent to any of these islands; for though they are not as unhealthy as was formerly supposed, yet severe fevers and inflammatory diseases are common, and run a rapid course. Moreover, the returns show that nearly twice as many cases of consumption originate among our troops stationed here, as at home. If a man in search of health will visit them, however, he must only do so between the months of December and April, after the heavy autumnal rains. Jamaica, the chief of the British possessions, is reputed the most healthy. The Bahamas are resorted to by American invalids. In the Bermudas and the Barbadoes, dysentery, rheumatism, and yellow fever are the prevailing diseases.

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456. *Hill and Marine Sanitaria in India.*

The Indian *hill stations* offer a climate which is of great use to convalescents from fever, invalids from local cachexia, &c.; and which exerts a powerful influence in maintaining the health and vigor of Europeans.

According to Dr. W. J. Moore, of the Bombay Medical Service, the climate of hill ranges differs from that of the plains in having a mean temperature some 10° to 15° cooler, in being above the influence of the hot winds, and in being more humid during the monsoon season. Various localities differ in minor points: in the *Himalayas*, a greater elevation will procure a colder climate; the fall of rain has sometimes been excessive at *Mahableshwar*, at *Nynee Tal*, &c.; while at many of the hill stations sanitary laws are still too much disregarded, and too little care is taken to protect the system from the inclemencies of the weather.

The climate of the hill stations in the *Himalayas*, of *Mount Aboo*, of *Ootocamund*, *Bangalore*, &c., as well as of *Matheran* and *Mahableshwar* in *Bombay*, is of great service to the European whose health has deteriorated from a residence on the Indian plains. The air invigorates both mind and body. But it is unsuitable where there is structural disease of any internal organ; diarrhœa and dysentery being increased by it, while affections of the brain and lungs and liver are much aggravated. Cholera, dysentery, and malarious fevers are less prevalent and fatal in the hill stations, than in the plains below. Yet these affections are met with at high elevations; as are also cases of hepatitis, tuberculosis, typhus, croup, diphtheria, small-pox, rheumatism, neuralgia, severe catarrh, and hill-diarrhœa. It has been well-suggested that European troops should be located more on the hills, and less on the plains than is now the case; not waiting until they are weakened by disease, climate, and service to be sent to these more temperate and less malarious regions.

Many of the diseases which are aggravated by the hill stations of India are much benefited by the greater purity and uniformity of the *sea climates*. The invalid who has been prostrated by the harsh parching winds of the interior, not only has his bodily sufferings greatly ameliorated by the moist fresh breeze from the sea, but the mere sight of the ocean raises his powers by giving him hope and confidence. It is necessary to select an open spot, with high cliffs and a rocky shore; low, flat, sandy coasts being generally unhealthy in the tropics. The proximity of the island of *Martaban* to Madras and Calcutta, as well as its geological characteristics, have led Dr. Macpherson to recommend it as a marine sanitarium.

The weak-chested and those persons of a strumous habit predisposed to phthisis are often greatly benefited by a residence in India; but where tubercle is deposited in the lungs, the climate seems to accelerate the progress of the disease. Individuals of a phlegmatic temperament, with difficulty in digesting, and a languid circulation, often improve very much in this country.

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457. *Australia—Tasmania—New Zealand.*

α. AUSTRALIA.—The immense extent of territory known as Australia, in the South Pacific Ocean, possesses a temperate climate which appears very favorable to the European constitution. In speaking of this antipodal region, it is necessary to remember that the meteorological phenomena are generally the reverse of those experienced in this country; the months of December, January, and February corresponding to our summer, and having a mean temperature of about 80°, while those of June, July, and August constitute the winter, the thermometer marking on an average 40° in an exposed situation.

In May, 1836, the number of settlers in the district of *Victoria* (formerly Port Philip) was 177. At the end of a quarter of a century (April, 1861) the amount had increased to 540,322. The total area of Victoria (86,831 miles) is nearly as large as that of England, Scotland and Wales united. *Melbourne*, the capital of Victoria, is the most prosperous commercial city of the southern world. The mean annual temperature is 57°; extreme cold in winter, and excessive heat in summer (except nine or ten times in the season, under the influence of hot winds), being unknown. Although the annual rain-fall is 26 inches (that for London being 24), yet the average number of wet days is much less than in Great Britain; for in Melbourne the rain falls with great violence, but it only lasts a few hours, and then the sky clears. A continuance of cloudy weather is unknown. There is a genial sun; with a pure, dry stimulating air.

DR. S. DOUGAN BIRD says ("Australasian Climates, and their Influence in Pulmonary Consumption," p. 41, London, 1863), that the main characteristics of the Victorian climate are these: "It is a temperate warm climate, whose average summer heat is but two or three degrees above that of London; while in winter it is warmer than Nice or Naples, and as warm as Valencia or Barcelona; and actual cold is never felt at, or near, the sea-level. The air is generally dry, always stimulating and ozoniferous; but so tempered by the prevalence of ocean winds, that it is prevented from becoming irritating, like that of Nice or Provence. With this there is a very large proportion of sunny, cheerful weather durimg the whole year. In no climate with which I am acquainted is there so much pleasant weather during the year as in Victoria—so many unclouded days, when it is neither too hot nor too cold—and an invalid has, consequently, every temptation to be in the open air."

Tuberculosis (*i.e.*, scrofula, phthisis, tabes mesenterica, and tubercular meningitis) is rare in Victoria, the mortality not being one-fourth of that in Great Britain from the same cause. Yet the population is composed of those who, hereditarily, from occupation, and mode of living (except that animal food is much cheaper) are as much predisposed to consumption, as the inhabitants of London or Liverpool.

In the penal establishments of *Pentridge* and *Collingwood* (the former five, the latter two miles from Melbourne), with an average of 1000 male adult prisoners, the greater number undergoing long sentences, there was no death from consumption in 1860 or 1861. Comparing this with the statistics to be found in the "Reports of the Directors of Convict Prisons in England," it appears that at Millbank the greatest number of male prisoners in confinement at any one time during 1860 was 741, the daily average throughout the year being 531, and the total number in the year 2404. Of these 2 were recommended for pardon on account of advanced consumption; 2 died from the same; and 102 were removed to the Invalid prisons of Dartmoor, Lewes, or Woking on account of phthisis. These numbers, moreover, do not include 16 who were removed for hæmoptysis.—At the same prison in 1861, the greatest number of

such prisoners in confinement at one time was 809, the daily average throughout the year 515, and the total number in the year 2612. Of these 5 died from phthisis, and 132 were removed to Invalid prisons on account of it. This number also does not include 19 removed for hæmoptysis.

At *Sydney* (the capital of New South Wales, East Australia) the mean annual temperature is about 65°. Disease is said to assume a milder form here than in European countries. Dysentery and pulmonary affections are, however, not uncommon. The winters are colder than at Moreton Bay, though this season is very salubrious and agreeable.

Moreton Bay (Queensland, East Australia) has a fine winter climate which proves very useful in advanced cases of phthisis, with irritability of the system and a tendency to bronchial inflammation. The average temperature on the coast during the cold months is 62° or 63; the air being soft and sedative, and the weather brilliant and sunny. A few miles inland the ground rises, and the air is more dry and bracing.

In cases of consumption with copious expectoration, and in the chronic bronchitis of old people, *Adelaide*, the chief city of South Australia, may be chosen as a residence. The air is dry, warm, and tonic; the winter temperature averaging 53°.

The invalid leaving England for Australia will generally find the long uninterrupted voyage round the Cape of Good Hope, in a comfortable ship, much to be preferred to the more exciting and fatiguing "overland route," by way of Suez and Galle. The best time for leaving this country is from the middle of October to the end of November; when the new home will be reached in about 90 days from Liverpool. Thus supposing him to arrive about the end of January he will find a pale-blue cloudless sky, and the thermometer at 90° in the middle of the day without any unpleasant sense of heat. With a feeling of new life, general exhilaration, and a good appetite, he will experience a desire to be at work. The difficulty seems to be to persuade the phthisical that they are not cured; and that the general rules of hygiène must be adopted, and all excesses avoided to prevent the pulmonary mischief again starting into activity, or to escape hepatic congestion, or that he may obtain and retain health and vigor.

β. Tasmania.—This island (known as Van Diemen's Land, until the abandonment of transportation in 1852) is separated from the southernmost point of Australia by Bass's Strait. The chief towns are *Hobart Town* in the south, and *Launceston* in the north, the climate of both being salubrious and delightful. The latter port is reached in 24 hours, by steamer from Melbourne, and is beneficial to such cases as are usually sent to Pau. The air is moist, sedative, and equable. In the winter months of June, July, and August there is never great cold during the day.

γ. New Zealand.—This group in the South Pacific Ocean consists of two principal (the North and Middle) and several smaller islands. The chief British settlements are *Auckland*, *New Plymouth* or *Tarauki*, *Hawkes Bay*, and *Wellington*, in the North Island; with *Nelson*, *Marlborough*, *Canterbury*, and *Otago* in the Middle Island. The temperature of New Zealand is marked by its uniformity. The mean of the warmest month at Auckland is 68°, and of the coldest at Otago 42°. The climate, which in general terms may be described as mild and soft, appears to be favorable to the European constitution.

XX. MINERAL WATERS.

458. *General Observations.*

Mineral waters have been used in medical practice since the days when Æsculapius was worshipped all over Greece, and when his temples were erected in healthy places, near wells which were believed to have healing powers. Like many other important remedies their virtues have been regarded with singular skepticism at one time, and with blind credulity at another. The practitioner in the present day wisely attempts to keep the middle course; neither over-estimating, nor unduly depreciating, the value of these agents in subduing disease.

A mineral water is merely a complicated medicine, containing various salts and gases blended together. The ingredients are generally derived from the soil or rocks through which the waters pass; and they consist of saline principles, organic and inorganic matters, and more or less of a free gas (sulphuretted hydrogen, carbonic acid, nitrogen or oxygen). The cause of the temperature of hot springs is a mystery,

and we know not whether it is due to the internal heat of the globe, to electricity, to chemical decomposition, or to volcanic agency. The heat is always under that of boiling water (212° F.), and it has varied but little during a long succession of years. The waters are administered internally and applied externally; and they act chiefly by purifying the blood, increasing the processes of secretion and excretion, and by stimulating the cutaneous and visceral circulation. It cannot be doubted that these effects are due to the chemical composition and temperature of the waters; though it is allowed on all hands that the beneficial influence is aided by the locality of the spring, the nature of the climate, the absence of business and care, the diet, and the general regimen.

Mineral waters are useful only in chronic disorders, where there is little—if any—structural change; or in cases where disease is threatened. Hence the sufferers sent to the Spas are for the most part affected with skin affections, rebellious ulcers, stiffness of limbs from old sprains, &c.; chronic gout, rheumatism, sciatica, or neuralgia; hepatic or renal disorders; paralytic affections, where all active disease has been subdued; hysteria, or with certain functional disorders of the uterine system. Nothing but mischief can arise where there is either acute disease, tuberculosis, cancer, aneurism, or mischief about the heart. The young and very aged, moreover, will derive little or no benefit; and in pregnancy the use of the springs, to say the least, demands great caution.

The time for residing at some of the Spas is from May to September; but at several of the foreign ones it is only from June until the end of August. At a few of the hot springs, invalids (chiefly the gouty) remain through the winter. The treatment, however, is not commonly to be prolonged beyond six or eight weeks; and often three or four will suffice. The invalid should not be led to expect immediate relief. And he should be cautioned against the popular idea that the benefit derived will be in proportion to the quantity of water taken; while it may be as well to let him know that "critical eruptions" (psydracia thermalis), and "critical fluxes" are neither necessary nor advantageous. As a rule, bathing and drinking ought not to be commenced on the same day; and at first only a moderate quantity of the water should be taken. Very hot water is also to be cooled, and very cold to be warmed, before drinking.

When the strength will permit of it, early rising (at about 6 o'clock) is to be recommended, so that the doses may be taken before breakfast. The contents of the tumbler are to be sipped slowly and methodically, not hastily swallowed like a nauseous draught; and an interval of 15 minutes, at least, should be allowed between each glass, which time may well be spent in a short walk. An hour after the last glass, a light breakfast is to be taken. Then, a gentle saunter, the bath, reading, writing letters, &c., will agreeably occupy the hours till the early dinner; at which fruit and raw vegetables had better be avoided, while a moderate quantity of light wine, or of mild bitter beer may be allowed. An excursion to the objects of interest in the neighborhood, perhaps one or two more glasses of water—never more than half the quantity taken in the morning,—a light supper at eight o'clock, and bed two hours afterwards will complete the day's work.

Mineral waters are sometimes classified into the thermal or hot, and the cold springs. But a more useful division is into chalybeate, sulphurous, gaseous or acidulous, saline, iodo-bromated, and muriated lithia waters.

Class 1. *Chalybeate or Ferruginous Waters.*—A large number of waters contain small quantities of iron, but none are considered as belonging to this class unless the proportion of metal is considerable. The chief acidulous chalybeates (those which contain much carbonic acid gas) are the waters of Schwalbach, Spa, Pyrmont, Brückenau, the Cambray well at Cheltenham, and Tunbridge Wells. The principal saline acidulous chalybeates (such as, in addition to iron and carbonic acid, have a certain amount of sulphate and carbonate of soda, with chloride of sodium) are the springs of Franzensbad, Bocklet, Harrogate, &c. Chalybeate waters are useful in anæmia, and in functional disorders of the generative organs.

Class 2. *Sulphurous Waters.*—They have the odor of rotten eggs, owing to their impregnation with sulphuretted hydrogen. The chief sulphurous thermals are those of Aix-la-Chapelle, Baden near Vienna, Aix-les-Bains, Barèges, Bagnères de Luchon, St. Sauveur, Cauterets, Eaux-Bonnes, and Eaux Chaudes. Amongst the cold sulphurous springs may be mentioned Harrogate and Bocklet. Sulphurous waters are recommended in cutaneous, hepatic, uterine, rheumatic, gouty, and old constitutional syphilitic diseases. In chronic poisoning by mercury, lead, or copper, they help to eliminate the mineral.

Class 3. *Gaseous or Acidulous Waters.*—The carbonic acid gas gives these waters a sharp acidulous taste, with a sparkling appearance. The most important are the thermal springs of Vichy, and the cold of Fachingen and Bilin. The refreshing and ex-

hilarating waters of this class are recommended in dyspepsia, hepatic derangement, gout, and rheumatism, &c.

Class 4. *Saline Waters.*—Those which are purgative and have sulphate of soda or sulphate of magnesia as their chief ingredients, are Epsom, Cheltenham, Leamington, Seidlitz, Pülna, Carlsbad, and Marienbad. Those which have chloride of sodium as their characteristic ingredient, are Wiesbaden, Baden-Baden, Homburg, Kissingen, &c. The sulphate or carbonate of lime, or both, predominate in the thermal waters of Bath and Buxton. While the carbonate or bicarbonate of soda is the characteristic ingredient of the thermal springs at Ems, Teplitz, &c.

Class 5. *Iodo-bromated Waters.*—The springs at Kreuznach are the most celebrated of this class; while in England there is the Woodhall spa. The waters are used in all forms of scrofula, in many chronic skin diseases, in uterine tumors, and in old-standing constitutional syphilis.

Class 6. *Muriated Lithia Waters.*—The springs of Baden-Baden have considerable reputation for the cure of gout and the uric acid diathesis, owing to the chloride of lithium which they contain.

459. *Tunbridge Wells, in Kent and Sussex.*

This town is more visited on account of its dry bracing air, beautiful varied scenery, and fine walks, than for its chalybeate spa. The water of the latter has a temperature of 50°, is feebly ferruginous to the taste, contains about a quarter of a grain of *oxide of iron* to the pint, and has just sufficient *carbonic acid* to hold the metal in solution. Frequently, increased doses of steel are given with the water; or sulphate of magnesia may be added, if an aperient be needed. The chief value of the spring is witnessed in cases of anæmia and chlorosis, debility inducing dyspepsia, and in general lassitude from a too sedentary mode of life.

460. *Bath, in Somersetshire.*

The thermal mineral springs, situated in the southern part of the town, near the Abbey church, are four in number. The temperature of the waters varies from 120° F. to 104° F. Speaking generally, the solid contents are about ten grains to the pint. The chief constituents are *sulphate of lime*, *sulphate of soda*, *chloride of sodium*, *chloride of magnesium*, *carbonate of lime*, *silicic acid*, and a comparatively small proportion of *iron*. The gases evolved consist of *nitrogen* in large quantity, with *oxygen* and *carbonic acid*.

The sparkling appearance of the waters at the springs is due to the carbonic acid they contain. The quantity generally drunk is from one-quarter to one pint before breakfast, and again in the afternoon. Taken quietly and leisurely the effect is usually to raise the temperature of the body, to quicken the circulation, to increase the appetite, and to promote the salivary and renal secretions. When headache, loss of appetite, thirst, nausea, mental depression, and a diminished flow of urine follow their use, they should either be discontinued or taken in very small doses.

The accommodation for bathing is excellent; there being douche, shower, vapor, reclining, swimming, and chair baths. By the latter, worked with a crane, a helpless invalid is lowered into, and raised from, the water. The bath is to be taken three or four times a week, not too near the mealtimes, and the patient should remain in it from ten to thirty minutes. The proper temperature is 96° to 98° F.

The spring and autumn are the best seasons for taking the baths and waters, though they may be advantageously employed in the winter. And the diseases which are most benefited by them are subacute gout, chronic rheumatism, sciatica, neuralgia, lumbago, rheumatoid arthritis, contracted or rigid joints, dyspepsia, paralysis from rheumatism or metallic poisoning, leucorrhœa, chorea, anæmia, lepra, eczema, and psoriasis.

461. *Cheltenham, in Gloucestershire.*

Since the cure of George the Third by the waters of the Royal Old Wells, this spa has been a fashionable resort. Situated 8 miles E.N.E. of Gloucester, Cheltenham offers an agreeable permanent residence, particularly for valetudinarians from the East or West Indies. The climate in winter is mild and equable, rather moist, and sheltered by the Cotswold and other hills from the north and east winds. The season, however, is from the middle of April to the beginning of October.

The waters are chiefly taken internally. There are several cold springs, all of them powerfully saline except the Cambray chalybeate. The waters of the Royal Old Well contain chiefly *chloride of sodium*, *chloride of calcium*, *chloride of magnesium*, and *sulphate of soda*. They are but slightly gaseous. Some of the wells of the Mont-

PELLIER SPA have, in addition to the foregoing, a little *oxide of iron*, and *iodureted magnesium*, *saline salts*. There is an unusual amount of *silica* in the PITTVILLE saline; while the CAMBRAY spring is strongly *chalybeate*. The Montpellier baths have accommodation for warm and cold bathing, swimming, medicated air and vapor, douches, &c.

These springs enjoy considerable reputation for relieving the diseases engendered by a residence in tropical climates, and hence many old Indians with liver affections resort to them. They are also useful in gouty and rheumatic disorders, in the lithic acid diathesis, in plethoric and irritable systems, in skin diseases, in dyspepsia with torpidity of the bowels, as well as in some forms of amenorrhœa and chlorosis. The dose is usually from half a pint to one pint before breakfast; it is better to take the water pure, without the addition of any "solution" of the crystallized salts; and it may be warmed if a more than ordinary aperient effect is needed. The spring to be recommended must depend upon whether a simply alterative, or an alterative and tonic remedy is indicated.

462. *Purton and Melksham, in Wiltshire.*

The healthy village of PURTON, in North Wilts, 4½ miles W.N.W. of Swindon, has a dry bracing air. The Spa is 2½ miles from the village, in a field known as Salt's Hole, where a pump-room has recently (1859) been erected for the accommodation of visitors. An analysis of the water shows that it is rich in *sulphate of soda*, *sulphate of magnesia*, *sulphate of lime*, *carbonate of potash*, and *chloride of sodium*. It has also small quantities of *sulphate of potash*, *silica*, *iodide of sodium*, and *bromide of magnesium;* with traces of *iron*, *phosphoric acid*, and *sulphuretted hydrogen*. There is a large amount of free *carbonic acid gas;* and the temperature is 58.50° F.

The Purton sulphated and bromo-iodated saline water may be recommended where an alterative stimulant is needed. It seems to have been useful in strumous sores and enlarged glands, threatened consumption, stomach and liver disorders, gouty and rheumatic affections, obstinate skin diseases, and in functional derangements of the uterine system. The dose is from half a pint to a pint before breakfast, with half a pint in the evening.

The small town of MELKSHAM lies 10 miles E.S.E. of Bath, in a fine open country. In its vicinity are baths and a pump-room erected over the chalybeate and saline springs. The chief constituents of the waters are the salts of *lime* and *magnesia*, with smaller portions of *soda* and *iron;* and they are artificially charged with gas for exportation. In strumous, rheumatic, and cutaneous diseases, the medicated vapor and douche baths may be employed simultaneously with the internal use of the waters.

463. *Leamington, in Warwickshire.*

Being less protected by hills than Cheltenham, the town of Leamington, 2½ miles east of Warwick, has a lower temperature. The climate, however, is genial and bracing, but humid; while it is agreeable and healthy to the flagging invalid during the autumn and winter months.

The springs all lie near the banks of the Leam, their principal salts being *chloride of sodium*, *sulphate of soda*, *chloride of calcium*, and *chloride of magnesium*. The chief gas is *carbonic acid*, with great quantities of *nitrogen* and *oxygen*. The most ancient and most used of the springs is the OLD WELL. The water at GOOLD'S SPRING AND BATHS contains more *chloride of sodium*, while CURTIS'S WELL has more *muriate of magnesia* than the others. The VICTORIA WELL AND PUMP-ROOM possesses a weak *sulphurous* and a *saline chalybeate* spring; and so does LEE'S WELL.

The temperature of the Leamington waters is about 48° F.; and their action is aperient and alterative. They are suitable for the same class of cases as is sent to the Cheltenham springs; but being more active, they agree better with invalids of a torpid habit, than with those of a susceptible irritable temperament.

464. *Buxton, in Derbyshire.*

For invalids requiring mountain air Buxton may be recommended. Situated 31 miles W.N.W. of Derby, at an elevation of 900 feet, while some of the neighboring hills are 2000 feet above the sea, it enjoys a pure bracing air. The season is chiefly from June to October; the winds being sharp and cold late in the autumn, during winter, and early in the spring. It is not to be selected where there is a tendency to internal hemorrhage.

The Buxton waters issue from several crevices in the limestone rock, at a temperature of 82° F. The chief saline salts in them are, *carbonate of lime*, *carbonate of*

magnesia, *chloride of sodium* and *potassium*, with traces of *silex* and *oxide of iron*; though so small is the quantity, that in the whole they only amount to 20 grains in the imperial gallon. In the same amount of water Dr. Playfair found, *free carbonic acid*, in weight, 704.2 grains, *nitrogen gas* 200 cubic inches, and *carbonic acid gas* 15.66 cubic inches. In addition there is a chalybeate spring, containing one grain of *oxide of iron* to the gallon. As these waters, minus their gases, have only the composition of ordinary spring water, their stimulating effects are generally attributed to the nitrogen. They are, however, chiefly used externally; the accommodation for plunge, swimming, and douche baths being excellent. The good which results from the latter is most marked in cases of gout and rheumatism, sprains and muscular contractions, and where it is wished to stimulate the vascular or nervous or digestive systems.

A pleasant drive from Buxton is the picturesque village of Matlock, built on the slope of a hill, at the base of which flows the Derwent. It is an agreeable summer residence, and its springs supply large tepid baths. The water, however, has no medicinal properties, though the guide books describe Matlock as a spa.

465. *Woodhall, in Lincolnshire.*

This strong saline spring rises in a plain 3 miles W.S.W. of Horncastle, and contains more *iodine and bromine* than any other English water. It has also 189 grains of *chloride of sodium* in the pint, with a little *chloride of calcium* and *magnesium*, *bicarbonate of soda*, and *sulphate of soda*. The temperature is 55°. It is chiefly used externally in rheumatic and cutaneous affections, and in scrofula. Taken internally, half a pint acts as a mild aperient.

466. *Harrogate, in Yorkshire.*

High and Low Harrogate, half a mile distant from each other, and 27 miles west of York, are filled with visitors during the season,—from June until the middle of October. The air is pure and bracing, but somewhat humid. Low Harrogate is the most sheltered.

There are upwards of fifty different springs, some of which have been in repute since the end of the seventeenth century. The waters are all cold, being generally warmed artificially before they are drunk. Dr. Kenyon divides the springs into four distinct groups: 1. The strong sulphurous waters. 2. The mild sulphurous waters with alkaline impregnations. 3. The saline chalybeate waters. And 4. The pure chalybeate waters.

1. Strong Sulphurous Springs.—As types of this class may be mentioned the Old Sulphur Well in the Royal Pump Room, and the strong Montpellier Sulphur Well in the Montpellier Gardens. They are both impregnated with *sulphuretted hydrogen gas* (upwards of 25 cubic inches in the gallon); their chief salts being *chlorides of sodium*, *calcium*, *potassium*, and *magnesium*, *sulphide of sodium*, and *carbonate of lime*, with traces of *bromide of sodium*, *iodide of sodium*, &c. The waters are alterative, aperient, stimulant, and diuretic; they are taken internally, and used as baths.

2. Mild Sulphurous Springs with Alkaline Impregnations.—The two most important are the mild Montpellier Well, and the one at the Victoria Gardens. They contain much less *sulphuretted hydrogen*, less *chloride of sodium*, and less *chloride of magnesium* than those of the preceding group; but they have in addition *carbonate of magnesia*. They are antacid, alterative, diuretic, and deobstruent; and are used externally as well as internally.

3. Saline Chalybeate Waters.—One of these springs is in the Cheltenham Pump Room, the other in the Montpellier Gardens. In addition to the salts already mentioned they contain carbonate of iron, so that they have a tonic action superadded to their other properties.

4. Pure Chalybeate Waters.—The springs of the Tewhit and St. John's Well have almost the composition of pure water, with the addition of a small quantity of *carbonate of iron*.

Invalids with all forms of chronic disease visit Harrogate to drink the waters. But the cases most likely to derive benefit are the following: imperfect digestion, in men too fond of good living, where the bowels and liver are inactive (the strong sulphur springs); chronic skin diseases, such as eczema, lepra, psoriasis, pityriasis, lichen, &c. (the sulphur, beginning with the mild); gouty and rheumatic affections (the strong sulphur); threatened phthisis, especially in young women with disordered menstruation (the mild sulphur, alternating with the pure chalybeate); strumous affections (the saline chalybeate); and lupus, chronic ulcers, &c.

467. *Spa, in Belgium.*

Situated near the frontier of Rhenish Prussia, in the beautiful valley of the Ardennes, at the foot of a steep mountain sheltering it from the north winds, is Spa. It contains the only mineral springs found in Belgium. The waters of the principal well—the Pouhon—have a temperature of 52° F., and are largely charged with carbonic acid; the chief solid constituents being the *bicarbonates of soda, iron, lime*, and *magnesia*.

The wells of the Sauvinière, Groesbeck, Geroustère, and the Tonnelet are situated at short distances from the town. Their waters are similar to those of the Pouhon, but the proportion of iron is smaller. The Tonnelet spring is the most gaseous.

These gaseous chalybeate waters are employed, to the extent of two or three pints daily, commencing with a couple of glasses before breakfast. They impart power, strengthen the digestion, and are valuable in such cachectic and other diseases as require a ferruginous tonic.—The season is from the commencement of May until the end of July.

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468. *Bagnères de Bigorre, in the Pyrenees.*

This celebrated watering-place is situated at the foot of the Pyrenees, on the left bank of the Adour, about 35 miles to the southeast of Pau. The season commences in June and ends about the middle of October.

The springs in Bagnères and its neighborhood are numerous, and may be divided into three classes: 1. The Saline. The temperature of these waters varies from 124° to 85° F.; the chief chemical products found in them being *carbonic acid, chlorides of magnesium* and *sodium, sulphates of lime, soda*, and *magnesia, subcarbonates of lime, magnesia* and *iron*, an infinitesimal proportion of *arsenic*, with *resinous and vegetable extractive matter*, and *silex*. 2. The Ferruginous. There is only one spring of this kind, properly so-called—la Fontaine Ferrugineuse. 3. The Sulphurous. Only one sulphurous spring has much reputation,—that of Labassere; and its waters contain a minute quantity of *carbonic acid, hydro-sulphuric acid, chloride of sodium, hydro-sulphate of soda, subcarbonate of soda, vegeto-animal matter*, and *silex*.

The general effect of the waters, taken internally and as baths, is that of a stimulant to the mucous membranes, kidneys, lymphatic system, and skin. They are useful, more particularly, in diseases of the bones and articulations; in chronic rheumatism, and allied disorders, as neuralgia, sciatica, &c.; in atonic dyspepsia from over-mental work; and in nervous affections,—hysteria, palpitations, hypochondriasis, gastrodynia, &c.—especially if there be biliary derangements. The Labassere waters are beneficial in cases of excessive secretion from the mucous canals, in many skin diseases, and in some morbid states of the abdominal viscera. In anæmic conditions, valuable effects result from the employment of the ferruginous spring.—Patients who have been benefited by Pau during the winter may advantageously proceed to Bagnères for the summer.

When the saline waters are taken for their alterative effects, the daily dose is small—about a pint; but if a purgative action is needed, from one to two quarts, in divided quantities, should be drank daily.

469. *Capbern, in the Pyrenees.*

Situated about ten miles from Bagnères de Bigorre, the waters of Capbern are of a saline character, like most of those in that neighborhood. Their chief constituents are *carbonic acid gas, sulphates of lime* and *magnesia*, with *carbonate of lime*. One authority says that they also contain carbonate of iron, while another asserts that there is not a trace of it. They are deemed useful in congestions of internal organs, and are supposed to have warded off apoplectic seizures, when the cerebral circulation has been sluggish: they stimulate the uterus and ovaries, and have been said to cure sterility: while many cases of chlorosis, leucorrhœa, dysmenorrhœa, &c., seem to have been benefited by them. The dose is from four to six tumblers, early in the morning, taking exercise between each glass. At the same time reclining or douche baths are employed.

470. *Barèges, in the Pyrenees.*

This village, on the Gave-de-Bastan, about 47 miles from Pau, is nearly 4000 feet above the sea.—The season lasts from the beginning of June to the middle of September.

The well-known sulphurous and stimulating waters of Barèges are of three kinds, as regards temperature, viz.: the *hot source*, the *temperate*, and the *tepid*. The principal baths are, the BAIN DE L'ENTREE, 107° F.; BAIN DU FOND, 98°; BAIN DE POLARD, 101°; and BAIN DE LA CHAPELLE, 84°. The waters are all limpid, have an oily nauseous flavor, and exhale an odor of rotten eggs. They contain *nitrogen*, *sulphuret of sodium*, *sulphate of soda*, *chloride of sodium*, *silica*, *lime*, &c. On their surface is found a thin pellicle called *barègine* or *glairine;* which is probably of a vegetable character, and is supposed to have some peculiar power in curing chronic rheumatism.

These waters are beneficial in inveterate squamous, pustular, and papular skin affections; in some forms of scrofula; in chronic rheumatism, sciatica, lumbago, and stiffness of the muscles or tendons; in strumous and other indolent ill-conditioned ulcers; and in irritation from the presence of caries or necrosed bone. For healing sinuses left by old gun-shot wounds they are considered particularly efficacious. Pulmonary cases derive more benefit from Eaux Bonnes and Cauterets. And the waters of Barèges are not to be prescribed where there is any tendency to inflammatory disorders, or in heart disease, or for irritable nervous temperaments. They are more powerful and stimulating than the waters of St. Sauveur.

The waters are taken internally, as well as employed in the form of baths, douches, lotions, and injections.

471. *St. Sauveur, in the Pyrenees.*

Situated on a cliff near the Gave de Gavarnie, this watering-place is 44 miles from Pau, 4 from Barèges, and 1 from Luz. The season is from May until October.

The waters are milder than those of Barèges, but have the same constituents. They are useful for women and children, in the same disorders as are sent to Barèges. Hysteria, neuralgia, hypochondriasis, leucorrhœa, and irregularities of the catamenial flow, are much benefited by them. When taken internally they have to be diluted, their greasy properties, from the excess of barègine, being so great. They are mostly used as reclining and douche baths, vaginal injections, &c.

472. *Bagnères de Luchon, in the Pyrenees.*

This little town, in a magnificent valley surrounded by noble mountains, is 85 miles from Pau, and 2000 feet above the sea. The season is from May to October.

There are upwards of 48 thermal sulphurous springs, the temperature of the waters varying from 152° to 62° F. Their chief constituents are *sulphuret of sodium*, *chloride of sodium*, *silicate of lime*, and *silica*, with traces of the *sulphurets of iron* and *manganese*, *iodide of sodium*, *sulphate of potash* and *soda*, and *sulphite of soda*, &c. They are efficacious in chronic skin diseases, in stiffness of limbs after dislocations and fractures, in old ulcers, chronic bronchitis, rheumatism, and neuralgia. Also in some cases of torpid digestion, anæmia, hypochondriasis, hysteria, &c. They are drank, in doses of three or four glasses, pure or mixed with milk; and are used as baths, injections, lotions, eye-washes, &c.

473. *Cauterets, in the Pyrenees.*

This celebrated watering-place, imbedded among the mountains, in the valley of Levadan, 3057 feet above the level of the sea, and more sheltered than Barèges, is much frequented by Spanish invalids. July and August are the best months, but September is also good. There are some 32 sulphuretted saline springs, the temperature of the warmest being 122° F.

Some of the waters are very stimulating, causing headache and feverishness. They contain *nitrogen*, *sulphuret of sodium*, *sulphate of soda*, *chloride of sodium*, *silica*, *barègine*, &c. They are not to be used where there is any tendency to inflammatory affections. The cases most benefited are, chronic derangements of digestive organs, chronic rheumatism and rheumatoid arthritis, chronic skin diseases, uterine congestions or irritations, bronchial catarrh, the early stages of phthisis, and strumous affections. They are often taken diluted with milk.

The baths are especially valuable in rheumatic affections, scrofula, and obstinate skin diseases.

474. *Eaux Bonnes, in the Pyrenees.*

Eaux Bonnes, a village in a sheltered valley at the foot of the Pic du Fur, is 2.5 miles from Pau. The air is remarkably pure and fresh. The mineral waters, of which the supply is scanty, have been deemed efficacious in the early stages of tuber-

cular and other chronic diseases of the respiratory organs. They are likewise useful in scrofula generally, in chlorosis, in dyspepsia from want of tone, and in amenorrhœa. The springs are slightly alkaline, and contain *chloride of sodium*, *sulphates of lime* and *soda*, *iodide of sodium*, &c. Their temperature is about 90° F. The sulphurous waters are mildly stimulating; and are taken internally, and less frequently applied in the form of baths. In the commencement only small doses (three ounces) should be taken, the quantity being gradually increased to three or four glasses of six ounces each. While undergoing treatment the patient is encouraged to live as much in the open air as his symptoms will permit. A residence of about a month, for one or two seasons (the season lasts from the 1st of June to the 30th of September), is generally deemed sufficient. Afterwards a trip to Biarritz, for the enjoyment of sea-bathing, may often be taken with advantage.

475. *Eaux Chaudes, Pyrenees.*

The position of this village, hemmed in by precipitous limestone cliffs, is wild and secluded. It lies about 26 miles from Pau, and 4 from Eaux Bonnes. The season lasts from the beginning of July until the end of October.

Of the six springs some are used for baths, others as internal remedies. The hottest source is Le Clot (95°); while L'Esquirette has the largest amount of salts. The waters contain *sulphuret of sodium*, *sulphate of lime*, and *silica*. They deposit *glairine*. Their taste is disagreeable, the smell of rotten eggs being powerful.

The waters (two to six glasses early in the morning) and baths are useful in rheumatism and sciatica, in threatened pulmonary disease, in scrofula, and in atonic dyspepsia.

476. *Ussat, in the Pyrenees.*

The mineral baths of Ussat, in the Department of the Ariège, are 70 miles from Thoulouse, the inhabitants of which city value them highly. They contain about 11 grains of solids to the pint, chiefly *sulphates* and *carbonates of lime* and *magnesia*, and *chloride of sodium*, with traces of *arsenic*. The waters belong to the acidulous thermal class; are not at all unpleasant; are soothing to the nervous system; and hence prove useful in hypochondriasis, hysteria, chorea, paralysis agitans, neuralgia, cramp, muscular pains, dysmenorrhœa, irritable conditions of uterus, &c. Though sometimes taken internally, they are chiefly used as baths. The season is from June to October.

477. *Vernet les Bains, in the Eastern Pyrenees.*

The little village of Vernet, 34 miles from Perpignan, is placed in a deep and well-sheltered valley. The waters belong to the thermal sulphurous class, but are only feebly charged with solids and sulphuret of sodium.

Where a long course of weak sulphur waters is needed, these baths may be resorted to in the winter as well as in the summer months. Sunny walks may be had on most days in winter. The waters are taken internally, and employed as warm and vapor baths; and this combination of drinking and bathing is thought efficacious in chronic chest affections.

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478. *Panticosa, in Arragon.*

This remarkable Spanish watering-place, 56 miles from Pau, is situated at a level of 8500 feet above the sea. It is romantically placed in one of the little green valleys of the Pyrenees; being surrounded by the lofty granite mountains, except at one part through which flows the river Caldarés. There are four springs, two being saline, one sulphurous, and one ferruginous. The chief source is the Fuente del Higado, which contains *nitrogen* in large quantity, with feeble proportions of *sulphate of soda*, *chloride of sodium*, *carbonate of lime*, *chloride of magnesium*, and *silica*. Its waters are agreeable, have a temperature of 81° F., and numerous gas-bubbles (owing to its free nitrogen) escape with it.

The waters taken internally increase the secretions of the kidneys and skin; produce a sedative effect on the system; increase the appetite and general powers; and in pulmonary cases, relieve the cough. They are particularly recommended in laryngeal phthisis, in hemorrhage from lungs or stomach or uterus, and in chronic irritation of the bronchial or intestinal mucous membranes. Where there is softened tubercle, or much debility of system, they do harm. The best part of the season is from the beginning of July to the end of August.

479. *Vichy, in Central France.*

This important alkaline thermal spa is situated on the right bank of the Allier, in a large open valley, surrounded by hills covered with vineyards. The air is temperate and pure. The season lasts from the middle of May to the 15th September.

The springs used at Vichy for drinking and bathing are nine in number; the waters of all being limpid, and having somewhat the taste of soda water. *Bicarbonate of soda* and *carbonic acid gas* form the predominating ingredients; but they also contain small quantities of the *bicarbonates of potash* and *magnesia*, and the *arseniate of soda*. There is also some *barègine*, most abundant at the Source de l'Hôpital. The proportion of chief chemical components, in the sources generally resorted to, is shown in the following table:

Grande Grille, ...	105.8° F.	Bicarb. Soda, grs.	37.50	Carbonic acid gas, grs.	6.97	to each 16 ozs.
Puits-Chomel, ...	107.6°	"	39.09	"	5.91	"
Fontaine de l'Hôpital, . .	89°	"	38.60	"	8.21	"
Fontaine des Célestins, .	53.6°	"	39.19	"	8.04	"
Grand Puits Carré, . .	110.5°	"	37.57	"	6 71	"
Puits d'Hauterive, . . .	59°	"	36.99	"	20.92	"

Wherever the use of strongly alkaline waters is indicated, those of Vichy will prove useful. They may be taken internally, or employed as baths, or used in both ways at the same time. The diseases which derive most benefit are, pulmonary catarrh, debility and irritability of the digestive organs, chronic enlargement of the liver and spleen, uric acid gravel and calculi, chronic gout and rheumatism, diabetes, and some cases of albuminuria. Obesity has been lessened by these waters, and they might be employed with advantage where the blood contains an excess of fibrin. The dose is from half a pint to two pints daily; but they must not be continued too long, lest a super-alkaline condition of the blood be induced.

The Vichy waters are exported in considerable quantities, and without any deterioration.

480. *Mont D'Or, in Central France.*

At this bath there are six thermal and one cold spring. The water of the latter, St. Marguerite, is acidulous from the carbonic acid it contains, has a temperature of 52° F., and is an agreeable drink mixed with milk or wine. The thermal sources are Le Grand Bain (108° F.), the Source of Cæsar (113°), the Fountain Caroline (107°), the Bain Raymond (109°), the Rigny (109°), and the Madeleine (114°). The ingredients in the different waters only vary in quantity, consisting of the *carbonates of soda* and *lime*, *chloride of sodium*, *sulphate of soda*, with mere traces of *iron* and *alumina*. They all contain an excess of *carbonic acid*. The Madeleine spring is also strongly arsenical.

Besides drinking the waters, most invalids employ warm bathing. The effect is to increase the perspiration; and at the end of a few days to produce "the bath-fever" (lassitude, depression, constipation, &c.), which soon passes off. The invalids who will derive benefit from a visit to Mont D'Or are such as have chronic pulmonary catarrh, some kinds of asthma, rheumatism, and congestion of the liver. Mischief will result to persons of a languid circulation, and such as have a tendency to hemorrhage.

The season is from the middle of July to the end of August; but the waters should not be used for more than a fortnight on account of their exciting properties. The visitors who drink them take three or four glasses daily.

481. *Neris, in Central France.*

The thermal springs of Neris are much resorted to, from May to October, for the purpose of drinking the waters and bathing in them. There are four wells; the temperature of the waters at their source being about 120° F. They are insipid and oily; containing only small proportions of *carbonic acid*, *bicarbonate of soda*, *sulphate of soda*, and *chloride of sodium*. Confervæ grow freely in the basins. These waters are recommended in cases of nervous and hysterical excitement, in rheumatism, and prurigo.

482. *St. Galmier, in Central France.*

These waters, owing to their richness in *carbonic acid gas*, are agreeable whether taken pure or mixed with wine; while they have the property of hastening digestion, increasing the appetite, and augmenting absorption from the alimentary canal. The chief salts in them are the *bicarbonates of lime* and *magnesia*.

The St. Galmier waters are cold, and resemble Seltzer water. They are in common use at Lyons; being deemed useful in gastric affections, and for preventing the formation of urinary calculi.

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483. *Aix-la-Chapelle, in Rhenish Prussia.*

This handsome city, 40 miles W.S.W. of Cologne, is situated in a valley between the Rhine and Maas rivers, and is surrounded by well-wooded hills. There are eight principal springs,—six thermal and slightly sulphurous, and two cold chalybeate. Their therapeutical effects are due to the high temperature of the water (varying from 111° to 131° F.), and the *sulphur* and *chloride of sodium* contained in it. The latter salt is found in the proportion of about 20 grains to the 16 ounces: while the sulphuret of sodium varies from three-quarters to a quarter of a grain. The chalybeate springs are sometimes employed as an "after-cure;" but they have little power, one containing half, and the other three-quarters of a grain of iron in the sixteen ounces, with some carbonic acid.

In doses of a few glasses these clear transparent waters produce but little appreciable effect; their chief use being externally,—as vapor baths, douches, shampooing, &c. They have considerable reputation for curing scrofula, skin diseases, ulcers, and gun-shot wounds. The season begins in June and ends about the middle of September.

484. *Kreuznach, in Rhenish Prussia.*

The rather nauseous and bitter waters of this spa have a considerable reputation for the cure of uterine diseases, as well as of most scrofulous affections. The chief waters are those of the Elizabeth Brunnen, having a temperature of 54.50° F. They contain about 90 grains of solid constituents in 16 ounces; chiefly,—*chloride of sodium* (73), *chloride of calcium* (13), *chloride of magnesium* (4), *bromide of magnesium* ($\frac{1}{4}$), *oxide of iron* ($\frac{1}{8}$), with a trace of *iodide of magnesium*, &c. The Karlshaller water has a temperature of 59°, and 75 grains of salts in the sixteen ounces; the Theodorshalle 70.25°, and 87 grains; while for the chief well of Münster the numbers are 81.50°, and from 64 to 76 grains.

In drinking the waters it is better to begin with small quantities, which may be drunk pure or mixed with hot milk. The baths are generally taken tepid; "mother-lye" (the brownish glutinous liquid left in the boiling pans, after the salt has been crystallized and removed) being added to the water, in proportions suitable to the requirements of each case. In uterine affections, fomentations and injections are employed in addition to the baths.

The Kreuznach waters have proved valuable in congestion of the uterine organs; as well as in chronic inflammatory affections of these parts, in hypertrophy and induration, in uterine displacements, and in derangement of the menstrual functions. Dr. Prieger, who has had very great experience in the use of these waters, tells the author that he has never seen a true fibroid tumor of the uterus absorbed through their influence; but when such a growth is œdematous or congested, the waters relieve these complications.

The season extends from the end of April until the beginning of October. The stay which a patient should make may vary from six to eight weeks.

The springs of Nauheim, a village of Hessen-Cassel, resemble those of Kreuznach, except that they contain rather more chloride of sodium, only a trace of bromide of magnesium, and none of the iodide of magnesium. There is also an abundance of carbonic acid; and the temperature of the four chief springs varies from 72° to 92° F. The waters are drunk and used as baths; while, like those of Kreuznach, they are recommended for all strumous affections.

485. *Neuenahr, in Rhenish Prussia.*

This village, in the valley of the Ahr, is easily reached from Cologne. Of the springs, the Victoria is the best. Mr. Miller, the late Professor of Surgery in the University of Edinburgh, says that it is the richest of all known brunnens in carbonic acid. It furnishes some 29,792 cubic feet of water daily; an analysis of which has shown the presence of small quantities of *bicarbonate of soda, sulphate of soda, chloride of sodium, bicarbonate of magnesia, bicarbonate of lime, protoxide of iron and alumina, silica,* and free *carbonic acid.*

The waters are taken internally and applied externally. The dose is from two to five tumblerfuls, early in the morning; with half the quantity in the evening. The temperature of the water is between 78° and 80° F.; and the taste is pungent and pleasant, resembling—as an English valet said—"Seltzer water with the chill off." The best time for the bath is two or three hours after breakfast; the temperature of the water being about 88° F., and the time for remaining in it twenty minutes. When the invalid is acclimatized, the douche may be used if needful.

The waters are tonic and anti-rheumatic; acting especially on the mucous membranes and the glandular system. They are useful in simple dyspepsia, diminished secretion of bile, irritability of bladder with excess of uric acid in the urine, chronic gout and rheumatism, asthma uncomplicated with organic disease, chronic affections of larynx or bronchi, eczema and prurigo, and chronic uterine maladies. In a person apparently healthy DR. WEIDGEN found that the use of the waters was followed by these effects: A sense of warmth in the stomach soon after drinking; exhilaration; increased flow of urine; increased appetite; and increased salivary and bronchial secretions. After a week the bowels were affected; copious, soft, bilious evacuations being produced. The urine became neutral, but never alkaline.

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486. *Ems, Duchy of Nassau.*

Ems, or Bad-Ems (as the spa is called, to distinguish it from the village), lies on the right bank of the sluggish Lahn, inclosed in a narrow valley between high mountains, 15 miles N. of Wiesbaden. There are several springs. The waters are alkaline, saline, and gaseous; while the temperature varies from 86° F. to 133°. The chief constituents are *bicarbonate of soda*, *chloride of sodium*, and *bicarbonate of magnesia;* with small quantities of *iron*, *manganese*, *potash*, and *lithia*. Their action is that of a mild alterative, diuretic, and laxative; and they are believed to favorably influence all catarrhal affections of the mucous membrane.

The principal drinking springs are the KRAENCHENBRUNNEN and the KESSELBRUNNEN. The waters of the former are clear, odorless, have a temperature of 86° F., and leave a soapy taste owing to the soda they contain. According to STRUVE each 16 ounces contains 15½ cubic inches of free carbonic acid gas. The Kesselbrunnen or Kurbrunnen waters give out more carbonic acid gas, and are 118° F. The dose is from 1 to 6 beakers, each holding about 4 oz. In many cases it is an improvement to add one-third part of milk to the measure.

The waters are also employed externally, the baths being partly filled overnight to lower the temperature. The BUBENQUELLE (boy's spring) is used as a vaginal douche, and is in repute for the cure of sterility.

The waters generally are recommended in bronchial and pulmonary affections, and in the dyspepsia of such as have only a tendency to phthisis. For the relief of the lithic acid diathesis they are valuable, but less so than those of Vichy. For drinking and bathing, French and German visitors usually resort to Ems in June. Our own countrymen, however, seem to prefer July and August; though the narrowness of the valley in which this spa is situated causes the air to be very oppressive and relaxing during these months.

The mineral springs of FACHINGEN, a village 9 miles E.N.E. of Nassau, on the Lahn, resemble those of Ems, the salts being present in rather smaller proportions. The waters form an agreeable antacid drink in some forms of dyspepsia.

487. *Selters, in Nassau.*

This village, in a pleasant valley 37 miles N. of Wiesbaden, is everywhere famous for its mineral springs; an enormous quantity of Seltzer water being annually exported.

The water has a temperature of 60° F., and contains much more than its volume of carbonic acid gas. It has about 32 grains of solids in the sixteen ounces; chiefly *chloride of sodium* (18), and *carbonate of soda* (9), with minute quantities of *sulphate of soda*, *lime*, *magnesia*, and *iron*. Seltzer water stimulates the stomach; and is a grateful, antacid, slightly alterative drink.

488. *Schwalbach and Schlangenbad, in Nassau.*

SCHWALBACH or LANGENSCHWALBACH, 8 miles N.W. of Wiesbaden, consists of one long street, in the middle of which is the Kursaal. The gaseous chalybeate

waters, with a temperature of 50° F., owe their invigorating properties to *carbonate of iron*, which is held in solution by an excess of *carbonic acid*. They also contain a small amount of the *bicarbonates of soda*, *magnesia*, and *lime*. The chief springs are, the WEINBRUNNEN, near the Kursaal, which contains most iron, and is believed to counteract the evils arising from excessive indulgence in wine; the PAULINENBRUNNEN, the mildest, which is used by invalids from tropical climates with torpid livers; the ROSENBRUNNEN, only employed externally, the bath being heated by steam to 86°; and the STAHLBRUNNEN, in the northern valley, which is the most exciting of the springs. The waters are drank fasting, to the amount of one to three glasses; and they may be strongly recommended in cases of impaired strength where a ferruginous tonic is indicated. The bath should be taken about two hours after breakfast, omitting its use every third or fourth day. The best time for a visit to this spa is from the middle of June until the end of August.

Rather more than 2 miles from Schwalbach, in a pleasant valley, with romantic environs, is SCHLANGENBAD. The climate is pure and bracing; but as a spa it is of insignificant value, owing to the small amount of solid constituents—only a few grains of *carbonate of soda* and *common salt*—in the waters. Warm saline and mud baths are used by the visitors: such amusements being in repute for softening and whitening ("satinizing") the skin, and for allaying nervous irritability.

489. *Wiesbaden, in Nassau.*

Wiesbaden, the capital of the Duchy of Nassau, lies on the southern slope of the Taunus Mountain, 5 miles N.N.W. of Mayence. It is the most frequented of the watering-places in Germany. The season extends from June until September, but it is very hot in July and August. Owing to the shelter afforded by the several peaks of the Taunus, the autumnal and winter climate is good.

There are some eighteen or twenty thermal springs, but only one is of much importance. This, the KOCHBRUNNEN, appears literally to resemble a boiling well. The temperature reaches 160° F., volumes of vapor are emitted, and it contains some 63 grains of solids in the sixteen ounces. The salts are *chloride of sodium* (52½), with small quantities of *potash*, *lime*, *iron*, *magnesia*, *arseniate of lime*, *bromide of magnesium*, &c. The *carbonic acid gas* is one-fifth of the bulk of the water. DR. GRANVILLE compares the taste to that of weak chicken-broth slightly salted. Taken in a dose of three or four glasses, cooled, before breakfast, it has a slightly laxative effect, and increases the appetite. As baths, at a temperature varying from 86° to 98°, about two hours after a light breakfast, the waters are somewhat soothing, while they increase the action of the skin and kidneys.

The cases in which these waters are likely to prove valuable are chronic gout and rheumatism, hepatic congestion with hemorrhoids, and chronic skin disease connected with abdominal plethora. They will be injurious in debility, in congestion of the uterine organs, or where there is a tendency to apoplexy or any other form of hemorrhage. The invalid may know that they disagree, when prostration, loss of appetite, constipation, irritability, and palpitation are produced.

490. *Soden, in Nassau.*

The waters at this spa are saline and gaseous, issuing from twenty-three springs, scattered through the village. Their temperature varies from 64° to 75° F.

The most important springs are,—the MILCHBRUNNEN containing 23 grains of solids in the sixteen ounces, 17 grains being *chloride of sodium*, 3 *chloride of potassium*, with 17 cubic inches of *carbonic* acid gas. The WARMBRUNNEN has 35 grains of solids, 26 of which are chloride of sodium; the carbonic acid gas being 35 cubic inches. The WILHELMSBRUNNEN has 117 grains of salts, 104 being chloride of sodium, with 48 cubic inches of gas. Whilst the SOOLBRUNNEN has 129 grains, 114 of which consist of the same salt that predominates in the others, together with 14 cubic inches of gas.—Where alterative aperients are needed, these waters may perhaps be recommended. They are deemed useful in pulmonary, strumous, gouty, and uterine affections.

One advantage possessed by Soden is the presence of the two ferruginous springs of KRONTHAL; so that the visitor having employed the alteratives of the first Spa, may strengthen the system with the mild chalybeates of the Stahlquelle or Wilhemsquelle.

491. *Homburg, in Nassau.*

The air of Homburg is invigorating and bracing during the months of June, July, and August; but it is injurious to such as have delicate lungs, owing to the temperature being very variable. There are four cold (about 50° F.) muriated mineral

springs. The most frequented is the ELISABETHQUELLE, containing about 110 grains of salts in the 16 ounces, and being strongly charged with carbonic acid (48 cubic inches). The chief salts are *chloride of sodium* (79), the *chlorides of magnesium* and *calcium* (15), and *carbonate of lime* (11); with small quantities of *carbonate of magnesia*, *sulphate of soda*, *carbonate of iron*, and *silica*. The KAISERQUELLE has more *chloride of sodium* (117), more *chloride of calcium*, and a little more *iron*. The STAHLQUELLE has the same amount of common salt as the Elizabeth spring, but is more ferruginous than either of the others. While the LUDWIGSQUELLE is weak in almost all its constituents. The flavor of all the waters is refreshing, saltish, somewhat bitter, and ferruginous.

Gout, dyspeptic and other derangements of the abdominal viscera, strumous enlargements of the external glands and the mesentery, debility of the reproductive organs, constipation, and hypochondriasis, are the diseases most likely to be benefited. From two to four tumblerfuls of the waters are taken fasting during three or four weeks. Though chiefly used internally, there are baths, douches, &c.

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492. *Baden-Baden, in Grand Duchy of Baden.*

This renowned spa, in one of the most delightful valleys of the Black Forest, about six miles from the Rhine, has 16 weak saline springs, the temperature of which varies from 117° to 154° F. The chief spring, and the only one demanding notice, is the URSPRUNG; which has a transparent, inodorous, saltish water. Its chemical constituents are merely about 23 grains to the 16 ounces, 18 grains being *chloride of sodium*. There are also 2½ grs. of *sulphate of lime*, about $\frac{1}{10}$ of a grain of *carbonate of iron*, with less than half a cubic inch of carbonic acid.

Though their efficacy must be slight, these waters are often taken internally. Some drinkers add goat's milk to them, or whey, or aperient salts. But they are chiefly to be employed where simple hot baths are needed, while the invalid is enjoying beautiful scenery, in pure mild air. The season lasts from the beginning of May until the 1st of October.

The waters of WILDBAD, some thirty miles from Baden-Baden, and situated in the kingdom of Wurtemburg, contain only four grains of salts in the 16 ounces, and have a temperature varying from 86° to 98° F. Where hot baths and douches are needed in chronic paralysis, rheumatism, &c., a six weeks' sojourn at Wildbad may perhaps be recommended. The climate is very bleak from November until May, and then in the four succeeding fashionable months the heat is most oppressive.

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493. *Kissingen, in Bavaria.*

Kissingen, one of the most fashionable watering-places of Germany, is situated in a fertile valley, about 30 miles N.N.E. of Würtzburg. The tonic, laxative, and alterative waters are all cold (about 52° F.). The most important spring is the RAGOCZI, containing 65 grains of solids in the 16 ounces, according to Liebig, with 41 cubic inches of *carbonic acid gas*. The principal salts are *chloride of sodium* (45), *carbonate of lime* (8), *sulphate of magnesia* (4), *chlorides of potassium* and *magnesium* (5), with minute quantities of *chloride of lithium*, *bromide* and *iodide of sodium*, and *carbonate of iron*. The waters of the PANDERBRUNNEN have rather a smaller amount of solids; while those of the MAXBRUNNEN and of the THERESIENBRUNNEN are very much weaker, and contain no iron.

The Ragoczi spring is most used early in the morning, from three to six glasses being taken. In the evening the milder waters of the Pandur are preferred. The effect is to quicken the circulation, and to stimulate the secretions of the mucous membranes generally, but especially those of the alimentary canal. Hence they are valuable in habitual constipation, congestion of the liver or kidneys, in dyspeptic eructations or flatulence, and in tubercular diseases of the mesenteric glands. Gouty and calculous cases also derive benefit.

The baths are prepared from the waters of the wells just named, some of the "mother-water" of the SOOLENSPRUDEL being frequently added. This spring has a temperature of 62° F., and contains 187 grains of solids in the 16 oz., upwards of 100 consisting of *chloride of sodium*. The astonishing flux and reflux of the Sprudel is one of the sights of the town.

About 4½ miles from Kissingen is the spa of BOCKLET, in Bavaria, which contains

several chalybeate and a weak sulphur spring. The temperature of the waters is about 52° F.; while there is rather more than half a grain of *carbonate of iron* in the 16 oz., with 39 cubic inches of *carbonic acid gas*. They also contain a small amount of the *sulphates of soda* and *magnesia*, *chloride of sodium*, *carbonate of lime*, &c. Independently of the constant interchange of visitors between Kissingen and Bocklet, the baths of the latter (especially the "douche ascendante") have a considerable reputation for the cure of sterility, and for breaking off the tendency to habitual abortion.

Bruckenau, in Bavaria, is also only a few hours' drive from Kissingen. The waters contain scarcely any salts, but have about a quarter of a grain of *iron* in the 16 oz., with at least 35½ cubic inches of *carbonic acid gas*. Their temperature is 49° F. They are often employed by those who, after going through a course of the solvent waters of Kissingen, require a pure mild tonic.

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494. *Gastein, in Austria.*

A few hours' drive from Salzburg is the village of Gastein, in the most beautiful part of the Tyrol. It is the highest bath in Europe, being 3000 feet above the Mediterranean. The houses are grouped round the edge of the mountain torrent Ache, which here forms a splendid waterfall. The bracing Alpine air is invigorating for such as have strong lungs, but the climate is often too raw and unsettled for the delicate invalid to depend upon it.

There are six or eight very weak thermal springs, having the same chemical composition, but varying in temperature from 95° to 118° F. In 16 oz. of water there are only 2.68 grs. of solids, *sulphate of soda* being the chief (1.51). The waters, after cooling to about 90°, are used as baths, and are said to stimulate the nervous system. It seems certain that the prematurely old, the hypochondriac, the paralytic, and the sufferer from chronic rheumatism derive benefit.

The waters of Teplitz, in Bohemia, very much resemble those of Gastein, as regards temperature and chemical power. They contain only about 4.64 grains of solids in the 16 oz.; the *carbonates of soda* and *lime*, with *sulphate of soda*, being the chief ingredients. The baths are used in gouty and paralytic affections.

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495. *Friedrichshall, in Saxe-Meiningen.*

This place has long been noted for the manufacture of Glauber's salts and common salt. Of late years the waters have acquired a high reputation, especially for cases where it is necessary to promote excretion from the liver, kidneys, and bowels.

The bitter saline water of Friedrichshall contains about 194 grs. of solids in the 16 ounces, with 5.32 cubic inches of *carbonic acid gas*. The chief ingredients are *chloride of sodium* (61), *sulphate of soda* (46), *sulphate of magnesia* (39), *chloride of magnesium* (30), *sulphate of lime* (10), with small proportions of *sulphate of potash*, *carbonate of magnesia*, *bromide of magnesium*, *carbonate of lime*, and *silica*. The dose is from three ounces to a pint or a pint and a half, according to the aperient effect required.

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496. *Carlsbad, in Bohemia.*

This town occupies the bottom of a narrow winding valley, on the banks of the Töpel, 70 miles W.N.W. of Prague. The season extends from the beginning of June until the end of September; but the month of May is very quiet, pleasant, and healthy. The "cure" generally occupies from five to six weeks.

There are several important springs, chiefly differing from each other only in temperature. The most important is the Sprudel; the waters of which bound upwards for four or five feet, and then fall back in foam while giving off clouds of vapor. The temperature is about 165° F., and there are some 45 grs. of solids in the 16 oz. The principal salts are *sulphate of soda* (20), *carbonate of soda* (9), *chloride of sodium* (8), and *carbonate of lime* (2); with small quantities of *sulphate of potash*, *carbonate of iron*, *phosphate of alumina*, and *silica*. The *carbonic acid gas* is nearly 8 cubic inches. The Schlossbrunnen contain only half the amount of *sulphate of soda*, double the

quantity of *carbonic acid gas*, and have a temperature of 113°. The heat of the waters of the THERESIENBRUNNEN is 131°, and as regards important ingredients they resemble the Schlossbrunnen. The MARKTBRUNNEN differ from the others principally in containing a little *iodide* and *bromide of sodium*.

The waters are chiefly taken internally, early in the morning and again in the evening. The dose varies from one or two glasses to ten or twelve, according to the stimulating and alterative effect on the digestive organs and abdominal viscera generally, which it is desirable to produce. The cases most benefited are, liver and abdominal diseases, diabetes, gouty and rheumatic disorders, calculous affections, and hypochondriasis with dyspepsia and constipation. Old Indians, with enlarged livers, often derive remarkable relief. Baths of the cooled mineral water are now but seldom resorted to, though for one hundred and fifty years invalids only visited Carlsbad for the purpose of bathing. Sometimes the peat soil from the neighborhood, mixed with Sprudel water, is used as a poultice, &c.

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497. *Marienbad, in Bohemia.*

Marienbad, in the territory of the Abbey of Tepl and the district of Eger in Bohemia, is about five hours' drive from Carlsbad. The air is pure and dry, but changes in temperature take place rapidly, owing to the height of the village—1912 feet above the level of the North Sea. The season lasts from the commencement of May until the end of September.

There are several cold (from 43° to 50° F.) saline chalybeate springs; the chief constituent being sulphate of soda, with a moderate quantity of iron and carbonic acid. The waters when drawn are quite clear, but as the gas escapes they become turbid from deposition of the carbonates. The KREUZBRUNN has 69 grains of solids in the 16 oz., with 8½ cubic inches of *carbonic acid gas*. The principal salts are *sulphate of soda* (38), *chloride of sodium* (13), *carbonate of soda* (9), and *carbonate of magnesia* (3); with small quantities of the *carbonates of lime*, *lithia*, *iron*, *manganese*, &c. The FERDINANDSBRUNN has nearly the same solid ingredients, but with nearly 14 cubic inches of *carbonic acid gas*. The WALDBRUNN is much weaker in *sulphate of soda* (7), and *common salt* (3), but its proportion of *carbonic acid gas* is 18¾ cubic inches. The waters of these brunnen are all used for drinking. The CAROLINENBRUNN has only 11 grs. of solids in the 16 oz., *sulphate of soda* being the chief; but there are 15½ cubic inches of *carbonic acid gas*. The AMBROSIUSBRUNN is still weaker (7 grs. in 16 oz.), with 13 inches of gas; while the MARIENBRUNN has scarcely any salts (2 grs. in 16 oz.), with 9 cubic inches of *carbonic acid gas*. The well of the Marienbrunn is used only for water and gas baths; but the Caroline and Ambrosius waters are employed internally and externally.

The effect of the Marienbad waters is laxative, alterative, and tonic, in proportion to the dose (from one to six tumblerfuls), while they increase the action of the liver and kidneys, and promote appetite. Hence they are particularly valuable in chronic disorders of the abdominal viscera. The mud baths and poultices are made with the Marienbad water mixed with a black mineral pulverulent substance, brought from a neighboring peat-bed. They stimulate the skin, heal chronic ulcers, and disperse glandular swellings. The gas baths (carbonic acid with a small amount of sulphuretted hydrogen) soothe muscular and neuralgic pains, remove torpor of the female sexual organs, and generally tranquillize the nervous system.

The bitter saline waters of PULLNA, in Bohemia, are very nauseous and indigestible, while they possess no advantages over the ordinary preparations sold by the chemist. Their chief ingredients are *sulphate of soda* (124 grains in the 16 oz.), *sulphate of magnesia* (93), *chloride of magnesium* (16), *carbonate of magnesia* (6), with *sulphates of lime* and *potash*.

498. *Eger, in Bohemia.*

This frontier town stands on the right bank of the Eger, 92 miles W. of Prague. In the district, some three miles off, is the spa of FRANZENSBAD. The tonic solvent waters of this spring have a refreshing acidulous taste, a temperature of 52° F., with 42 grs. of solids in the 16 oz. The chief of these are *sulphate of soda* (24), *chloride of sodium* (9), and *carbonate of soda* (9); together with the *carbonates of magnesia*, *lime*, *iron*, *lithia*, *manganese*, *strontia*, and 40 cubic inches of carbonic acid gas.

The waters of the Franzensbad and other wells are taken internally and employed as baths. They strengthen the nervous system, improve digestion, stimulate the

circulation, relieve bronchial affections, and act powerfully on the uterine organs. Mud and gas baths are likewise employed; the black mud containing iron, soda, lime, alumina, and ulmic acid. They are perhaps beneficial in old rheumatic affections, gouty deposits, and in paralysis without active disease of the nervous centres. The gas baths are considered as specifics for the cure of scrofulous ulcers.

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499. *Aix-les-Bains, in Savoy.*

This beautiful and sheltered town, 768 feet above the sea, may be reached by railway from Paris in about fifteen hours. The climate is mild but yet bracing, and is especially adapted to invalids from April until October. There are two chief springs; but as they are only slightly mineralized, the effects which they produce must chiefly be due to their temperature,—about 116° F. The SULPHUR-SPRING contains but little more than 3 grains of salts in the 16 oz., with a small quantity of *carbonic acid* and *sulphuretted hydrogen gas*. The ALUM-SPRING, so-called on the *lucus à non lucendo* principle, since it contains no alum appreciable to the senses, has the same composition minus the sulphuretted hydrogen.

The waters are chiefly used externally, and especially in the form of douches. They are valuable in chronic rheumatism, sciatica, rigidity of tendons or muscles after sprains and contusions, chronic skin affections, diseases of the bones, nervous disorders, &c.

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500. *Baths of Switzerland.*

LEUK or LOUECHE, on the Rhone, stands a little to the left of the highroad passing through the Vallais to the Simplon, and is 5000 feet above the sea. There are twenty-three thermal mineral springs, varying in temperature from 95° to 124° F. The latter is the heat of the St. Laurent or Lorenzquelle. All the waters have the same composition, the solid constituents being about 15 grs. in the 16 oz. The chief salt is the *sulphate of lime* (nearly 13), with small quantities of the *sulphates of magnesia* and *soda*, &c. It is the custom to bathe in common; there being four public piscinæ, each about a yard deep, and each capable of accommodating some forty bathers, with their small floating tables. On the first day the patient remains an hour in the water, clothed in a long flannel gown; the duration being daily increased till it extends to four or five hours in the morning, and for a shorter period again in the afternoon. About the twelfth day an erythematous rash called the *poussée* appears over the body, with prickling sensations of heat, and febrile symptoms; its disappearance being followed by desquamation of the cuticle. The duration of the bath is then gradually diminished by half an hour daily, until the cure is complete in some twenty-five or thirty days from the commencement. This peculiar practice is recommended in cases of scrofula, enlargements of the liver or spleen, chronic gout and rheumatism, obstinate eczema and psoriasis, old wounds and ulcers, calculous affections, &c. The season is from May until October.

PFAFFERS, in the Canton of St. Gall, in the Grisons, is in a wild and sombre dell. The thermal water is conducted down the romantic glen of the Tamina by wooden tubes, to the hotel and bathing-house at Regatz, in the valley of the Rhine. The salts in the waters are scarcely equal to 3 grains in the 16 oz., the chief being the *sulphates of soda* and *lime*, with *carbonate of lime*. The temperature is nearly 100° F. The bath is used twice a day, for about an hour each time; and is useful in calming nervous irritability, and in relieving neuralgia, hysteria, &c. The waters are also used for drinking,—from four to eight tumblerfuls. The invalid should be advised to reside at Ragatz rather than at Pfäffers.

TARASP, on the banks of the Inn in the Grisons, has cold gaseous springs, somewhat resembling those of Marienbad. There are numerous wells, having their source in a rocky hollow, some 4300 feet above the sea. The chief are the Grosse Quelle and the Kleine Quelle, their composition being similar, and their temperature 45° F. Their salts (95 grs. in the 16 oz.) consist of *chloride of sodium* (29), *carbonate of soda* (27), *sulphate of soda* (16), and *carbonate of lime* (12); with small quantities of the *carbonates of magnesia* and *iron*, *iodide of sodium*, *sulphate of potash*, &c. The *carbonic acid gas* is 32 cubic inches. These aperient and resolvent waters are useful in plethora of the abdominal viscera, and in incipient phthisis.

BADEN, a few miles from Zurich, on the left bank of the Limmat, has several thermal gaseous springs. The temperature of the waters ranges from 117° to 122° F., and the salts are in the proportion of 34 grs. to the 16 oz. The principal are, *chloride of sodium* (13), *sulphate of lime* (10), with smaller quantities of the *carbonates of lime* and of *magnesia* and of *strontia*, *sulphate of soda*, and the *chlorides of potassium*, and *magnesium*, &c. There are 22 cubic inches of *carbonic acid gas*, 125 of *nitrogen*, and an odor of *sulphuretted hydrogen*. The action of these waters is chiefly diuretic and constipating. They are recommended in gouty and rheumatic diseases, in chronic diarrhœa with congestion of the bowels, and in incipient phthisis. They are used internally, and externally as baths and douches. The climate of Baden being mild, invalids often remain throughout the winter.

BIRMENSDORF has bitter purgative waters resembling those of Pullna. They are cold (46° F.), have only traces of carbonic acid gas, and their solid constituents slightly exceed 5 grs. in the 16 oz. They are used principally for exportation.

SCHINZNACH, in the Canton of Aargau, in a valley through which flows the Arve, five miles from Baden, is well known for its saline sulphurous thermal spring. The temperature of the waters is about 90° F., the solid constituents being nearly 25 grs. in the 16 oz., with 1½ cubic inches of *carbonic acid gas*, and 6½ of *sulphuretted hydrogen*. The chief salts are, *sulphate of soda* (6½), *sulphate of lime* (7), and *chloride of sodium* (5); with smaller quantities of *sulphate of magnesia*, *chloride of magnesium*, and *carbonate of lime*. The invalids both drink and bathe; the baths being used for twenty minutes at first, and afterwards for a longer time if necessary. The *poussée* is milder but appears more quickly than at Leuk. The waters have a reputation for relieving strumous and rheumatic affections, for curing skin diseases, and for healing callous spongy ulcers.

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