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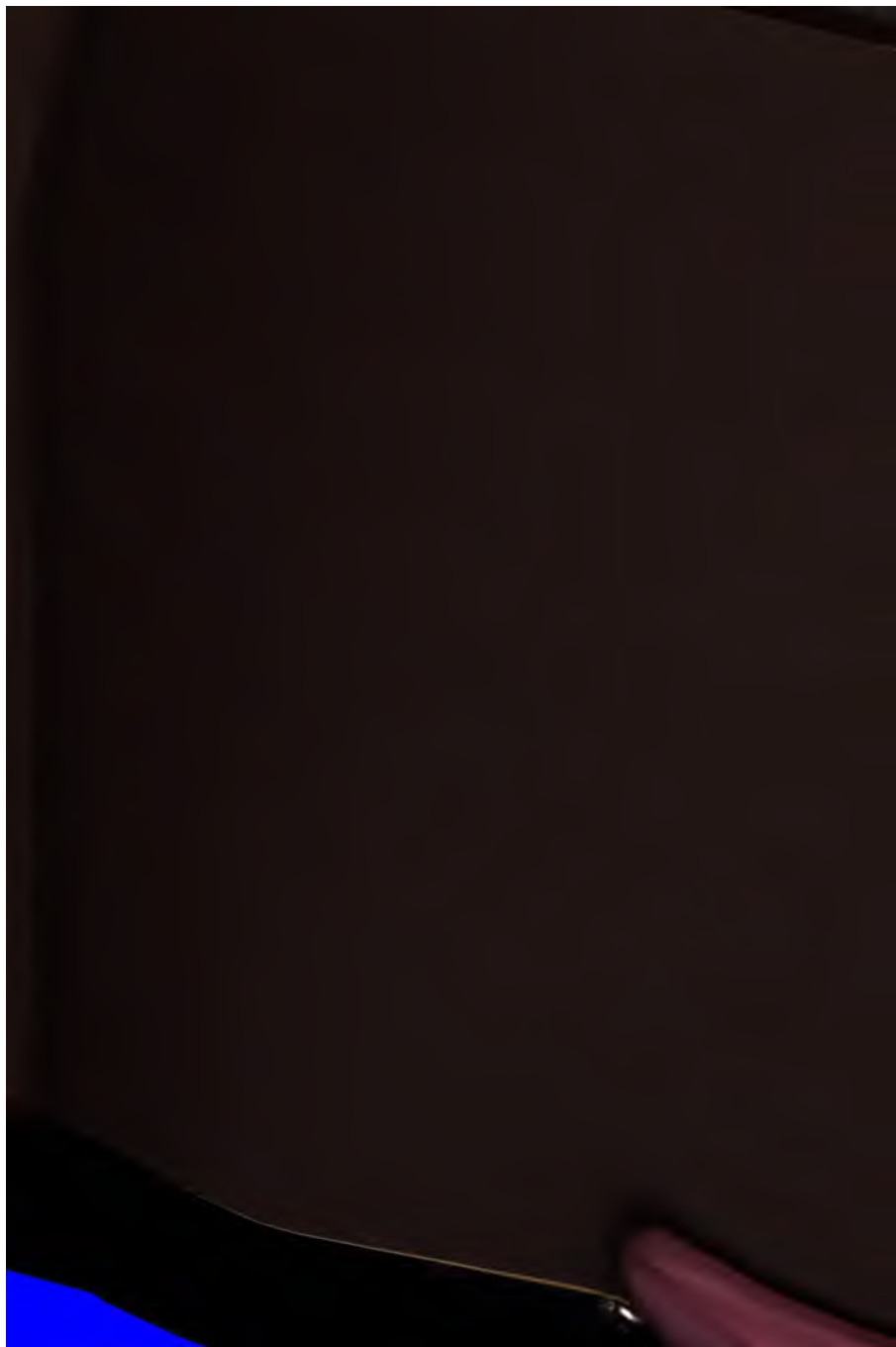
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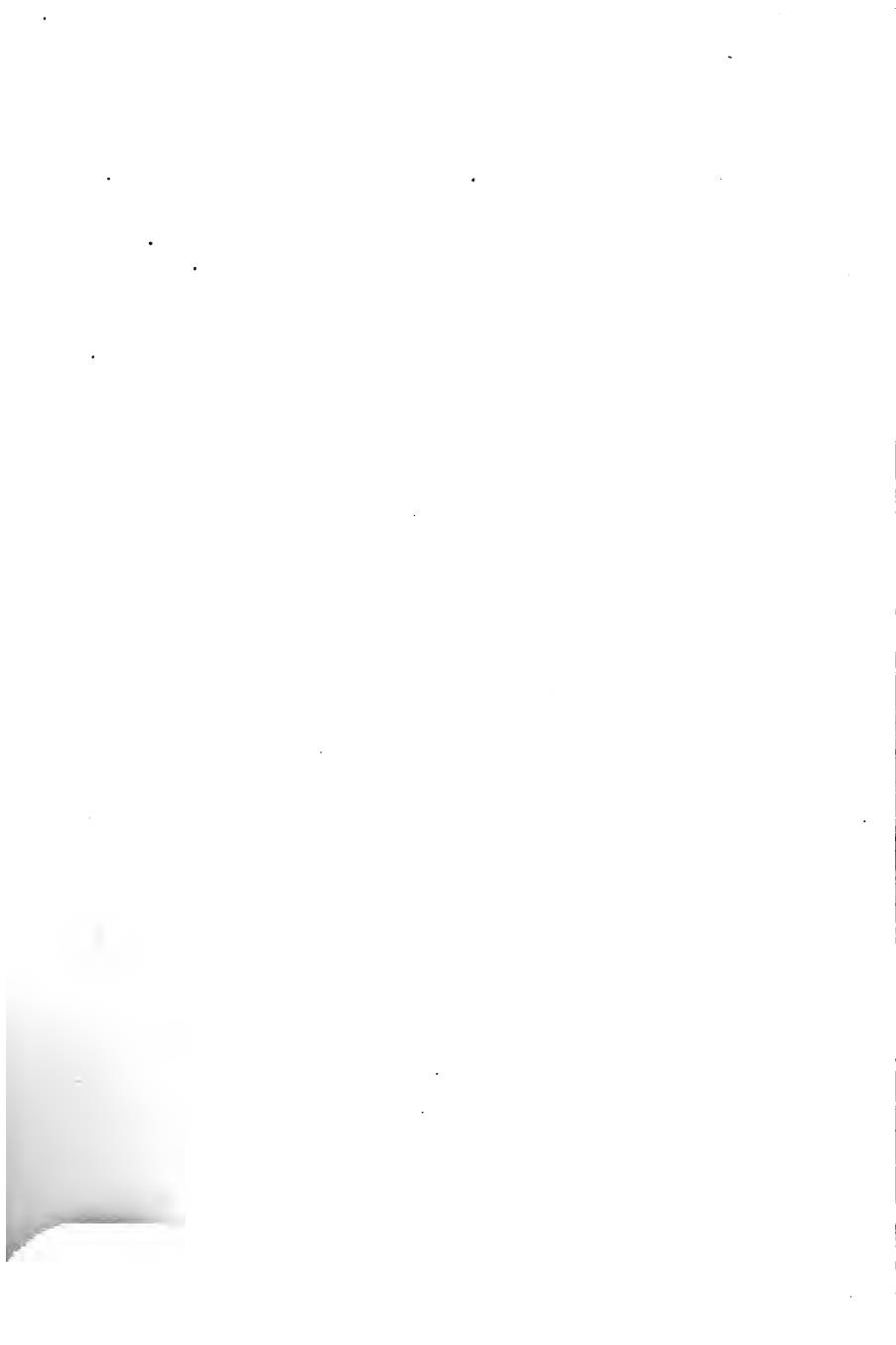
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ELEMENTS OF PRACTICAL MEDICINE.



ELEMENTS
OF
PRACTICAL MEDICINE

BY
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SECOND EDITION.

LONDON
H. K. LEWIS, 136 GOWER STREET
1888

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OF CALIFORNIA
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TO
MY FATHER
CHARLES HENRY CARTER, Esq., F.R.C.S.

THIS WORK
IS
AFFECTIONATELY DEDICATED.

of the world, and the world of the future. The book is a well-organized, readable, and thought-provoking study of the world of the future. It is a must-read for anyone who is interested in the future of the world.

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PREFACE TO THE SECOND EDITION.

My original object in preparing the present work was stated in the preface to the first edition ; and numerous kind communications, since received from all parts of the kingdom, have induced me to think that this object has not been entirely unfulfilled.

In submitting a second edition, I have striven to make it more worthy of the favour which the former so generally received. New sections on the Relation of Micro-organisms to Disease, Pyæmia, Septicæmia, Tuberculosis, &c., have been introduced ; much has been entirely rewritten ; the whole has been thoroughly revised ; and an Index has been added.

At the same time, I am sensible that the work still exhibits many defects ; and I shall feel indebted for any suggestions made with a view of increasing its usefulness, so far as consistent with its character as a *simple introduction* to the study of Medicine.

A. H. C.

51 NEWHALL STREET, BIRMINGHAM,
September, 1883.

PREFACE TO THE FIRST EDITION.

THIS little volume in no way pretends to compete with the valuable standard works of Aitken, Bristowe, Niemeyer, Roberts, and others. My object has been partly to provide the student with a general introduction to the study of Medicine, and partly to bring the essentials of the subject —so far as required for the ordinary medical qualifications —within the grasp of those who are not disposed or have not the leisure to read the large and complete works referred to, a class of readers which in my opinion usually meets with too little sympathy. To what extent I have succeeded in fulfilling these objects, time alone will show.

The methods of physical diagnosis have not been treated in detail for the reason that they can only be acquired at the bedside, and there is little or no scope for improvement in the excellent manuals on these matters already in existence.

In conclusion, I beg to acknowledge my indebtedness to the above-mentioned and other authors for the many suggestions derived from the perusal of their works, the

restricted space at my disposal alone having prevented (except in a very few instances) the mention of authorities in the text. I also owe special thanks to my friend Dr. J. W. Hunt, of Wolverhampton, for his kindness in reading over and correcting the greater part of the manuscript; and to my publisher, Mr. H. K. Lewis, for his courtesy and valuable assistance in the course of bringing the work through the press.

A. H. C.

51 NEWHALL STREET, BIRMINGHAM,

October, 1880.



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ELEMENTS OF PRACTICAL MEDICINE.

SECTION I.

GENERAL PATHOLOGY.

CONGESTION.

By *hyperæmia* or *congestion* is meant an overfulness of the blood-vessels, which may arise either from a *too abundant supply of blood* to a part, or from some *impediment to its proper escape*.

In the first case the congestion is termed *arterial* or *active*, and it occurs in one of two ways. 1. *The arterial pressure may be increased*. Thus, when from some cause the main current of blood is interrupted, increased pressure is thrown upon the collateral vessels (*collateral congestion*); and again, the sudden stoppage of a long-continued, or habitual discharge of blood may lead to general overfulness and increased tension of the vascular system (*supplementary congestion*). 2. *Peripheral resistance may be diminished*. Thus, owing to vaso-motor paralysis either from local irritation, or from some central disturbance as in blushing, the arterioles of a part become dilated and over-full; and sudden removal of the external pressure from vessels, as by dry cupping, also occasions congestion of this kind.

The congestion which arises from imperfect escape of blood from a part, is termed *mechanical* or *venous* when there is a direct impediment to the return of blood by the veins, and thus it is a common result of valvular disease of the heart, emphysema, cirrhosis of the liver, and thrombosis of

2 ELEMENTS OF PRACTICAL MEDICINE.

important veins. *Passive* or *capillary congestion* is closely allied to the foregoing, and is characterised by a sluggish and difficult circulation through the capillary vessels of a part. It is met with in feeble states of the system, and is determined either by the influence of gravitation leading to the accumulation of blood in dependent parts (*hypostasis*), or by diseased conditions of the arterial walls.

The effects of *active* and *mechanical* or *passive* congestion may be thus contrasted :—

ACTIVE CONGESTION.	MECHANICAL OR PASSIVE CONGESTION.
Redness and pulsation.	A dusky livid tint.
Elevation of temperature.	Temperature lowered.
Increased nutritive activity.	Diminished nutritive activity.
Functional excitement.	Functional depression.
Increased oxygenation.	Surcharge of carbonic acid.

Both varieties when long continued lead to swelling, serous transudation, and modifications of nutrition, with a liability to hæmorrhage; but these effects are much more marked in mechanical than in active congestion.

HÆMORRHAGE.

HÆMORRHAGE signifies an escape of blood from the general current of the circulation. It may arise (1) from rupture of a vessel, due to injury, or disease (endarteritis, atheroma, fatty degeneration, or aneurism); (2) from rupture due to overfulness or increased tension of the blood vessels, as in congestion; or (3) from an alteration in the quality of the blood as in scurvy, purpura, etc.

Special terms are applied to hæmorrhage from particular parts; thus *epistaxis* signifies bleeding from the nose; *hæmatemesis* from the stomach; *melæna* from the bowels; *hæmaturia* from the urinary passages; and *metrorrhagia* or *menorrhagia* from the uterus. A constitutional tendency

to bleed profusely from slight causes is known as the *hæmorrhagic diathesis* or *hæmophilia*.

The following changes occur in an extravasated blood-clot. It shrinks and becomes more dense; its colour passes from brown to yellow, and may ultimately disappear altogether. Crystals of hæmatoidin and granular pigment are apt to be found. The clot now either undergoes organisation and vascularisation; or it becomes absorbed, in which case a pigmented cicatrix remains behind.

DROPSY.

By dropsy is meant the accumulation of serous fluid in the serous cavities, or in the interstices of the tissues. Special terms are employed to indicate the extent and seat of the effusion. More or less generally distributed dropsy of the integuments is termed *anasarca*; when localised, *œdema*; *hydrothorax* denotes dropsy of the pleura; *hydropericardium*, of the pericardium; *ascites*, of the peritoneum; and *hydrocephalus*, of the cerebral ventricles.

Dropsical fluid is closely allied to the serum of the blood in character. It is thin and watery; colourless or straw-coloured; clear, or slightly turbid; alkaline or neutral; with a specific gravity of 1010—1014; and contains in solution, albumen, salts (especially chlorides), and extractives. Occasionally urea is also present.

One of the most important pathological causes of dropsy is the *increased blood-pressure* which attends the various forms of congestion, and especially that which is due to direct mechanical interference to the return of blood by the veins. But the pressure of the blood may be increased, *independently of congestion*, by obstruction to the flow of blood through the capillary system, traceable to some disturbance of that obscure relationship which normally

exists between the blood in the capillaries, and the tissues immediately around. Such a condition more or less constantly accompanies chronic renal disease. Given then increased blood-pressure, it is easy to see that the balance between the exudation and absorption of fluid in the tissues will be disturbed, and that dropsy will be apt to occur. These ill effects are enhanced by a feeble and relaxed state of the vessels, and still more by a poor and watery condition of blood, with deficiency of albumen. These conditions, variously combined, go far to explain the mode of origin of most dropsical effusions.

Dropsy may be either local or general. *Local* dropsy most frequently depends upon mechanical obstruction of the veins leading from the dropsical part, as in ascites from cirrhosis of the liver, or phlegmasia dolens from plugging of the femoral vein. It occurs also as a result of inflammation, and (more rarely) of lymphatic obstructions. *General* dropsy may be either active or passive. Active general dropsy begins abruptly, and results most commonly from acute Bright's disease, but it sometimes accompanies an acute general erythematous eruption on the skin, such as now and then occurs after a hearty meal of shell-fish, &c. Passive general dropsy may be due either to (1) chronic disease of the heart or lungs, or (2) renal disease, or (3) anæmia.

SYMPTOMS.—Anasarca or general dropsy usually begins in the most dependent parts. The integuments become swollen and pit on pressure. The vitality of dropsical parts is defective, and they are consequently liable to low forms of inflammation from slight causes. Dropsy of internal organs and serous cavities will be considered elsewhere.

DIAGNOSIS.—With regard to local dropsy it is always necessary to bear in mind, that when really local it must be due to a local cause. General dropsy at its onset may

be limited to a particular part, but it almost always develops *symmetrically*, affecting corresponding parts on both sides.

The *active form of general dropsy* may be distinguished by its abrupt onset, its frequent association with febrile symptoms, and its wide distribution. *Cardiac* or *pulmonary* general dropsy begins about the feet and ankles, gradually extends upwards, and is attended with the signs of disease of the lungs or heart. The skin is congested and livid, and the superficial veins are more or less engorged. *Renal dropsy* begins in the loose connective tissue of the eyelids or scrotum, is widely distributed, and extends rapidly. The skin is usually pale, pasty, and anæmic, and the urine contains albumen and tube-casts. *Anæmic dropsy* is rarely extensive and does not affect the serous cavities. It is usually confined to the ankles, or sometimes to the eyelids. Albumen is present in the urine only under very exceptional circumstances, and the general anæmic condition is obvious.

TREATMENT.—This should be first directed to the removal of the cause. Absorption of the fluid may be aided by increasing the secretions of the skin, bowels, and kidneys, by diaphoretics, watery purgatives, and diuretics respectively. Finally, removal of part, or of the whole of the fluid, may be necessary, either by tapping (*paracentesis*) in the case of dropsy of the serous cavities; or by punctures or incisions in anasarca.

INFLAMMATION.

THE process of inflammation represents those changes which take place in a living tissue as the result of local injury. The phenomena of inflammation vary somewhat according to circumstances, but they may be conveniently considered under these three heads, (a) vascular disturb-

ances, (b) exudation processes, and (c) changes in the inflamed tissue.

Vascular disturbances.—Shortly after the infliction of the local injury causing inflammation, the arteries dilate and the blood-flow becomes accelerated. The arterial dilatation is the result of direct damage to the vascular wall, and the accelerated blood-flow is the outcome of increased pressure of the blood in the capillaries, resulting from arterial dilatation. This dilatation extends to the capillaries and veins of the part, and soon afterwards the blood-flow becomes retarded, while the white blood-cells accumulate, and tend to adhere to the walls of the vessels. The current now becomes slower and slower, the vessels of the affected part become packed with corpuscles—both red and white—till at last complete stagnation occurs (*inflammatory stasis*).

Exudation processes.—Closely following the above disturbances, the white corpuscles—and the red also to a limited extent—migrate from the vessels into the surrounding tissues, accompanied with plasma which exudes at the same time. The fluid and the corpuscular elements which have escaped from the vessels, constitute the so-called *inflammatory exudation*. The nature of the exudation varies according to circumstances. When it speedily coagulates, it is said to be *fibrinous*; when in addition, there is more or less serous effusion, it is termed *sero-fibrinous*, examples of which frequently occur in inflammation of serous membranes; while the watery or slimy exudation which accompanies certain inflammatory conditions of mucous membranes is termed *mucous*.

Tissue changes.—These changes are exceedingly complex, and as yet are not completely understood. In the first place there are changes which are characterised by *impaired nutrition*, and result partly from direct injury of tissue elements, and partly from the stagnation of the circulation. Secondly, there are changes in the tissue

immediately bordering on the inflamed area which are characterised by *increased nutritive activity*, and apparently represent efforts of nature towards the repair of damage inflicted. Lastly, there are changes dependent on the behaviour of the exudation.

The issue of the inflammatory process varies according to circumstances. 1. The exudation may be completely absorbed, and the parts may regain their normal condition. 2. *Suppuration*, which is characterised by the formation of a fluid called *pus*, may take place. Pus is a thickish yellow liquid of alkaline reaction, and an average specific gravity of 1080. It consists of an albuminous fluid—*liquor puris*—holding in suspension a large number of granular cells, or *pus corpuscles*, which closely resemble the white corpuscles of the blood. *Liquor puris* is formed from plasma which has transuded from the blood; while the pus-corpuscles are derived mainly if not exclusively, from migrated leucocytes (white blood-cells). Pus, when once formed, undergoes certain changes, unless previously removed by natural or artificial means. It may become inspissated by the absorption of its fluid parts followed by fatty degeneration of its cellular elements, and lead to the formation of a yellow *cheesy mass* which may afterwards undergo calcification. 3. Inflammation may destroy the superficial tissues, and produce *ulceration*; or it may cause the death of tissue in mass, with formation of a slough (*gangrene*). 4. The exudation may become *organised*. Granulation tissue may form and develop into ordinary fibrous tissue; or under certain circumstances, into new tissue other than fibrous.

VARIETIES.—Inflammation may be *acute* or *chronic*, according to its intensity, and rate of progress; *adhesive*, *suppurative*, *ulcerative*, or *gangrenous*, according to its effects; *circumscribed* or *diffuse*, according to its limits; *specific* or *benign*, according to its character.

Three varieties of inflammation in mucous membranes may be conveniently considered here. 1. *Catarrhal*—characterised by congestion and swelling of the membrane, active proliferation and desquamation of cells, and mucous exudation. 2. *Croupous*—by a fibrinous exudation on the surface of the membrane (*false membrane*), which is readily removable, and has no tendency to become organised. 3. *Diphtheritic*—by a fibrinous exudation which is deposited, not only on the surface, but *in the substance of* the mucous membrane. It cannot, therefore, be readily removed, and leads to sloughing, and ulceration of the parts involved.

SYMPTOMS.—*Locally*—redness, swelling, and heat. *Subjectively*—pain, tenderness, and disturbance of function. *Constitutionally*—the symptoms are those of fever, which, if suppuration occur, is usually of the hectic type.

THROMBOSIS.

THROMBOSIS denotes any coagulation of the blood in the heart or vessels, which takes place during life. The clot is called a *thrombus*. A thrombus, or ante-mortem clot may be distinguished from that formed after death by the laminated structure, which is almost invariably presented by thrombi of any size; its greater quantity of fibrin, rendering it firmer, and drier than post-mortem coagula; its granular appearance on tearing or breaking; the greater relative proportion of white blood-cells; and by its firmer adhesion to the parts with which it is in contact.

In all cases, except those in which the coagulation has been very rapid, as after ligature of a vessel, the thrombus first appears on the lining membrane of the vessel, slowly grows from without inwards by fresh accretions of fibrin, and finally blocks the vessel altogether. It now extends

chiefly in a backward direction (*i.e.*, towards the heart), until it meets with a current of blood sufficiently strong to arrest its further progress.

All thrombi are proximately induced by one of two conditions, or by both combined, viz:—(1) *retardation of the blood-current*; and (2) *modification of the vascular walls*. The blood-current may be retarded or stopped—(a) by ligation, compression, or plugging of the vessel; (b) by aneurismal dilatations of the vessels or heart; (c) by solution of continuity, as in rupture of a vessel from injury; or (d) by feebleness of the heart's action, this being probably the main factor in the production of thrombosis which so often occurs towards the end of exhausting diseases, such as phthisis, or cancer. Speaking generally, thrombi are more frequently met with in the veins than elsewhere; though thrombosis in the heart and arteries is by no means uncommon as the result of endocarditis, endarteritis, and atheroma.

PROGRESS.—The thrombus may either become *organised* into connective-tissue, and ultimately blend with the wall of the vessel; or, on the other hand it may *soften*, and break down (beginning in the centre) into yellowish puriform pulp, surrounded by the thickened coats of the vessel into which the suppurative process often extends. Organisation is most common in the arteries, while softening is chiefly met with in the veins.

RESULTS.—1. The coats of the vessels are altered in the manner just described. 2. Certain circulatory disturbances occur:—thus, unless collateral circulation be quickly established, thrombosis of an artery will lead to the death of the parts supplied; while thrombosis of an important vein will cause painful swelling, and—if long continued—nutritive changes in the part which it drains. 3. A fragment of the clot may be washed off into the current of the blood, and lead to embolism.

EMBOLISM.

EMBOLISM denotes the plugging of a vessel by a substance carried to it from a distance. The plug is called an *embolus*. The most frequent sources of emboli are detached fragments of thrombi in the veins; vegetations and morbid debris from the heart; drops of oil which have escaped from fat-cells after certain surgical injuries, etc., and have become absorbed by the veins; and portions of new growths, or parasites.

An embolus, arising in one of these ways, is swept into the general current of the circulation, in which it flows on until its further progress is arrested by a vessel, the calibre of which is too small to allow it to pass. Thus emboli which originate in the systemic veins, will be probably arrested in one of the smaller branches of the pulmonary artery; while those arriving from the pulmonary veins or heart will be lodged in one of the systemic arteries; and those from the radicles of the portal vein—in the liver. It will thus be seen that, in all cases, the seat of the embolism is either in the arteries, or in the hepatic branches of the portal vein or in their respective capillaries.

RESULTS.—The embolus, having been arrested, now blocks the vessel, and cuts off the blood-supply from the area to which the latter is distributed, and, for the same reason, deprives that part of its functions—for the time at least. Thrombosis takes place around the embolus, and extends in all directions as far as the nearest large collateral vessels. If the embolism be small, and collateral circulation is soon established, the part may soon regain its normal condition. Otherwise, collateral congestion ensues, and a backward current takes place in the veins which leads to hæmorrhage. The patch of thrombosis, with extravasated blood, constitutes a *hæmorrhage*.

PROGRESS.—The further progress of the infarct depends upon the character and source of the embolus. If it be *infective*, or in other words, if it be derived from a putrefactive source, as from a thrombus occurring in the neighbourhood of a pyæmic abscess, rapid softening and disintegration of the infarct takes place, resulting in the formation of an *embolic* or *metastatic abscess*. On the other hand, if the embolus be non-infective, and of small size, absorption or organisation occurs; but if it be large, the infarct often softens in the first place, then becomes encapsuled, and finally dries up, leaving merely a fibroid cicatrix.

HYPERTROPHY.

HYPERTROPHY means a quantitative overgrowth of an organ or a tissue. The increase in amount of the tissue may be due either to an absolute increase in the *size* of the individual tissue-elements, when the hypertrophy is said to be *simple*; or to an increase in their number, when it is termed *numerical hypertrophy* or *hyperplasia*.

The anatomical changes in hypertrophy consist of increase in the size and weight, and sometimes in the shape of the organ affected.

Hypertrophy, in whatever way it may be induced, should be regarded as *the anatomical expression of increased functional activity*. Thus, in the case of muscular tissue, where hypertrophy is of most frequent occurrence, any increase in the demands made upon the muscle by increased strain, or additional work, is responded to—*cæteris paribus*—by hypertrophy; and since it tends to bring about a balance between the work to be done, and the means of doing it, it is accordingly regarded as *compensatory*. Functional excitement, induced by nervous irritation, is sometimes the cause of hypertrophy. Again, increase in the supply of

blood to a part, will determine a functional excitement of the same, and may in time be followed by hypertrophy.

The term "hypertrophy" is often inappropriately applied to enlargements of parts or organs resulting from inflammation, or from the deposit of some morbid material.

ATROPHY.

ATROPHY is the reverse of hypertrophy, and implies a *quantitative diminution* of the substance of an organ or a tissue. Atrophy, like hypertrophy, may be termed *simple* or *numerical*, according as it is characterised by an absolute diminution in the size of the tissue elements, or by their numerical decrease. These two varieties are generally more or less combined. Atrophy is necessarily attended with a certain amount of impairment of function, which is apt to be intensified by its very frequent association with degeneration of the tissue-elements; in other words, changes of *quality* are superadded to changes of *quantity*.

Atrophy may be either *general* or *local*. General atrophy is usually simple in its early stages, but later on numerical atrophy supervenes. The adipose tissue is first affected; then the muscles and viscera; and lastly, the tissue of the nervous centres. It may be caused by: 1. *Deficient supply of nutritive material*, as in starvation, constriction of some part of the alimentary tube, defective digestion, &c. 2. *Excessive waste*, as in protracted diarrhoea, immoderate hæmorrhage, and profuse persistent suppuration. 3. *Impaired nutritive activity*, as in the atrophy of old age.

Local atrophy may be caused by:—1. *Imperfect supply of blood to a part*, as in atrophy induced by pressure or ligation of a part. 2. *Impaired nutritive activity*, as in the atrophy of parts no longer required, *e.g.*, the ductus arteriosus, and the Wolffian bodies after birth; or of parts

that have long remained disused, *e.g.*, muscular atrophy after certain forms of paralysis. 3. *Excessive functional activity*, leading to exhaustion of a part. 4. *Inflammation*. 5. *Nervous disturbance*. There is no doubt that certain lesions of the nervous centres and of the peripheral nerves may be followed by atrophy of the parts to which they are distributed; but whether this is the result of mere withdrawal of nervous influence by solution of continuity of trophic nerve-fibres; or whether, on the other hand, it is caused by the peripheral extension of inflammatory and degenerative changes along the course of the nerves, affecting the parts in an indirect manner, is still *sub judice*. Until this problem is finally solved, the pathology of such diseases as progressive muscular atrophy will remain unexplained.

DEGENERATIONS.

DEGENERATION differs from atrophy in that it is characterised by *qualitative* rather than by *quantitative* changes in the tissues. Two kinds of degeneration must be distinguished from each other. In the one, the albuminoid constituents of *tissues are directly metamorphosed* into some new material of a lower type; while in the other, the *new material is deposited in the tissues* from the blood. The term *metamorphosis* is applied to the former, and *infiltration* to the latter variety. Both are attended with impairment of function, but to a much greater extent in the former than in the latter.

THE METAMORPHOSES.

These include fatty, mucoid, and colloid degeneration.

FATTY DEGENERATION. This form of degeneration is characterised by the direct conversion of the albuminoid

substance of cells or fibres into fat. The fat appears in the form of minute oil-globules, of comparatively uniform size, and with little or no tendency to fuse together. The oil-globules are recognised by their sharp contour, dark colour, and solubility in ether. The cells or fibres at first enlarge, then break up, the albuminous matter between the oil-globules liquefies, and the fat becomes distributed in the tissues. Physiological examples of fatty degeneration occur in the secretion of milk, and sebaceous matter, which is due to a fatty degeneration of the epithelial cells in the respective glands.

CASEATION is a modification of fatty degeneration, which is mainly due to extreme dryness of the affected part. This dryness arises from a defective supply of blood, usually caused by obliterative endarteritis. Where cells are crowded together in quantity under these circumstances, their nutrition is necessarily impaired, and they are apt to become converted into a yellow 'cheesy mass of putty-like consistency. Such changes often occur in the products of chronic pneumonia, and constitute an important feature of phthisical processes. Such cheesy masses were formerly described as *yellow tubercles*. The caseous mass may subsequently soften and undergo liquefaction; or on the other hand, it may become calcified.

The most common causes of fatty degeneration are (a) senile decay; (b) deficient supply of arterial blood; (c) diminished vitality; and (d) congestion and inflammation.

MUCOID DEGENERATION.—Here the albuminous intercellular substance, and—far more rarely—the cells themselves, become liquefied, and converted into a substance called *mucin*. Mucin differs from albumen in not containing sulphur, and being precipitated by acetic acid. The tissue thus becomes converted into a jelly-like material of mucilaginous consistency. It is met with most frequently in the inter-vertebral, and costal cartilages of old people;

and it also enters into the composition of many new growths.

COLLOID DEGENERATION.—Here the albuminous contents of the cells (and not the intercellular substance) are converted into a jelly-like material called *chondrin*, which differs from mucin, in containing sulphur, and not being precipitated by acetic acid. It is notably liable to affect the cells of certain cancerous growths (*colloid cancer*); but sometimes occurs in tumours, other than those of a malignant kind.

THE INFILTRATIONS.

These include fatty infiltration, and lardaceous, calcareous, and pigmentary degenerations.

FATTY INFILTRATION.—In this condition, fat is deposited within the cells as distinct globules, which accumulate, increase in size, and tend to run together. The protoplasmic contents of the cells are at first merely *displaced*; but they subsequently atrophy, and are reduced to a small remnant, which is gathered around the nucleus. Typical examples of fatty infiltration are met with in the conversion of connective into adipose tissue, and in fatty infiltration of the liver.

Etiologically, it results from an excess of fat in the blood, in greater quantity than can be got rid of by oxidation. This excess may arise, on the one hand, from a too liberal dietary, combined with insufficient exercise and fresh air; or, on the other hand, it may be due to its absorption in excessive quantity, from rapid wasting of fatty tissues elsewhere, especially when associated with imperfect respiration, as in the fatty liver of phthisis.

ALBUMINOID OR LARDACEOUS DEGENERATION.—Here the material which infiltrates the tissue elements is a peculiar, translucent, homogeneous substance, called *lardacein*; which impairs their vitality and alters their appearance.

Lardacéin is essentially a modification of albumen, with a deficiency of potash and of phosphoric acid, but with an excess of soda and hydrochloric acid. It exhibits a characteristic brown mahogany colour when treated with a weak solution of iodine; and an equally characteristic test is the readiness with which it is stained ruby-red by a solution of methylaniline.

Lardaceous degeneration is almost always of secondary origin. The conditions with which it is most frequently associated are (1) Phthisis; (2) Syphilis; and (3) Prolonged suppuration, such as is met with, for instance, in disease of the hip-joint, and in spinal caries.

The circumstances affecting its formation and deposit in the tissue-elements, are not thoroughly understood at present. So far as is known the mode of its occurrence is as follows:—it appears first in the muscular coat of the small arteries, infiltrating the muscular fibre-cells, and adjacent cells of the intima, subsequently affecting the remaining structures of the vessel. Thence it may invade the cells and intercellular substance of the surrounding parts. The affected cells at first enlarge, become smooth and rounded, lose their nuclei, and tend to merge imperceptibly with adjacent cells which are similarly diseased. A larger or smaller mass of homogeneous, glistening material, is ultimately formed which is scantily supplied with blood, partly owing to the pressure exerted on the vessels by the swollen tissue, and partly to the narrowing of the small arteries by degenerations of the vascular walls. In its earlier stage, the process can only be recognised with the microscope; but when more advanced, it can be readily appreciated by the naked eye.

It is especially liable to occur in the liver, spleen, kidneys, intestines, and lymphatic glands.

CALCAREOUS INFILTRATION.—This consists in the deposit of calcareous particles, generally between but sometimes

within, the elements of the tissues. The particles are composed of lime and magnesian salts, and the process as a whole is closely analogous to the physiological process of ossification, with, however, certain distinctions, which may be thus tabulated.

OSSIFICATION.

Essentially an *active* process.
Increased nutritive activity.
Formation of a new tissue.
Special structure (*lacunae and bone corpuscles*).

CALCIFICATION.

Essentially a *passive* process.
Nutrition impaired.
Mere infiltration of old tissue.
No special structure.

It occurs either as the result of an excessive amount of earthy salts in the blood, as in osteomalacia or extensive caries; or again, as the result of impairment of the nutrition of the tissues themselves, owing to which, earthy matter, normally held in solution in the blood, is deposited in them, *e g.*, arterial calcification.

PIGMENTARY INFILTRATION.—This degeneration is characterised by the deposit of pigmentary particles in the tissue elements. The black skin of the negro, and the choroid coat of the eye, are physiological examples of this condition. The pigment is primarily derived from the blood. An irregular form of pigmentation is met with in the lungs, which must not be confounded with pigmentary infiltration, *viz.*, the black markings on section of the lungs of colliers, grinders, and others, resulting from the persistent inhalation of black particles in the form of dust. Arriving in the bronchi they penetrate the mucous membrane, and are carried into the lymphatics, vessels and glands, where they remain permanently.

FEVER OR PYREXIA.

FEVER is a pathological condition characterised by undue elevation of temperature. The average temperature of

the human body is 98.4° F. (36.8° C.), and only varies in health within very narrow limits. Of these variations the most important is that termed the "diurnal variation," which represents the interval between an early morning minimum, and an evening maximum. It rarely exceeds 1.5° F. Other slight variations also occur, due to the ingestion of food, external temperature, physical exercise, &c., but are unimportant. The production of heat is exclusively traceable to the oxidation of tissues and food, which accompanies every form of bodily activity; while on the other hand, heat is being constantly lost by the lungs, and excreta, and still more by conduction, radiation and evaporation from the surface of the skin. The temperature of the body represents the balance between the production and loss of heat, both of which are under nervous control, and are brought into constant relation with each other by the circulation of the blood. In fever this state of equilibrium is disturbed, and the temperature rises. The increased heat of the body may be evident to the touch, but can only be correctly estimated by the thermometer. The increase of temperature varies from a slight rise to 108° to 110° . Below 101° the fever is slight, above 104° it is high, while over 106° it may be regarded as *hyperpyrexia*.

Associated with the elevated temperature, other phenomena are more or less constantly observed. The *skin* is generally hot, harsh, dry, and often pungent, but is sometimes bathed in profuse perspiration. Headache, vertigo, restlessness, insomnia, and delirium, are common *nervous* symptoms. The *chill* or *rigor* which so frequently ushers in the febrile condition is also a nervous phenomenon, of a purely subjective kind, and is due to spasmodic contraction of the cutaneous vessels. The *pulse* and *respirations* are quickened in proportion to the rise of temperature, while the characters of the pulse are variously modified. *Diges-*

tive disturbance is indicated by a dry clammy mouth, a coated tongue, thirst, loss of appetite, nausea or vomiting, and constipation. The *urine* is scanty, high-coloured, of high specific gravity, and very acid; its solid constituents are both relatively and absolutely in excess; urea and uric acid are largely increased, while the chlorides are usually diminished. Lastly, *general emaciation* takes place in proportion to the intensity and duration of the fever.

TERMINATIONS.—The febrile process may terminate in death, or recovery. In the event of recovery, the temperature subsides suddenly, by *crisis*; or gradually, by *lysis*.

VARIETIES OF TYPE.—I. Special terms are employed to denote varieties in the course and character of the fever; thus, it is said to be *continuous* when it persists for some time without marked variations; *remittent*, when between consecutive accessions of fever the temperature approaches but does not reach the normal level; *intermittent* when between consecutive accessions of fever the temperature falls to the normal level; *relapsing*, when paroxysms of fever of considerable duration are separated from each other by periods of complete apyrexia lasting for one or more days.

II. Other varieties are based upon the severity and character of the febrile symptoms as a whole. Thus it is said to be *simple*, when it occurs in a mild and trifling form; *inflammatory*, when it is dependent on acute local inflammations; *specific*, when it is regarded as due to the introduction of a specific poison into the system.

Asthenic or *adynamic* fever is characterised by a comparatively slight rise of temperature, with symptoms of great weakness and prostration.

A fever is said to be *malignant* when it is exceedingly severe, and of a low and exceptionally fatal type.

The "*typhoid*" state, so called because of its frequent occurrence in bad cases of typhus, is by no means confined

to this affection. It denotes a low febrile condition which is especially characterised by a tendency to the accumulation of sordes about the lips and tongue; a dry brown tongue; great frequency, feebleness, and sometimes irregularity of the pulse; a liability to passive congestions of dependent parts; and low muttering delirium, ending in coma. It is supposed to be due to the defective elimination, and accumulation in the blood of the effete products of the oxidation of nitrogenous tissues.

Hectic fever mainly occurs in connection with persistent purulent discharges as met with in caries of bones, phthisis, and the like. The fever is distinctly of an intermittent or remittent type, comes on insidiously, and is usually of long duration. It is further associated with marked progressive emaciation, circumscribed flushing of the cheek, a soft frequent pulse, profuse perspirations, and irregular action of the bowels. Hectic fever is now generally regarded as a form of septicæmia.

NATURE OF FEVER.—From what has gone before, it follows that an elevation of temperature might arise either from diminished heat-loss, or from increased heat-production, or from a combination of both. The rapid emaciation, the increased elimination of urea and carbonic acid (even with almost complete abstinence from food) show pretty clearly that it is essentially due to increased heat-production from tissue-disintegration. Other considerations into which it is impossible now to enter would seem to show that fever is from “first to last a disorder of protoplasm,” and that all systemic disturbances are secondary.

RELATION OF MICRO-ORGANISMS TO DISEASE.

IN many infective diseases—though not as yet in all—the existence of minute living organisms has been established

beyond all doubt. The question arises as to what is the precise nature of the connection of such organisms, if any, with the diseases in which they are found. The so-called germ theory assumes that all infective diseases are directly due to the presence and development within the body of specific living contagia or germs. This theory is mainly based on the capacity of such contagia for indefinite multiplication within the body, however small the quantity which was originally introduced; on experimental and clinical evidence that the contagium of any one disease produces that disease and no other; on the latent period which separates the moment of exposure to the contagious influence from the actual appearance of symptoms; on the definite course of such diseases; and lastly, on the experimental causation of at least one infective disease (anthrax) by the inoculation after repeated artificial cultivation outside the body, of living organisms originally derived from a similar case. Admitting this view, every such organism is distinguished from an ordinary animal or vegetable parasite by its capacity to modify—in a manner specific to itself—the various physiological processes of the body.

The micro-organisms now under discussion go by the generic term of *bacteria*. They are of a vegetable nature, belonging to the order of Fungi, and are of various kinds. Those known as micrococci consist of exceedingly minute spherules isolated from each other, or arranged in rows or in masses (*zooglaea*); others resemble minute straight rods, also existing separately, or in rows, or in masses, and are called *bacilli*; while in a third variety the rods exhibit a spiral shape, and are termed *spirilla*. They multiply either by transverse subdivision, or by the formation of minute bright-looking particles called "spores," which under favourable circumstances develop into bacteria similar to those from which they were derived. The growth and de-

velopment of bacteria demands a due supply of nutritive material, of which part at least must be of an organic nature; a certain degree of moisture; and moderate warmth. Bacteria are destroyed by the temperature of boiling water; though it is probable that the spores in many cases are able to resist a higher temperature with impunity. Many substances like corrosive sublimate, carbolic acid, etc., exert a similar destructive effect. Their mode of action on the media in which they live and grow is probably closely allied with that of fermentation.

Vegetable organisms answering to this description are found in abundance almost everywhere, in the soil, in water, and in the air. It is clear therefore that enormous quantities must be introduced into the body in the food we eat, the water we drink, and in the air we breathe. Of the bacteria thus introduced the vast majority are either incapable of development, or are altogether destroyed by reason of the unsuitability of their new surroundings. But some are able to multiply freely in the healthy body; and others, while incapable of this, may develop when the tissues are morbidly changed in such a way as to conform with their requirements, and thus to constitute a *predisposition* on the part of the system.

It is obvious that the latter group alone has any pathological significance. Assuming that a bacterial settlement of this kind has actually taken place, prejudicial results quickly follow. For instance, the organisms draw on the tissues for the materials necessary to their growth; the secondary products of their vital activity are introduced into the system; the normal vito-chemical changes of the tissue-elements become disturbed; and the organisms themselves by getting into the current of the circulation may give rise to embolic infarction. Sooner or later the process ends either by reason of an amount of functional disturbance incompatible with the life of the patient; or by

the rallying of the normal powers of the tissues, and the establishment of conditions no longer consistent with the development of the bacterial organisms. It is a curious fact that diseases of this kind leave the system in a condition which is peculiarly unsusceptible to a repetition of the same bacterial growth, and thus a more or less complete immunity from the recurrence of the disease in question is conferred upon the patient.

COLLAPSE AND SYNCOPE.

BOTH collapse and syncope are characterised by functional depression, in the former of the nervous system, in the latter of the heart, and are met with under a great variety of circumstances. Either may arise from the operation of some specific poison in the system, or as a result of high fever, suppression of certain excretions, violent mental emotion, excessive pain, rupture or perforation of internal organs, hæmorrhage, and the like.

The *symptoms of collapse* are as follows :—the temperature usually (not always) falls; the skin is pale, cold and clammy, the features are pinched and drawn; the respiration is slow, shallow, and often sighing; the pulse is small and feeble, sometimes very rapid, sometimes very slow; hiccough, nausea, or vomiting, noises in the ears, dimness of sight, and extreme debility, are also common symptoms. The mental condition varies; it may be clear, or insensibility may be partial or complete.

Syncope differs from collapse mainly in the suddenness of its onset, the greater intensity of its symptoms, and its shorter duration. There is no time for a marked depression in the temperature.

DEATH.

THE circumstances under which death takes place are very complex and variable. Certain typical modes of death may be distinguished with advantage, though it is not always possible to refer any given death exclusively to one mode. Death may begin at the heart, lungs, or brain.

When the heart's action suddenly and completely fails under any of the circumstances enumerated above, death is said to take place from *syncope*. When death is preceded by marked general depression and prostration, it is said to occur from *collapse*. When the action of the heart ceases more gradually, together with a similarly gradual failure in the general vitality, death is said to occur from *asthenia*. When death is due to interference with the respiratory functions, it is said to occur from *asphyxia*. Lastly, death from *coma* begins at the brain, and is characterised by stupor and insensibility.

SECTION II.

GENERAL DISEASES. (A).

TYPHUS FEVER.

TYPHUS fever is undoubtedly produced by a specific poison. As regards its origin, Murchison and others are strongly of opinion that it may arise *de novo*, from overcrowding. Whether this be so or not, typhus fever is eminently infectious, and is easily communicable by the poisons contained in the emanations from the patient. The contagious

influence, *per se*, travels but a short distance, being readily lost by dilution with the air ; but it may be conveyed a considerable distance by contaminated clothing, furniture, &c. A feeble state of health, defective hygienic surroundings, bad ventilation, want of cleanliness, impure water and air, and intemperate habits appear to favour the development of the disease. Typhus occurs most frequently in those of middle and advanced age.

MORBID ANATOMY.—The *post mortem* appearances are characterised by *disorganisation*. The blood is dark and coagulates imperfectly ; the muscles are dark and softened ; and many of the internal organs are apt to become enlarged, hyperæmic, and softened.

SYMPTOMS.—The period of *incubation* is said to be about nine days, and may be marked by premonitory signs of constitutional disturbance.

Typhus varies much in severity. In a typical case, the *invasion* is generally abrupt, and is ushered in with chilliness, or rigors, followed by high fever. Prostration and depression are present from the outset, in direct proportion to the severity of the case ; so that the patient is compelled soon to take to his bed. These features characterise the disease throughout its whole course. Nervous symptoms are prominent and come on early. The head is heavy and confused, and complaint is also made of giddiness, intolerance of light, and ringing in the ears. Delirium is also an early symptom, and though at first it amounts to mere mental dulness and confusion, it soon becomes marked, and is then of a low muttering type. The expression is dull, and the complexion dusky. The limbs are often painful, and tremble on movement. The tongue trembles when protruded ; and is covered with a white fur, which soon becomes thicker, or a yellowish brown colour, and is apt to get dry. An unpleasant taste in the mouth is of frequent occurrence. Thirst, nausea, (and perhaps vomit-

ing), anorexia, and constipation, are commonly present. The pulse is frequent, soft, compressible, and finally feeble. The urine is febrile. Symptoms of catarrh, such as sneezing, slight cough, and expectoration, are not uncommon. The temperature will be considered separately.

The eruptive stage.—The eruption consists of *maculae* or “mulberry-spots,” usually combined with more or less *sub-cuticular mottling*. The *maculae* appear about the fourth or fifth day on the front of the chest and upper part of the abdomen, and if abundant, on the limbs also. They come out in one crop, and persist throughout the disease, and also after death in fatal cases. They consist of distinct small irregularly roundish spots, which, when fully developed, are of a dark-red mulberry-juice colour, and do not disappear on pressure. The *mottling* is described as a dusky-red irregular mottling, which appears as if beneath the surface of the skin.

In this stage the symptoms, previously enumerated, tend to increase in severity. The depression becomes still more complete. The delirium is apt to lapse into semi-coma, or stupor, and the special senses are dulled. The tongue becomes dry, brown, and cracked; and the lips and teeth are encrusted with sordes. Thirst persists, and the appetite is completely lost. The pulse rises to 130 or 140 or more, and is very feeble, fluttering, and dicrotous,—indicative of threatening cardiac paralysis. Respiration is hurried and disturbed. The urine is very scanty, high-coloured, and *not infrequently contains albumen*. In bad cases it is often retained, and dribbles away involuntarily with the stools. Bed-sores are common.

Stage of decline.—The average duration of typhus fever is from 14 to 21 days. Death is most frequent about the end of the second week, and results from profound exhaustion or coma; if later, it is more often due to pneumonia, or some other complication. In favourable cases—which

are the rule—the fever ends by *crisis*, sometime usually in the third week. The patient falls into a good sleep, from which he awakes greatly relieved. The tongue moistens, the mind clears, the appetite returns, and recovery often sets in with wonderful rapidity.

Course of the temperature.—There is a rapid, and continuous rise of temperature from the first, reaching a maximum of 104° or 105° by the fourth or fifth day, without morning remissions. On the sixth day a slight remission takes place. Then a second rise—but not up to the first maximum—which is maintained in favourable cases till the final fall, which is sudden and complete. In fatal cases, however, death is often preceded by a rise to 108° or 109°.

By far the most common *complication* is hypostatic congestion of the lungs, passing on to pneumonia. More rarely, we meet with cardiac softening, gangrene of the lower limbs, parotid bubo, abscesses, and renal disease.

The main *diagnostic* features are—the rapid rise of temperature without morning remissions; the early prostration; the early appearance of nervous symptoms of a low type; and the “mulberry” rash.

As to *prognosis*, great feebleness or extreme rapidity of the pulse; profound coma; hiccup; suppression of the urine; delirium of a marked kind alternating with stupor are bad signs. Of the complications, pneumonia and parotid bubo are the most ominous. A large majority of all cases recover.

TREATMENT.—The patient should rest completely in bed, in a well-ventilated, airy room. The food should be liquid, but nutritious, and easily assimilable. Alcoholic stimulants are needful in the majority of cases; but are especially called for in the aged, and in those whose vitality is impaired by excesses of any kind. The secretions must be attended to, and the urine should be drawn if necessary. Medicinally, the mineral acids, quinine, and

tincture of steel, have been chiefly recommended. The *nervous symptoms* are best met by tepid spongings of the body, and by the application of ice to the head; *violent delirium with excitement*—by tartar emetic and opium; *low muttering delirium* and the “*typhoid*” state—by stimulants, (opium is contra-indicated); *stupor*—by stimulants, or strong coffee, and by counter-irritation to the nape of the neck.

TYPHOID FEVER—ENTERIC FEVER.

TYPHOID fever is due to a specific poison, and is not communicable by the exhalations from the patient. Eberth and others claim to have discovered specific bacilli in the mesenteric glands, spleen, etc., but their precise relation to the disease has yet to be made out. The source of the poison is to be found in the emanations from typhoid stools, and also—according to Murchison—from decomposing sewage matter of any kind. It is mainly conveyed through the medium of drinking-water, which has been contaminated by soakage from privies, cesspools, or drains. The disease is most common between the ages of 15 and 25 years.

MORBID ANATOMY.—The most characteristic lesions are as follows:—1. *Inflammation and ulceration of the solitary and agminated glands (Peyer's patches)*, in the intestine. These changes begin and are most extensive in the neighbourhood of the ileo-cæcal valve, becoming less marked on proceeding upwards from this point. The solitary glands of the large intestine are also not infrequently affected. The glands first enlarge from profliferation of their cellular elements, and subsequently undergo a process of necrosis. Ulceration begins about a week later, and is in some cases preceded by sloughing of the mucous membrane over the glands. The typhoid ulcer may be simultaneously

described and contrasted with the tubercular intestinal ulcer, thus—

The *typhoid ulcer* has its long axis parallel to the intestine; its edges are thin and undermined; it never leads to stricture of the bowels; it generally heals; and is accompanied with little or no peritonitis.

The *tubercular ulcer* has its long axis transverse to the intestine; its edges are thick and indurated; it is often followed by stricture of the bowels; it rarely heals; and is always accompanied with local or general peritonitis.

The floor of the ulcer is formed by the sub-mucous, muscular, or peritoneal coats of the intestine according to its depth. Cicatrisation takes place about the end of the third week. When once the glands and mucous membrane have been destroyed they are never properly renewed. 2. The *mesenteric glands* become infiltrated, enlarged, and softened. 3. A similar *enlargement of the spleen* is very constant.

Perforation of the intestine may occur (a) from extension of the ulcer; (b) from sloughing of the whole thickness of the gut; (c) from rupture or laceration.

Symptoms.—The period of *incubation* extends from 10 to 20 days, but is not attended with any marked symptoms.

The *actual attack* begins insidiously. The patient is feverish, and at first complains of little more than frontal headache, abdominal discomfort, general malaise, and aching pains in the limbs. Slight epistaxis is apt to occur during the first few days. The bowels are usually relaxed and the stools paler than usual; but not infrequently there is constipation in the first instance. Thus, for the first 4 or 5 days the symptoms are not as a rule so severe as to compel the patient to take to his bed. Now, however, the general condition becomes more characteristic. The countenance is pale, though the cheeks are flushed; the skin is hot and dry; the appetite is lost; and thirst is marked. The tongue is at first coated with a white fur, which thins off towards the tip and edges and is often cracked trans-

versely. The abdominal symptoms are now obvious, viz :—*pain* and *tenderness*, especially over the right iliac fossa ; *tympanitis*, with gurgling on pressure over the right iliac fossa ; *enlargement of the spleen* ; and *diarrhœa*. Typical typhoid stools are of thin consistence and pale yellowish colour resembling pea-soup, of an offensive odour, and of alkaline reaction. On standing, a *deposit* occurs which consists of epithelial debris, blood, shreds of mucous membrane, undigested food, and crystals of triple phosphates ; while the *supernatant liquor* contains albumen, and salts (especially chloride of sodium) in solution. In this stage nervous symptoms are not prominent. The urine is febrile.

The *eruption* appears from the seventh to the tenth day upon the abdomen, chest, and back ; and comes out in successive crops, each spot lasting for 3 or 4 days. The number of spots varies much. The average duration of the rash as a whole is about a fortnight. The spots are roundish, of the size of a millet seed, slightly elevated, well defined, rose-coloured, and disappear completely on pressure, and after death.

During the *second week* the countenance becomes more flushed, and the patient rapidly emaciates. The fever continues, but the frontal headache disappears, he gets apathetic and restless, and lies mostly on his back. All muscular movements are feeble and uncertain. The tongue trembles when protruded, is dry, and brownish in the centre while the tip and edges are red. There may now be sleepiness with some delirium, but at this stage the latter rarely gets beyond slight rambling. The abdominal symptoms increase, and hæmorrhage from the bowels may occur. The pulse becomes more frequent, and feeble. There is usually some little cough and expectoration ; and the physical signs of bronchial catarrh may always be detected, especially over the posterior bases of the lungs.

In the *third week*, the patient is at his worst. Dull, worn, and prostrate, he lies helplessly on his back; the tongue is shrivelled and dry, and often coated with sordes which extend to the teeth and lips; the pulse is very rapid, feeble, and generally dicrotous; the delirium becomes more marked; and in bad cases, there may be marked stupor. The fæces and urine are often passed involuntarily, or the urine may be retained. It is about this time that complications are especially apt to arise.

In course of the *fourth week* the symptoms usually subside, in favourable cases. Defervescence is by *lysis*. The convalescence is slow, and liable to interruption from *relapse*. The total duration varies considerably, that of very mild cases may be less than 4 weeks, while that of severe cases may be much longer.

Temperature.—The primary onset of the fever is very characteristic; the temperature rises 2° every evening, and falls 1° every morning for the first 4 or 5 days, attaining a maximum towards the end of the first week. During the second week this maximum is usually maintained, and the fever is of a continued type; during the third week it is of a remittent type; while during the fourth week it is of an intermittent type. The more severe the case, the longer the duration of the period of continued fever.

The most important *complications* are pneumonia, pleurisy, perforation of the bowel, hæmorrhage, and peritonitis; while phlegmasia dolens, prolonged mental impairment, and grave anæmia constitute the most important *sequelæ*.

The *diagnosis* will be afterwards considered with that of other acute specific fevers. A rule of considerable service in practice is that any acute fever lasting for 4 or 5 days without any rash, or obvious local disease is probably either typhoid or tuberculosis. The diagnosis between these two diseases is often a matter of great difficulty.

The *prognosis* is favourable on the whole, but the pos-

sibility of death from perforation or hæmorrhage always gives an element of uncertainty to every case. The course of the temperature is the best guide.

TREATMENT.—The *hygienic* management is similar to that of all fevers. With regard to the *diet*, great caution should be exercised. The food should be exclusively given in a liquid form. A milk diet is the best, to which may be added beef-tea, arrowroot, custard, or jelly. Beef-tea should, however, be avoided if the diarrhœa be excessive. A caution is also necessary against the indiscriminate use of milk in large quantities; hard curds are often formed in the stomach, which on passing into the intestine may cause symptoms of violent irritation, and do much harm. Cooling drinks may be given in moderation. I have often found a table-spoonful of black coffee, from time to time, relieve the thirst better than anything else, and it has the advantage of not interfering with digestion. *Alcoholic stimulants* are not needed in ordinary cases, and few require them before the end of the second week. A rapid fluttering pulse and inability to take proper nourishment, provide the safest indications for their use. Again, during convalescence, a glass of light wine with the heavier meals often aids digestion, and accelerates recovery. Medicinal remedies have but little influence on the course of the disease. In ordinary cases nothing is needed beyond a little chlorate of potash, or some simple salines. In grave cases, antipyretic treatment by large doses of quinine, or by cold baths has been strongly recommended. The *diarrhœa* should not be checked unless it be excessive, when 5 to 10 grains of Dover's powder, or an opiate enema may be given occasionally. If the bowels be *constipated*, great care is requisite in the use of aperients. Nothing beyond a small dose of castor oil (which can be repeated if necessary), or a simple enema should be employed. *Hæmorrhage* may be best controlled by the appli-

cation of ice to the iliac region, by cold enemata, and by the internal administration of turpentine, acetate of lead with opium, gallic or sulphuric acid, hazelin or ergotin. During *convalescence* food should be given in small quantities at a time, and at moderate intervals, indigestible substances being strictly avoided.

RELAPSING FEVER.

THIS is a peculiar specific fever, which is characterised by periodical intermissions and relapses. In whatever way the disease may first arise, it is exceedingly infectious, and as a rule it takes the form of an epidemic. It especially occurs during seasons of famine, and its propagation is enhanced by overcrowding and insanitation.

Minute corkscrew-shaped organisms (*spirilla*) have been found in the blood during the febrile periods, and are regarded by some as the specific cause of the disease.

SYMPTOMS.—The *invasion* is remarkably sudden; setting in with rigors, frontal headache, marked pains in the limbs, and general depression. Febrile reaction soon follows, with its usual accompaniments. The more characteristic symptoms at this stage are—severe nausea and vomiting of a bitter bilious fluid, with pain at the epigastrium. The tongue is furred, and liable to become dry and brown. The bowels are confined; and occasionally there is jaundice. The pulse is very frequent, and in bad cases feeble and irregular. The urine is febrile. *There is no eruption.*

The general condition now appears grave indeed; but about the fifth or seventh day, a profuse perspiration breaks out, the pulse falls to its normal standard, the fever disappears by *crisis*, the tongue gets moist, and the appetite quickly returns. The patient fancies himself well, and looks forward to a speedy and complete recovery—

but in this he is disappointed. Generally in about seven days (fourteen from the first onset) there is a *sudden relapse*, with the reappearance of all the former symptoms. The average intensity of the relapse is, however, less than that of the first attack. The relapse continues from three to five days, when a *second crisis* occurs. This may be repeated even a third or fourth time. The debility which results is considerable, and the convalescence is slow.

The *temperature* rises rapidly to a maximum of about 105° which is reached on the fourth or fifth day, and is maintained with slight morning remissions until the critical fall. As already mentioned, the temperature does not usually rise so high as before.

Troublesome *complications* are apt to occur, of which bronchitis, severe pains in the limbs, ophthalmia, anasarca, and diarrhoea are the most important. Pregnant women always abort. The *prognosis* is usually favourable.

TREATMENT.—No specific form of treatment is known. At the outset, gentle aperients, with cooling drinks, a light nutritious diet, and perfect rest are required. Tepid sponging often gives great relief. Opium is said to greatly relieve the headache, muscular pains, and insomnia. It may be advantageously combined with belladonna, or given hypodermically. Quinine has no influence in preventing the relapse.

SCARLET FEVER.

SCARLET fever is produced by a specific poison. It is extremely infectious. The poison is contained in the emanations from the patient, and in the epithelial scales which are so freely shed towards the close of the disease. No limit is known to the period for which clothing, &c., which have been thus contaminated may retain their infective properties. A second attack is rare. This is essentially a

disease of children. There are no characteristic anatomical appearances.

SYMPTOMS.—The period of *incubation* is exceptionally short, and may not exceed twenty-four hours. The *invasion* is very sudden, and ushered in by chilliness, vomiting, or (in infants) convulsions. The temperature rises rapidly to a high grade, and is accompanied with the usual febrile symptoms. The pulse is *extremely rapid*. The tongue is furred on the dorsum, but the tip and edges are bright red. The throat is sore, red, and relaxed. The redness is *uniformly diffused* over the fauces, soft palate, and back of the pharynx, which distinguishes it from the one-sided inflammation of tonsillitis. Slight nocturnal delirium is not unusual.

The *eruption* first appears about the neck and shoulders on the second day, and extends thence over the whole body in the course of twenty-four hours. It consists at first of bright red spots, which are not elevated, and soon fuse together, till the skin becomes of a bright scarlet hue, the latter disappearing entirely on pressure. The rash reaches its height in three or four days, when it begins to fade and it disappears altogether at the beginning of the second week.

The soreness of the throat increases, and a thin exudation over the fauces with some slight ulceration is often seen. The glands at the angle of the jaw are always more or less enlarged and tender, and the surrounding parts are often oedematous. The temperature attains its maximum with the rash, and rapidly falls when the latter disappears. The pulse is similarly affected. At the end of the first week the tongue cleans from before backwards, and becomes of a bright red colour, with large prominent papillæ (*strawberry tongue*). The bowels are constipated; the urine is febrile, and often contains a little albumen. Nervous symptoms are not very marked in simple cases.

Desquamation, or peeling of the skin begins soon after the rash has faded. Where the skin is thin, the scales are small and branny; where it is thick, as on the hands and feet, it comes away in large flakes. Its duration varies greatly according to the treatment adopted, but it usually extends over two or three weeks. The fever and all the symptoms now completely subside; the urine becomes more abundant, and contains a large quantity of renal and vesical epithelium.

VARIETIES.—1. *Simple* scarlet fever has been already described. 2. *Scarlatina anginosa*. Here the throat symptoms are relatively prominent and severe; ulceration is extensive; the glands at the angle of the jaw greatly enlarge, and abscesses are apt to form in the neck and elsewhere. 3. *Scarlatina maligna* is characterised by grave nervous symptoms of a low type from the first, viz:—great prostration, delirium, with convulsions or coma. The pulse is rapid, feeble, and irregular. The rash is dusky and comes out badly. This variety is extremely fatal.

The *complications* of scarlet fever are both numerous and important. 1. *Acute nephritis*, characterised by albuminuria, hæmaturia, and dropsy, which is especially apt to supervene about the twenty-first day (*vide* Acute Bright's Disease). 2. *Rheumatic inflammation of the joints*, which not unfrequently goes on to suppuration. 3. *Abscess in the neck and elsewhere*. 4. *Inflammation of the serous membranes*. 5. *Purulent inflammation of the middle ear*, from the throat along the Eustachian tube.

In the *diagnosis* of scarlet fever, special attention should be given to the initial symptoms, which taken together, are very characteristic. When the rash has appeared, it is only likely to be confounded with measles, the differences from which will be given hereafter.

TREATMENT.—The patient should be isolated in a well ventilated room, from which all superfluous furniture

should be at once removed. At the outset, to reduce the fever and to ease the throat, nothing is more useful than chlorate of potash combined with tincture of aconite, which should be given frequently. Gargles may be used for the throat, but topical applications are preferable in the case of those too young to gargle. For this purpose boracic acid, carbolic acid, chlorate of potash, and Condy's fluid, are the best. Tepid or cold water spongings are especially useful to allay nervous symptoms. During desquamation, frequent bathing followed by inunction of the whole surface should be employed. In the malignant variety nourishing food and stimulants are specially needed. Complications require treatment as they arise.

MEASLES—RUBEOLA.

MEASLES is an acute specific disease, dependent upon a specific poison which is contained in the emanations from the patient. It may also be communicated by clothing, &c., but the contagium of measles is much less persistent than that of scarlet fever. A second attack is rare. Children are especially apt to be affected. There are no characteristic anatomical changes.

SYMPTOMS.—The period of *incubation* lasts usually from 7 to 10 days. The *invasion* sets in with chilliness, or (in infants) with convulsions, but not so suddenly as scarlet fever. The fever rises more or less rapidly to 101° or 102°, or higher in grave cases; but it very rarely equals that of scarlet fever. At the same time, the symptoms of ordinary catarrh of the nose and eyes are observed, indicated by redness, clear watery discharges, and frontal headache. Some intolerance of light, and epistaxis are not unusual. The catarrh soon increases, and extends into the throat, air-passages, and alimentary canal, causing sore throat, hoarseness, cough, expectoration, slight

difficulty of breathing, and wheezing sounds in the chest; loss of appetite, gastric discomfort, and constipation; but occasionally the bowels are relaxed.

The *eruption* appears on the fourth day, first on the forehead, thence spreading to the rest of the body, It forms little crescentic or semilunar patches of a dusky-red colour, and slightly elevated. At first the rash disappears completely on pressure; but when it is very intense, or has been out for some time, a yellowish staining may persist after pressure. It lasts altogether 4 or 5 days, and is followed by an insignificant powdery desquamation.

The catarrhal symptoms persist, but the character of the discharges from the mucus membrane now alter. They are no longer clear and watery, but turbid, thick, and yellowish. The margins of the eyelids are red and tumid, the tongue is usually moist, thickly coated, and often "patchy" in appearance. There may also be some vomiting and diarrhoea at this stage. The temperature often remits a little on the appearance of the rash, then rises to a maximum with the rash, and usually ends by crisis about the seventh or eighth day. The urine is febrile.

VARIETIES.—1. *Simple measles* as above described. 2. *Malignant measles*, which exhibits analogous symptoms to those enumerated with malignant scarlet fever. In this form the eruption is imperfect, and is very dark and dusky. Hæmorrhages are also apt to occur from the cutaneous and mucous surfaces.

The most important *complications* are:—capillary bronchitis, catarrhal pneumonia, pulmonary collapse, chronic inflammations of the eye and nose, and gangrene of the vulva.

The *diagnosis* will be afterwards considered. The *prognosis* is nearly always favourable in this country, unless it be complicated, or of a malignant type.

No *treatment* of a special kind is necessary in simple cases, beyond the relief of symptoms. Any threatening of the "typhoid state" should be met at once by the free use of stimulants, and nourishing food. As there is undoubtedly some liability to phthisis, or tubercular and scrofulous disorders after measles, it is very desirable that the patient should be placed during convalescence under tonic and invigorating conditions of life.

SMALL-POX—VARIOLA.

SMALL-POX is a specific disease caused by a poison which may be communicated by the emanations from the patient, or by inoculation with the contents of the pock. Hence, small-pox is both infectious and inoculable. The poison may be also conveyed to a distance by contaminated clothing, furniture, &c. Small-pox may be met with at any age, and affects those most severely who have not been previously vaccinated. A second attack is very unusual. Besides the eruption, which will be briefly described further on, there are *no characteristic anatomical changes*.

SYMPTOMS.—The average duration of the stage of *incubation* is twelve days. The *invasion* begins suddenly with a well-marked rigor or repeated chills, accompanied by high fever. The temperature frequently begins to rise even for some hours *before* the initial rigor, and reaches 104° or 105° by the end of the second day (*Primary Fever*). With the fever the following symptoms are more or less invariably associated:—Great constitutional disturbance, palpitation, throbbing of carotids and flushing of the face, abundant perspiration, headache and insomnia, severe pain in the loins, a sense of constriction at the epigastrium, nausea and vomiting. With the exception of vomiting, which generally ceases towards the end of the

second day, the foregoing symptoms increase in severity up to the appearance of the eruption. As occasional symptoms, we may meet with severe radiating pains in the limbs, convulsions or delirium. The latter are of very grave import, should they persist after the appearance of the eruption.

The *eruption* generally appears on the third day, and if later, is rarely, if ever, confluent. It comes out first on the face, extending over the body in the course of one or two days. The number of the "pocks" varies much. Each begins as a small isolated congested spot; this enlarges, becomes indurated, and by the third day of the eruption becomes a true *papule*, which feels like a small shot imbedded in the skin. Owing to the accumulation of serous fluid in the *rete mucosum*, the horny layer of the epidermis becomes elevated, and by the sixth day a perfect *vesicle* is formed. The vesicle is broad, flattened, and its cavity is subdivided by a network of altered epithelial cells. The latter fact, together with swelling and proliferation of cells at the periphery, probably accounts for the central depression of the vesicle known as umbilication. A red areola soon surrounds the vesicle, and its contents become turbid, and finally purulent, constituting a *pustule* which reaches its height about the ninth day. By these successive stages the period of *maturation* is reached.

In all but the worst cases *the primary fever falls, and the initial symptoms subside on the appearance of the eruption*. In mild cases the remission is complete. But with the maturation of the eruption, other symptoms appear, the intensity of which is directly proportionate to the number of the pocks. Thus the temperature rises again, and in doing so, represents a symptomatic and suppurative fever akin to septicæmia (*Secondary Fever*). It continues in "discrete" cases for about 7 or 8 days. In addition to the ordinary febrile symptoms, (which are

marked in direct proportion to the intensity of the fever) the skin become greatly swollen, red, and very irritable, especially on the face. Since the "pocks" not infrequently appear on the various mucous tracts, sore-throat, hoarseness, cough, diarrhœa, ophthalmia, or blindness may be observed. A peculiar and disagreeable odour is also apt to emanate from the patient.

The pustules now dry up (*dessication*), and dark-coloured scabs form which usually separate some time during the third week. Since the eruptive inflammation generally involves more or less destruction of "the true skin," cicatrices or "pits" occur, which are at first of a dull-reddish colour, but ultimately become quite white. With the subsidence of the secondary fever and its accompanying symptoms, convalescence rapidly returns. It is at this time however—especially in "confluent" cases,—that serious complications are apt to arise.

VARIETIES.—Where the pocks are distinct, and not numerous the disease is termed *discrete*; where they are at first distinct, but subsequently come into contact with each other—*coherent*; where they are numerous and run together—*confluent*. In *malignant* small-pox intense nervous depression, low muttering delirium, and general prostration are marked from the onset. Hæmorrhages under the skin, into the "pocks," and from the various mucous surfaces are of frequent occurrence in malignant small-pox, and give rise to a *hæmorrhagic* sub-variety, which is especially serious and fatal.

COMPLICATIONS AND SEQUELÆ.—The most important are (1) *boils* on the skin, and *abscesses*; (2) *erysipelas* of the face and head; (3) *conjunctivitis* and *ulceration of the cornea*, sometimes leading to destruction of the eyeball; (4) *bronchitis*, and low forms of *pneumonia*; (5) *laryngitis*, sometimes followed by *œdema of the glottis*, dependent on the eruption within the larynx; and (6) *pyæmia*.

The *diagnosis* will be considered hereafter.

As to *prognosis*—very young children, and subjects above 60 years of age generally die. Pregnant women usually abort and die. It is especially dangerous in drunkards, in the un-vaccinated, and in the confluent forms of the disease. Epidemic is more grave than sporadic small-pox.

VARIOLOID.—In those who have been vaccinated, the course of small-pox is so much modified, as to merit a separate description under the name of *varioloïd*. Its main features are as follows :—(1) the rash may be absent, or if present is scanty and ill-developed; (2) the development of the “pocks” is much more rapid, and often very imperfect; (3) There is either no “secondary fever” at all, or it is very slight, and only lasts for 18 or 24 hours; (4) there is little or no “pitting;” and (5) the prognosis is almost always favourable. A diffused scarlet rash, not unlike that of scarlatina and sometimes mistaken for it, occasionally precedes the true eruption in varioloïd.

TREATMENT.—In mild cases but little is required beyond isolation of the patient, rest in bed, cleanliness and good ventilation, a light nutritious and non-stimulating diet, and general attention to the excretions.

In graver cases we meet with important symptomatic indications. Thus during the stage of invasion, there may be great *nervous excitement* and *delirium*, which may be due either to general excitability, to the height of the fever, or to previous alcoholic excesses. In the *first* form chloral, bromide of potash, and especially small doses of Dover's powder are required; in the *second*—tepid spongings of the body, and the internal administration of salines with aconite or digitalis frequently repeated; and in the *third*—good nutritious food, a discreet exhibition of stimulants, with occasional subcutaneous injections of morphia. *Coma*, *nervous prostration*, and *low forms of delirium*, require a liberal allowance of stimulants and good food. In such cases, I

can also speak favourably of tepid sheet-packs repeated from time to time.

As regards the *eruption*, protection of the surface from air and light by inunctions of different kinds, or mercurial plasters, and keeping the room darkened are said to prevent "pitting." The troublesome *irritability of the skin* is best relieved by frequent spongings, followed by dredging with some absorbent powder, such as starch and oxide of zinc. During *dessication*, baths should be taken, and the linen frequently changed. Complications must be treated as they arise.

VACCINIA—COW-POX.

Cow-pox is a specific contagious disease of cattle, which is characterised by a pustular eruption closely resembling that of small-pox, and appears in the cow on the udder and teats. It only occurs in the human being as the result of inoculation. The most recent investigations seem to show that it is essentially a distinct disease from small-pox, though when inoculated it affords immunity from small-pox; and like other specific diseases it confers protection against a second attack.

METHODS OF INOCULATION.—First as to the *source of lymph*—it may be obtained direct from the cow; but for obvious reasons, this source is rarely practicable. It is usually obtained from the human being, from whom it may be directly inoculated; or it may be collected in capillary tubes; or ivory points may be charged by dipping them in the lymph, and afterwards allowing them to dry. The advantage of either of the last two methods, is that the lymph may be preserved, and used as required. In whatever way the lymph is obtained, it should be taken from mature vesicles on the eighth day after inoculation, and unmixed with blood. As to the *time for inoculation*—vaccination

should be carried out at 2 to 3 months old; the child should be healthy at the time; and if unsuccessful it should be repeated. *Mode of introducing the lymph.*—The chief methods are *three* in number:—(a) by simple puncture with a lancet; (b) by tattooing; (c) by a series of scratches. The part usually selected for inoculation is the skin over the deltoid muscle of the shoulder. Liquid lymph direct from the vaccine vesicle, or from a capillary tube, should be inserted by the lancet; with dried lymph on ivory points, the latter should be introduced into the punctures, or well rubbed on the surface previously abraded. Whatever method may be selected, the punctures or scratches should only penetrate the cuticle. If the deeper layers of the skin be wounded, hæmorrhage will occur, and inoculation will be uncertain. It is usual to inoculate at least four points on the arm, about $\frac{1}{4}$ -inch apart.

PHENOMENA FOLLOWING VACCINATION.—By the *third* day little red *papules* appear, which become *vesicular* by the *sixth* day. The vesicles are roundish, flattened, and generally umbilicated. They are surrounded by a bright-red inflammatory areola, and by the *eighth* day are at their height. The contained lymph is clear and slightly viscid, and it is only at this stage that it should be used for inoculation. On the *tenth* day the contents become purulent. Shortly after, the *pustule* begins to dry up, the inflammation subsides, and by the 14th or 15th day a hard dark scab has formed, which falls off about a week later, leaving a depressed pitted scar, which is permanent. These changes are associated with some general constitutional disturbance, and fever. The glands in the axilla often enlarge.

Re-vaccination is often recommended about puberty, as conferring additional protection from small-pox. In some cases no effect results; in others, the phenomena above related recur in the usual order, but the development is generally much more rapid, and the different stages are less marked.

The remote effect of successful vaccination is to confer absolute and complete protection against small-pox in the majority of cases; but where this is not obtained, the course of the disease is much modified, as described under the head of Varioloid.

VARICELLA—CHICKEN-POX.

CHICKEN-POX is an acute specific fever, running a definite course, and communicable either by infection, or by inoculation. It never occurs twice in the same person, and is generally confined to children.

SYMPTOMS.—After an *incubation* period of uncertain duration, there is slight fever and general malaise for about 24 or 36 hours, when the eruption appears. The *eruption* comes out first on the body, and afterwards—but much less abundantly—on the neck and face. It begins as reddish papules, which become vesicular in a few hours. The vesicles are large, hemispherical, one-chambered, and are filled with clear fluid. About 24 hours later the fluid becomes turbid, and perhaps a slight inflammatory areola surrounds the vesicles. On the 4th or 5th day they rupture or dry up; and a small scab is formed, which comes away gradually, leaving as a rule no discolouration or pitting behind. The general symptoms are very slight; but occasionally the convalescence is protracted.

The *prognosis* is invariably favourable.

No special *treatment* is called for.

ERYSIPELAS.

ERYSIPELAS is an *acute specific disease*, characterised by a diffuse inflammation of the skin. It may be either *traumatic* or *idiopathic*; that is to say, it may occur either in

connection with wounds, or as a primary disorder. The latter form alone concerns the physician. From the fact that it is eminently infectious (although to a less degree than the specific fevers already described), and is occasionally epidemic, it would appear that it is unquestionably of a *specific* nature. At the same time it must be admitted, that since it sometimes seems to arise *de novo*, and that one attack, so far from conferring protection against its repetition, renders the subject of it especially liable to its recurrence, there is at least ground for regarding this point as yet unsettled. General debility, by whatever cause induced, and insanitary surroundings, undoubtedly operate as *predisposing* causes.

MORBID ANATOMY.—The skin becomes red, and infiltrated with serum and leucocytes, leading to various degrees of swelling. Where inflammation is more intense, *vesicles* and *bullæ* may form, containing clear or sanious fluid; or subcutaneous suppuration of a diffuse kind may occur. The lymphatic glands and vessels of the part become enlarged and tender; and the coats of the veins may inflame, and lead to thrombosis. The inflammation may extend from the skin into the mucous orifices; *e.g.* the ear, mouth, or nose.

SYMPTOMS.—The *local symptoms* are preceded by a period, lasting from three hours to two or three days, which is marked by chills, headache, digestive disturbance, slight fever, and enlargement of the lymphatic glands of the part; and at the end of this premonitory stage the local signs appear. The skin becomes red, swollen, smooth, shining, and very painful and tender at some point, from whence it rapidly extends, and generally in some special direction. The line of its advance is well defined by an abrupt red margin, while the redness passes quite gradually into the healthy skin where the inflammation is subsiding. The amount of œdema and pain depends upon

the nature of the cellular tissue ; where this is dense, and unyielding, the swelling is comparatively slight and the pain very severe ; while the reverse holds good, where the tissue is lax, and abundant, as in the eyelids. The starting point of idiopathic erysipelas is generally on the face, at the junction of skin and mucous membranes, especially the nose. Thence it usually extends upwards over the scalp, and by the swelling causes much disfigurement, even to obliteration of the features. In bad cases, vesicles and bullæ are apt to form, and subcutaneous suppuration occasionally takes place.

The inflammation usually attains its height on the 2nd or 3rd day ; but when the development is slow it may be at its maximum in one part while it is subsiding at another. As the swelling and redness abate, the vesicles and bullæ burst, and scab over, and free *desquamation* of the cuticle follows. *Relapses* are common.

General symptoms.—The temperature rises rapidly to a high grade, and the morning remissions are well-marked. The pulse is frequent, full, and strong. More or less delirium is nearly always present, and is due to sympathetic excitement of the cortical layers of the brain, rarely to meningitis. The tongue is dry and brown. The appetite is lost, and the bowels are costive. In severe cases the *typhoid state* is apt to supervene. The urine is febrile, and a small quantity of *albumen* is frequently present, but rarely ends in chronic renal disease. *Defervescence* usually occurs about the end of the first week, when the temperature rapidly falls.

The more important *complications* are bronchitis, intestinal catarrh, pneumonia, meningitis, and œdema of the glottis.

The *prognosis* in uncomplicated cases is almost invariably favourable.

TREATMENT.—Rest in bed, in a room of equable temper-

ature not too warm, and well ventilated, but free from draughts. Good nourishing food is required, and stimulants are frequently indicated at an early period. Full doses (m 20 to m 40) of the tincture of the perchloride of iron, frequently repeated, are of great value. Quinine has also been recommended. Locally, the inflamed surface should be dredged over with flour, or starch with oxide of zinc, and covered with cotton wool. Such dressing should be bathed off daily with tepid water, and renewed. Shaving the scalp, followed by application of ice to the head, is of considerable service in bad cases with much delirium. To allay excitement, and to produce sleep, bromide of potash and chloral hydrate are far preferable to opium, the use of which is rarely desirable.

GLANDERS—FARCY.

THESE are two varieties of a specific contagious disease which originates only in the horse and animals of that class, and from which it is communicated to man by inoculation, accidental or otherwise. It occurs for the most part in grooms and stablemen.

MORBID ANATOMY.—The characteristic feature of the disease consists in peculiar nodular formations, which vary in size from that of a pin's head to that of a hazel-nut, and appear on the mucous membrane of the nose, throat, mouth, &c., on the skin and subcutaneous tissues, or in various internal organs. They consist of cells, which rapidly soften and break down, forming ulcers when superficial, and abscesses when more deeply situated. The lymphatic glands are often enlarged.

SYMPTOMS.—*Acute glanders*, after an incubation of variable length, sets in with rigors, fever, severe pains in the limbs, and great debility. Before very long a copious and

offensive discharge from the nose occurs; and about the same time a peculiar eruption appears on the skin, which is accompanied with foetid sweats. The eruption consists at first of red spots, which soon become indurated and nodular. A pustule then forms over each spot, bursts, and leaves an irregular sloughy ulcer with a livid margin. Sores of a similar kind may occur in the mouth, throat, and air-passages; and abscesses are apt to form about the joints. There is also more or less erysipelatous redness of the nose, eyelids, and surrounding parts. Meanwhile, the patient becomes progressively weaker and more prostrate; and finally delirium and coma supervene, death usually taking place before the 20th day.

Chronic glanders is rare. Its symptoms are on the whole analogous to those of the acute form; but the eruption is often absent, and deep suppuration is more marked. Its course is very tedious.

Acute Farcy usually depends on the inoculation of some part of the trunk or limbs. The lymphatics leading from the point of inoculation become inflamed, and there is enlargement of the neighbouring glands, followed by the formation of subcutaneous nodules and abscesses. There is, however, no discharge from the nose, and the eruption too is often absent. Farcy also occurs in a *chronic* form.

The *prognosis* is always very grave, but it is better in the chronic than in the acute forms, and in farcy than in glanders.

TREATMENT.—No specific is known. Stimulating, nutritious and tonic plans of treatment should be carried out.

YELLOW FEVER.

THIS is a specific infectious fever, which confers protection against a second attack, and occurs almost exclusively in warm climates. A high temperature, in fact, is neces-

sary for its production, and the disease is endemic in certain tropical regions. Filth and insanitary conditions generally, appear to promote its occurrence.

MORBID ANATOMY.—The liver is somewhat enlarged, soft, and yellowish. The mucous lining of the alimentary canal is injected and softened, and often more or less infiltrated with altered blood. The kidneys are usually enlarged, softened and degenerated; but rather strangely, the spleen is not often enlarged. Hæmorrhages in various parts are common.

SYMPTOMS.—With or without warning the invasion is sudden, and marked as a rule by rigors. The temperature rapidly rises to a variable height (101° - 105°), and is associated with the usual febrile symptoms. The most marked features of this stage are troublesome vomiting, constipation, tenderness of the epigastrium, intense frontal headache, redness and irritability of the eyes, with pains in the back and limbs. The urine generally contains albumen.

At the end of the second and third day the temperature falls and the symptoms subside; but the improvement is of short duration except in very mild cases, when the disease may pass off altogether. In a few hours, though fever is slight or absent, the epigastric tenderness is increased, the vomit contains blood ("black vomit") and the stools are black from the same cause. Jaundice now supervenes. If the patient survives longer, nervous symptoms of the "typhoid" type appear in a marked form with subcutaneous petechiæ. The urine is scanty or suppressed and contains blood, albumen, and casts. Delirium, convulsions, or coma are of common occurrence, and in fatal cases death takes place at this point.

DIAGNOSIS.—Remittent fever may somewhat resemble yellow fever, but the former is not contagious, does not confer protection against a second attack, its febrile

paroxysms distinctly remit, there is enlargement of the spleen, hæmorrhages are not so severe and persistent, and the disease is controlled by quinine.

The *prognosis* varies greatly in different epidemics. Death sometimes occurs in the early febrile stage from sudden collapse. In the second stage the gravity is proportionate to the prominence and persistence of hæmorrhagic and nervous symptoms.

TREATMENT.—Quinine has no specific action. The food should be light, liquid, and nutritious, and alcoholic stimulants are of great value. If these cannot be retained on the stomach they should be given *per rectum*. The *vomiting* may be met with hydrocyanic acid, creasote, or chloroform, and in such cases, food should be given in very small quantities, frequently repeated. Opiates should be used with caution. The wet sheet-pack has been recommended; and I have heard the internal administration of carbolic acid, or the sulpho-carbolates very favourably spoken of.

CEREBRO-SPINAL FEVER.

CEREBRO-SPINAL fever is an acute specific disease, which is characterised by inflammation of the membranes of the brain and spinal cord. It is both *epidemic* and *infectious*, but little or nothing is known as to the conditions which determine its appearance or propagation.

Its *morbid anatomy* consists in inflammation of the pia mater of the brain and cord, attended with a purulent or semi-purulent exudation into the sub-arachnoid tissue, and an excess of somewhat turbid fluid in the ventricles. The inflammation may be either generally distributed, or limited to certain parts of the surface of the brain or cord. The substance of the brain and cord is congested.

SYMPTOMS.—The disease usually *commences very abruptly*

with a violent chill, intense headache, and persistent vomiting. Stiffness and retraction of the neck; pain down the spine and radiating to the limbs (much increased on movement); and general cutaneous hyperæsthesia are also early and characteristic symptoms. In severe cases there may be insensibility, convulsions, coma, or delirium from the outset; accompanied not only with stiffness of the neck, but with tonic contraction of all the extensor muscles of the spine. In milder cases the patient is only dull, drowsy, and restless. The face is pale and the expression is anxious. The temperature rises to a variable height; but the fever is generally not very marked, and it runs a most irregular course.

The disease now rapidly develops to its full intensity. About the 2nd to the 5th day various cutaneous eruptions may appear. Of these, *herpes* on the face and lips is the most common, but petechiæ, small patches of erythema, or roseola are not infrequently met with. There is as a rule more or less intolerance of light and sound. The pulse is feeble, and liable to great variations in frequency; the tongue is brown and dry; the appetite fails, the bowels are constipated, and active delirium may alternate with insensibility.

In fatal cases the symptoms of irritation subside, and are replaced by those of general depression; death taking place in a few days from coma. In favourable cases the signs of depression are either absent, or not marked. The symptoms gradually subside, and convalescence begins in one or two weeks, but it may be protracted for a long time, with pain in the back and disturbance of the sight or hearing.

The most important *sequelæ* are deafness, derangements of vision, chronic hydrocephalus, and chronic meningitis. The mortality varies within such wide limits as from 20 to 80 per cent.

TREATMENT.—The most important indications in the acute stage are—rest in bed, cold applications to the head, local abstraction of blood by leeches placed behind the ears, and the free and early hypodermic injection of morphia. In the later stages, iodide of potassium combined with tonics appears to be of some service.

DIPHTHERIA.

DIPHTHERIA is an acute specific disease, epidemic and contagious, and is characterised by more or less profound general disturbance, with a special inflammation of the throat and adjacent parts.

The poison is not only contained in the inflammatory products, but also in the exhalations from the patient; and, according to some, it may originate from insanitary surroundings. It is very apt to cling for long about the locality in which it occurs. The young, feeble, and nervous, are especially liable to be attacked, and girls more than boys.

MORBID ANATOMY.—The inflammation first begins in the throat—as a rule—affecting the tonsils, soft palate, or pharynx, or all of these parts. Thence it may spread to the nose, larynx, and air-passages (even to the remote bronchi), or more rarely to the alimentary canal. The mucous membrane is at first red, swollen, and secretes viscid mucus. The inflammation extends, and at one or more points, an exudation appears, patches are formed, and ultimately the entire surface of the throat may be thus covered with what is called “false membrane.” The latter is at first quite thin and of a grayish-white colour, and is removable from the surface on which it lies. In mild cases, it may not progress beyond this point. More often however it increases in thickness, becomes of a dirty yellow colour (like

chamois leather) and can no longer be detached without injury to the mucous membrane which it infiltrates. The false membrane is usually thinner, softer, and less firmly adherent the farther it gets from the point of origin. Microscopically, it consists of fibrin in which cells, nuclei, and granules are imbedded. Rod-shaped bacteria, and micrococci are also found in the exudation, but their relation to the causation of the disease is not yet definitely ascertained. Considerable ulceration and sloughing of the mucous membrane sometimes supervene at a later stage. Hæmorrhage from the inflamed surface is not uncommon, and mingles with the exudation.

SYMPTOMS.—The onset of diphtheria sometimes begins abruptly with a severe rigor and vomiting; but more often it is gradual, and marked by chilliness, depression, loss of appetite and general malaise, which are soon followed by more or less pyrexia, soreness of the throat, stiffness of the neck, painful if not difficult deglutition, and slight swelling of the glands at the angle of the jaw. The throat at this stage is red and swollen, with one or more small grayish-white or yellowish spots on the tonsil, soft palate, or back of pharynx; or if the nasal cavity be already implicated, one or other nostril may be obstructed. It is well to remember that the severity of the early symptoms is no safe criterion of the gravity of the case.

When the disease becomes fully established all the above symptoms grow much worse. Deglutition is painful, difficult or impossible, the breath is foul, the breathing is impeded, the voice is muffled or nasal in tone, and the glandular enlargement in the neck increases but has no tendency to suppurate. The condition of the throat has already been alluded to. The fever is rarely high, but is attended with intense prostration, headache, restlessness, and perhaps vomiting; the tongue becomes dry and brown; the skin pale, cold, and clammy; the pulse rapid,

feeble, and irregular; and delirium if present is usually slight and nocturnal. The urine is almost always *albuminous* from the onset.

Diphtheria not only varies widely in severity, but the symptoms differ according to the part which is affected. If the nares be involved, there is more or less obstruction of one or both nostrils, with a foetid discoloured discharge. If the larynx and air passages be implicated, the symptoms are those of laryngeal croup. Death occurs in more than half of the cases, and may be due to asphyxia (chiefly during first week); or to asthenia (chiefly during second week); or to syncope (sometimes occurring quite unexpectedly). In favourable cases gradual recovery usually takes place in the second week.

Apart from the low inflammatory complications which sometimes occur, we meet not infrequently with peculiar nervous sequelæ of a paralytic nature, (even after the mildest attacks) which usually come on during the second or third week of apparent convalescence. Thus, there may be paralysis of the soft palate and pharynx, causing a nasal tone of voice, regurgitation of fluids through the nose, and difficulty of swallowing; of the ocular muscles, causing squint; of the limbs (especially the legs) causing more or less loss of power. Some disturbance or impairment of sensation usually occurs in the paralysed part. If neglected, such paralyzes are apt to be very chronic.

TREATMENT.—Rest in bed, pure air, alcohol in some form, and good nourishment are urgently needed from the outset. Beef-tea (strong), and milk, should be given at short intervals; and if from any cause food cannot be taken by the mouth, it should be given *per rectum*. Stimulants should be employed freely. Brandy is the best form, and to the youngest child a tea-spoonful every two hours has been given with good result. If brandy cannot be retained champagne is a good substitute. As to medicine nothing

is better than full doses of the tincture of the perchloride of iron, combined with chlorate of potash, and dilute hydrochloric acid, to be given every three or four hours. As to local treatment, some advise swabbing out the throat with a solution of nitrate of silver (gr. xx to 3 j of water), or equal parts of strong hydrochloric acid and honey. If an application of this kind be resorted to, it should be made once for all at the outset of the throat mischief, and should not be repeated. A wash or gargle of solution of boracic acid, chlorate of potash, perchloride of iron (weak), Condy's fluid, or alum is recommended. Great comfort is also derived from sucking ice constantly and freely. Emetics are sometimes useful as a means of inducing expulsion of false membranes from the larynx. Sleeplessness should be combated with an opiate at night, which is usually well borne. During convalescence quinine, iron, and change of air are required. The nervous sequelæ are best treated by strychnia, galvanism, and the application of blisters alongside the spinal column.

SEPTICÆMIA—PYÆMIA.

THE above terms are used to denote blood-poisoning resulting from the absorption of putrefactive material into the body. Various morbid conditions are probably included under this head, but our present knowledge of the subject is not precise enough for their exhaustive distinction and classification. A primary distinction must, however, be drawn between the two following conditions. In the one, the poison does not multiply in the blood, the effects are in direct proportion to the amount absorbed, and the disease thus caused is incapable of spreading by infection. In the other, the poison multiplies in the blood, gives rise to a disease which runs a definite course,

and is communicable by infection. The one then is a putrid intoxication, the other is a putrid infection. Putrid intoxication may exist alone, but it is difficult to suppose that putrid infection ever exists, without more or less putrid intoxication. To avoid confusion, it would be well to denote all toxic cases, pure and simple, by the term Septicæmia; and all infective cases by the term Pyæmia. In actual practice, however, it must be admitted that this distinction is not always practicable. In both, the poison is the result of a special form of putrefactive decomposition, in which the agency of bacteria is essential. These bacteria are incapable of producing the poison in healthy tissues, and in the vast majority of cases the poison originates in a local lesion followed by inflammation, especially when the latter is in direct communication with the external air. Impure air by over-crowding or otherwise, the puerperal condition, intemperance, and chronic disease of eliminating organs, are among the more important predisposing causes. Whether the bacteria giving rise to Septicæmia and Pyæmia, are the same in each case, or not, we cannot say; but in Septicæmia it would appear that the *septic products* of bacterial activity are alone absorbed; while in Pyæmia the whole system becomes infected, in addition, with micro-organisms which actively multiply within the body.

SEPTICÆMIA.—The *post-mortem* appearances are not very striking. Decomposition sets in more rapidly than usual. The blood is dark, and coagulates imperfectly; and the internal organs are congested and softened.

Clinically, the disease is generally ushered in with chilliness followed by fever of an irregular type, accompanied with general depression and muscular prostration, loss of appetite, nausea and vomiting, irregularity of the bowels, headache, and occasional delirium of a low type. The duration varies greatly. In grave cases the tendency is to death, preceded by stupor and collapse.

PYÆMIA.—This is an infective disease which includes the simpler toxic condition, called Septicæmia, and therefore, the remarks already made under that head, apply equally to Pyæmia. In the latter affection, the blood swarms with micro-organisms, originally derived from the neighbourhood of the primary lesion. Another characteristic feature of this condition, consists in the formation of secondary or metastatic abscesses. These are found most frequently in the lungs, but they also often occur in the liver, spleen, kidneys, brain, and other organs. They are undoubtedly of embolic origin as a rule, and the suppurative changes which take place must be regarded as the direct outcome of the infective nature of the embolus. It is quite possible that in some instances they are due to local stagnation and coagulation of the blood, resulting from vito-chemical changes in the latter. Suppurative inflammation, moreover, is apt to occur in the subcutaneous tissue, and in the serous cavities of the joints, pleura, and pericardium; especially in the more chronic forms of the affection.

The symptoms of Pyæmia are characterised by repeated well-marked rigors, accompanied with high fever, and followed by profuse sweating. The indications of general disturbance, are much the same as those already described under the head of Septicæmia, but are more severe. More or less congestion of the lungs is generally present, and thus cough, expectoration, with pains in the chest are common symptoms. Special symptoms also occur, which are directly attributable to metastatic suppuration, and will thus vary according to circumstances. The prognosis is extremely unfavourable, and death occurs either from asthenia or some secondary visceral complication.

Pyæmia is not always of this acute nature. Sometimes it runs a chronic course, the symptoms are less marked, and the fever is of the intermittent type. This fact should

especially be borne in mind, in connection with a pyæmic condition, of great interest to the physician, arising from a putrid infective form of ulcerative Endocarditis, of which something will be said in another place.

The indications for the treatment of these conditions are few and of a very general kind. When the lesion constituting the source of infection, can be got at, surgical measures should be adopted to reduce the putrefactive process, and to promote a more healthy condition of the part. The patient must be well supported by nutritious food and stimulants; while the various excretions should be encouraged. Large doses of quinine or salicylic acid have been recommended, on account of their supposed antiseptic effects. It would be more to the point, were we to aim at such a thorough knowledge of the circumstances under which the disease arises, as to enable us to prevent its occurrence.

MALARIAL FEVER.

SUCH is the term applied to the acute specific fever produced by *marsh-poison*, or *malaria*.

Nothing is known respecting the intimate nature of malaria. The conditions necessary for its production are (*a*) a certain porosity of the soil; (*b*) a certain degree of saturation of the soil with water; and (*c*) a certain elevation of temperature. Decay of vegetable matter is frequently mentioned as another necessary condition, but the facts scarcely warrant the prominence assigned to it. Notwithstanding, the disease is most common in low-lying marshy ground. The poison is generated more actively by night than day, hanging over the ground in a sort of thin mist, and extending to no great distance above it; hence, in such districts it is safer to sleep in the upper storeys than on the ground floor. It may be carried for

considerable distances by the wind, but its progress is arrested by intervening obstacles, such as a range of hills, or a belt of trees; and it is absorbed by passing over any broad surface of water.

Malarial fevers are strictly *endemic*, and are not contagious; neither are they protective, but on the other hand render the subjects of them especially liable to their recurrence. They are more common in the autumn season.

Two well-marked forms are recognised, viz:—*Intermittent fever*, or *ague*, and *remittent fever*. Intermediate varieties not conforming exactly to either one type or the other are of frequent occurrence.

MORBID ANATOMY.—The spleen is enlarged from congestion, which at first subsides during the intervals; but later on, the enlargement becomes permanent from hyperplasia of its substance. The blood contains more or less black pigment, and the blood-corpuscles are diminished in number. The liver, lymphatic glands, and intestinal mucous membrane are congested, and softened.

I. INTERMITTENT FEVER—AGUE.

SYMPTOMS.—Ague is characterised by febrile attacks of regular periodic occurrence, separated by intervals of complete apyrexia. These attacks either come on suddenly, or are preceded for some few days by general malaise, with perhaps some slight fever.

The actual attack of ague comprises three distinct stages—a cold, a hot, and a sweating stage.

1. The *cold stage* begins with shivering which soon passes into a severe rigor. The patient feels cold, and his teeth chatter. The skin is dry and pale, the breathing is hurried, the pulse is rapid, small, and irregular, and he complains of headache, pains in the back and limbs, with loss of appetite. The urine is pale, abundant, and is passed frequently. During the *whole* of this stage the temperature

rises rapidly, reaching a high grade. The duration varies greatly, but the average is from half, to one or two hours.

2. The *hot stage* as a rule sets in gradually, and the feeling of cold first gives place to one of pleasant warmth, but shortly afterwards the heat becomes intense. The skin is dry and pungently hot, the breathing is more rapid and deeper, and the pulse is full and soft but very frequent. The patient is excited and flushed, the thirst and headache are extreme, and sometimes there is more or less delirium. The urine becomes darker and of higher specific gravity, and is intensely acid. The high temperature is maintained. The average duration is from one to four or five hours, but is often longer.

3. *Sweating stage.* Profuse perspiration now sets in which appears first in the face; a general sense of comfort supervenes, and the above symptoms subside. The quantity of urine diminishes, and deposits urates on standing. The temperature rapidly falls, the patient drops into a refreshing sleep, and wakes well. The duration is very variable.

The period intervening between one attack and the next is called the *intermission* or *interval*; during which the health is often complete, but occasionally is marked by more or less malaise. The temperature is now normal.

Certain *varieties* are distinguished according to the length of the interval. Of these the more important are the *quotidian*, in which the attacks occur every 24 hours; *tertian*, every other day; *quartan*, every third day. In the quotidian form the attacks are the earliest, and last the longest of the three; in the quartan the reverse obtains; and the tertian form occupies an intermediate place.

II. REMITTENT FEVER.

THIS form of malarial fever is almost confined to tropical climates. It is closely analogous to the intermittent form, but the essential difference lies in the fact that, during the

interval the fever only *remits*, and does not fall to the normal limit.

The *symptoms* differ somewhat from ague in their mode of development. Thus, the *cold stage* is of shorter duration, and sometimes escapes recognition. The *hot stage* is much prolonged and continues for 6 to 12 hours or more. Gastro-intestinal and nervous symptoms are especially well marked. Vomiting is severe, and the vomited matters sometimes contain blood. The tongue is dry and parched; and occasionally there is slight jaundice. Head-ache is constant and distressing, and sometimes ushers in delirium and coma. The *sweating stage* is imperfect, and passes imperceptibly into the remission. The attack sometimes assumes an adynamic or "typhoid" type.

These attacks usually recur about noon each day, for 5 to 14 days, while the remission is not marked in the early morning. More rarely there are two attacks daily. In favourable cases the severity of successive attacks gradually decreases, and the prognosis is good in proportion to the distinctness and length of the remission, and to the absence of complications. Speaking generally, this is far more serious than the intermittent type.

TREATMENT OF MALARIAL FEVERS.—Preventive. Those who live in malarial districts should avoid going out at night, or in the early morning; should not sleep on the ground floor; should not drink the water of the district, unless previously boiled and filtered; and finally when attacked should remove (if possible) to some healthier locality without delay.

During the paroxysm, the obvious indication in the cold stage is the application of warmth, while in the hot stage a cool atmosphere should be maintained by sponging the skin with tepid water, free ventilation, and light clothing. Cooling drinks may also be given, and a little opium if there be great restlessness.

During the intervals, quinine or arsenic are our sheet-

anchors, and unquestionably exert a powerful influence over the malarial poison. If quinine be employed (and in most cases it is preferable to arsenic), it must be given in large doses of 20 to 30 grains, either in one dose just before a paroxysm is expected, or in divided doses during the interval. If it cannot be retained, it may either be combined with an opiate, or be given as an enema. With regard to arsenic, it should be given in the form of Fowler's solution, in doses of $\eta v-x$ three or four times a day. Whichever remedy be selected, it should be continued in smaller doses for at least a week or two after all the symptoms have disappeared. It is also worth while to notice that great importance has been attached to keeping the bowels properly open.

GENERAL DIAGNOSIS OF ERUPTIVE FEVERS.

CUTANEOUS eruptions constitute one of the most important diagnostic features of the majority of the acute specific fevers; and, by their differences as to date of onset, site of first appearance, and general characters, afford a ready and useful means of distinguishing one fever from another.

If the rash appears within the first four days from the onset of the fever, it is either scarlet fever, measles, erysipelas, small-pox, chicken-pox, or glanders. The onset of each is usually sudden and well marked; and may be recognized not only by the increased heat of the body, but also by the occurrence of rigors, vomiting, or convulsions. If the rash consists of patchy, or more or less diffused redness, which disappears readily on pressure, and is not attended with any infiltration of the skin, it is either scarlet fever, measles, or erysipelas; such specific red rashes may be distinguished from roseola, by the very sudden appearance and fugitive character of the latter, the slight febrile disturbance, the absence of sore-throat, the mild constitutional disturbance, and non-infective origin.

	MEASLES.	SCARLET FEVER.	ERYSIPELAS.
RASH.	Appears on 4th day. Begins on forehead. Brightest on the exposed parts. Dusky red crescentic patches.	Appears on 2nd day. Begins on the neck. Brightest on the covered parts. Bright red points, merging into patches of large size.	Appears in a few hours to 2 or 3 days, and begins generally on the nose or eyelids, and extends thence in one definite direction, generally upwards over the head.
TONGUE.	Furred.	Red, with prominent papillæ.	Furred, tendency to get dry and brown.
THROAT.	Slightly sore.	Soreness generally marked; diffused redness of the fauces and soft palate.	Unaffected.
INITIAL SYMPTOMS.	Those of common catarrh (swelling of face and eyelids, coryza, photophobia, lachrymation and cough.) Moderate fever.	High fever, pungent heat of skin, and great frequency of pulse, which set in suddenly and develop rapidly.	Fever marked in proportion to the eruptive inflammation.
DESQUAMATION.	Slight and branny.	Copious.	Unimportant.

If the eruption be papular in the first instance it is either small-pox, chicken-pox, or glanders.

	SMALL-POX.	CHICKEN-POX.
INCUBATION.	Constant, lasting 12 days.	Very variable.
ERUPTION.	Appears on 3rd day. Begins and is most abundant on the face. Comes out in one crop. Frequently present on mucous membranes. Begins as a well-marked shotty papule; afterwards a vesicle which is flattened, umbilicated, multilocular; ultimately a pustule which is mature by the 9th day.	Appears within 24 hours. Begins and is most abundant on the body. Comes out in successive crops. <i>Very rarely</i> present on mucous membranes. Papules imperfect, and become vesicular in the course of a few hours. Vesicles hemispherical, one-chambered, not umbilicated, and do not become pustular.
INITIAL SYMPTOMS.	Pain in the back, vomiting, and high fever.	Very slight indeed, and often not observed at all.
DURATION.	3 to 5 weeks.	Average 7 to 10 days.

Glanders may be distinguished from the above by the history of the case, (as a rule it is confined to grooms or stable-men); the rash differs in appearance, and is followed by characteristic rapid ulceration.

The only other eruptive fevers are typhus and typhoid, which may be thus contrasted.

TYPHUS FEVER.	TYPHOID FEVER.
May occur at any age Invasion more or less abrupt. Face dusky; expression heavy; and eyes injected and suffused. No special abdominal symptoms, or diarrhoea. Prostration and low nervous symptoms appear early. Special eruption which appears on the 4th or 5th day; first on the back of wrist, and epigastrium; comes out in one crop; and does not disappear on pressure. Special course of temperature. (Refer). Duration shorter than that of typhoid.	Rare after middle age. Invasion gradual. Face pale, with a circumscribed flush on each cheek. Typical abdominal symptoms, and diarrhoea. Low nervous symptoms, if present, appear much later. Special eruption which appears from 7th to 12th day; first on the abdomen or back; comes out in successive crops, and disappears on pressure. Special course of temperature. (Refer). Duration longer than that of typhus.

SECTION III.

GENERAL DISEASES. (B.)

RHEUMATISM.

THE terms *rheumatism* and *rheumatic*, have been very loosely employed to denote an inflammation or painful affection of *any part* arising from exposure to cold or damp; but they will here be exclusively applied to certain inflammatory and painful conditions of the joints, muscles, and fibrous tissues in connection with them.

1. ACUTE ARTICULAR RHEUMATISM.—RHEUMATIC FEVER.

The conditions which lead to articular rheumatism are two in number:—(1) A constitutional predisposition which may be hereditary or acquired; and (2), an exciting cause, which is invariably exposure to cold or damp. As to the precise nature of the pathological disturbance we know very little, but there is evidence of some weight pointing to defective elaboration of nitrogenous matters, which leads to the formation of acid products in the system. The disease is most common between the ages of 16 and 26.

MORBID ANATOMY.—The interior of the joint becomes congested and loses its natural polish. An effusion into the joint-cavity usually follows, which consists of clear or slightly turbid serosity, with flakes of lymph in suspension. There is no tendency to suppuration. Similar changes are apt to affect the sheaths of tendons, and the synovial bursæ. There is often a little œdema of the tissues around the joint.

SYMPTOMS.—The actual attack is usually preceded for a few days by wandering pains in the joints and muscles accompanied with more or less malaise; and it is characterised by inflammation of the joints, fever, profuse sweating, and anæmia.

Local Signs.—The joints usually affected are of middle size, *viz.*, the knees, ankles, elbows, and wrists. The affected joint is extremely painful (the pain being intensified by the least movement), tender, swollen, and hot. The swelling is mainly due to the fluid effusion within the joint, but partly to œdema of the tissues around it. The skin is slightly reddened or unaltered. The number of joints attacked at one time varies greatly; but the inflammation has a great tendency to migrate suddenly from one point

to another. Similar changes may be observed in connection with the sheaths of certain tendons, or synovial bursæ.

General Symptoms.—The amount of *fever* varies much, but it rarely exceeds 104° in uncomplicated cases. It is characterised by very variable daily remissions, and by considerable irregularities in its course. It subsides by *lysis*, concurrently with the articular inflammation. *Hyperpyrexia* occasionally takes place. *Profuse perspiration* with a sour smell, and of very acid reaction, often accompanied with sweat-rashes (*sudamina* and *miliaria*), is an almost invariable symptom. The very rapid development of *anæmia* requires special notice, and is in direct proportion to the severity, and the duration of the disease. The urine is scanty, high-coloured, very acid, and deposits urates in abundance. The bowels are usually constipated. Delirium is rarely met with.

Endocarditis, leading to valvular disease, is by far the most frequent and most important complication of acute rheumatism. Pericarditis also occurs not infrequently; and in such cases usually co-exists with endocarditis. Among the rarer complications are pneumonia, pleurisy, meningitis, and a peculiar cerebral affection coming on suddenly with delirium, followed by coma, and rapidly fatal, of which the precise nature is unknown (*cerebral rheumatism*).

The *duration* depends entirely upon the severity of the case, and the kind of treatment adopted, varying from 1 to 6 weeks. There is special liability both to relapse and recurrence.

The *diagnosis* from gout will be given when describing that disease.

The *prognosis* is always favourable in uncomplicated cases. Hyperpyrexia may occur quite unexpectedly, and is of the gravest import. It is well to bear in mind that

this symptom is sometimes heralded by nervous disturbance, such as delirium and sleeplessness.

TREATMENT.—Under all circumstances rest in bed should be insisted upon, and the joints should be wrapped in cotton wool. The diet should be liberal though plain and light; alcoholic stimulants are rarely required.

As to medicinal remedies, many have been from time to time recommended. Of these, the salts of soda and potash—given in large doses, combined or not with quinine or opium—tincture of the perchloride of iron, salicine, salicylic acid, and the alkaline salicylates, are the most important. Treatment by the salicylates of ammonia, soda, or potash, is, in my experience, vastly superior to any other method. The salicylate should be given in doses of grs. x to xx, repeated every three or four hours, and continued until the temperature has returned to the normal level. It is readily taken, and unpleasant symptoms rarely occur. Occasionally, however, there may be some headache, buzzing in the ears, deafness, and slight mental confusion, but these symptoms quickly subside as a rule, on suspending the use of the drug.* I now rarely see an uncomplicated case (if taken early) last longer than a week or ten days, when treated in this way. The remedy should be continued in smaller doses for at least a week or ten days after the cessation of acute symptoms. The secretions must be attended to; and great comfort is sometimes derived from sponging the body with tepid water, of course avoiding all unnecessary exposure.

The local application of poppy fomentations, or light poultices, sometimes gives relief to the pain in the joints. Blisters cannot be recommended, and when employed,

* Owing to their depressing effect on the heart in some cases, the administration of the salicylates should not be persisted with, in the event of no impression being made upon the fever in the first instance; and their action should be carefully watched where there is any cardiac complication.

should be used with great caution. Hyperpyrexia calls for prompt and active antipyretic treatment.

Care should be taken during convalescence to avoid exposure to cold or damp. Quinine in combination with iodide of potassium is a useful tonic at this stage.

2. CHRONIC ARTICULAR RHEUMATISM.

This is a chronic form of rheumatism which is very common in advanced life. It is generally chronic from the beginning, but sometimes occurs as a sequel of the acute variety.

It is characterised by pain and tenderness in the affected joints, with stiffness on movement; together also with some amount of swelling, which is partly due to effusion within the joint, and partly to thickening of the tissues around it. Crackling or grating sounds may sometimes be elicited on forced passive movement. Besides these local symptoms, there is usually anæmia, with feeble digestion, and more or less general debility. The subjects of the disease are also remarkably sensitive to cold, damp, and changes in the weather. Cardiac complications may sometimes occur, and it is not improbable that some valvular diseases of the heart which appear to have arisen spontaneously, may in reality be traceable to chronic rheumatism which has been overlooked.

TREATMENT.—Flannel should be worn and all exposure to cold or damp avoided. The skin should be maintained in a healthy active condition by baths (hot air, vapour, or water) and frictions. The diet should be light and bland; and gentle exercise in the open air is desirable.

Locally, frictions, counter-irritation with iodine, stimulating liniments, or strapping the joint with simple or medicated plasters may be employed with advantage, according to circumstances.

Medicinally, tonics, cod-liver oil, iodide of potassium, guaiacum, and liq. arsenic. hydrochlor., are among the most useful remedies. Salicin and the alkaline salicylates are of little or no service in chronic rheumatism.

3. GONORRHOEAL RHEUMATISM.

This is sometimes described as a variety of articular rheumatism. It arises in the course of, or as a sequel to an attack of gonorrhœa; and it is mainly characterised by very considerable effusion into the affected joint (most frequently the knee); a tendency to become intractable and chronic; anatomical changes in the joint-structures which are apt to end in more or less ankylosis; and a great liability to recurrence. Otherwise it resembles acute articular rheumatism, and calls for essentially similar treatment. Co-existing gonorrhœa of course requires attention.

RHEUMATOID ARTHRITIS. ARTHRITIS DEFORMANS.

This is a disease which is usually chronic from its commencement, and is characterised by nodular deformities of the small-sized joints, especially of the fingers. It is probably influenced by hereditary conditions of an obscure kind. It is especially common among the poor and ill-fed, and between the ages of 20 and 40.

MORBID ANATOMY.—The articular cartilages are *primarily* affected, and present a velvety appearance in the first stage, but afterwards become worn down, exposing a bony surface, of the smoothness and hardness of ivory (*eburnation*). *Secondarily* the synovial membrane is affected. Its fringes are thickened and form bulb-like clusters at the circumference of the joint, which are afterwards converted into cartilage or bone. Similar enchondrosis and

ossification occur in connection with the periosteum, tendons, and ligaments about the joints. The synovia is not materially increased.

SYMPTOMS.—The onset is gradual and marked by more or less severe pain in the joint (intensified on movement), tenderness on pressure, with some slight febrile disturbance. The joints swell, but as the swelling increases the pain often subsides. Such attacks frequently recur, affecting a gradually-increasing number of joints, which sooner or later become characteristically deformed, and the muscles in connection with them are generally much wasted. The disease usually begins in the finger joints, thence passing to the wrist and knees. The deformity of the hands is very characteristic, the fingers overlap each other, are directed to the ulnar side, the first and third phalanges being flexed and the second extended.

DIAGNOSIS.—(Refer to "Diagnosis of Gout.")

The *prognosis* is unfavourable in proportion to the chronicity of the disorder.

TREATMENT.—The course of rheumatoid arthritis is generally very tedious and unsatisfactory. A light nutritious diet is called for; and the addition of some light dry wine is often of service. Exercise in the open air should be resorted to daily, where possible. Above all it is of the greatest importance to maintain the action of the skin, by baths, frictions and otherwise. As internal remedies—general tonics, arsenic, iodide of potassium, *actæa racemosa*, are chiefly recommended. With regard to local treatment, rest, and mild counter-irritation are indicated in the earlier and more acute stage; while later on, passive motion, friction, or strapping may prove beneficial.

5. MUSCULAR RHEUMATISM—MYALGIA.

Under this term are included all painful affections of the muscles, fasciæ, and fibrous structures of the body gen-

erally. A diseased condition so vague and inclusive defies methodical description. Suffice it to say here that special names are applied to certain varieties of muscular rheumatism, *viz.*,—*pleurodynia*, implying pain and tenderness in the intercostal and thoracic muscles; *lumbago*, in the muscles of the loin; *torticollis*, in the sterno-mastoid and other muscles of the neck, attended with a twisting of the head to the opposite side. It is probable that many morbid conditions, with which we are only imperfectly acquainted, are too hastily described as cases of muscular rheumatism.

GOUT—PODAGRA.

Gout though usually *hereditary*, is not infrequently *acquired*. As a rule, it first appears in the latter half of life; but it appears earlier when inherited, than when acquired. In either case the proximate cause of an attack of Gout is a disturbance of nutrition, of which an *accumulation of uric acid in the system* is the most prominent feature.

This excess of uric acid is variously interpreted. Thus, Garrod ascribes it to a defective elimination of uric acid by the kidneys; Murchison to a functional disturbance of the liver; while Ord again, believes it to be due to a degeneration of fibroid tissues characterised by the formation of uric acid. Be the interpretation what it may, gout may clearly be induced by luxurious living, excessive eating and drinking, indolence, deficient exercise, and want of fresh air, all of which present this feature in common, *viz.*, that they tend to the imperfect oxidation and elaboration of food.

MORBID ANATOMY.—In the first place a deposition occurs of crystals of urate of soda in the substance of the articular cartilages, synovial fringes and fibrous structures of the

joints. The tendons, bursæ, periosteum, internal organs, and fibrous tissue elsewhere (especially of the lobules of the ear) may become the seat of similar deposits; which, when large enough to be felt during life, are called "tophi," or from their white chalk-like appearance "chalk-stones." Ordinary inflammation of the tissue in which the deposit has formed now supervenes. The proximal joint of the great toe is generally first attacked, but as the disease progresses, several joints are involved, which tend to become stiff and ankylosed. The skin overlying the concretions, may ulcerate, and lead to the formation of abscesses, which discharge pus and "chalky" matter.

SYMPTOMS.—When gout is limited to the joints it is said to be *regular*, and in this form is *acute* at first, but afterwards becomes *chronic*. When, however, it is characterised mainly by visceral disturbance, it is termed *irregular* or *retrocedent*.

An attack of *acute regular gout* is generally preceded for a variable time by digestive troubles, acidity, heartburn, nervous irritability, and scanty uric acid urine; but it may occur suddenly without previous warning.

The onset is usually during the night, in the course of which the patient awakes with violent pain in the proximal joint of one great-toe. This is soon followed by heat, redness, and swelling of the skin over the joint, which then becomes smooth, shining, and marked by blue dilated veins.

These changes are accompanied with more or less febrile disturbance, irregular sour-smelling sweats, anorexia, constipation, and extreme restlessness. The urine is scanty, high-coloured, with a thick deposit of urates, *the total amount of uric acid being less than normal*.

The symptoms usually abate during the daytime, and return each night, but with diminishing severity. At the end of about a week (in first attacks) the pain, redness,

and swelling of the joint subside, and after desquamation of the cuticle around, it returns to its normal condition.

These attacks are very liable to recur, tending to become less acute and of longer duration, to involve a larger number of joints, to attack other parts such as the heel or the instep, and to return at shorter intervals as the case proceeds, until it finally passes into the *chronic* form.

There is now less fever, but the pain though less acute, is almost constant. Several joints are affected, around which "chalk-stones" are apt to form, causing enlargements, deformities, and stiffness. Nodular deposits of a similar kind may occur in the lobule of the ear, and elsewhere. The health is greatly impaired, and the patient complains of acid eructations, flatulence, loss of appetite, irregular action of the bowels, circulatory disturbance, and great irritability.

Occasionally, in the place of the usual articular changes, the internal organs may be attacked (*retrocedent*, or *irregular gout*). Thus it may affect (1) *the brain*, causing intense headache, delirium, or convulsions; (2) *the stomach*, causing gastralgia, nausea, vomiting, &c.; (3) *the heart*, giving rise to irregular or intermittent cardiac action, palpitation, and attacks of syncope, or angina pectoris; or (4) *the lungs*, causing bronchitis and asthma.

The subjects of gout are especially liable to obstinate eruptions of the skin; to a form of chronic Bright's disease (granular kidney); and to arterial degeneration, a common proximal cause of apoplexy.

For the purposes of *diagnosis* the following table* may be of service.

* Adapted from Roberts' *Handbook of Medicine*.

ACUTE GOUT.	ACUTE RHEUMATISM.	RHEUMATOID ARTHRITIS.
1. Rare in early life.	1. Common in early life.	1. Rare in early life.
2. Smaller joints chiefly affected, especially the great toe. Not erratic. Joint very œdematous, red, smooth, shining, with enlarged veins. Cuticle finally desquamates.	2. Medium-sized joints chiefly affected. Very erratic. Swelling of joint mainly due to effusion within it. Skin only slightly altered. No enlargement of veins. No desquamation.	2. Smaller joints more often affected in first instance. Not erratic. Changes attended with deformity of the joint.
3. Urate of soda deposited in the joint.	3. No deposit of urate of soda.	3. No deposit of urate of soda.
4. Attacks of short duration, and with great tendency to periodical recurrence.	4. Attacks of longer duration, with less liability to recur. No periodicity.	4. Essentially chronic.
5. <i>Complications.</i> —Severe functional disturbance of brain, stomach, heart, or lungs.	5. <i>Complications.</i> —Endocarditis, pericarditis, and inflammation of lung or pleura.	5. No special complications.
6. <i>Urine.</i> —Scanty, acid; deficient in uric acid at first; afterwards in excess. Albuminuria common.	6. <i>Urine.</i> —Febrile; sometimes slight albuminuria.	6. Nothing special in the urine.

PROGNOSIS.—Gout usually runs a chronic course with little direct danger to life. Death, when it occurs, is due either to some complication or intercurrent disease.

TREATMENT.—Plain living, a restricted amount of animal food, avoidance of alcoholic stimulants, plenty of exercise in the open air, attention to the action of the skin and bowels, and as much freedom as possible from worry and anxiety will suffice to ward off, if not altogether to prevent an attack of acute gout, in the early stages of the disease. In the more chronic forms, however, the patient is often so crippled, and his general health so broken, that a liberal diet, with stimulants, may become necessary.

During the attack the joint must be rested, and hot fomentations or anodyne applications may be employed to relieve the local pain. Internally, *after* the bowels have been freely opened, it is well to administer full doses of an alkaline bicarbonate in combination with colchicum (*vini*

ἡx-xv) three or four times a day, until the attack subsides. The salts of lithia or potash are preferable to those of soda. Generally speaking the emunctories should be encouraged to act pretty freely, by systematic bathing, followed by friction of the skin, drinking of mild alkaline diluents in abundance, and the occasional use of an aperient. In the chronic forms of gout, alkalies freely diluted, guaiacum, and iodide of potassium are of value, but attention to hygienic matters is of still greater importance.

RICKETS—RACHITIS.

RICKETS is a form of general malnutrition, which is specially characterised by peculiar changes in the bones. It is essentially a disease of childhood, and seldom occurs before the 6th or after the 18th month. It is caused by any condition which interferes with the proper development and nutrition of the child; such as debility on the part of the mother, improper food, or defective hygienic surroundings.

MORBID ANATOMY.—The changes in the bones, consist of an excessive proliferation of the deeper layers of the cartilages and periosteum, together with delay in the process of ossification. The bones are consequently increased in thickness, especially at their ends; and, moreover, they become softened, so that they are peculiarly apt to bend or break. After awhile ossification is once more resumed, and the new-formed bone is extremely hard and dense. The liver, spleen, and lymphatic glands are also often enlarged. As yet we have little or no precise knowledge to account for these remarkable changes.

SYMPTOMS.—Three signs stand out as especially characteristic of the onset of rickets:—(1) profuse sweating of the head, face, and upper part of chest, increased during sleep,

or on the slightest exertion when awake; (2) a strong desire to be cool at night by kicking off the bed-clothes; and (3) a peculiar tenderness of the body when moved or pressed, which indicates the beginning of morbid changes in the bones. Side by side with these signs there is general debility and emaciation. The skin is pale and flabby, the bowels act irregularly, the motions are offensive, and the appetite is often ravenous. The cutting of the teeth is delayed, and if the child has already begun to walk, it now ceases to do so, sits "all in a heap," suggesting to an anxious mother that the back is "growing out." The child is dull and languid, though peevish and restless.

In a short time *the ends of the long bones become enlarged*; a change which is first noticeable at the junctions of the ribs with their cartilages, and afterwards at the wrist and other joints. The bones generally become more or less thickened.

Enlargement is followed by *deformities*, of which the following are the chief. The head is large, out of all proportion to the face; the forehead is high, square, and projecting; and the closure of the fontanelles is delayed. The long bones bend in various ways under the weight of the child. The thorax is deeper from before backwards, the sternum is thrown forwards, and the natural curve of the ribs is diminished (*pigeon-breast*). The antero-posterior diameter of the pelvis is shortened by the thrusting forward of the sacrum into the pelvic cavity. The spine may be variously curved.

The general symptoms continue. The child is emaciated and old-looking, the appetite is perverted or lost, the digestion is disturbed, and the abdomen is enlarged and distended. The urine is increased in quantity, and often loaded with earthy phosphates. At this stage, complications are apt to occur which may prove fatal; but more frequently recovery sets in, slowly at first, with improvement in the discharges, a better appetite and a

brighter appearance, and afterwards more rapidly, till it is complete. Ossification of the softened bones now proceeds apace, so that they soon become once more hard and firm; but stunted growth, and any deformity which may already have taken place, persist, as permanent indications of the past disease.

The *complications* of rickets are both numerous and important. Bronchial catarrh, diarrhoea, laryngismus stridulus, convulsive affections generally, and chronic hydrocephalus, are those most commonly met with.

The *diagnosis* in well-marked cases is attended with no difficulty whatever. In the milder forms, most reliance may be placed on the initial symptoms (as already described), the delayed dentition, and the lateness in walking and talking. It is distinguished from *mollities ossium* in that the latter is a disease of adults and is never followed by re-ossification.

TREATMENT.—Careful attention to diet, and general hygienic management claim the foremost place both as preventive and curative treatment, for details relating to which reference must be made to larger manuals. Where the bowels are irregular and the stools offensive, a mild aperient is necessary at first, followed by a few grains of some alkaline bicarbonate or liquor potassæ, in combination with nux vomica or some vegetable bitter which may be repeated three or four times a day for awhile. Obstinate constipation is best treated by warm clothing, and frictions of the abdomen; should any aperient be necessary, an occasional dose of castor oil may be given, or better still, one or two drops on sugar, once or twice a day, of a solution of podophyllin in spirits of wine (gr. j ad 3 j). Starchy food should either be suppressed altogether, or restricted in quantity, according to the age of the child, and the special requirements of the case; and may be replaced by light nitrogenous food (milk, yolk of egg, &c.).

Medicinally, tonics are indicated, of which the best are the various preparations of iron, quinine, and cod-liver oil. Lime salts have been recommended, and in my own experience I have frequently seen favourable results from a course of chloride of calcium (dose, gr. j—iij). As to the deformities, children should be prevented from getting about too early; and in recent cases where the bending of the limbs is marked, gentle extension with splints may be employed. Complications must be treated as they arise.

SYPHILIS.

SYPHILIS is a specific disease, which may be either acquired or inherited. In the former case, it can only be communicated by inoculation, which occurs for the most part during sexual intercourse with an infected person. In the latter it is transmitted from the parent to the offspring. One attack of the *primary* disease would appear to confer protection against its repetition.

PRIMARY SYPHILIS.—About 28 days after inoculation a “primary sore” appears, which is characterised by a superficial ulcer with an elevated margin, and an indurated base. After about two months it gradually cicatrises. The lymphatic glands in connection with the affected part begin to enlarge shortly after the commencement of the “sore,” but have little or no tendency to suppurate. After the disappearance of the sore they usually soon regain their normal size, or nearly so; but sometimes they remain more or less enlarged for months or even years.

SECONDARY SYPHILIS.—From six weeks to three months after the first appearance of the primary sore, some slight febrile disturbance, debility, and anæmia, usher in a group of so-called *secondary symptoms*, which present considerable variety. The most important are as follows:—

1. *Cutaneous eruptions*, which may be macular, papular, vesicular, scaly, or pustular. They are mainly characterised by (a) a coppery colour; (b) a brownish stain left for a considerable time after their disappearance; (c) the appearance of various forms of eruption at the same time; (d) a tendency to circular grouping; (e) an absence of itching; and (f) by an aptitude to affect parts such as the forehead, soles of the feet, and palms of the hands, which are rarely affected by non-specific eruptions. The hair is also liable to become dry and fall out. 2. *Lesions of mucous membranes*, including, (a) superficial ulcers of the tonsils, soft palate, &c.; and (b) mucous tubercles of the orifices of the mouth, nose, rectum, or elsewhere. 3. *Lesions of the eye*, including, (a) iritis; and (b) choroido-retinitis. 4. *Pains in the joints and bones*, due to slight periostitis.

TERTIARY SYPHILIS.—Unless the further progress of the disease be checked by appropriate treatment, in a variable time after the disappearance of the secondary symptoms which have been enumerated, fresh symptoms are apt to occur, which are termed *tertiary*. There is no sharp distinction between secondary symptoms on the one hand, and tertiary symptoms on the other; but the latter are mainly characterised by (a) their tendency to affect internal organs and deep-seated parts; (b) their want of symmetry; and (c) their association for the most part with the formation of gummata. The most important are as follows:—

1. *Cutaneous lesions*—rupia, tubercular formations, and ulceration. 2. *Lesions of mucous membranes*—destructive ulceration of the soft palate, pharynx, or rectum. 3. *Gummatous tumours*, composed of a fibro-nuclear growth infiltrating the sub-cutaneous, or sub-mucous tissues, the muscles, or internal organs. 4. *Periostitis and necrosis of the bones*, most frequently affecting the tibia or the bones of the skull.

Sooner or later, if the progress of the disease be still unchecked, the so-called syphilitic cachexia sets in, and the patient may finally die either from exhaustion or from some intercurrent affection.

CONGENITAL SYPHILIS.—Symptoms usually first appear at the end of the third to the sixth week after birth, in the form of cutaneous eruptions resembling those of the secondary period of acquired syphilis, and of most frequent occurrence on the nates, abdomen, palms and soles. Congestion and swelling of the nasal mucous membrane, with increased secretion, also constitute common initial symptoms (*snuffles*). Mucous tubercles about the mouth or anus, and interstitial inflammation of the cornea are frequently met with. The temporary incisor teeth are cut early and as a rule with little difficulty; but they soon decay, and the permanent teeth which replace them are ill-formed, short, peg-shaped, and present a central notch. If the disease proceed unchecked, symptoms of the tertiary type may occur. The child's appearance is cachectic, the features pinched, the skin dry and shrivelled, and it gradually sinks. On the other hand appropriate treatment by mercurials will speedily restore the child, in most cases, to a condition of comparative health, if begun sufficiently early.

TREATMENT.—The only effectual remedy for syphilis is mercury. It may be given either (*a*) by *inunction* with mercurial ointment; (*b*) by *fumigation* with the vapour of calomel; or (*c*) by *internal administration* of some mercurial preparation. For infants the method of inunction is the most convenient. For adults, in all ordinary cases, nothing answers better than gr. j doses of mercury and chalk three or four times a day in the form of a pill made up with a little ext: gentian. The treatment should never be pushed to the extent of salivation, and should be continued for at least one year after the disappearance of symptoms, in smaller doses given less frequently. When

more rapid effects are desired, the employment of fumigation, or of blue pill (gr. ij—iij ter die) with a little opium is preferable. Iodide of potassium is of special service in tertiary syphilitic affections of the internal organs, particularly of the nervous system. In such cases the dose should be free, and be rapidly increased. Above all, it should be remembered that syphilis is a debilitating disease, and the importance of all treatment which tends to the improvement of the general health cannot be over-stated.

Further details must be sought in surgical text-books.

SCORBUTUS—SCURVY.

SCURVY is a disorder which primarily depends on a morbid condition of the blood, arising from a deficient supply of certain substances necessary for proper nutrition, more particularly of the salts of potash with vegetable acids. As powerful auxiliary causes, cold, damp, hardship, and depressing influences generally, must be mentioned.

MORBID ANATOMY.—The blood is profoundly altered, being liquid and dark-coloured. Ecchymoses are seen on the surfaces of the skin, serous and mucous membranes. Firm coagulated extravasations are also met with beneath the skin, and between the muscles. Blood-stained effusions may occupy the serous cavities.

SYMPTOMS AND COURSE.—A sense of lassitude, debility, and disinclination for exertion of any kind, often accompanied with darting pains in the limbs and joints, usually precedes the characteristic changes in the gums, which become swollen, soft, and spongy, and bleed on the slightest touch. The teeth are tender and loosened. Subcutaneous hæmorrhages (*petechiæ*) occur, and are most abundant over the lower limbs; while not infrequently deep-seated extravasation gives rise to brawny indurations about the

limbs and elsewhere, rendering all movements of the limbs difficult and painful. Hæmorrhages from the various mucous surfaces are also liable to occur. The general condition is characterised by debility and prostration, the skin is sallow and harsh, the breath is offensive, the appetite fails, and the bowels are generally constipated. There is no fever in uncomplicated cases. If not relieved, the prostration increases, the pulse becomes very feeble, the least exertion is attended with dyspnoea and palpitation, and the integument is often œdematous and sometimes the seat of obstinate ulceration. Prompt and appropriate treatment is usually followed by recovery; otherwise the case drags on from bad to worse, till death occurs from exhaustion or some complication.

TREATMENT.—It is important, without delay to restore those substances to the system, to the want of which the disease is primarily due, viz., the vegetable salts of potash. For this purpose fresh vegetables and green stuff should be freely supplied. Lime or lemon juice ($\frac{3}{4}$ j— $\frac{3}{4}$ ij in a tumbler-full of water, and sweetened, taken thrice daily) is also of great value.

The diet should be light, nutritious, and liquid until the condition of the gums is improved, and the digestion is stronger. Stimulants are occasionally required.

In the absence of fresh vegetables or lime juice, citrate of potash may be given with advantage.

PURPURA.

PURPURA like scurvy is a disorder which is characterised by depression, and a tendency to hæmorrhages; but it differs from it in many particulars to be afterwards noted. Anything which depresses the vitality below a certain limit may cause purpura. Thus, it may occur primarily as a

result of bad living, and general neglect; or in connection with acute fevers (hæmorrhagic varieties) or in the course of certain chronic diseases; lastly it is exceptionally met with in those previously healthy.*

Purpura is supposed to be due to one or both of the following conditions:—(a) malnutrition of the walls of the smaller blood-vessels, and (b) alteration in the quality of the blood.

SYMPTOMS.—Two varieties are generally described—P. simplex, and P. hæmorrhagica, but they merely differ in degree. The onset is sometimes gradual, and ushered in with some premonitory symptoms of malaise; or it may be sudden, accompanied with slight febrile disturbance. The skin is studded with hæmorrhagic extravasations which vary in size from minute petechiæ, to large and irregular ecchymoses, and present the usual changes of colour which characterise bruises. They are most abundant on the legs and lower part of the trunk, and generally appear in successive crops. There is especial liability to hæmorrhage from the various mucous surfaces, namely epistaxis, hæmoptysis, hæmatemesis, hæmaturia, and menorrhagia. The constitutional symptoms are mainly characterised by debility and depression, which are proportionate to the severity of the case, and the loss of blood. Death when it occurs, is usually the result of asthenia or syncope; but recovery is the rule.

Scurvy is distinguished from purpura by the marked cachexia, the affection of the gums, and its dependence upon a want of fresh vegetables. Hæmorrhages from the mucous surfaces are also more common and abundant in purpura than in scurvy.

The *treatment* is necessarily of a general kind, and atten-

* It is proper to state that the term *purpura* is sometimes restricted to those cases in which the hæmorrhages are unconnected with any local mischief, or other disease.

tion to the hygienic surroundings of the patient, a liberal supply of good food, with warmth and rest, should constitute its leading features. Medicinally, iron and quinine with sulphuric acid are of most service. Internal hæmorrhages are best checked by the administration of turpentine in doses of ηx — xx with *mist. amygdalæ*, frequently repeated.

SCROFULOSIS—STRUMA.

SCROFULOSIS or STRUMA is a constitutional condition which is manifested by a peculiar tendency to inflammation in various parts of the body, arising from trivial causes. The inflammatory process moreover is characterised by extreme chronicity, profuse cell-proliferation, and liability to consecutive caseous degeneration. Inflammation of this kind is especially apt to invade the lymphatic glands, skin, mucous membranes, joints and bones. Great stress is laid upon the frequency of inflammation of the lymphatic glands, as being peculiarly characteristic of the scrofulous habit; and undoubtedly glandular enlargements often constitute the first obvious outward indication of scrofulous mischief. It must be remembered, however, that the glands do not enlarge spontaneously, but only under the influence of irritation set up by some antecedent lesion of an inflammatory nature, to which the scrofulous habit renders them peculiarly susceptible. Thus enlargement of the cervical glands commonly arises from preceding inflammation of the tonsils; enlargement of the bronchial glands from bronchial inflammation; and enlargement of the mesenteric glands from intestinal inflammation.

The liability of scrofulous subjects to develop Tuberculosis has long been known, and discussion as to the exact nature of the relationship between these two conditions has led to endless confusion of the whole subject. The recent

investigations of Koch, which clearly stamp Tuberculosis as a specific infective disease, go a long way towards permanently clearing up the difficulty. The nature of the relation according to this view is simple enough, and amounts to this,—that chronic scrofulous inflammations afford peculiarly favourable conditions for the growth and development of the tubercular virus, now conclusively proved to consist of specific micro-organisms. There is in other words no *necessary* relation between them at all; and so long as the system is free from the specific tubercular virus, Scrofulosis will never lead to Tuberculosis.

Heredity is the most important predisposing cause of Scrofula; but it may be also undoubtedly acquired by anything which tends seriously to lower the general health; and to impair development. It is essentially a disease of childhood and early life.

SYMPTOMS.—Children who inherit a scrofulous taint are often characterised by a short stumpy figure, thick opaque skin, round face, ugly features, thick coarse hair, thick upper lip, broad nose, dull temperament and backward intellect. The bones are thick, the teeth decay early, and the belly is tumid.

With regard to the special manifestations of Struma there is nothing peculiar beyond what has been stated when defining the nature of the disease. As in Syphilis, affections of the skin and glands often constitute the earliest lesions; subsequently the mucous membranes and cellular tissues are apt to be attacked; while still later in bad cases, the bones and joints are prone to suffer. At the same time, departure from this sequence of events is of frequent occurrence. Among the more frequent affections thus met with, are enlargement and suppuration of lymphatic glands, pustular eruptions, tinea tarsi, otorrhœa, ozæna, vulvitis, cold abscess, synovitis, and osteitis with caries. Should morbid diathesis remain unchecked by treatment,

secondary diseases such as tuberculosis, pulmonary phthisis, and albuminoid degeneration of various organs may arise.

The *treatment* of Scrofula is primarily hygienic. Fresh air, exercise, baths, good food (especially animal food) are chiefly required. Medicinally, bitter tonics, cod-liver oil and preparations of iodine are indicated.

TUBERCULOSIS.

In the light of recent knowledge, Tuberculosis must be regarded as a specific infective disease which only arises on the introduction within the body of a specific bacterial organism, which alone constitutes the tubercular virus. The organism in question is a slender bacillus, about $\frac{1}{3}$ of the diameter of a red blood-cell in length. It is peculiar for the slowness of its multiplication and diffusion through the body, as compared with other analogous organisms. For a long time its development may be confined to a particular locality, *e.g.*, the lungs; and death may occur as the result of the local disease thus set up, before the system as a whole becomes involved. Under other circumstances its development may become general from the outset.

But in order that growth and development of the tubercular virus may take place, a predisposition on the part of the individual attacked is necessary; without which, tubercular disease does not occur. This predisposition may be either general or local. The scrofulous diathesis perhaps constitutes the most important form of general predisposition. But a constitutional predisposition to Tuberculosis, other than Scrofula, may be either inherited or acquired; and in the former case is often recognisable by a special build and appearance of the body. If the term "Tubercular

diathesis" is to be retained at all, it may fairly be applied to this condition. As to local predisposition, little is definitely known, but it would appear that antecedent chronic inflammation acts in this way.

The characteristic anatomical feature of Tuberculosis consists in the formation of so-called "Tubercles" in the affected part. Two kinds of tubercles have been described, namely *grey* and *yellow*. The latter however is now known to depend upon caseation, not only of grey tubercles, but of other inflammatory products. True tubercles consist of pearly-looking, greyish, non-vascular nodules about the size of millet-seeds when isolated; but larger nodules may result from fusion of adjacent tubercles. Tubercles may be found in the lungs, intestines, lymphatic glands, serous membranes, spleen and other viscera. Microscopically, a typical tubercle consists of a centrally situated, many-nucleated giant-cell, surrounded by a zone of largish cells of an epithelioid type with oval nuclei; outside which is another zone of small lymphoid cells; the whole being imbedded in a reticulum of doubtful nature. While this is the usual structure of a fully formed tubercle it must be remembered that there is nothing specific about either the cell elements or their arrangement, both of which differ according to circumstances.

Bacilli, such as already described, are found as a rule both inside and outside the nodule, and are arranged either singly or in groups. Later on, the centre of the tubercle becomes opaque, yellowish and granular from degenerative changes. The further progress varies. 1. Re-absorption (?) may occur. 2. The nodule may caseate, soften, and become converted into a puriform liquid, forming an ulcer when superficial or a pseudo-abscess when situated more deeply. 3. It may caseate and calcify, becoming quiescent and inert. 4. It may undergo fibroid organisation.

A tubercle must be considered as a local inflammatory

new formation, primarily set up by tubercle-bacilli which have found their way to the part. Its cellular elements are derived from multiplication and metamorphosis of leucocytes, epithelia, or connective-tissue-cells; but the share (if any) which is taken by each, remains to be ascertained. More or less diffuse inflammation of the surrounding tissue always occurs. The process extends by the formation of fresh nodules in the immediate neighbourhood of the part just affected, or the virus may be carried to distant parts by the lymphatics or blood-vessels.

SYMPTOMS.—As above remarked, certain children other than strumous inherit a special susceptibility to the development of tubercle. They are often characterised by a tall thin figure, thin soft delicate skin, oval face, regular features, silky hair, large bright eyes with long eyelashes, excitable temperament and precocious intellect. The symptoms of Tuberculosis necessarily vary according to the organ affected, and will be described among the local diseases. There is a form however in which the tubercular formations are not confined entirely or even principally to one part, but scattered throughout the body. Acute general tuberculosis gives rise to symptoms which are very like those of typhoid fever, but the absence of any eruption, typical diarrhoea, or enlargement of the spleen, together with the irregularity of the temperature is usually sufficient to distinguish it.

The prognosis is unfavourable; and little can be done in the way of treatment beyond that indicated in any acute fever.

CANCER—CARCINOMA.

In cancer we find a general malnutrition associated with the local formation of new growths of a distinctive kind. It yet remains to be settled whether, on the one hand, the

new growth is but the local expression of a constitutional taint: or, on the other, whether it is primarily a local disorder and only affects the general system secondarily.

A cancer is a *malignant* growth, a term which implies a tendency to invade the surrounding tissues indiscriminately, to implicate the neighbouring lymphatic glands, to appear in distant parts as a "secondary deposit," and to recur after removal.

There are four chief varieties of cancer, *viz.*, Scirrhus, Encephaloid, Colloid and Epithelioma; but they all present the following structural features in common.—They all consist of cells of an epithelial type grouped irregularly within the meshes of a fibrous stroma. The *cells* present no *specific* characters. They are large and irregular in shape, nucleated, and remarkably apt to undergo degenerative (especially fatty) changes. The *stroma* varies greatly in amount, and consists of bands of fibrous tissue, interspersed with connective-tissue corpuscles, and is arranged so as to form an irregular network, in the alveoli of which the cells are collected. The *blood vessels* are confined to the stroma, and in no case encroach upon the alveoli. They are accompanied by *lymphatics* which communicate directly with the alveoli.

Scirrhus is most commonly met with in the female breast, in the œsophagus, pylorus, and rectum. It is characterised by the relatively large proportion of stroma, which renders it extremely hard, and resistant, and by its slow growth.

Encephaloid cancer admits of no hard-and-fast distinction from scirrhus. It differs from the latter in the small relative amount of its stroma, its consequent softness and its rapid growth. It occurs most frequently in internal organs, as a secondary growth.

In *colloid* cancer the cellular elements have undergone colloid degeneration. It is a soft, quick-growing variety, and occurs most often in the stomach, peritoneum, and intestines.

Epithelioma is the least malignant form of cancer, and presents considerable differences from the other three. It always originates in connection with the skin or mucous membranes. Its cells are large, flattened, and nucleated; they tend to become hard and horny; and they are arranged in a peculiar concentric fashion so as to form "nests," which are imbedded in a stroma varying greatly in character and amount. The lips, prepuce, labia, eyelids, and uterus are most frequently affected.

Cancer is undoubtedly hereditary; though it is sometimes met with in the absence of any family history of the kind. It rarely occurs until after middle age, but the young are not altogether exempt. Females are more prone to it than males, but this would appear to be largely due to the frequency with which the mamma and uterus are affected.

SYMPTOMS.—The constitutional effects of cancer are manifested by what is termed the *cancerous cachexia*, characterised by a peculiar sallowness of complexion, an anxious expression, pinched features, and general emaciation, together with more or less prostration, debility, and languor.

Pain (usually of a burning or lancinating kind) and tenderness of the affected part, together with the physical signs of a "tumour" are almost always present. Other local symptoms may arise from interference with the functions of important viscera, caused by pressure of the growth on surrounding parts.

The diagnosis, prognosis and treatment will be referred to when describing the disease as it affects special parts.

ANÆMIA.

THE term anæmia, is one which is very loosely employed; but speaking generally, it may be applied to any func-

tional disturbance or defective nutrition which is traceable to a depreciation in the physiological value of the blood, either by reason of a diminution in its quantity, or a simple impairment of its quality. These latter conditions usually coexist. The chief qualitative changes consist in a deficiency of the red corpuscles and albuminates of the blood, with an increase in the percentage of its saline, and (usually) also of its watery constituents.

The terms *spanæmia* (thin blood), *hydræmia* (watery blood), and *oligæmia* (scanty blood), are sometimes employed in place of *anæmia*.

It would be impossible to enumerate all the various causes of *anæmia*. They may however be classified in three groups :—(1) *deficient supply of the proper materials for the formation of healthy blood*, such as good food, fresh air, light, &c.; (2) *excessive drain upon the nutritive constituents of the blood* by hæmorrhage, over-exertion, long continued discharges, &c; and (3) *general malnutrition* arising *e.g.*, from dyspepsia, organic disease of various kinds, fever, chronic metallic poisoning, &c. *Anæmia* is common to both sexes, and to all periods of life.

SYMPTOMS.—In chronic *anæmia*, the integuments are of a pale, sallow, or waxy hue, which is especially well marked on the mucous membrane of the mouth and eyes. *Œdema* of the ankles, legs, or eyelids is of frequent occurrence, and sometimes affects a much wider area.

The general nutrition suffers in proportion to the duration and intensity of the *anæmia*. The skin becomes thin, and (when not *œdematous*) wrinkled; the subcutaneous fat disappears; the muscles waste and get flabby; the extremities are chilly; the scalp becomes scurfy, and the hair falls off, producing more or less temporary baldness: the nails also are thin, and often ill-formed.

Nervous symptoms are uniformly present, and are in the main characterised by exalted irritability followed by

speedy exhaustion. Thus the anæmic patient is fretful, querulous, whimsical and lacks decision; his memory is bad, he is disinclined for exertion, soon gets tired, and yet sleeps badly. Neuralgic pains (especially in the left side), and twitching or trembling of the muscles are often met with.

Palpitation and shortness of breath occur on the least exertion. The pulse is small and feeble. A *systolic murmur* is often heard *at the base of the heart*, louder at the left than at the right edge of the sternum; and a continuous *venous hum* (bruit de diable) may also be heard over the large veins at the root of the neck, especially on the right side.

The appetite is poor or lost; digestion is always feeble, and is often accompanied with pain and flatulence. The bowels are usually constipated.

The urine is copious, pale, and limpid. Menstruation is generally disturbed, being scanty, absent, or painful. Leucorrhœa is a frequent symptom.

TREATMENT.—The first consideration is to ascertain the cause and to remove it if possible. General treatment is of great importance. Thus, fresh air, out-door exercise, plenty of sleep, and tepid or cold bathing greatly aid recovery. Since digestion is very feeble, the food should be light and nutritious, taken in very moderate quantity, and at shorter intervals than usual. A little light wine, or sound ale is often of service, but should never be taken without food.

Iron in some form or another is the most important medicinal remedy. The blander preparations (*e.g.*, Ferri et Ammon. Cit.) are usually preferable at first, and may often be advantageously combined with strychnia. The tendency to constipation often calls for the addition of some aperient to the iron, of which aloes is the best. A convenient formula is the Pil. Aloes c. Ferro (B.P.); or a

combination of sulphate of iron with sulphate of magnesia. Iron in any form is apt to disagree where the tongue is foul, and the stomach much disturbed. Under such circumstances it is better to begin with a purgative, followed by a short course of an alkali (or mineral acid as may be indicated) combined with some vegetable bitter. Among other remedies may be mentioned arsenic (liq. arsenicalis) and phosphate of lime. The former I have often found of great service in the intense anæmia sometimes associated with bleeding piles; and the latter is recommended by Dr. Ringer in the anæmia of rapidly growing children, or women weakened by over-suckling, &c.

In anæmia dependent on syphilis, or metallic poisoning, and the like, the treatment must be directed to the condition on which it depends.

CHLOROSIS.

CHLOROSIS, though in some respects resembling anæmia, differs from it in many particulars. The characteristic feature of the blood-change consists in a deficiency of the red colouring-matter (hæmoglobin), independently of any diminution in the number of red corpuscles. The quality of the plasma remains unchanged. It comes on in young girls about the age of puberty, and does not admit of being traced to familiar causes, like anæmia. The pathology of chlorosis is very obscure.

The *symptoms* are in the main similar to those of anæmia, but are indicative rather of functional disturbance, than of malnutrition. The pallor is intense, and of such a peculiar greenish wax-like kind, that the disease is popularly known as the *green-sickness*. The body does not waste; on the contrary, there is sometimes a tendency to obesity which ceases on recovery from the disorder. Edema is rare, and when

present is inconsiderable. Menstruation (if it has appeared), ceases, or its first appearance is delayed till after recovery. In exceptional cases however the menstrual flow is not checked. It is remarkably amenable to treatment by iron (far excelling anæmia in this respect), but the drug must be given in *large doses*. The dose is of more importance than the form of preparation; but the most convenient and satisfactory, in my experience, is a pill of five grains of *dried sulphate of iron*, made up with *syrup*. Three of these pills (increased up to six or even eight) may be given daily.

DIABETES MELLITUS.

DIABETES is characterised by the persistent presence in the urine of grape-sugar (glucose) in more or less abundance; and is attended with constitutional disturbance of a marked kind. Normal urine contains, it is said, a very minute trace of sugar, and we may meet with temporary glycosuria in various morbid conditions, but such are not included in the affection now about to be described.

Diabetes is occasionally hereditary; and while it occurs at all ages, it is much more frequent in the male than in the female. Exposure to cold, violent emotion, injury or disease of the nervous system are among the chief exciting causes, but very often none can be traced.

The *pathology* of diabetes is very obscure, and it is probable that it is not identical in every case. We may however pretty safely conclude that it is closely related to some disturbance of the glycogenic functions of the liver. In some cases the glycogenic activity of the organ would appear to be increased, and more sugar is thus thrown into the circulation than can be metamorphosed in the tissues, the surplus being excreted with the urine. Whether this increased activity is due to direct nervous influence upon

the hepatic cells, whether it arises from vaso-motor disturbance producing dilatation of the hepatic arterial system, or whether it is sometimes the one, and sometimes the other, future observation must be left to decide. Other cases again, in which the urine becomes normal by avoiding all saccharine or starchy food-stuffs, may be explained by assuming inadequate conversion into glycogen of the saccharine matter which is absorbed from the alimentary canal, an excess of sugar thus appearing in the blood. No characteristic morbid appearances are met with.

SYMPTOMS.—The onset is generally insidious, and attention is first aroused by gradually increasing weakness in spite of a wonderfully good appetite. Simultaneously the patient may note an increase in the quantity of urine passed, but this is frequently not observed till attention has been attracted to it by the doctor. But however the condition first attracts attention, the essential features, when fully established, are—excessive abundance of saccharine urine, intense thirst, voracious appetite, progressive emaciation, dryness of the skin, with various functional disturbances, ultimately followed by death.

The Urine.—The quantity is largely increased and varies from 5 to 12 pints daily, or even more. It is acid, clear and of remarkably brilliant aspect. Its sp. gr. is unusually high, and varies from about 1080° to 1060°, a fair average being about 1040°. It contains a large but variable quantity of sugar, usually ranging from 15 to 25 oz. daily (8 to 12 per cent.); but may be much more, or much less.* It is most abundant after meals, especially after saccharine or starchy food; and sometimes disappears altogether when these are withdrawn. The amount of urea is increased; and a little albumen is sometimes present. Micturition is more frequent.

* For the tests for sugar in the urine refer to the chapter on "Urine."

Thirst is always excessive, the quantity of fluid drunk roughly corresponding with that of the urine passed. The *appetite* too is generally—but not always—voracious.

Emaciation is progressive from the first ; and in the later stages is extreme, and affects all the soft tissues. It must not be forgotten that some diabetic patients are excessively corpulent, an anomaly sometimes met with in cancer.

The *skin* is dry, harsh, irritable, and often œdematous about the ankles. Certain eruptions—especially boils—are common. The *tongue* is red and dry. The teeth are apt to decay rapidly, and the gums recede, and become unhealthy.

Functional Derangements.—Digestive disturbance, flatulence, and constipation of the bowels ; mental dulness, and want of resolution ; weak or absent sexual desires ; visual troubles with or without organic change (cataract is not infrequent), are among the more important functional troubles.

As to *complications*, the chief is pulmonary phthisis, which supervenes in at least half of all cases, and is a frequent cause of death. Low forms of pleurisy, pneumonia, and peritonitis ; abscesses ; carbuncle ; and gangrene are also occasionally met with.

The course of diabetes is slow, chronic, and progressive, the duration varying from one to three years. Sometimes however it runs an acute and rapid course. Recovery is exceptional, and death usually occurs from asthenia or from some complication.

I have sometimes met with glycosuria in gouty people alternating with a sandy deposit of uric acid. So long as the latter condition persists there is no sugar in the urine, but on its disappearance sugar is found in abundance. In such cases the other symptoms of diabetes have either been absent or ill-marked ; and the course is very chronic.

TREATMENT.—This may be discussed under three heads : general, dietetic, medicinal.

General.—Exercise (always stopping short of fatigue), fresh air, warm clothing, and occasional baths are of considerable benefit. The bowels should be carefully regulated by castor oil, or saline aperients. The digestive functions require attention, and for this purpose, nothing is better than alkalies combined with some vegetable bitter. To relieve the intense craving for food, Dr. Wm. Roberts recommends a pill containing two or three grains of assafoetida twice or thrice daily. Sleeplessness may be combated with opium, bromide of potassium, and the like.

Dietetic.—All saccharine and starchy foods should be avoided; *e.g.*, sugar, bread, rice, tapioca, potatoes, peas, beans, carrots, turnips, parsnips, alcohol, and most fruits. The diet should be selected from the following: milk, butter, cheese, eggs, meat, fish, and green vegetables. Any bread used, should be well and uniformly toasted; or gluten bread, bran-cakes, or almond-biscuits may be substituted for it. Donkin speaks highly of a dietary consisting exclusively of six to eight pints of skimmed milk daily. Acidulated drinks, or a solution of bitartrate of potash are of service in relieving the extreme thirst.

Medicinally, opium appears to be the most valuable drug, and should be given in small doses (gr. $\frac{1}{2}$ ter die) at first, gradually increased. Others prefer codeia to opium, which is given in similar doses. I have sometimes seen great benefit from the administration of salicylate of soda (ʒj ter die). The anæmia and emaciation often call for iron and cod-liver oil.

ADDISON'S DISEASE.

It is difficult to know under what class this affection ought to be described. For the present purpose it may be regarded as a constitutional malady, characterised by general

debility, bronzing of the skin, and cheesy changes in the supra-renal capsules. The large sympathetic ganglia in the upper part of the abdomen are also said to exhibit changes of a degenerative nature.

The prominent *symptoms* are (1) general and progressive debility; (2) pigmentation of the skin; and (3) pain in the epigastrium or loins, with nausea or vomiting.

The *onset* is insidious, and is marked by increasing weakness (with little or no emaciation), shortness of breath, palpitation, a feeble frequent pulse, lassitude, languor, and prostration. The *skin* meantime becomes darker, with a tint of yellowish brown, or greenish black of variable depth. This change usually begins on the surface of the upper half of the body; and is most intense in those parts which are naturally darker than elsewhere, *e.g.*, the lower eyelids, axillæ, areolæ of nipples, and pudenda. The conjunctiva remains white and pearly. Black spots sometimes form on the lips or on the buccal mucous membrane. In addition there is as a rule more or less pain at the epigastrium or loin, with nausea or even severe vomiting.

Remissions not infrequently occur, but are only of temporary duration, the progress being invariably towards a fatal termination, though slow and tedious. Death ultimately occurs from asthenia or syncope, sometimes preceded by grave nervous disturbance.

As to *treatment*, all that is possible, is to endeavour to keep up the strength by tonics, cod-liver oil, wine, good food, warmth and fresh air.

LEUCOCYTHÆMIA.

LEUCOCYTHÆMIA is the term applied to a morbid and persistent increase in the white corpuscles of the blood, which is associated with peculiar overgrowths of the lymphatic tissues.

100 ELEMENTS OF PRACTICAL MEDICINE.

To appreciate the nature of this affection it is necessary to bear in mind two facts, (1) that the lymphatic tissues include not only the lymphatic glandular system and the spleen, but also the solitary and agminated glands of the intestine, the pulp of the spleen, and the delicate adenoid tissue found in submucous and subserous tissue, around the bronchial tubes, hepatic ducts and elsewhere: and (2) that the cell elements of the blood take their origin in these lymphatic tissues.

The colour of the blood is obviously paler than normal, and the proportion of white to red blood-cells is on an average about 1 to 10 or 20, instead of the normal proportion of 1 to 840. Sometimes they are even *more* numerous than the red cells. The spleen is always more or less enlarged from overgrowth of its pulp—sometimes enormously so; and in about one third of all cases, some or many of the lymphatic glands are also enlarged; while small multiple lymphoid growths are frequently met with in the substance of the liver, kidneys, lungs and elsewhere.

Apart from the enlargement of the spleen or lymphatic glands, or of both together, the main *symptoms* consist of a slowly progressive anæmia, weakness, and emaciation, with incapacity for exertion, shortness of breath, and digestive derangements. The temperature is often somewhat raised, and sometimes persistently so. The urine is normal in appearance; but the urea is diminished, while the uric acid and urates are increased. In the later stages, there is a tendency to dropsy, and hæmorrhage from the various surfaces. The prognosis is exceedingly grave, and death occurs sooner or later, more often from asthenia, but sometimes from severe hæmorrhage, or some complication.

The *treatment* of leucocythæmia is in the highest degree unsatisfactory, and is limited purely to palliative measures.

SECTION IV.
DISEASES OF THE RESPIRATORY
SYSTEM.

TABULAR ARRANGEMENT OF PHYSICAL SIGNS.

I. INSPECTION.

1. ALTERATIONS IN THE SHAPE OF CHEST . . .	{ Congenital, or due to pre-ex- isting disease	{ Alar chest. Flat chest. Pigeon-breast. Transverse constriction. Rickety chest.
2. ALTERATIONS OF RESPIRATORY MOVEMENTS	{ Increased. Diminished. Irregular. Laboured. Thoracic movements in excess. Abdominal movements in excess.	

II. PERCUSSION.

PERCUSSION-NOTE	{ Resonance Dulness Peculiar sounds	{ Hyper-resonance. Tubular resonance. Amphoric resonance. From slight deficiency to abso- lute dulness. Metallic resonance. Cracked-pot sound.
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III. PALPITATION.

FREMITUS (Vibration of chest- walls as felt by hand)	{ Vocal fremitus Friction fremitus.	{ Increased. Diminished. Absent.
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IV. AUSCULTATION.

1. BREATH-SOUNDS ALTERED AS TO	}	Intensity . . .	{ Increased, exaggerated, or puerile. Diminished, or weak.
		Rhythm . . .	{ Jerky, irregular, or wavy. Expiration prolonged.
		Quality . . .	{ Harsh. Bronchial. Tubular. Blowing. Cavernous. Amphoric.
2. RALES OR RHON- CHI	}	Sibilant. Sonorous. Mucous.	
		Creptitation . .	{ True. Redux.
		Crackling . . .	{ Dry. Moist.
		Hollow	{ Amphoric. Metallic. Cavernous.
3. VOCAL RESON- ANCE	}	Increased or modified	{ Bronchophony. Pectoriloquy. Œgophony.
		Diminished.	
4 PLEURAL FRICTION.			

GENERAL SYMPTOMATOLOGY.

Alterations in the Voice.—True vocal sounds originate in the larynx, and are due to the concurrence of the following events:—an expiratory effort, together with approximation, tension, and vibration of the vocal cords. From feebleness of the expiratory act, the voice becomes faint and weak; and from uncertainty in its production, the voice becomes tremulous. Should paralysis prevent the due approximation or tension of the cords, aphonia (loss of voice), results. If by inflammation, ulcers, or new growths, the

vibration of the cords is interfered with, hoarseness or even aphonia may occur.

Temporary variations in the vocal *pitch* depend on alteration in the tension of the cords, and their relaxation by inflammation or otherwise therefore deepens its tone. Lastly, since the *quality* of the voice is mainly related to the physical condition of the walls of the throat and mouth, it becomes modified by enlarged tonsils, paralysis of the soft palate, &c.

Alterations of Respiration.—*Dyspnœa* is a term which is applied both to rapid and laborious breathing. The depth of respiration is generally (but not always) in inverse proportion to its frequency. *Dyspnœa* is often due merely to excessive nervous irritability, such as that met with in hysteria. Far more often, however, it is the proximate result of an abnormal condition of the blood which is supplied to the respiratory nervous centre in the medulla. Thus, *dyspnœa* occurs (1) when the blood is overheated, as in fevers; (2) when it contains unusual ingredients, as in some cases of uræmia; (3) when it is deficient in oxygen, as in anæmia; and (4) when a similar result is brought about by a deficiency in the oxygen of the air breathed, by disease of the lungs or heart, by obstruction of the air-passages, by mechanical interference with the movement of the chest-walls or diaphragm, or by paresis and spasm of the respiratory muscles.

Sometimes the difficulty is mainly confined to inspiration, as in certain forms of laryngeal paralysis; at other times to expiration, as in emphysema; but more often it attends both inspiration and expiration. When *dyspnœa* is so severe that breathing is only possible in a more or less upright posture, it is termed *orthopnœa*. When the difficulty in breathing comes on for the most part in attacks of temporary duration, it is said to be *paroxysmal*. In all cases of partial obstruction, or of constriction of the laryngeal or

tracheal passages, the breath-sounds have a peculiar harsh wheezing quality, known as *stridor* or *stridulous breathing*. Another variety known as *Cheyne-Stokes respiration*, is characterised by a series of respirations gradually increasing in depth up to a maximum, then gradually declining to a minimum, and followed by a considerable pause. It is a sign of very unfavourable import.

The respiration is slowed in syncope, collapse, and in various lesions of the nerve centres.

Cough.—Coughing consists of a long-drawn inspiration followed first by closure of the glottis, and then by one or more forcible expiratory efforts by which the glottis is forced open with noise. It is a purely reflex act, the afferent impulses of which travel upwards for the most part through fibres of the vagus nerve coming from the throat, air-passages, lungs, stomach, or ear. Irritation of these parts is therefore specially liable to be attended with cough. Cough may be simple or paroxysmal; as to quality, it may be hacking, hoarse, barking, metallic, aphonic, and so on; and it may be dry, or accompanied with expectoration.

Expectoration.—In health expectoration is rarely necessary, but when the secretion of mucus in the air-passages is excessive, it is expelled as a *mucoid sputum*, and may be more or less frothy from admixture with air. Pus or blood from the air-passages or from parts in communication with them is sometimes expectorated, either in a pure state or mixed with mucus. Viscid purulent-looking lumps, suspended in mucoid sputa (*nummulated sputa*), are highly suggestive of dilated bronchi or phthisical cavities; and such sputa are often very offensive. This odour must be distinguished from that of gangrene. Fibrinous moulds of the smaller air-passages are sometimes expectorated.

SUB-SECTION I.

GENERAL RESPIRATORY DISEASES.

INFLUENZA.

INFLUENZA is an *epidemic* form of catarrh, chiefly affecting the respiratory and digestive tracts. It is apparently dependent upon a *specific poison*, the nature of which is unknown; and it is usually regarded as *infectious*. A weak state of health, insalubrious surroundings, and overcrowding constitute *predisposing causes*.

The *anatomical characters* are those of ordinary catarrh.

SYMPTOMS.—After an incubation period of uncertain length, the disease usually sets in suddenly, with chilliness, lassitude, pains in the limbs, and frontal headache followed by high fever, thirst, great prostration, and debility. *Locally*—smarting of the eyes, a watery acrid discharge from the nose with sneezing, occasional epistaxis, sore-throat, deafness, hoarseness, and cough with mucoid sputa indicate a progressive catarrh of the respiratory tract. When the digestive tract is affected, the tongue is furred, and there is also anorexia, epigastric pain and tenderness, nausea and vomiting, and diarrhœa. The *urine* is febrile. In uncomplicated cases the duration does not usually extend beyond four or five days, but convalescence is often protracted, and is characterised by marked debility and general prostration, and often by troublesome cough, or neuralgic pains. In grave cases, there may be delirium, convulsions, and coma; or the “typhoid” state may supervene. Capillary bronchitis and pneumonia are common complications. Under such circumstances the duration is longer. Though the prognosis is favourable as a rule, still it may prove fatal with the aged and feeble.

TREATMENT.—No lowering treatment is admissible. The

diet should be nutritious and liberal, regulated according to the digestive capacity. Alcohol though not needed in ordinary cases, is necessary when the debility is great. At the outset Tr. Aconite ($\text{m}\frac{1}{2}$ -ij every one or two hours) is often very useful. The sneezing and frontal headache are often relieved by Liq. Arsenicalis ($\text{m}\frac{1}{2}$ every two or three hours) or by sponging the face with water as hot as can be borne. Inhalations of steam medicated with conium or chloroform, stimulating expectorants and poultices, fomentations or sinapisms to the chest may be employed to allay the catarrhal symptoms. During convalescence tonics such as quinine and iron are indicated.

WHOOPING-COUGH.

WHOOPING-COUGH or PERTUSSIS is a specific, infectious, and often epidemic disease. The poison on which it depends has not as yet been definitely ascertained; but whatever its nature it is contained in sputa, and may be carried to others by *fomites*, such as clothing, articles of furniture and the like. Speaking generally, its effects are manifested by catarrh and hyperæsthesia of the air-passages. It is essentially a disease of childhood, but adults are not entirely exempt from it. A second attack is rare.

The anatomical appearances are those of bronchial catarrh, with enlargement of the bronchial glands.

SYMPTOMS.—Three stages are usually recognised. 1. The *catarrhal stage* begins gradually with fever and the symptoms of an ordinary catarrh, and is attended with cough and abundant viscid expectoration. It continues for a very variable period, but its average duration is about ten or twelve days. 2. As the *convulsive stage* sets in, the catarrhal symptoms often abate, but the cough gets worse, lasts longer, and assumes a characteristic paroxysmal form.

Each attack begins with a long-drawn inspiration followed by a *series of sharp, short, rapidly successive expiratory coughs*, and concludes with a prolonged crowing inspiration or "whoop." The paroxysm may be repeated once or twice until at last some glairy mucus is expelled, or actual vomiting occurs, and the breathing once more becomes quiet. During the attack the face is dusky, the veins become swollen, the eyes suffused, suffocation seems imminent, and the breath-sounds on auscultation are feeble and suppressed. Hæmorrhages from the nose, mouth, ears, or beneath the conjunctivæ are apt to occur. The number of paroxysms *per diem* varies widely, but they are usually both worse and more frequent at night. 3. After the lapse of three or four weeks the *stage of decline* gradually sets in, the coughing-fits become fewer and less severe, the expectoration more easy, the sputa muco-purulent, till at last convalescence is re-established. The physical signs—in the absence of pulmonary complications—are unimportant.

Simple pertussis as above described is rarely fatal, but it is quite otherwise when complicated. Whooping-cough may supervene upon other diseases, especially *measles*; or it may be complicated (1) with *bronchitis, pulmonary collapse and pneumonia*; (2) with *convulsions and grave nervous symptoms*; or (3) with *disordered conditions of the stomach and bowels*.

DIAGNOSIS.—The peculiar cough and expectoration are quite characteristic.

TREATMENT.—During the *first stage*, confinement within doors, some simple medicine such as *vin. antim. or vin. ipecac. with paregoric*, warm baths, and counter-irritation to the chest are necessary. In the *second or spasmodic stage*, it is possible here only to enumerate the more important of the many drugs recommended, *viz.*, bromide of potash, belladonna (well borne by children), hydrocyanic acid

($\eta\frac{1}{2}$ -j), lobelia ($\eta\vee$ of tinct. every hour), alum (gr. ij-vj every three hours), chloral hydrate, morphia, chloroform, and carbolic acid. Counter-irritation with sinapisms or stimulating liniments is of service. During the *decline* cod-liver oil, tonics, and change of air are urgently required. Each case, however, must be treated according to its special type, and complications dealt with as they arise.

The diet should be light and unirritating; and the secretions require attention.

ASTHMA.

ASTHMA may be briefly defined as *paroxysmal dyspnœa*. The *paroxysm* may be preceded for a variable time by a sense of oppression and constriction at the chest, with wheezy respiration, or in some cases by the abundant discharge of pale watery urine. On the other hand it often comes without any warning, and most commonly at night. The patient awakes scarcely able to breathe, adopts the sitting or erect posture with the shoulders raised and fixed, the head thrown back, and the mouth open, and all the extraordinary muscles of respiration are brought into play. The face wears an aspect of terror; the eyes are widely opened; the skin is pale and dusky, and often bedewed with sweat; the extremities are cold; and the pulse is small and quick. The breathing however is not hurried, but inspiration is short and jerky, and expiration is inordinately prolonged.

The resonance of the chest on percussion is increased, vesicular breath-sounds are weak or even suppressed, and attended with abundant sibilant râles. These physical signs very commonly exhibit a patchy distribution, which is frequently shifting.

Towards the end of an attack, cough occurs with expect-

toration of small, firm, non-aerated pellets of mucus, in rare cases mixed with blood. The *duration* varies greatly; the paroxysm may either pass off in a few minutes, or continue on and off for days. When it lasts long, or is left to itself, it subsides gradually: but if short, or arrested by treatment, it often ends abruptly. The expectoration often continues for several days afterwards. Asthma sometimes assumes a *periodic* character, which is liable to change its type as the case proceeds. It rarely begins before 20 or after 50 years of age.

Asthma is *primary* or *idiopathic* when it occurs independently of any other affection; on the other hand it is *symptomatic* or *secondary* when it occurs in the course of other diseases, such as indigestion, bronchitis, or heart disease.

ETIOLOGY AND PATHOLOGY.—Asthma consists essentially of a spasmodic contraction of bronchial muscular fibres from impulses received through the branches of the vagus nerve supplied to them. It is necessary to assume a condition of the vagus centre which renders it peculiarly susceptible to irritation, a condition which would often appear to be *hereditary*. The source of irritation may lie in some altered condition of the blood, which then acts *directly* upon the centre. But most commonly it originates elsewhere and operates in a *reflex* manner. Thus, in asthma associated with *indigestion*, *bronchitis*, or *heart disease*, the stimulus is conducted along afferent fibres of the vagus, and reflected through its centre and efferent fibres to the bronchial muscles. The operation of other known exciting causes may be similarly explained, *viz.*, the *inhalation* of particles, or odorous emanations *from hay, flowers*, and certain animals; easterly winds; *uterine derangements*; worms, &c. In many cases, it must be admitted that the cause is not apparent.

The *diagnosis* rests upon the paroxysmal and usually sudden nature of the attacks, the absence of moist râles, and complete recovery in the intervals.

110 ELEMENTS OF PRACTICAL MEDICINE.

TREATMENT.—*During the paroxysm.* Remove tight clothing and give fresh air. Medicinally, hypodermic injection of morphia; the administration of chloral, or lobelia (tinct. ℥xxx upwards every half hour); the inhalation of the smoke of tobacco, stramonium, or nitre paper; emetics, of which ipecacuanha is the best; inhalation of chloroform; and strong black coffee, have been chiefly recommended.

During the interval. Special attention should be given to any disorder on which the attacks appear to depend. Change of air is often necessary. Tonics, as quinine, steel, or arsenic, combined or not with antispasmodics, as lobelia, are of great service.

SUB-SECTION II.

DISEASES OF THE AIR-PASSAGES.

OZÆNA.

Ozæna is a generic term which is used to include all those diseases which are attended with a chronic offensive discharge from the nose. The morbid condition on which it depends consists of inflammation of the nasal mucous membrane, which is often followed by ulceration, and caries or necrosis of the nasal bones. It generally occurs in connection with either a scrofulous or syphilitic taint. The disease commences in the upper part of the nasal cavity, and may affect one or both nostrils.

SYMPTOMS.—The breath is extremely offensive; and the fœtor may be readily distinguished from that due to other causes by the fact that it is more marked when the mouth is closed and the nostrils are open, than when the nostrils

are closed and the mouth is open. The amount of discharge from the nose varies much. As to its nature, it may be thin and almost colourless, but much more frequently it is thick and purulent-looking, occasionally streaked with blood, and tends to form horribly offensive adherent crusts, which separate from time to time, and are quickly followed by fresh formations. If the bones become involved in the process, bony fragments sometimes come away with the liquid discharge; and the bridge of the nose is apt to fall in. The sense of smell is more or less completely lost.

TREATMENT.—Both local and constitutional treatment are necessary. The nasal cavities must be repeatedly cleansed by injections of tepid water, to which a little Condy's fluid, carbolic acid, or chlorinated soda may be added with advantage. The local introduction of glycerine and boracic acid, or of a weak solution of nitrate of silver is often of service. Certain powders for insufflation have also been recommended. (See Therapeutic index). Frontal pain may be relieved by external inunction with an ointment containing 2 or 3 grains of morphia to the ounce. Constitutionally, the treatment must be directed to the strumous or syphilitic taint on which the disease depends.

ORGANIC DISEASES OF THE LARYNX.

ORGANIC diseases of the larynx include acute and chronic inflammations together with the conditions to which inflammation gives rise, such as ulceration, œdema, and perichondritis; and new growths.

Certain local phenomena are more or less common to all laryngeal affections—(1) *Alterations in the voice*, varying from slight huskiness to complete aphonia; together with modifications of its quality and pitch. (2) *Dyspnœa*, which is

noisy, hissing, or stridulous in proportion to the extent of obstruction in the air passages by which it is caused. It is liable to come on suddenly, and to occur in paroxysms induced by trivial causes. Inspiration and expiration are equally affected when the obstruction is material and persistent; but in certain paralytic and other conditions, expiration may be altogether unaffected. (3) *Cough* which is due to laryngeal irritation is frequent, paroxysmal, and of a harsh, hoarse, or barking quality. (4) The *expectoration* in recent inflammation is clear and scanty, and viscid; but later on, and in the more chronic laryngeal affections it may be more abundant, muco-purulent, or it may be streaked with blood. (5) *Dysphagia*, or difficulty in swallowing is not a frequent symptom, but is particularly apt to occur when the epiglottis is the seat of disease. (6) *Pain* is frequently present and varies from mere uneasiness, and a sensation of tickling about the throat, to burning irritation; and it is sometimes accompanied with external tenderness on pressure of the adjacent parts.

ACUTE LARYNGITIS.

Among the most frequent causes of acute laryngitis are (a) catching cold, (b) the introduction of irritating vapours, acid liquids, or water into the larynx, (c) over straining the voice, and (d) morbid growths and ulceration. It moreover occurs as a frequent symptom in many acute diseases, such as scarlet fever, measles, typhus, and small-pox. Previous attacks, and sedentary indoor occupations may be regarded as predisposing causes.

The *symptoms* consist of more or less febrile disturbance, together with those already enumerated as being common to all laryngeal affections. They vary however in extent according to the severity and seat of inflammation. The chief danger consists in the liability to *acute œdema of the*

larynx, which causes intense suffocative dyspnoea, and if not speedily relieved, leads to death from asphyxia. Examined with the laryngoscope, the laryngeal mucous membrane is red and turgid; and in severe cases the œdema of the ary-epiglottic folds is such that they completely obscure the interior of the larynx. As an acute disease it rarely persists for longer than 3 or 4 days, when either recovery sets in, or death occurs from asphyxia, or it passes into the chronic form.

Diagnosis.—It is often impossible to distinguish ordinary acute laryngitis from *croup* (assuming the presence of false membrane to be essential to the latter) without laryngoscopic examination. *Laryngisnus stridulus* differs by its sudden onset, the absence of fever, the general convulsive symptoms with which it is associated (turning in of thumbs and toes, &c.), and the cessation of all symptoms between the paroxysms.

The treatment will be considered together with that of Croup.

CROUP.

The disputed relationship of croup to diphtheria on the one hand and simple laryngitis on the other renders a precise definition difficult if not impossible. For the present it will be as well to regard it as a clinical term indicating a peculiarly fatal disease of childhood characterised by acute membranous laryngitis. The false membrane which is formed on the mucous membrane of the larynx and adjacent parts may probably in some cases be due to diphtheritic infection, and in others to severe inflammation of a non-specific kind. Cases in which the false membrane is absent must be regarded as laryngeal catarrh, or pseudo-croup.

It is essentially a disease of childhood, generally occurring between the ages of 2 and 7 years, and in boys more

often than in girls. Whether it is contagious or not is still a question.

MORBID ANATOMY.—The affected mucous membrane is at first red and swollen. The epithelium is then shed, and a layer of coagulable lymph (“false membrane”) is thrown out upon its surface. This membrane varies in thickness from a mere film to 2 or 3 lines or more, is only loosely adherent, and is removable without loss of substance of the subjacent mucous membrane. Gradually it becomes loosened, and may be expelled by coughing, when in favourable cases the parts return to their normal condition. The inflammation extends more or less into the pharynx above, the trachea and bronchi below, and passes gradually into the catarrhal type.

SYMPTOMS.—Signs of an ordinary catarrh, clanging cough, hoarseness, sore-throat with slight fever *precede* in many cases the actual attack. The *actual attack* sets in as follows. Late in the evening, or at night the child awakes with a hoarse or almost inaudible voice; a harsh husky cough, (which has now lost its “barking” character for the most part), and urgent dyspnoea. The dyspnoea chiefly affects inspiration, which is long drawn, high-pitched, and sibilant; the *alæ nasi* are in active motion; the epigastrium and lower part of the chest sink in instead of expanding at each inspiration; and the child tosses about, clutching at his throat, as if to remove some obstacle there situated. Some viscid mucus may be expelled from time to time by coughing. The temperature is raised by some 3° or 4°, the skin is hot; the pulse is frequent, hard and full; and the face is dusky and flushed.

In most cases the symptoms abate towards morning, the fever subsides somewhat, and the cough is less frequent; the voice returns, but it is still hoarse, and the inspiration is still more or less stridulous. The symptoms however return at night-fall. The disease may progress in this

rhythmic fashion for some 4 or 5 days but the attacks become less severe, and at last recovery sets in. In graver cases the remissions become less marked, the respiratory difficulties increase, the paroxysms become more alarming, the skin is cold and clammy, the eyes are dull, the complexion is livid, until death occurs with signs of convulsive asphyxia; or the child may pass into a state of coma due to carbonic acid poisoning. Death is most frequent on the 4th day.

By means of auscultation information may be gained as to the amount of air entering the lungs. The *breath-sounds are weak in proportion to the obstruction*, though they are often masked by the loudness of the laryngeal sounds. Sonorous and mucous râles are usually present, indicating bronchitis. Broncho-pneumonia, and pulmonary collapse are also not unusual complications.

The *diagnosis* of croup from laryngismus stridulus has already been alluded to. From simple laryngeal catarrh, distinction is often difficult. Shreds of false membrane expelled by coughing, and membranous patches on the pharynx, point to croup, and in the latter the dyspnoea is more urgent, and the fever more intense. True croup is a most fatal disease.

TREATMENT.—All cases of acute laryngeal inflammation require rest in-bed, warm clothing, a temperature of 70° F. and *air moistened by steam*.

In *adults* frequent inhalations of steam to which Tr. Benzoin co. ʒj, or Succus Conii ʒij with Sodæ Carb. gr. xx, may sometimes be added with advantage. External application to the throat of hot sponges, or linseed and mustard poultices is useful. The skin must be excited to action by warm water or vapour baths, warm drinks, and diaphoretic salines; and the bowels should be well opened. Mackenzie recommends the internal direct application of chloride of zinc (gr. ʒ0 ad. ʒj), or the inhalation of the

atomised spray of tannin (gr. 5 ad $\bar{3}$ j), or tincture of steel (\mathfrak{m} 8 ad $\bar{3}$ j), in obstinate cases.

In *children* whether it be true or pseudo-croup the treatment is similar. *Begin it as early as possible*; give a warm bath immediately, to which mustard ($\bar{3}$ ss to the gallon) may be added, dry quickly, and put to bed in flannel. If the breathing be very difficult (especially if expiration be impeded) some rapidly acting emetic may be given. (Alum $\bar{3}$ j in honey every 10 or 15 minutes, has been strongly recommended; or sulphate of zinc). Hot sponges should be constantly applied to the throat. The best internal remedy to begin with, in my experience, is Tr. Aconite ($\mathfrak{m}\frac{1}{2}$ or 1 every 10 or 15 minutes for 2 or 3 hours, afterwards hourly). Warm drinks may be given in small quantities frequently as occasion offers. After the more urgent symptoms are over, salines with Vin. Antim. Tart., or Vin. Ipecac. are indicated; and later on more stimulating expectorants, as ammonia, potass. iodid., squills, and senega.

The *diet* should be light and nutritious. Stimulants are needed in the diphtheritic forms of the affection, and whenever it is associated with marked debility.

Tracheotomy should be resorted to when asphyxia appears imminent.

CHRONIC LARYNGITIS.

Chronic laryngitis may occur as a sequel of the acute form; or it may depend upon over-straining of the voice, the inhalation of irritating matter, new growths, syphilis, chronic alcoholism, or the abuse of tobacco.

Whatever be the cause, the *symptoms* are those common to laryngeal mischief of all kinds, as already described. They vary only according to the seat of the lesion, and the physical changes induced by it. The employment of

the laryngoscope is therefore essential for a proper diagnosis.

Simple chronic catarrh causes but little discomfort in the larynx. The laryngoscopic changes are those of general or partial congestion and swelling of the mucous membrane. The ventricular bands and epiglottis are most frequently affected. Patches of mucus are met with on the surface here and there.

In "*Clergyman's sore-throat*" the racemose glands of the larynx or pharynx are the seat of the mischief. It often extends from the larynx to the pharynx, or *vice versa*. The symptoms are usually milder than in simple catarrh.

New growths in the larynx may be either malignant or benign. To the former class belong epithelioma, and cancer (very rare); while to the latter belong papillomata, mucous polypi, and fibrous growths. They can only be diagnosed with certainty by means of the laryngoscope. As to their symptoms it may be noted that the amount of alteration in the voice, and dyspnoea is liable to sudden variation; that when the growth is above the glottis, expiration is often quite free; and that since obstruction of the passage is the rule, *stridor* is a frequent symptom.

Syphilis.—Chronic laryngitis may occur both in the secondary and tertiary stages of syphilis, but more frequently in the latter. In the former we meet with condylomata, and superficial ulceration; while in the latter we find extensive destructive ulcers, the cicatrisation of which is very apt to be attended with serious constriction of the larynx, and more or less distortion of its parts. Tertiary ulcers are especially prone to attack the epiglottis.

Laryngeal phthisis.—There is nothing distinctive in the symptoms beyond the fact of the very frequent association with pulmonary phthisis. The laryngoscopic appearances are however characteristic. In the early stages it is true, there is nothing to distinguish the condition from that due

to ordinary chronic catarrh; but soon the ary-epiglottic folds begin to thicken, forming two pale pyriform tumours, the large ends meeting posteriorly in the middle line and extending thence upwards and outwards. The epiglottis is often thickened. Subsequently some ulceration of the vocal cords is apt to occur, especially at their junction with the ary-tænoid cartilages. Since *necrosis of the cartilages* more often results from laryngeal phthisis than from all other causes put together, it may be mentioned under this head. Necrosis is generally associated with ulceration, the inflammation extends to the perichondrium, under which pus forms and collects, and the cartilages necrose and may even be expectorated in fragments. The prognosis of laryngeal phthisis and its sequelæ is most unfavourable.

GENERAL TREATMENT OF CHRONIC LARYNGITIS.—All varieties urgently require rest for the larynx, a dry air of equable temperature, warm clothing, avoidance of exposure, and removal of any source of irritation. Constitutional remedies are more especially useful in the syphilitic and phthisical varieties where the usual treatment of those diathetic conditions is indicated. Should deglutition be very painful or difficult, only liquids thickened with cornflour or arrow-root should be given, and in some cases nutrient enemata are of service.

Local remedies are of most benefit. These may be employed in the form of inhalations of vapour or atomised spray, or applied directly by means of a special brush. The introduction of powders or of liquids cannot be recommended. For *inhalations* with steam, oils of pine or juniper, creasote, or carbolic acid are suggested; for *sprays*, alum (gr. x), tannin (gr. v), perchloride of iron (gr. ij), chloride of zinc (gr. ij-v), each to the ounce of water; for *direct application*, chloride of zinc is the best for general purposes, but in phthisis—tannin, and in syphilis—nitrate of silver

(gr. xx ad $\frac{3}{j}$), or sulphate of copper (gr. x ad $\frac{3}{j}$) are often more useful. Such applications should be made daily for the first week, after which less often as a rule.

In extreme cases tracheotomy may be required; and certain forms of new growths need removal by operation.

NEUROSES OF THE LARYNX.

LARYNGISMUS STRIDULUS.

LARYNGISMUS is a disease characterised by spasmodic approximation of the vocal cords, constricting the calibre of the larynx, and hence giving rise to dyspnoea and stridor.

The causes of the spasm may be:—(1) *Central*, such as hydrocephalus or some organic disease or functional disturbance of the brain; or (2) *Peripheral* (*a*) from direct irritation of the recurrent or vagus nerves by enlarged strumous glands in the mediastinum, or (*b*) from indirect irritation at a distance, due to worms, difficult dentition, an over-loaded stomach, &c. It is most common between the ages of 6 months and 2 years, and is especially predisposed to by rickets and scrofula.

SYMPTOMS.—The attack begins suddenly in the night without previous warning, with dyspnoea and crowing inspiration which in a few minutes may pass off, and the child after crying with fright soon falls asleep again. In other cases, the severity and duration of the attack is more marked; while in the worst forms of the disease, all respiratory sounds may actually cease for a short time, owing to complete closure of the glottis, and death from asphyxia seems imminent. At this crisis however, the laryngeal spasm as a rule suddenly ceases, and the attack quickly subsides. Spasmodic flexion of the thumbs and great toes, or more or less general convulsion is apt to be associated with the laryngeal phenomena. There is no

pyrexia. Such attacks are very prone to recur, but with appropriate treatment, the prognosis is usually favourable. Of course, in cases dependent on incurable organic nervous disease, recovery is hopeless. Death sometimes occurs from asphyxia.

TREATMENT.— *During the attack* the child should be placed in a warm bath and cold water may be dashed on the face. Slapping or rubbing is sometimes recommended. In bad cases inhalations of chloroform may be resorted to.

After the attack the source of the complaint should be thoroughly investigated. If thought to be due to an overloaded stomach, or the presence of indigestible food, an emetic is useful. Similarly, lancing the gums, or vermicide remedies may be required. Medicinally, nothing in a general way gives more relief than periodical doses of bromide of potassium. Attention to the diet, the exhibition of tonics, and change of air are often necessary to complete the cure. Tracheotomy might be necessary in exceptional cases.

LARYNGEAL PARALYSIS.

Four varieties are described.

1. **BI-LATERAL PARALYSIS OF ADDUCTORS.**—Most commonly caused by hysteria. The voice is lost (*aphonia*), but coughing is usually attended with sound. The laryngoscope shows that on attempting to speak the vocal cords either do not move at all, or only approach each other slightly. The prognosis is very favourable.

2. **UNI-LATERAL PARALYSIS OF ADDUCTORS.**—Caused by local injuries, chronic poisoning by lead or arsenic, pressure on the recurrent nerve, or diphtheria. There is dysphonia, and the sound of coughing is always altered, and sometimes toneless. The laryngoscope shows that the affected cord remains at the side of the larynx, and does not approach the middle line on attempted phonation.

3. BI-LATERAL PARALYSIS OF ADDUCTORS.—Generally a result of cerebral disease. Laryngoscopy shows that the cords do not separate on inspiration. The voice is but little affected, but the least exertion brings on dyspnoea and stridor. The cough is croupy.

4. UNI-LATERAL PARALYSIS OF ADDUCTORS.—May arise from cerebral disease, but more often from pressure on the vagus, or on one recurrent nerve. The symptoms are similar to, but not so severe as when both cords are affected. Laryngoscopy shows that the cord on the affected side is not drawn outwards on inspiration.

The *treatment* is for the most part that of the affection to which the paralysis is due. Paralysis of the adductors due to hysteria is readily cured by faradisation; one pole being placed at the back of the neck, while the other is either introduced into the larynx, or applied to it externally. Paralysis of the abductors may call for tracheotomy.

BRONCHITIS.

BRONCHITIS is a catarrhal inflammation of the mucous membrane lining the bronchial tubes, which may on the one hand be limited to the trachea and larger bronchi (*simple bronchitis*); or on the other hand, may extend to their ultimate ramifications (*capillary bronchitis*). With respect to its course, it may either be *acute* or *chronic*.

ACUTE BRONCHITIS.

This condition usually arises from "catching cold;" but it may also occur from the introduction of irritating vapours, or solid particles into the bronchi; or as a symptom in many acute specific fevers; or lastly, it may be epidemic as in influenza. Previous attacks, early or ad-

vanced age, constitutional debility, and changeable damp climate are common predisposing causes.

MORBID ANATOMY.—As in all catarrhs we meet with congestion, swelling and softening of the membrane. In the earlier stages the epithelium is shed, and the secretion is scanty; but later on there is active cellular proliferation and mucous exudation. While in the larger tubes the swollen mucous membrane does not appreciably lessen the calibre, in the capillary tubes it is quite otherwise. Occlusion of the latter readily occurs, the passage of air to and from the air-cells is impeded or prevented, and hence emphysema and pulmonary collapse are common complications.

Again, since the terminal bronchi merge into the air-cells, the catarrhal process is very apt to extend into the latter, and set up catarrhal pneumonia.

SYMPTOMS.—1. *Simple bronchitis* is usually ushered in with chilliness, febrile disturbance, and general malaise. A sense of constriction about the chest, and sub-sternal soreness soon follow. The respiration is increased slightly in frequency; cough is uniformly present, is worse after sleep, and is often paroxysmal; the expectoration is at first scanty and viscid, but soon becomes more abundant, white, and frothy, and still later, yellowish or mucopurulent. At this stage the cough is looser, less painful, and the expectoration more easy.

2. *Capillary bronchitis* being generally preceded by the milder form just described, its onset is less marked than might otherwise have been expected, but rigors sometimes occur. The patient breathes with difficulty, the complexion is dusky, and the countenance betrays anxiety. The superficial veins are more or less engorged, and the *alæ nasi* movements are exaggerated. The respiration and pulse are very frequent, the former out of proportion to the latter; the cough is almost perpetual; the sputa

are at first frothy, but soon become muco-purulent, and are expelled with considerable difficulty. Sub-sternal pain is not a marked feature, but troublesome pains in the intercostal muscles, brought on by the cough, are of frequent occurrence. The temperature rises, and the general restlessness becomes extreme. The urine is scanty, high-coloured, and sometimes contains a little albumen.

In fatal cases the prostration increases; the skin becomes more livid, and is cold and clammy; anasarca supervenes; till at last fitful somnolence and muttering delirium usher in coma and death.

The duration varies according to the severity of the case from one to three weeks. Relapse is less common than recurrence. Capillary bronchitis terminates either by (1) death, (2) recovery, or (3) passage into a chronic form.

Physical Signs.—There is no alteration on percussion, but the breath-sounds are coarse and noisy, and are accompanied (or perhaps masked) by sonoro-sibilant, and mucous rhonchi, the former of which indicate irregular obstruction of the air-tubes by viscid secretion, while the latter point to the bubbling of air through more liquid secretions. These rhonchi are modified by coughing. The milder kind of bronchitis yields no physical signs of importance.

The *diagnosis* of simple bronchitis offers no difficulty. Capillary bronchitis is distinguished from *catarrhal pneumonia* by the greater fever and disturbance of breathing, the dulness on percussion, tubular breathing, and irregular distribution of the latter affection. In *acute tuberculosis* the violence and irregularity of the fever, the rapid collapse, and the extreme dyspnoea out of all proportion to the physical signs indicate the nature of the case. Care should be taken not to confound cases of idiopathic bronchitis with specific fevers—*e.g.*, typhoid—in which the catarrh is symptomatic.

As to *prognosis*, early childhood, advanced age, previous organic disease of the lungs or heart, and the occurrence of complications are especially of unfavourable import.

TREATMENT.—Rest in bed, with warm equable temperature. It is important to get the skin to act freely by hot air, vapour, or water baths, warm diluent drinks, and diaphoretic salines, combined (where there is great restlessness) with a small dose of Dover's powder at night. Such treatment will if begun promptly, often nip the development of the affection in the bud. Relief is often obtained by steam inhalations, and external applications of poultices or turpentine stupes to the chest.

As to medicines, *expectorants* are often of service, but in the febrile stage only those of a sedative kind should be used, *e.g.*, Vin. Ipecac. and Vin. Antimoniale; but later on the more stimulating expectorants are indicated. *Sedatives* are useful to allay the cough, *e.g.*, opium, henbane, conium, and hydrocyanic acid; but where the secretion is abundant they should be used with caution. *Anti-spasmodics*, *e.g.*, ether, chloroform, and tincture of lobelia may be combined with any of the foregoing. As the acute symptoms subside, tonics are of great service.

The diet should be liberal, nutritious, and supporting. Stimulants are seldom necessary. Dry cupping over the chest often gives great relief; but venæsection should only be practised where death is imminent and there is great venous engorgement.

CHRONIC BRONCHITIS.

This is a very common disease, its frequency increasing with age. It is often chronic from the outset, especially when associated with cardiac, renal, or gouty affections; but not infrequently it occurs as the sequel of the acute form. Chronic lung affections of other kinds, chronic

alcoholism, and the introduction of irritating matter into the tubes are also common causes.

MORBID ANATOMY.—The mucous membrane is dark-coloured, thickened, and its vessels are dilated. Structural changes also occur in the bronchial walls, the bronchi may be narrowed or dilated, and usually contain more or less puriform matter, which is sometimes very fœtid.

SYMPTOMS.—The following are the most important varieties :

1. "*Winter-cough.*"—The cough is violent, most severe in the mornings, the expectoration being scanty and difficult to expel ; or abundant and easy, consisting of yellowish-green matter which runs together, is only slightly frothy, and is sometimes very fœtid. There is not much pain or soreness except after violent coughing ; neither is there much dyspnœa except after exertion. The general health suffers, but there is no fever. At first, the symptoms are comparatively slight and may be confined to the winter months, disappearing in the summer. The attacks tend to become more severe, and to last longer, till the patient is never quite free. Among the aged there is great risk of an acute attack supervening upon the chronic form.

2. *Dry catarrh* is especially characterised by very scanty expectoration. The cough is especially violent and paroxysmal, the breathing is oppressed, and the dyspnœa is sometimes extreme. This form is most common in gouty subjects.

3. *Bronchorrhœa* generally occurs in old people, and is characterised by copious expectoration of a thin watery fluid, but sometimes ropy and glutinous, and occasionally fœtid. The cough and dyspnœa are marked. This variety is especially apt to be associated with bronchial dilatations (bronchiectasis).

The *Physical signs* of chronic bronchitis are in the main similar to those of the acute form.

Chronic bronchitis becomes a serious affection from its leading so frequently to emphysema, collapse of lung, and catarrhal pneumonia, and thus when it is well developed is only curable in a very restricted sense.

The *treatment* depends very much on the age and constitution of the patient. Expectorants are first indicated, followed at a later period by tonics (of which the astringent preparations of iron are perhaps the best), and cod-liver oil. In gouty bronchitis, iodide of potassium with colchicum; in bronchorrhœa, turpentine, the balsams of tolu or Peru, or ammoniacum; in winter cough, tar (in pill containing gr. 2) every four hours, or inhalation of a spray of pure or diluted Vin. Ipecac., is recommended. Inhalations of steam impregnated with oils of pine, juniper, or turpentine, are sometimes useful.

The external application of poultices, sinapisms, or stupes, and occasional hot air or vapour baths often give great relief.

BRONCHIAL DILATATION.

DILATATION of the bronchi, or bronchiectasis, though a purely secondary affection, deserves separate mention both on diagnostic and prognostic grounds. The dilatation may affect a considerable length of one or more bronchial tubes (*general dilatation*), or be limited to particular parts (*saccular dilatation*). The bronchi of the middle and lower lobes of the lung are more frequently affected than those of the upper lobe. The dilatations usually contain pus or muco-pus, more or less inspissated, and sometimes horribly foetid. The mucous lining may be unaltered, but more often it is either congested and swollen, superficially ulcerated, or atrophied. The pulmonary tissue around is, as a rule, condensed by collapse or fibroid change. Such dilatations are primarily due to structural alteration of the

walls of the bronchi, by which their resistant power is diminished, and thus they give way to the distending influences of repeated coughing, and accumulated secretion.

The *diagnosis* of bronchial dilatation rests chiefly upon the history of severe or long-continued antecedent bronchitis, the violent paroxysmal character of the cough, the abundance and not infrequent fœtor of the expectoration, the physical signs of one or more cavities (see Phthisis) in the middle or lower part of the lung, the slight amount or complete absence of febrile disturbance, and the very slow progress of the disease. Hæmoptysis is not an unusual occurrence at some period or other in the course of the case. Phthisis and pulmonary gangrene are the diseases with which bronchial dilatation is apt to be confounded. When once dilatation has occurred it is probably permanent. The *treatment* resembles that already described for chronic bronchitis.

SUB-SECTION III.

DISEASES OF THE LUNGS.

PULMONARY CONGESTION AND ŒDEMA.

BOTH on pathological and clinical grounds, congestion and œdema of the lungs should be considered together. Congestion of the lungs may be either *active*, *mechanical*, or *passive*. *Active* congestion may result from (a) the breathing of very hot or cold air, or irritating matter; (b) circulatory obstruction in another part of the same lung, or in that of the opposite side; (c) inflammation, of which it forms the first stage; (d) suction-action on the internal surfaces of the air-sacs from inspiratory obstruction. *Mechanical* congestion is a common result of valvular disease

of the heart. *Passive* congestion depends upon enfeeblement of the heart's action, and is a common complication of fevers and other conditions characterised by great debility and prostration. Under the influence of gravitation, it especially affects the most dependent parts of the lung (*hypostatic congestion*). When congestion is severe or long continued, other changes are apt to follow, *e.g.*, pneumonia, hæmorrhage, and œdema. Œdema of the lungs not only occurs as the result of congestion, but also as part and parcel of general dropsy.

MORBID ANATOMY.—*Congested lung* is denser and heavier than normal, has a dark-red colour on section, and blood-stained frothy serum flows freely from the cut surfaces on pressure. It crepitates imperfectly on pressure, but floats in water.

When *œdema* is present, the lung-tissue is swollen, does not collapse when the chest is open, and pits on pressure unless the œdema be quite recent. It is pale or dark-red according as congestion is absent or present, and large quantities of watery serum exude on section.

SYMPTOMS.—These vary according to the severity and duration of the congestion, and the amount of œdema. Cough, dyspnoea, more or less oppression at the chest, together with duskiness or lividity of the cutaneous surface, are the chief symptoms. The expectoration is scanty in the active form, more abundant in mechanical congestion, while it is profuse and watery in œdema. Hæmoptysis may also occur.

Physical examination reveals nothing of importance in simple congestion; but when œdema is present the breath sounds are weak and somewhat harsh, and are accompanied with thin bubbling râles; the percussion-note also is often diminished. When œdema of the lung occurs as a part of general dropsy, *both bases* are affected, though unequally so, if the patient lie habitually on one side.

The *prognosis* and *treatment* necessarily vary according to the condition to which the congestion is due.

HÆMORRHAGES OF THE LUNG.

UNDER this head are included (1) hæmorrhage into the tubular air-passages, (2) hæmorrhagic infarction, (3) pulmonary apoplexy. 1. *Hæmorrhage into the tubular air-passages* may arise from *congestion* caused by the inhalation of irritating vapours, paroxysmal cough, valvular disease of the heart, or suppressed menstruation (?); from catarrhal, phthisical, syphilitic, or cancerous *ulceration*; from perforative communication with an *aortic aneurism*; and lastly from disease of the lungs, notably *phthisis* and *cancer*. It should also be remembered that unusual fragility of the vessels, or the hæmorrhagic diathesis may account for some few cases, otherwise inexplicable. Excepting certain rare cases of syphilitic or cancerous ulceration, and perforative communication with an aneurism, the seat of hæmorrhage is almost invariably in the small terminal bronchi.

2. *Hæmorrhagic infarction* is due to embolic plugging of a branch of the pulmonary artery by a fragment of clot; either from the right heart or a systemic vein. The size and position of the infarction depend upon the calibre of the obstructed vessel. The nodule is wedge-shaped, the apex corresponding with the point of obstruction. It is firm, airless, dark-coloured, infiltrated with blood, but there is no destruction of lung-tissue. Its margins are defined by a zone of congestion and œdema. The infarct is either subsequently removed by absorption, or a blackish fibrous knot remains, or it undergoes caseous degeneration or a "metastatic abscess" is formed (see page 11).

3. *Pulmonary apoplexy*, or diffuse hæmorrhage from rupture of a pulmonary vessel, may occur from extreme

congestion due to heart disease, from disease of arterial walls or from external injury. The lung tissue is lacerated and an irregular potential cavity is formed, which becomes infiltrated with clotted blood.

SYMPTOMS.—*Hæmoptysis* is the characteristic symptom of pulmonary hæmorrhage. It varies from a few streaks in the sputa, to large quantities of pure blood. When the amount is small it is expelled by spitting; when larger it escapes in gulps, or with efforts scarcely distinguishable from vomiting. The blood is usually bright red, alkaline, and frothy; but when its discharge is delayed, it may be dark coloured; and again in large quantities it may be non-aerated. The attacks are prone to recur; and for some days after each, the sputa are usually more or less tinged. When the hæmorrhage depends on some disease of the lungs, or the blood is sucked back into the air-tubes, moist râles may be heard in certain parts of the chest. A single attack is rarely fatal, and the ultimate prognosis depends almost entirely on the cause of the bleeding. A careful inspection, and the dark colour of the blood will usually suffice to distinguish bleeding from the nose or mouth; while laryngoscopic examination, and the presence of laryngeal symptoms will enable us to detect hæmorrhage from this source. *Hæmoptysis* will be contrasted with hæmatemesis when describing the latter. The special points to be noted are the ejection by spitting, the bright-red colour, the alkaline reaction, the frothy appearance, and the usual coexistence of disease of the lungs, heart or mediastinum.

Assuming the ability to exclude bleeding from the nose, mouth, stomach and larynx, it is not always easy to refer hæmoptysis to its exact cause. Careful examination of the lungs, heart, and mediastinum is of the first importance, and the results thus obtained, must be considered together with the age of the patient, the history of the case,

and the general condition. Hæmoptysis is more often associated with phthisis than any other affection, and not infrequently constitutes the first obvious indication of this disease; though on inquiry, it will almost always be found to have been preceded by progressive loss of flesh. Hæmoptysis and dyspnœa suddenly occurring in connection with valvular disease of the heart, or thrombosis of a peripheral vein, point to pulmonary infarction or apoplexy. In these cases, an area of consolidation may sometimes be detected, which corresponds to the seat of hæmorrhage. The diagnosis of the rarer forms of hæmoptysis caused by cancer, aneurism, etc., depends entirely on the evidence of the existence of these conditions.

The general principles of *treatment* to be observed are—rest in bed, in the recumbent posture, in a cool room; and the administration of hæmostatics, *e.g.*, ergot (in full doses) gallic acid, acetate of lead, dilute sulphuric acid, or turpentine. In some cases the addition of an opiate is desirable to calm the nervous system and to allay the cough. Ice may be sucked, or applied (with caution) to the chest-wall. The bowels should act freely, especially in plethoric habits. Dry cupping over the chest, or hot stimulating foot-baths are often of service.

ACUTE CROUPOUS PNEUMONIA.

ACUTE croupous pneumonia is an inflammation of the lung which is characterised by a fibrinous exudation into the air-cells. With reference to its causation, exact knowledge is wanting. There are many reasons for regarding pneumonia as the local manifestation of some more general disease, which may perhaps be of a specific nature. In many cases, exposure to cold appears to act as an exciting cause, especially when the body is heated. Pneumonia

also often supervenes as a secondary affection in other diseases.

MORBID ANATOMY.—Three stages are generally described.

(1) The first *stage of engorgement* or congestion is similar to that already described under the head of active congestion of the lung. (2) In the *stage of exudation or red hepatisation* the inflamed lung is of dark-red colour, enlarged, solid, inelastic, non-crepitant, and heavy. It breaks down readily on pressure, and sinks in water. On *section* the surface is dark-red, mottled with grey, and presents a peculiar *granular* appearance which is less marked in children and old people than in adults. Microscopically, the vesicles and terminal bronchioles are filled with a fibrinous exudation, inclosing both red and white blood-cells. As yet there is little or no alteration in the alveolar walls. (3) The *stage of grey hepatisation* is mainly characterised by cell-multiplication and degeneration. The colour gradually changes from dark-red to grey or yellowish white. Its weight, density, and friability are increased, but the granular appearance on section is less marked. Microscopically, excessive multiplication of the cellular elements in the exudation and alveolar walls is now met with, and these cells rapidly tend to become granular and undergo fatty degeneration.

Arrived at this stage the process terminates in one of four ways; (a) liquefaction of the exudation, and removal by absorption or expectoration, (b) caseous degeneration and phthisis, (c) gangrene, (d) the formation of an abscess.

The *lower lobe of one lung* is generally affected, but the inflammation may involve the whole of one lung, or both. Sometimes it is confined to the *upper lobe*. The rest of the lung is congested and œdematous. An exudation of lymph is commonly found on the pleura covering the affected part.

SYMPTOMS.—In the primary form of pneumonia, the attack generally sets in abruptly with a single severe and prolonged rigor, during which the temperature rapidly rises to a high grade, followed by the usual febrile symptoms. In children the chill is often replaced by severe vomiting or convulsions. Three important local symptoms now occur. (1) *Pain* in the mammary region of the affected side, which is sharp, stabbing, and aggravated by movement, respiratory or otherwise, and also by pressure. (2) *Dyspnœa*, which is characterised by extremely frequent shallow breathing, and is not of the suffocative kind met with in bronchitis. It ranges from 30 to 60 per minute and is due partly to the fever, partly to mal-aeration of the blood, and partly to the pain. The *alæ nasi* are in active motion. (3) *Cough*, which is frequent, hacking, and restrained on account of the pain accompanying it. It is dry at first, but by the second or third day it is attended by the characteristic *expectoration of viscid, tenacious, rust-coloured material*, consisting of albumen and mucus mixed with blood and innumerable cells of various kinds. Expectoration does not occur in young children, and is often absent in secondary pneumonia, and in pneumonia of the aged.

General Symptoms.—The *fever* attains its maximum on the second or third day, usually ranging from 103° to 105°, and excepting the small daily variations, this temperature is maintained until the *crisis*. The *skin* is excessively hot, dry, and pungent. The *pulse* is frequent, from 80 to 120 per minute, usually large and full at the outset; but it afterwards becomes small and weak, partly as the result of imperfect filling of the arteries from obstruction to the pulmonary circulation, and partly through cardiac feebleness. The *cheeks* are flushed, and *herpes* is often present on the lips, which are dusky. Prostration, feebleness, headache, sleeplessness, and slight nocturnal delirium, are common *nervous symptoms*. The *tongue* is coated and dry; *thirst* is

increased; the *appetite* is lost, and the *bowels* are usually costive. The *urine* is of the febrile type; chlorides are deficient or absent, and it may contain a little albumen.

In severe cases the symptoms often assume an *adynamic* or *malignant* type, marked by grave nervous disturbance, delirium, coma, convulsions, &c., especially in those who are enfeebled by vicious excesses, previous disease, or old age.

The symptoms (as described) increase up to the 5th, 6th, or 7th day, when in favourable cases they quickly subside, the temperature rapidly falls to normal, constituting what is called a *defervescence by crisis*. The cough and dyspnoea abate, the sputa become more abundant, of a yellowish colour, and muco-purulent. When the disease ends fatally, death usually occurs at the end of the 1st, or beginning of the 2nd week, and results from cardiac failure, and respiratory embarrassment. More rarely, it occurs from collapse after the crisis, or from complications.

PHYSICAL SIGNS.—In the *state of engorgement* nothing is noted beyond *fine crepitation* over the affected part, on deep inspiration. In the *stage of red hepatisation*, the movements of the chest are impaired, there is dulness on percussion while the breathing is tubular or bronchial, and the vocal fremitus is increased over the hepatised area. Similar signs characterise the stage of *grey hepatisation*, with the addition of *redup crepitation*, which is moister, and of coarser quality than the crepitation of the first stage. The physical signs persist for a considerable, but very variable time, after the crisis.

Pleurisy, pericarditis, and bronchitis sometimes occur as complications; while—as already mentioned—abscess, gangrene, and pneumonic phthisis constitute occasional sequelæ.

With regard to *diagnosis*, it must not be forgotten that when of secondary origin, or when occurring among the

aged, pneumonia is very apt to run a *latent* course. In drunkards and young children too, the disease is sometimes masked by violent nervous symptoms.

The extreme frequency of the breathing *out of all proportion* to the pulse, and the very sudden onset are signs also of great value.

As to *prognosis*—old age, infancy, drunken habits, the affection of both lungs, and extreme nervous disturbance, are of unfavourable import. Secondary pneumonia (*cateris paribus*), is more serious than primary pneumonia.

TREATMENT.—Since little or nothing can be done either to subdue the inflammation, or to shorten the course of the disease, the chief objects of treatment are to sustain the strength of the patient, and to relieve symptoms as they arise. Rest in bed is imperative, in a well ventilated room, at an equable temperature. The diet should consist of milk, eggs, beef-essence, &c., and should be given in small quantities at short intervals. Alcohol is always necessary among the aged, also in most cases of secondary pneumonia, and in any case whenever there are evidences of progressive debility and cardiac failure. When indicated, it should be given freely. In the early stage, unless contra-indicated by undue depression, small and frequent doses of aconite and antimonial wine are of great service. Later on, the medicinal indication depends upon circumstances. In simple cases, nothing may be needed beyond some simple saline expectorant. But whenever the age, previous habits, and present condition of the patient make it probable that the disease will assume an asthenic type, tonic remedies, such as quinine, ammonia and bark, in combination with digitalis, or nux-vomica, are urgently required. Symptoms of asthenia should not be waited for, but foreseen, if possible.

Pain in the side, sleeplessness, delirium, and high fever often call for special treatment. Hot fomentations, sinapisms, stupes, or a few leeches may be employed for

the relief of pain. For sleeplessness, tepid sponging followed by a draught of bromide of potash, and henbane in camphor water is recommended. If this fails opium may be given, but chloral is most undesirable. Delirium, which is so frequent among habitual toppers, may best be met by tepid sheet-packing, ice to the head, and in bad cases by morphia injections. High fever calls for the employment of cold, in the form of baths, sheet-packing, or sponging, together with full doses of quinine.

CATARRHAL PNEUMONIA.

CATARRHAL, or lobular pneumonia, is *always secondary to bronchitis*; either by the *direct* extension of the catarrhal inflammation into the alveoli, or *indirectly* by catarrhal changes occurring in collapsed lobules. Hence its causes are those of bronchitis; and for similar reasons, it is of frequent occurrence in such diseases as measles and whooping-cough. As an *acute* affection it is more common in children; but the *chronic* form is more common in adults, and usually results from chronic bronchitis. The acute form only will now be described, the chronic form being referred to under the head of phthisis.

MORBID ANATOMY.—Catarrhal pneumonia is almost always at first limited to single lobules, scattered throughout the lung, especially in the lower lobe. Nodules of consolidation are thus formed, which are non-crepitant on pressure, friable, and vary in size according as they remain separate or merge with others. The surface on *section* is smooth, and of a greyish-red colour. Yellowish or purulent-looking non-frothy fluid can be expressed from the cut ends of the small bronchi, which are often dilated. Under the microscope, the *vesicles and terminal bronchi are observed to be stuffed with cells in various stages of fatty degeneration*. In favourable cases these products liquefy, and are then

absorbed or expelled ; but occasionally they form caseous masses, and lead to "consumption" of lung-tissue. The above description applies in the main to catarrhal pneumonia, whether it results directly from bronchitis, or from "collapse."

SYMPTOMS AND COURSE.—Since acute catarrhal pneumonia is invariably a secondary affection, it will suffice to point out those features which characterise its invasion. Its onset may be *abrupt*, as in measles ; or *gradual*, when it supervenes on collapse, as is usual in whooping-cough.

The more important signs are :—(1) a more or less sudden accession of fever, the temperature rising to 103° or 105°, together with a corresponding rise in the frequency of the pulse ; (2) increased dyspnoea ; (3) a change in the character of the cough, which becomes short, hacking, and painful ; and (4) diminished expectoration (if present). At the same time, the child is very restless, and in bad cases is apt to fall into a state of coma.

Physical examination in the more trivial forms gives no characteristic results ; but where the nodules are large or numerous, there is dulness on percussion, bronchial breathing, moist crackling, and bronchophony.

The progress is sometimes rapid, and death may ensue in a few days. More often, however, it is prolonged, and the defervescence is gradual. Occasionally it terminates in acute phthisis.

TREATMENT.—No lowering treatment is admissible. Internally, ammonia combined with ipecacuanha wine, and small doses of hydrocyanic acid or aconite are useful. Good nourishment is essential, and often alcohol is requisite. Brandy is the best form, and may be given to children in doses of ʒss-ij every 2 or 3 hours. External hot and moist applications are recommended, as in croupous pneumonia. During convalescence tonics are indicated.

INTERSTITIAL PNEUMONIA—FIBROID PHTHISIS.

THIS disease is essentially *chronic*, and is characterised by excessive *over-growth of the pulmonary connective tissue*, and is usually associated with *dilated bronchi*. When first formed, it is soft and rich in cells, but afterwards is converted into dense contracting fibrous tissue, which ultimately more or less completely replaces the proper tissue of the lung.

In the vast majority of cases it is clearly a *secondary* affection, supervening, as a rule, upon chronic catarrhal pneumonia, bronchitis, or more rarely upon croupous pneumonia. Whether it is ever really *primary* is still doubtful. The dilatation of the bronchi is usually *secondary* to the induration, and is mainly due to the shrinking of the lung, which leads to distension of the tubes, by the pressure of the air within them, the effects of which are probably enhanced by coughing and inflammation. In some of the most marked cases the change is often confined to one lung.

MORBID ANATOMY.—The *lung* is hard, dense, and contracted. Its surface on section is smooth, of a marbled grey colour, and is traversed by white fibrous bands. The vesicular tissue is destroyed. Here and there caseous masses may often be seen. The *bronchi* present fusiform or saccular dilatations of variable size, the interior surfaces of which are irregular or ulcerated, and often filled with foetid secretion (*bronchiectasis*). The *pleura* is thickened and adherent.

SYMPTOMS.—The chief *local* symptoms are :—(1) *Cough*, which is incessant, and often paroxysmal, coming on especially in the early morning; (2) *dyspnœa* which is more marked after exertion; and (3) *expectoration*, the amount and character of which vary according to the condition of

the bronchi. When the bronchi are dilated, the expectoration is abundant, puriform, and very fœtid. Slight hæmoptysis is not uncommon. There is gradual loss of flesh and strength, and sometimes night-sweating is complained of. There may be a trifling amount of irregular fever; but, in the absence of bronchitis, there is more often none at all.

Physical signs.—(1) Retraction of the affected side with deficient movement; (2) tubular or wooden dulness on percussion; (3) the breath-sounds are weak, bronchial, or cavernous; (4) moist sounds of various kinds, often of a metallic quality; (5) increased vocal fremitus; (6) bronchophonic or pectoriloquous vocal resonance; and (7) frequent displacement of the heart's apex towards the affected side. The right heart is sometimes dilated.

The *treatment* is that of phthisis, and will be considered under that head.

PHTHISIS—PULMONARY CONSUMPTION.

THE old definition of phthisis was a clinical one based upon the more or less rapid emaciation, and exceptional recovery which characterised certain diseases of the lungs, due—according to Lænnec—to the deposit in those organs of a new growth, which he called tubercle. But it was afterwards ascertained, that what had been called yellow tubercles, were to a large extent merely the products of ordinary inflammation, which had undergone caseous degeneration. This in time led to the view, that the vast majority of cases of pulmonary phthisis were the exclusive result of inflammatory (pneumonic) changes of a low type; and that grey tubercles, if present, were of secondary and incidental origin. At the same time, it was admitted that at least in some cases, the tubercular formation constituted the primary change, and that the pneumonic condition was secondary.

In the light of recent knowledge, these views require still further modification. More careful observation has shown that the presence of true tubercle is almost, if not quite, an invariable feature of pulmonary phthisis in all stages; and the bacilli, which are pathognomonic of tuberculosis, are practically always found in the sputa of phthisical patients. Admitting these facts, pulmonary phthisis must be regarded as a *localised tuberculosis*. In other words, it is a *specific* disease, which is proximately due to the introduction and development of the tubercular virus within the lungs. The specific cause, however, cannot take effect under ordinary circumstances, in the absence of either an inherited or acquired predisposition on the part of the individual exposed to its influence. The predisposing causes of phthisis are identical with those of tuberculosis in general, and the reader is therefore referred to the chapter on this subject (page 87).

Speaking generally, the changes which are met with in phthisical lungs are the results of inflammation, which is characterised by two special features:—(1) the specific nature of the circumstances under which it arises; and (2) the destruction and necrosis of lung-tissue by which it is invariably followed. The inflammatory process is sometimes acute, and sometimes chronic. In the former, the destruction is rapid, and far-reaching; while in the latter, an overgrowth of interstitial and peri-bronchial connective-tissue accompanies the destructive process, and is well-marked in direct proportion to the chronicity of the disease. These differences are not quite easy to explain, but they probably have largely to do with the amount of the virus introduced, the general constitution of the patient, and the condition of the lungs at the time of infection. Acute miliary tuberculosis of the lung, which only forms a part of more widely-spread tuberculosis, is not now under discussion, as it does not come within the category of phthisis.

ACUTE PHTHISIS.

In acute phthisis the introduction of the tubercular virus sets up an acute capillary bronchitis, which by extension into the alveoli, quickly leads to acute catarrhal pneumonia. The special feature of the process consists in the rapid implication, and suppurative destruction of the lung tissue. From the rapidity with which the tubercles degenerate and break down, together with the destruction of the tissue around, few tubercles, or none at all, may be found *post mortem*.

SYMPTOMS.—The disease is ushered in with chills, and fever of the hectic type. Cough, dyspnoea on slight exertion, profuse expectoration sometimes tinged with blood, soon follow. The pulse is frequent and feeble, the tongue is red or furred, with anorexia and frequent diarrhoea. There is great exhaustion, profuse sweating, rapid emaciation, and restlessness passing on to delirium. It is almost always fatal.

Dulness on percussion in proportion to the amount of consolidation, bronchial breathing, copious moist or metallic crackling, increased vocal resonance and fremitus constitute the chief physical signs.

TREATMENT.—Dr. M'Call Anderson reports cases which he has treated successfully; and recommends rest in bed, liberal supply of fluid, nutritious food and stimulants, frequent application of iced-cloths to the chest to subdue the fever (to be at once removed if there is any tendency to collapse), hypodermic injections of atropine to check the sweating, and pills or powders containing quinine gr. i, pulv. digitalis gr. $\frac{1}{2}$ -i, and opium gr. $\frac{1}{4}$ -i, every four hours.

CHRONIC PHTHISIS.

ANATOMICAL APPEARANCES.—The disease as a rule begins, and is hence most advanced, at the apices of the lungs ; and extends, though to an unequal extent on the two sides, from above downwards. The process is usually described as occurring in three stages, viz., *consolidation*, *softening*, and *excavation*. If, however, we bear in mind that it is often impossible to determine at what stage the case has arrived, and that different stages are met with even in the same lung, it follows that such a classification can have but little practical importance.

Ignoring for the moment any bronchitic or pneumonic mischief which may precede the phthisical process, and on which the latter is so apt to supervene, the disease begins by the formation of tubercles in the finer bronchi, in association with catarrhal inflammation. Thence the inflammation extends (1) to the alveoli ; and (2) to the peri-bronchial connective tissue and by slow degrees to the interstitial tissue generally. The alveoli become crammed with epithelioid cells ; and their walls infiltrated with small round cells. The nodules of consolidation thus formed, some undergo caseous degeneration ; which, beginning in the centre of each, extends peripherally, till the whole is converted into a structureless cheesy mass. In some cases, the caseous mass becomes encapsuled with fibrous tissue, and perhaps more or less calcified ; and the process is temporarily or permanently arrested. More often, it liquefies, and cavities are formed, which are at first small and round, but afterwards become large and irregular by coalescence with others. Sooner or later they generally open into one or more bronchi, and their contents are discharged by expectoration. Their inner surfaces, in

the first instance rough and ill-defined, now become smooth and well marked.

Accompanying these changes, as already mentioned, there is an *increased formation of the pulmonary connective tissue*, which is attended with induration, and followed by shrinking of lung-tissue. More or less bronchitis, bronchial dilatation, and pleuritic adhesion, are almost constant accompaniments. Crops of fresh tubercle are constantly appearing, which are variously distributed throughout the lung. The small *pulmonary vessels* also often exhibit inflammatory or tubercular changes in their walls, causing coagulation of their contents. Sometimes they are the seat of *aneurismal dilatations*, which may burst and lead to serious hæmorrhage.

Symptoms.—The onset is usually gradual, and marked by one or more of the following conditions, viz., progressive debility and loss of flesh, chronic dyspepsia, diarrhœa, alterations in the voice (*laryngeal phthisis*), or amenorrhœa. Sometimes profuse hæmoptysis is the first symptom which attracts attention. A precursory catarrh is of common occurrence.

In a general description we may distinguish local and general symptoms.

Local.—*Pain* in the side and about the scapular region is generally complained of, but is rarely severe. *Dyspnœa* is comparatively slight in the absence of exertion, and if marked, is generally the result of high fever or some complication. *Cough* is a constant symptom, but varies greatly both in its character and severity. Sometimes it is paroxysmal and attended with vomiting. *Expectoration* may at first be mucoid and frothy, but it quickly becomes opaque and semi-purulent, and often exhibits a peculiar *striated* appearance. When cavities have formed, the sputa are often compact and globular (nummulated). Microscopic examination reveals *tubercular bacilli*, epithelium, pus,

and (sometimes) blood-cells; a large amount of granular matter; and *fragments of pulmonary elastic tissue*. *Hæmoptysis* occurs at some time or other in the vast majority of cases. It varies from a few streaks to a large quantity of pure blood; and frequently—but not necessarily—follows a fit of coughing

General.—*Fever* is a constant feature of all cases of phthisis *in progress*. It varies much in its intensity and its type, and runs a very irregular course. As a rule, the intensity is in direct proportion to the rapidity of the consumptive process, and it conforms to the *hectic* type. Profuse *night-sweating* is a constant drain upon the system, and contributes largely to the general enfeeblement. *Emaciation* is noticeable from the first; and its rate of progress constitutes the best criterion of the general progress of the case. The skin is pale, and often dry and scaly, and there is sometimes a little œdema about the ankles. The *finger-ends* are often *bulbous*, and the *nails incurved*. *Digestive disturbance* is indicated by a red or a slightly furred tongue, nausea and vomiting, bad smelling breath, loss of appetite with a special dislike for fats, and irregular attacks of diarrhœa. The *urine* is of the febrile type.

The chief *complications* are pneumo-thorax from perforation of the pleura, tubercular affections elsewhere (especially of the intestines followed by ulceration), albuminoid diseases of various organs, fatty degeneration of the liver, fistula in ano, thrombosis of femoral veins, &c. Laryngeal is not infrequently associated with pulmonary phthisis.

The *duration and course* of phthisis vary so much as to defy description. Death occurs from asthenia, or from hæmoptysis, or from some complication.

PHYSICAL SIGNS.—1. The *thorax* may be small and ill-developed, conforming either to the *alar* or *flattened* type. As the case advances, the supra- and infra-clavicular regions tend to become depressed from fibroid shrinking of

the subjacent apices of the lungs; and the movements of these parts are diminished. As a result of *consolidation* the vocal fremitus is increased; and there is dulness on percussion over one or both apices of the lung, extending downwards to an unequal extent on the two sides. In the absence of antecedent pneumonia, the percussion note may not be materially affected just at first. The breath-sounds generally weak and jerky in the first instance, become bronchial or blowing. Dry or moist crackling râles, occurring for the most part during inspiration, indicate commencing softening. The vocal resonance is bronchophonic. The heart is sometimes slightly displaced, and its impulse diffused, owing to shrinking on the part of the lungs; while the sounds are heard with unusual distinctness under the clavicles. A systolic bruit is also often heard over the subclavian artery in the same region.

The following are the chief signs of a *cavity*:—A tubercular, or cracked-pot sound on percussion, especially when the mouth is open; cavernous or amphoric breath-sounds; large, hollow, metallic or ringing râles, or metallic tinkling; whispering pectoriloquy; while the heart sounds are generally intensified, and are apt to acquire a hollow quality by transmission through cavities.

Certain clinical varieties of chronic phthisis may be briefly noticed. 1. In so-called *catarrhal phthisis*, there is always a precursory bronchial catarrh, lasting sometimes for many years. Its onset is very insidious, and its progress slow. This form is common among the young, after measles, or whooping-cough, or after any form of chronic bronchitis attended with constitutional debility. 2. The term *fibroid phthisis* is applied to those cases in which intestinal fibroid overgrowth is a marked feature. They run a very chronic course. This form is rarely, if ever, seen except in adults, with whom it may occur as a result of long-continued inhalation of dust, &c., or in a lung imper-

fectly recovered from the effects of pleurisy. 3. In *tubercular phthisis* the onset is very insidious. For a considerable time continued fever, progressive emaciation and weakness and hacking cough may be the only symptoms; while physical signs are inconspicuous, or wanting altogether. In such cases, there is a marked tendency to secondary tubercular mischief in other organs. 4. Cases in which attacks of profuse hæmoptysis are of frequent occurrence are sometimes distinguished by the term of *hæmorrhagic phthisis*.

TREATMENT.—Only a brief outline of the main principles and indications for treatment can be given here.

Fresh pure air is all-important, phthisical patients bearing free ventilation well; while moderate exercise with careful avoidance of fatigue, light yet warm clothing, cold or tepid bathing, and abstention from close unhealthy occupations are no less necessary.

The *diet* should be liberal and nutritious, including some easily assimilable fats. *Alcohol*, in so far as it is required to aid digestion, is often beneficial.

Bitter tonics, mineral acids, quinine, iron, and especially cod-liver oil are of great service. The last must be given in small doses (3 ss-j) at first, and increased afterwards if necessary. It may be taken in milk, or orange wine, preferably after meals. Dr. Foster recommends the addition of ether (℥x or xv to the drachm of oil). Dr. Dobell gives it in the form of pancreatic emulsion. Tonics, however, and especially cod-liver oil, are of no use while the stomach and bowels are out of order. These require close attention. When the tongue is furred, and digestion feeble, with irregular action of the bowels, an alterative pill should be given occasionally, with a mineral acid and some light vegetable bitter. When again the tongue is raw, and the stomach irritable, bismuth, with an alkaline bicarbonate, and hydrocyanic acid is useful; and light fluid food.

Sweating can best be checked by subcutaneous injection of atropine (gr. $\frac{1}{120}$ – $\frac{1}{60}$). The administration of small doses of Dover's powder the last thing at night, strychnia, sulphuric acid, or tepid spongings of the surface with acidulated water may be employed for the same purpose. *Chronic discharges*, such as diarrhoea or leucorrhoea, should be stopped. For the former, bismuth with Dover's powder is a useful combination.

The treatment of hæmoptysis has been dealt with elsewhere. *Cough mixtures* containing opiates should be avoided as far as possible, for many reasons; but if employed, the addition of some preparation of belladonna is desirable, as tending to neutralise the effect of the opium. Among the best remedies for this purpose may be mentioned, the balsams of tolu or Peru, hydrocyanic acid, hydrobromic acid with spirits of chloroform (Fothergill), and inhalations of steam medicated with conium or hyoscyamus. *Counter-irritant applications* to the chest, such as iodine, sinapisms, and flying-blisters often give great relief to the pain and to the cough.

The question of change of *climate* frequently arises. Our guiding principles in the selection of a locality should be pure air, equable temperature, good drainage, pleasant surroundings, dryness rather than moisture of the air, bracing rather than relaxing climate—preferably in the neighbourhood of the sea, or at high altitudes if inland; in a word, a climate which admits of as prolonged exercise in pure open air as possible.

EMPHYSEMA.

THE term *emphysema* is applied to two different conditions, (a) to air in the connective tissue of the lung, or *interlobular emphysema*; (b) to an increase in the capacity and size of the air vesicles, or *vesicular emphysema*.

INTERLOBULAR EMPHYSEMA is a condition of little importance. Occasionally as the result of a wound from without, or of a violent *expiratory* effort, one or more air-vesicles may be ruptured, and the air escape into the neighbouring connective tissue, forming on the surface of the lung rows of little bead-like bubbles corresponding with the boundary lines of the lobules. They can be removed by pressure. Air thus extravasated may find its way into the mediastinum, or the areolar tissue of the neck; and it is only under these circumstances that interlobular emphysema can be diagnosed during life.

VESICULAR EMPHYSEMA.—The causes leading to and maintaining an increased size and capacity of the air-vesicles are important and interesting. They may be grouped as follows:—1. *Causes associated with inspiration.* (a) Any morbid changes in the ribs or their cartilages, or again in the pulmonary parenchyma, which tend to impair their elasticity, tend equally to incomplete and imperfect emptying of the lungs on expiration. Inspiratory activity remaining the same, enlargement of the chest, and distension of the air-vesicles must follow. (b) Also when air is prevented by disease from entering some part of a lung, it is clear that if the chest expands to the same extent as in health, the remainder of the lung will be *over-distended* (*vicarious emphysema*).

2. *Causes associated with expiration.* Strong or sudden expiratory efforts with complete or partial closure of the glottis, from coughing, straining, &c., must necessarily increase the pressure of the air within the pulmonary vesicles, and tend to dilate them. Such distension will be greatest where the lung is *least supported externally*, namely, *at the apices and anterior border,—e.g., emphysema accompanying bronchitis.*

3. *Causes associated with primary changes in the nutrition of the vesicular walls.* Such changes doubtless enhance the

operation of all the causes already mentioned; but there is reason for thinking that they may sometimes lead to the development of emphysema without any *previous* disturbance of the respiratory act. For instance, in old age, several vesicles may be thrown together by atrophy and perforation of the partitions between them. (*Atrophous emphysema*).

VARIETIES.—1. *Acute vesicular emphysema* is a common result of acute bronchitis, and whooping cough. It is mainly due to the violent cough met with in these diseases. As a rule it subsides with the condition from which it arose. The affected lobules are puffed up, and pale; the capillaries are stretched and their network is enlarged.

2. *Chronic local emphysema* is characterised by extreme permanent over-distension of a few vesicles, and is most commonly associated with obsolescent tubercle of the apex of the lung. It is proximately caused by coughing, and owes its permanence to the defective nutrition of the vesicular walls. Its anatomical appearances resemble those of the acute form.

3. *Hypertrophous emphysema*. Here the vesicles of the whole, or a large section of one or both lungs are over-distended, causing an increase both in the bulk of the lungs, and in the capacity of the thorax. It is regarded by some as *primarily due to altered nutrition of the vesicular walls, and proximately to inspiratory efforts*. Sir W. Jenner, however, considers it to be produced by forcible expiration.

The lungs are paler, larger, and drier than usual. They have a soft cushiony feel, and readily pit on pressure. If inflated they recoil to a less extent than usual. The vesicles are obviously enlarged, and not infrequently several are thrown into one by atrophy and perforation of the intervening septa. This variety is generally associated with chronic bronchitis.

4. *Atrophous emphysema*. The atrophy which was *secon-*

dary in hypertrophous emphysema, now constitutes the primary change. It is essentially a disease of advanced life. Both lungs suffer equally, and are smaller, lighter, and drier than normal, and they shrink up on opening the chest. The separate air-cells are not disturbed, but only enlarged by atrophy and perforation of the septa.

SYMPTOMS.—These are marked in direct proportion to the amount of lung-tissue affected. *Dyspnœa* is the chief direct symptom of emphysema, and is due partly to the destruction of the alveolar surface, partly to the difficulty of expiration, and partly to the rigid state of the chest-walls. It is *expiratory* in character, and is aggravated by exertion, by flatulent distension of the abdomen, and by concurrent bronchitis. *Cough* is usually present, but is not attended with expectoration, except in those cases where there is co-existent bronchial catarrh. The complexion is dusky, and the patient is languid and dull.

Other symptoms of *indirect* origin are met with, which are mainly due to circulatory obstruction in the lungs from destruction, lengthening, and narrowing of the alveolar capillaries. This difficulty is at first counteracted by *hypertrophy* of the right ventricle, but sooner or later, the symptoms of cardiac *dilatation* supervene, which will be described in another chapter.

The *physical signs* in a marked case of emphysema are as follows:—1. In the *hypertrophous* form, the chest is enlarged throughout, the ribs are raised, the shoulders high, the sternum thrust forward, and the dorsal spine curved outwards—the chest is "*barrel-shaped*." In the *atrophous* form the chest is small and long, and the ribs are very oblique. 2. Expansion of the chest is deficient, while elevation movements are in excess. 3. There is hyper-resonance on percussion. 4. The breath-sounds are harsh or exaggerated, and *expiration is prolonged*. 5. Râles (due to co-existing catarrh) are often present.

The *prognosis* as to complete recovery is unfavourable in chronic cases.

TREATMENT.—1. Attention to the cause of the disease and removal when possible. 2. Due regard for the proper action of the alimentary canal. 3. Medicinally, tonics and diffusible stimulants are indicated. Among the best are cod-liver oil, tincture of steel, strychnia, or quinine; combined or not with ether, tincture of lobelia, or spirits of chloroform. Morphia and other narcotics require caution in their employment. 4. Complications must be treated as they arise. 5. Change to a warm climate is often beneficial.

PULMONARY COLLAPSE.

THE term "*collapse of lung*," strictly speaking, refers only to lung-tissue which is deprived of air. Collapse is said to be *congenital*, when the lungs have been only imperfectly expanded at the time of birth (*atelectasis*); but it is more often *acquired* in after-life. The latter alone calls for description here. It may arise from *direct pressure on the lung*, as in copious pleural effusions; or more commonly as a result of *capillary bronchitis* or *whooping-cough*,—a very frequent occurrence with young children.

The mechanism of its production in the latter case, according to Gairdner, is as follows:—the bronchi contain plugs of mucus, which, partly owing to the gradual centrifugal diminution in the calibre of the air-tubes, and partly to the greater force of expiration over inspiration, admit the expulsion of air during expiration, but prevent its return during inspiration. The flexible chest-walls and the small size of the bronchi sufficiently explain the greater frequency of collapse in children.

Collapse may be limited to a single lobe, or involve the entire lung. Collapsed lung-tissue is tough and

leathery, sinks in water, does not crepitate on pressure, is of a dark slate-colour, is depressed on its outer surface below the level of surrounding parts, and when of recent origin may readily be re-inflated. Collapsed lobules are, however, especially apt to undergo inflammatory changes; and in that condition can no longer be re-inflated.

The *symptoms* which indicate the supervention of collapse in the course of bronchitis or whooping-cough are, increased dyspnœa chiefly affecting inspiration, cough, some dulness on percussion (if the affected area be sufficiently large), and weak or bronchial breathing. Slight degrees of collapse do not admit of diagnosis.

SYMPTOMS.—It is difficult or impossible to detect slight degrees of collapse. When well-marked, as is often the case with young children, the symptoms are characterised by restlessness and prostration, a low temperature, dusky skin, feeble whining voice, rapid shallow breathing, and persistent ineffective cough. The lower ribs and epigastrium may sink inwards on inspiration; and there may be dulness on percussion, with weak or bronchial breathing over the affected area.

The *treatment* is that for the condition on which the collapse depends.

GANGRENE OF THE LUNG.

GANGRENE may supervene on certain diseases of the lung, *e.g.*, acute pneumonia, bronchial dilatations, and hæmorrhagic infarct. In other cases, it occurs without antecedent lung-mischief, especially in lunatics and drunkards; or more rarely from extreme debility due to defective nourishment, and bad hygiene; or as a sequel to certain low types of specific fevers.

ANATOMICAL CHARACTERS.—It occurs in two forms, either as *circumscribed nodules* of variable size, or *diffused* through

a large part of the lung, without any line of demarcation. The gangrenous tissue becomes softened, pulpy, of a greenish colour, and horribly foetid.

SYMPTOMS.—The peculiar and extremely foetid odour of the breath, and the expectoration of dirty brownish or blackish sputa, often containing fragments of lung-tissue, are very characteristic. Hæmoptysis sometimes occurs. There is great general depression, with low nervous symptoms, and a marked tendency to death from collapse. It is almost always fatal.

PHYSICAL SIGNS.—At first the precussion-note may be tympanitic, but it is afterwards dull. The breath-sounds are weak, and attended with moist râles. Sometimes we meet with the signs of a cavity.

It should be remembered that a gangrenous odour of the sputa is sometimes noted in certain cases of chronic empyema, or chronic bronchitis.

TREATMENT.—Abundant nourishment, with stimulants (alcoholic and otherwise). Antiseptic inhalations of creosote, carbolic acid, or turpentine are recommended. Quinine with mineral acids may be given internally.

CANCER OF THE LUNG.

Primary cancer of the lung is very rare, the growth being usually secondary to cancer elsewhere, notably in the breast and testicle. When secondary it comes on late in life, and affects both lungs; but when primary it is more common between the ages of 20 and 80, and is often limited to one lung.

Cancer of the lung is almost always of the *encephaloid* variety, and when secondary, it generally occurs as multiple rounded nodules of very variable size, sharply circumscribed, and apparently compressing and displacing the

surrounding lung-tissue. In the *primary* form it is apt to develope as an *infiltration*. In exceptional cases, the growth softens, and a cavity is formed. The bronchial *glands* and those in the mediastinum and neck are often *enlarged*. The growth may also extend to the pleura, leading to *adhesions* or *hæmorrhagic effusion*.

SYMPTOMS are often altogether absent, especially in the secondary nodular form. But in other cases we meet with *pain in the chest*, sometimes associated with tenderness; *cough*, which may be either dry, or attended with the viscid expectoration, the latter being often mixed with blood and looking like black-currant jelly; and *dyspnœa*. In addition, symptoms may arise from pressure on surrounding parts, *viz.*, cyanosis, œdema of face and neck, &c. The strength gradually fails, emaciation is rapid, the cancerous cachexia is usually evident, and the patient dies from exhaustion.

PHYSICAL SIGNS are sometimes absent; at other times the chest may be bulged, and its movements impaired, together with dulness on percussion *often extending into the mediastinum*, increased vocal fremitus and resonance, and bronchial breathing. In some instances the breath-sounds, vocal fremitus and resonance, are obliterated, and the diagnosis from simple pleurisy with effusion then becomes very difficult.

The *treatment* is purely palliative and symptomatic.

SUB-SECTION IV.

DISEASES OF THE PLEURA.

PLEURISY.

PLEURISY may be *acute* or *chronic*. Its most common cause is exposure to cold; but sometimes it arises from injury, or secondarily to adjacent inflammation, or in the course of some other disease, *e.g.*, Bright's disease or scarlet fever.

MORBID ANATOMY.—The membrane is first congested, and soon loses its usual polish by shedding its endothelium. Next a layer of coagulable lymph enclosing innumerable cells is thrown out on the surface, and a variable quantity of sero-fibrinous fluid accumulates within the pleural cavity. The elastic lung reacts as the fluid effusion increases, and *no direct pressure is exerted by the fluid until the elasticity of the lung is exhausted*. In extreme effusions, however, the lung may be *pressed* backwards and inwards against the spine, becoming more or less “collapsed,” or altered by inflammation. The opposite lung is collaterally congested. Similarly the heart is often displaced, *at first* by the elastic traction of the healthy lung on the mediastinum, and *afterwards* (in some cases) by direct pressure of the fluid. The diaphragm, liver and spleen are never displaced until the elasticity of the affected lung has been exhausted.

In favourable cases the fluid is absorbed after a while, and the pleural surfaces come into contact with each other once more; the exudation of lymph disappears more or less completely, and what remains becomes organised into fibrous tissue, causing adhesions and agglutinations. Where, however, the lung is prevented from proper re-

expansion by the resistance of the exudation, and the absorption of the effusion continues, the affected side of the chest sinks in, and the mediastinum with its contents is drawn over to the same side. But there is an obvious limit to this; and when it is reached without contact of the lung and the chest-wall being re-established, a chronic effusion remains.

The term *Empyema* is applied to those cases in which the effusion is purulent, or afterwards becomes so.

SYMPTOMS.—The onset of acute pleurisy may be either insidious, or more or less sudden and marked by repeated chills. The temperature at once begins to rise, but rarely exceeds 102°, and not infrequently falls considerably short of this. Simultaneously, or shortly afterwards, pain, dyspnoea, and cough are observed. The pain is always referred to the inferior mammary region on the affected side, and is sharp, lancinating, and especially aggravated by deep inspiration, or coughing. The dyspnoea is slight as a rule, and is mainly due to the pain in the side and the fever. In fact, when these have subsided, it is remarkable how little the breathing is disturbed, even when the chest is full of fluid, so long as the patient remains quiet. Marked or persistent dyspnoea generally indicates some pneumonic complication. The cough is short, hacking, and accompanied with little or no expectoration. The decubitus varies much, but more commonly the patient lies on the affected side.

The temperature exhibits no definite course; the pulse is frequent, but its ratio to the respiration is only slightly disturbed; the tongue is somewhat furred; the appetite is impaired; the thirst is increased; and the bowels are confined.

After a variable period the attack terminates by recovery, with or without retraction of the chest-walls according to the extent to which the lung is capable of re-

expansion; by death (very rarely); or by passing into a chronic form.

Chronic pleurisy.—Here the effusion persists, and may either remain sero-fibrinous, or become purulent (*empyema*). Purulent transformation sometimes takes place very early, especially in young children, or in those whose health is impaired. When the fluid is purulent there is always more or less febrile disturbance, usually of the hectic type. The skin of the affected side may be reddened, tender, swollen, or œdematous; the finger-ends are often clubbed; and night-sweats are not infrequent. The cough is troublesome, and may be accompanied with muco-purulent expectoration, which in rare cases possesses a gangrenous odour.

Complete recovery may take place by absorption of the fluid, by spontaneous discharge into the bronchi or externally, or after the operation of paracentesis. In other cases the recovery is incomplete, owing to the persistence of changes in the lung, or the establishment of a pleural fistula. Lastly, death may occur from asthenia.

PHYSICAL SIGNS.—*Before effusion* :—(1) diminished movement of the affected side; and (2) friction-sounds. *During effusion* :—(1) enlargement of the side and widening of the intercostal spaces; (2) absent or deficient vocal fremitus; (3) absent or deficient expansion of the side; (4) dulness and increased resistance on percussion over the area of the effusion, beginning at the base and extending upwards, together with a tympanitic percussion-note under the clavicle of the same side; (5) weak or absent breath-sounds, which sometimes exhibit a bronchial quality, especially in children; (6) absence of friction-sounds previously heard; (7) weak or absent vocal resonance over the fluid, with ægophony (in some cases) best heard about the upper margin of the effusion; and (8) signs of cardiac displacement. *During absorption* the above signs gradually disappear, and the friction-sounds return for a while. Should the lung

remain unexpanded, the chest-walls retract, the ribs become very oblique, the intercostal spaces very narrow, the shoulder on the same side falls, and the angle of the scapula projects. Impaired movements, some dulness, and weakness of the breath-sounds on the affected side usually persist for a considerable time.

Primary pleurisy is far more favourable than secondary pleurisy. The chronic form is apt to end unfavourably, though not often in itself the immediate cause of death. Serious collateral congestion of the opposite lung constitutes a frequent source of danger.

The *treatment* at the onset should consist of rest in bed, hot and moist applications to the chest, with small doses of aconite, frequently repeated, given internally. Dr. Roberts strongly recommends firm strapping of the affected side from the onset, with a view of rendering it immobile. The proper action of the skin, bowels and kidney, should be promoted. To relieve the pain—subcutaneous injection of morphia, or a few leeches may be employed with advantage in obstinate cases. To induce absorption of the effusion—counter-irritation by means of flying-blisters, stupes, sinapisms, or croton oil liniment, together with the administration of iodide of potassium, or pills containing mercury, squills and digitalis in combination, have been recommended; but the action of any mercurial should be closely watched. Paracentesis thoracis, or tapping the chest, may be resorted to for the removal of the fluid; and the operation is indicated where the dyspnoea is urgent, when syncope threatens, when the fluid is purulent, or when the effusion has become chronic. The methods for its performance include simple puncture with trocar and canula, aspiration, and free incision. The wound after a first operation should, as a rule, be closed and sealed up; but when the fluid is purulent or fœtid, it is generally desirable to keep up drainage for some time afterwards. When the

trocar and canula are employed, it is prudent to maintain a spray of carbolic acid before the opening while the fluid is being discharged. In chronic cases of empyema with great retraction of the side, and obliteration of the intercostal spaces, excision of a portion of a rib has been practised with success in children.

The diet should be liberal and nutritious ; but stimulants are not usually necessary except in chronic cases where the strength is failing, when alcohol and tonic remedies are always indicated.

HYDROTHORAX—DROPSY OF THE PLEURA.

HYDROTHORAX only occurs as a part of general dropsy, and hence is generally associated either with Bright's disease, or heart disease. It for the most part presents the symptoms and signs of pleurisy with effusion ; but it differs from the latter by the absence of all fever, its occurrence on *both* sides of the chest, and the clear serous character of the fluid.

The only *symptom* to which it gives rise is dyspnoea, which is marked in proportion to the amount of effusion. The *physical signs* are those of the effusive stage of pleurisy ; but there is no friction-sound at any time. Its *treatment* is that of the affection on which it depends ; but when urgent symptoms are traceable to the effusion, paracentesis may be performed with advantage—preferably by aspiration.

HÆMOTHORAX.—HÆMORRHAGE INTO THE PLEURA.

HÆMORRHAGE into the pleural cavity in any quantity is usually the result of bursting of an aneurism, or the rupture of a vessel from injury. It is well to recollect that

hæmorrhagic serous effusion, with all the signs of ordinary pleuritic effusion, almost invariably indicates the presence of some new growth in the pleura, viz:—tubercle or cancer.

PNEUMOTHORAX—AIR IN THE PLEURA.

PRACTICALLY, air is only met with in the chest as the result of a wound of the chest-wall, or of a perforation of the lung, the latter being generally caused by the bursting of a phthisical cavity. The entry of air is at once followed by retraction of the lung on the affected side, as far as any diseased condition which may happen to be present will admit; and for similar reasons traction of the opposite lung on the mediastinum, often causes displacement of the heart. Pleurisy soon follows, with the effusion of a serous or purulent fluid.

SYMPTOMS.—The symptoms commence suddenly—often during an attack of coughing—with pain in the side, a sense of something having given way, urgent dyspnoea, and general collapse. The pulse becomes more frequent, and is weak and small; the temperature is apt to fall at first; and the patient has an anxious appearance, and is often unable to lie down.

The *physical signs*, for reasons already given, are those of both fluid and air in the pleural cavity. The chest is enlarged on the affected side, and its movements are diminished; the vocal fremitus and resonance are weak or absent; the percussion-note is tympanitic at first, but as fluid collects, this gives place to dulness at the most dependent part of the chest, the limits of which alter with change of posture; the breath-sounds are weak or absent, but when the wound is open it is often typically amphoric; metallic tinkling is often observed; and not infrequently a splashing sound may be heard on sharp succussion or shaking of the patient.

The *treatment* in the main is that of pleurisy. A subcutaneous injection of morphia is often of great service at the outset, to diminish the effects of the shock and to relieve the pain. Later on, half-drachm doses of ether given every hour are useful. Alcohol often increases the pain. Locally, nothing is better than firmly strapping the affected side.

SECTION V.

DISEASES OF THE CIRCULATORY SYSTEM.

SUB-SECTION I.

DISEASES OF THE HEART AND PERICARDIUM.

TABULAR STATEMENT OF PHYSICAL SIGNS.

I. INSPECTION.

Pulsation	{ Cardiac impulse	{ Position. Extent.
	{ Abnormal pulsation	{ Position. Extent.

II. PALPATION.

1. Pulsation	{ Cardiac impulse	{ Position. Extent. Quality.
	{ Abnormal pulsation	{ Position. Extent. Quality.
2. Valvular thrills	{ Position of maximum intensity.	
	{ Rhythm	{ Systolic. Diastolic. Pre-systolic.
3. Friction-fremitus:		
4. Fluctuation (?).		

III. PERCUSSION.

Area of	{ Cardiac region	{ Area increased.
	{ Mediastinum	{ Area diminished.

IV. AUSCULTATION.

Cardiac	{ Murmurs Sounds	{ Point of maximum intensity. Rhythm. Direction of conduction. { Intensity. Rhythm. Quality.
Pericardial.		

GENERAL SYMPTOMS.

PALPITATION may be defined as the conscious sensation of excited action of the heart, and is a common symptom, both in functional and organic disease of that organ. It varies from a mere feeling of fluttering, to agitation of the most distressing violence. It should be remembered however, that the amount of distress is no safe guide either as to the real force of the heart's action, or as to the condition of the heart itself. In all cases the symptom is the expression of morbid nervous irritability dependent upon depression and debility, either on the part of the heart's structure, or of the nervous system generally. Thus it is of frequent occurrence in cardiac dilatation, and in all cases where the nutrition of the heart's substance is below par. Under these circumstances it indicates the result of a demand of work from the heart in excess of its powers. In other cases it is due to central nervous disturbance, as hysteria, emotional excitement, or abuse of tea, alcohol or tobacco; or to reflex irritation set up by uterine or ovarian disease, worms, constipation, &c. Persistent attacks of palpitation sometimes lead to cardiac hypertrophy.

Irregularity may affect either the rhythm or the force of the heart-beat. It arises in one of two ways, either from some change in the cardiac substance attended with impairment of function, or from some disturbance of cardiac innervation. Of these conditions, the former is the more serious and the more common. It generally supervenes,

sooner or later, in the course of all forms of cardiac disease; and marks the point at which the heart's substance has begun to degenerate. The latter is not infrequently associated with the gouty habit; and there is reason to think that changes in the blood, due to metabolic disorder, may directly give rise to irregularity of rhythm in a heart, the tissue of which is perfectly sound.

The action of the heart is sometimes *intermittent*. There are two kinds of intermission. The so-called "false intermission" is characterised by a series of immature heart beats, occurring every now and then, which may be insufficient to cause a perceptible or pulse-wave; and it indicates a more advanced degree of cardiac weakness than irregularity alone. "True intermission" on the other hand consists of complete occasional suppression of one or two beats. It rarely occurs in organic disease of the heart; and appears to be a purely nervous phenomenon, dependent on some general disturbance of health; it is met with most often among the gouty.

Cyanosis implies more or less marked blueness or lividity of the skin. Two factors are necessary for its production, viz:—venous and capillary engorgement, and mal-aeration of the blood. Hence it is a common symptom in bronchitis, emphysema, cholera, and valvular diseases of the heart, while its most extreme form is usually associated with cardiac malformation. The colour is most marked about the cheeks, lips, nose, ears, and the ends of the fingers and toes. The surface and extremities are cold, and the finger-ends are often clubbed. The patient is dull and languid, and is disinclined for exertion, mental or physical. He is also liable to attacks of oppression of breathing, palpitation, and syncope.

HYPERTROPHY OF THE HEART.

By hypertrophy of the heart is meant an increase in the thickness of its walls owing to an increase of its muscular elements. Three varieties are sometimes recognized: *simple hypertrophy* when the cavities are unaltered in size, *eccentric hypertrophy* when the cavities are dilated, and *concentric hypertrophy* when the cavities are diminished in size. It almost invariably results from some obstruction to the circulation, but occasionally it is caused by frequently recurring or persistent palpitation. Thus, it is a frequent sequel to chronic valvular affections, aortic aneurisms, chronic bronchitis and emphysema; or to general thickening and narrowing of the peripheral arteries as in chronic Bright's disease.

MORBID ANATOMY.—The heart is increased in weight and bulk. Its shape may also be modified, according to circumstances. The seat and extent of the hypertrophy vary according to its causes, but the left ventricle is most frequently affected.

SYMPTOMS.—The general effect of hypertrophy upon the circulation is that *the arteries become fuller, the veins less full, and the circulation is accelerated*. Thus, hypertrophy of the right heart tends to the over-filling of the pulmonary arteries and the emptying of the systemic veins. Palpitation, dyspnoea, uneasiness or pains in the chest, inability for exertion, headache, and giddiness are common symptoms, and are due to congestion of the parts concerned. At the same time it should be understood that, whereas in the majority of cases, the hypertrophy represents compensation for obstruction, *no symptoms* are manifested so long as an equilibrium is maintained. The association of dilatation with hypertrophy of the heart—so frequently met with—will also tend to modify or neutralise the effects peculiar to the latter.

The *physical signs* from a general point of view are (1) *pre-cordial bulging* (exceptional); (2) *diffusion and displacement of the apex-beat downwards and outwards*; (3) *slow heaving impulse*; (4) *enlargement of the area of cardiac dullness*; (5) *prolongation and muffling of the first sound, with accentuation of the second sound at the base*; and (6) *a full and tense pulse*. These signs apply mainly to *hypertrophy of the left ventricle*.

DILATATION OF THE HEART.

THIS affection is characterised by dilatation of the cavities of the heart, the walls of which may be either thinner than usual, or on the other hand, may be hypertrophied. The causes of dilatation are, in the main, those of hypertrophy. Whenever obstruction is brought to bear upon a heart, the resistant power of which is impaired by defective nutrition of its walls, dilatation results. There seems reason to believe that when strain is brought to bear on a muscle in action, the tendency is towards hypertrophy; when, on the other hand, it acts upon a muscle at rest, elongation of its muscular fibres, or (in the case of a hollow muscular organ like the heart) dilatation results. Thus the strain arising from aortic obstruction acts upon the left ventricle during its *systole* only; hypertrophy, therefore, is rapid and well-marked. But in aortic regurgitation the reflux of blood causes a strain on the left ventricular cavity during *diastole*, hence dilatation occurs from the very outset. In the latter case, however, inasmuch as the increased size of the cavity gives a greater volume of blood to be propelled during the systole, dilatation usually co-exists with more or less hypertrophy.

SYMPTOMS.—The general effect on the circulation is that *the veins are over full, the arteries less full, and the circulation is*

retarded. The symptoms already mentioned as resulting from hypertrophy are here even more marked, and in addition we meet with cyanosis, dropsy, and albuminuria, all of which are traceable to mechanical congestion of the parts concerned.

The *physical signs* from a general point of view, are (1) diffusion of the apex-beat, which is undulating, of a jerking or slapping quality, and often irregular; (2) increased area of cardiac dulness, especially towards the right side; (3) short, sharp and clear heart-sounds; and (4) feeble, small, and often irregular or intermittent pulse. Where hypertrophy is combined with dilatation, as so often happens, the signs of each are correspondingly mixed.

ACUTE ENDOCARDITIS.

THIS affection rarely occurs except in association with other diseases, especially rheumatic fever and Bright's disease. It is most common among the young.

MORBID ANATOMY.—The endocardium first becomes congested and loses its natural polish. Congestion is soon followed by thickening of the membrane, and formation of granulation-tissue on its surface, rendering it rough and papillose (*vegetations*). On these vegetations fibrin is deposited from the blood; afterwards they become fibrous, and may ultimately calcify. These changes are most commonly met with on the left side of the heart, and the orifices with their valves (especially the mitral orifice and valves) are mainly affected. The most common ultimate effects are (1) thickening and puckering of the valve-segments; (2) adhesion of the valve-segments to each other; (3) thickening, shortening and agglutination of the *chordæ tendineæ*; (4) narrowing of the orifices; and (5) formation of large vegetations.

The chief *symptoms* are, palpitation, increased frequency

of the pulse, dyspnoea, and pyrexia. The symptoms, however, are always vague and indefinite, until the orifices or their valves become involved, which is generally the case.

The *physical signs* indicate cardiac excitement and valvular disease, including increased force and area of apex beat, and valvular murmurs. Disease of the mitral orifice and valve is most common, that of the aortic orifice and valves coming next in frequency. The right heart is comparatively rarely affected.

The *treatment* chiefly resolves itself into the treatment of the diseases with which the endocarditis is associated; and the adoption of certain principles which will be alluded to in the next chapter. Counter-irritation, or warm and moist applications to the precordia, together with the administration of cardiac sedatives internally have been recommended.

ULCERATIVE ENDOCARDITIS.—This term is applied to certain cases of endocarditis, which are characterised by destructive endocardial changes, and peculiar symptoms of a septic type. The margins or faces of the valves become eroded at one or more points, forming rough irregular ulcers; which may be followed by perforation or aneurism of the valve-segment, or rupture of the chordæ tendineæ. Micro-organisms are found in the ulcerating tissue. Infarcts are of frequent occurrence in various organs; and being of an infective nature, are usually followed by supuration (*metastatic abscesses*).

The symptoms are those of pyæmia, and are due to the passage of septic matter from the endocardial lesion into the blood. The course is in some cases very acute; while in others, it is comparatively chronic, closely resembling a lingering form of typhoid or remittent fever. The physical signs are those of ordinary endocarditis. The termination is almost always fatal. Little can be hoped from treatment; but large doses of quinine, with a liberal supply

of nutritious food and stimulants would appear to be most desirable.

CHRONIC VALVULAR DISEASES OF THE HEART.

VALVULAR disease may arise from (1) endocarditis; (2) atheromatous and calcareous degenerations; (3) enlargement of the orifices, due to excessive cardiac dilatation; or (4) congenital malformation. Disease of one orifice or set of valves is very apt to extend to others.

The physical results of valvular disease are—(1) *insufficiency*, which owing to a disproportion between the size of the orifice to be closed, and the valves to close it, gives rise to *regurgitation* of the blood-current; and (2) *obstruction*, which owing to constriction or partial blocking of the orifice, impedes the onward flow of blood. Each orifice is then theoretically liable to either kind of disturbance, *regurgitant* or *obstructive*.

MITRAL REGURGITATION.—This is one of the most common valvular affections, and inasmuch as it so frequently arises in connection with rheumatic fever, it is met with most frequently in early adult life. It may result from endocarditis, from simple valvulitis supervening on aortic disease, or from dilatation of the left ventricle.

Morbid Anatomy.—The chief alterations met with are thickening, puckering, and rigidity of the valve-segments; atheroma and calcification; adhesion of the valve-segments to each other; or shortening, thickening or rigidity of the chordæ tendinæ. The right ventricle is more or less hypertrophied, with or without dilatation.

Clinical History.—At each left ventricular systole, blood regurgitates into the left auricle, the pulmonary circulation thus becomes over-full and is subjected to increased pressure. This difficulty is met for a time by hypertrophy of the right ventricle. Hence during this stage there are

often no manifestations of discomfort; but at the same time it should be borne in mind, that owing to the increased tension of blood in the lungs, there is not infrequently some dyspnoea on exertion, and any slight intercurrent attack of catarrh is apt to become serious. Sooner or later the hypertrophy of the right heart gives place to dilatation, and the engorgement and increased tension of the pulmonary vessels are reflected backwards *through* the right heart to the systemic veins, which now in turn become over-loaded; the aorta is under-filled, and the circulation is retarded; hence the symptoms now point to systemic mechanical congestion. The surface of the skin is dusky or livid; the ankles become œdematous and the anasarca gradually extends upwards; cough and dyspnoea are well marked, especially on exertion; and the expectoration is profuse, watery, and sometimes contains blood. Congestion of the liver causes a painful enlargement of that organ; congestion of the stomach and intestines—digestive disturbance, chronic intestinal catarrh, and sometimes hæmorrhoids; congestion of the kidneys—scanty high-coloured urine containing albumen and sometimes renal casts; congestion of the brain—headache, languor, and restless sleep.

The *physical signs* are (1) a *murmur* of maximum intensity at the left apex, occurring with or replacing the first sound, and conducted outwards into the left axilla; (2) accentuation of the second sound at the base of the heart; (3) an occasional systolic thrill over the apex; (4) a small, feeble and often irregular and intermittent pulse, even though the heart appears to be acting violently.

MITRAL OBSTRUCTION is nearly always due to endocarditis and its effects; but my own observations would seem to show that occasionally it may be associated with mere functional dilatation of the left heart, in which case the obstruction is relative, not absolute. The present description applies exclusively to the organic variety.

Morbid Anatomy.—The orifice is constricted or narrowed, and its margins are often irregular and thickened. The valve-segments frequently adhere together, producing a funnel-shaped passage into the left ventricle, which terminates in a narrow slit-like opening (*button-hole mitral disease*). The left auricle and right ventricle are hypertrophied or dilated.

The *clinical history* is similar to that of mitral regurgitation, with which it is usually combined.

The *physical signs* are (1) a *murmur* of maximum intensity at the left apex, running up to and ending with the first sound (*pre-systolic*) and not markedly conducted in any special direction; (2) a pre-systolic thrill which is almost always present; (3) accentuation of the second sound at the base; and (4) a small, feeble, and frequently irregular pulse.

AORTIC REGURGITATION constitutes one of the most serious valvular lesions; and may be caused by chronic inflammation with degeneration of the valves, rupture of a valve segment, or more rarely by endocarditis. It occurs most frequently in advanced life.

Morbid Anatomy.—The valve-segments are puckered, thickened or adherent, and occasionally they are ruptured, perforated, or lacerated. The left heart is greatly enlarged by hypertrophy and dilatation.

Clinical History.—The general effect of aortic regurgitation is to retard the circulation. The increased strain brought to bear upon the left ventricle during its diastole causes dilatation from the first, but—for reasons already explained—hypertrophy also takes place, and to some extent tends to compensate for the effect of the lesion, by the energetic propulsion of a greater quantity of blood into the aorta; but the compensation is probably never quite complete. Thus even in the early stages we meet with cough, dyspnoea (especially on exertion), headache, verti-

go, and palpitation. Sooner or later the dilatation proceeds apace, owing to the impaired nutrition and degeneration of the cardiac walls caused by the imperfect filling of the coronary arteries. Implication of the mitral orifice follows after awhile, and a train of symptoms sets in similar to those already described with mitral regurgitation. Death generally occurs from cardiac failure, apoplexy, or embolism.

The *physical signs* are (1) more or less heaving and diffused impulse, the apex-beat being always displaced downwards and outwards; (2) increased length and breadth of the cardiac dulness; (3) a *murmur* of maximum intensity at the base, occurring with or replacing the 2nd sound, conducted downwards towards the xiphoid cartilage, and also often heard in the back; (4) an occasional diastolic thrill at the base; (5) a *sudden jerking pulse*, with unusual pulsation of the carotids. This lesion is very frequently combined with aortic obstruction. The arteries generally are apt to become tortuous, elongated, and resistant.

AORTIC OBSTRUCTION.—The etiology of this lesion is similar to that of aortic regurgitation.

Morbid Anatomy.—The valves become rigid, thickened and adherent, so that they cannot be pressed back; or the orifice as a whole may be puckered and narrowed. In no form of cardiac valvular disease is pure hypertrophy of the left ventricle better marked.

Clinical history.—In the early stages the symptoms are usually *nil*, for the compensatory hypertrophy of the left ventricle is very complete and persistent, and advantageously occurs *immediately in the rear* of the lesion for which compensation is needed. After a while the mitral orifice with its valves becomes implicated, and then the former equilibrium breaks down. Or again, owing to the frequency, with which it co-exists with aortic regurgitation, symptoms of discomfort may be present from the outset.

The symptoms therefore respectively correspond with those of mitral and aortic regurgitation, already described.

The *physical signs* are (1) a heaving diffused impulse which is displaced downwards and outwards; (2) increased length and breadth of cardiac dulness; (3) a murmur of maximum intensity at the base, occurring with or replacing the 1st sound, and conducted upwards towards the large arteries of the neck; (4) an occasional systolic thrill at the base; and (5) a small, steady, but usually regular pulse.

TRICUSPID REGURGITATION.—This occurs either as the result of dilatation of the right heart, or of valvulitis. Its morbid anatomy does not differ essentially from that met with in lesions of the left auriculo-ventricular orifice.

Clinical history.—At each ventricular systole the blood is thrown through the right auricle into the venæ cavæ and jugulars, which speedily become dilated and overloaded. A *reflex pulsation of the jugulars*, which is synchronous with each ventricular contraction, is pathognomonic of tricuspid regurgitation. It therefore follows that the symptoms which arise from mechanical systemic congestion, come on quickly and in an exaggerated form. (See *Mitral regurgitation*).

The only *physical sign* of any importance is a *systolic murmur*, which is of maximum intensity over the ensiform cartilage. It is not invariably present, and when associated with a mitral systolic murmur, as so frequently happens, their differentiation is very difficult and often impossible.

Tricuspid obstruction and pulmono-arterial valvular disease are of such extreme rarity that no special description of them is necessary.

DIAGNOSIS OF VALVULAR DISEASE.—The diagnosis of valvular disease is almost always based upon the existence or otherwise of a *murmur*. But all murmurs are not endocar-

dial. An exocardial murmur or friction-sound is distinguished by its "to and fro" rhythm, its superficial grazing or rubbing character, distinct localisation, and absence of any obvious relation to the cardiac sounds. Again all endocardial murmurs are not due to organic disease of orifices and valves. Some merely depend on functional disturbance, *e.g.*, the so-called hæmic or anæmic murmurs (page 78), and those murmurs which are brought about by dilatation. Classification of cases can only be made (1) by a very careful physical examination; (2) by a full enquiry into the previous history, with especial reference to rheumatic fever and Bright's disease, not omitting sex, age, and nature of employment; (3) by a special examination of the superficial arteries and veins for irregularity, intermittence, abnormal pulsations, and indications of atheroma; and (4) by evidence or otherwise of circulatory disturbance, *e.g.*, cyanosis, dropsy, &c.

ELEMENTS OF PROGNOSIS IN VALVULAR DISEASES.—The gravity of a lesion bears no relation either to the intensity or to the quality of a murmur. Functional is less grave than organic disturbance. The nature of the condition with which a valvular affection is associated or on which it depends, the habits, the employment, and the presence or absence of pulmonary, renal, or other complications are of great importance. The condition of the walls of the heart and of the arteries demands the closest attention. Severe attacks of palpitation and dyspnoea on the least exertion, a feeble undulating impulse, an irregular or intermittent pulse, a liability to syncopal attacks, very scanty and albuminous urine, extensive anasarca serve to indicate weakness and degeneration of the former; while inspection and manipulation of the vessels, the age, and the presence or not of an *arcus senilis* give a clue to the condition of the latter. With reference to the relative seriousness of different varieties, it may be said that aortic regurgitation is the most grave,

while mitral regurgitation, mitral obstruction and aortic obstruction follow in the order enumerated. Sudden death is not a common occurrence, but is most frequent in aortic regurgitation, and is generally due to syncope. Usually death takes place more gradually.

TREATMENT.—Mere functional cardiac disease is curable in the strictest sense of the term; but with organic disease the case is different, we cannot repair the altered valves. We have seen however that all valvular diseases make increased demands upon the cardiac powers, demands to which hypertrophy may be regarded as the natural response. Again, the grave symptoms which sooner or later supervene are one and all the direct or indirect result of cardiac muscular failure. Such considerations furnish us with a key to the proper plan of treatment. *The work which the heart has to do should be reduced to a minimum, while its powers of doing it should be developed to a maximum.*

In acute and recent cases as *complete rest* as possible of the body in general and of the heart in particular is of the very first importance. The patient should be kept quiet in bed, hot fomentations or poultices should be applied to the front of the chest, and the blood-pressure kept low by means of chloral hydrate or aconite. The bowels must be kept fairly open, and the diet should be light and unstimulating. Such measures are the best adapted to arrest the progress, and to limit the extent of the valvular inflammation.

When the lesion has become chronic and confirmed similar general measures directed to the maintenance of rest, and avoidance of exertion or excitement are required; local applications are of no use, and depressant remedies are now out of place, and the treatment should be directed to *the prevention or postponement of cardiac failure*. For this purpose no drug is more generally useful than *digitalis*.

It may be given in the form of tincture, infusion or powder, in small doses at first, to be gradually increased. It acts as a cardiac tonic, the pulse becoming slower, stronger, and more regular, under its use. The symptoms of dilatation, irregularity and intermittence of the pulse are the indications for its use. Sometimes, it is true, the drug does not agree, but no precise rules can be laid down for universal guidance, each case requiring to be treated on its own merits. Caution is necessary where the arteries are extensively degenerated. Iron, ammonia, nux vomica, and vegetable tonics are often advantageously combined with digitalis. Belladonna is also a useful drug and is specially indicated when respiratory failure threatens.

The acute attacks of palpitation and dyspnoea (cardiac asthma), which not unfrequently come on at night, are best combated by large hot poultices or fomentations to the chest, and free administration of sal volatile, liquor ammonia, or spirits of chloroform in camphor water, with the addition of a few minims of digitalis or nux vomica. Hot brandy and water is also very useful. When sedatives are indicated, bromide of potash, henbane, and camphor are the most generally useful. Opium is seldom required, and hydrate of chloral is better avoided altogether.

The food should be light, nutritious, digestible, and not too liquid. No heavy meal should be taken late in the evening. Alcohol is not needed, as a rule, in the early stages; but later on, it may be necessary for digestive purposes, for the dyspnoic attacks just alluded to, or for great restlessness at night.

For the dropsy, reliance must be placed on free watery purgation by the compound powders of jalap or scammony, on the administration of diuretics, and on diaphoresis by hot air or water baths. In some cases a puncture of the legs with a capillary trocar allows a large quantity of serous fluid to drain away, and great relief is thus afforded.

MYOCARDITIS.

THE muscular substance is occasionally the seat of acute or chronic inflammatory change. It is usually secondary to inflammation of the endo- or pericardium, but it sometimes occurs in pyæmia, or typhus fever. In acute cases, either the muscular substance generally becomes softened and degenerated, or it presents foci of suppuration here and there. Chronic inflammation, on the other hand, leads to fibroid infiltration and induration. The disease rarely, if ever, presents any distinctive symptoms by which it may be recognised during life.

FATTY DEGENERATION OF THE HEART.

FATTY degeneration of the heart is the result of chronic malnutrition of the heart's substance. It sometimes forms a part of more or less general failure of nutrition from senile decay, long-standing anæmia, or chronic disease; sometimes it is traceable to interference with coronary circulation, arterial degeneration, cardiac dilatation, endo- or pericarditis; sometimes again it constitutes a symptom of phosphorus and certain other kinds of poisoning. Chronic alcoholism, gout, and sedentary habits are common predisposing causes. It generally occurs in the latter half of life.

The *anatomical changes* are unequally distributed through the organ, and the whole thickness of the cardiac walls is not necessarily affected. The left ventricle is its most common seat. The muscular substance is paler than normal, breaks down readily on pressure, loses its fibrous appearance, and has a greasy feel. The individual fibres gradually lose their striæ, become converted into fat-granules, and finally disappear altogether. The process now described *must be carefully distinguished from infiltration and encrustation of the heart with fatty tissue.*

SYMPTOMS.—While in some cases, a diagnosis is difficult or impossible, in others it is comparatively easy. The countenance is pale and anxious, the temper becomes irritable, the extremities are chilly (especially at night), perspirations break out from slight causes, and sleep is disturbed. The breathing is oppressed and shallow, especially on exertion; and involuntary sighing is often observed. The heart's impulse is weak; and the pulse is feeble, slow (as a rule), and apt to become irregular both in force and rhythm. From time to time, the patient is subject to sudden attacks of faintness, giddiness, or dyspnœa, with or without pain at the chest, in any of which he may die outright. A large proportion of sudden deaths arise from this cause. The condition is always serious, when well-marked. It sometimes leads to rupture of the heart.

TREATMENT.—The subjects of fatty heart should lead a quiet, even, and uneventful life, sudden efforts at any time being especially dangerous. At the same time gentle exercise in the fresh air may be taken, provided that it always stops short of fatigue. The diet should be light, nutritious, and mildly stimulating; and a small quantity of light wine daily is, as a rule, desirable. Medicinally, preparations of ammonia and iron, in combination with digitalis or nux vomica or both are of most value. The bowels should never be permitted to become stubborn and confined.

ANGINA PECTORIS.

SUCH is the name given to a neurosial affection of the heart which is characterised by paroxysmal attacks of neuralgic pain in the chest, presenting every degree of severity. It is rarely met with under 45 years of age, and is most fre-

quent in men of gouty habit. "It is part of a morbid process, not a disease of the heart *per se*." (Fothergill.) The proximate pathological cause of true angina is supposed to lie in a spasmodic contraction of the peripheral arterioles, which causes marked sudden obstruction to the circulation, followed by painful distension of the heart. In many cases it is associated with organic disease of the heart, especially with that affecting the aortic orifice; in others, we find atheroma and calcification of the coronary arteries, or fatty degeneration of the heart; while in a third category the heart appears to be normal.

The *symptoms* present every degree of severity, from a sharp transient pain to the most awful paroxysms of agony. In a typical case the pain comes on suddenly in the chest, and radiates into the arms. The face and body become suddenly pale, cold, and bedewed with sweat. The countenance is expressive of the most intense anxiety, and dread of impending death. The breathing is shallow, frequent, and often distressing, but not really obstructed. The pulse is usually small and thready. At the height of an attack, syncope or general convulsions may supervene. The attack continues "from a few seconds to many hours." Sometimes there is only one attack; or it recurs at longer or shorter intervals, each becoming more severe than the last. The disease in its typical form is generally fatal sooner or later.

TREATMENT.—During the attack nothing succeeds better than the inhalation of nitre of amyl. This drug relaxes the peripheral arterioles, lowers the blood-pressure and relieves the heart. Nitro-glycerine (4 or 5 drops of a 1 % solution for a dose), and hypodermic injection of morphia are also useful for the same purpose, and act much in the same way. Hot applications to the chest, faradisation of the cardiac region, with internal administration of diffusible stimulants, belladonna, and small doses of opium have
recommended.

During the intervals the indications for treatment are similar to those of chronic valvular disease.

GRAVES' DISEASE.

GRAVES' disease, or exophthalmic goitre is a neurosis which is characterised by palpitation, prominence of the eyeballs (*exophthalmos*), and enlargement of the thyroid gland (*goitre*). It is much more common in women than in men, especially in those of a nervous temperament. As to its precise nature we know very little; but it is usual to regard it as a neurosis of the sympathetic system which causes relaxation of the arteries, and excited action of the heart.

The *symptoms* may come on suddenly, but more often the onset is gradual. The subjects of it are usually nervous, emotional, irritable persons, with irregular appetite and digestion, and more or less anæmic. The first complaint is generally of *palpitation* with extreme frequency of the pulse, which is exaggerated by the least excitement. If organic disease of the heart be present, it is only coincidental. After a while *prominence of the eyeballs* is noticed which gradually increases until at last the eyelids are no longer competent to cover the eyes completely. Under such circumstances the eyes are apt to become inflamed. The *enlargement of the thyroid* is uniform and develops very slowly. The gland is soft, elastic, and pulsatile; and a systolic thrill or murmur may be often heard over it. In some cases the exophthalmos or goitre may never take place. Although death is a rare termination, yet complete recovery is quite exceptional, and the course is excessively chronic.

TREATMENT.—The general health requires careful attention, and any condition which tends to weaken the system must be removed where possible. Medicinally,

quinine or iron, in combination with digitalis, belladonna, or ergot is recommended. In one or two cases I have seen striking benefit result from a course of iron with arsenic. Cold applications to the thyroid are spoken highly of by some.

MALFORMATIONS OF THE HEART.

A VERY brief allusion to congenital malformations will be sufficient for our present purpose. The most important of these are, persistence of the foramen ovale with or without stenosis of the orifice of the pulmonary artery; stenosis or obliteration of the aortic orifice; and a persistence of a communication between the two ventricles. In any case the effects are very similar, retardation of the blood-current, and cyanosis. It is a noteworthy fact that in some cases symptoms are altogether absent; and in others are delayed for a variable period after birth. Diagnosis of the exact condition cannot generally be made with certainty during life.

PERICARDITIS.

PERICARDITIS is an acute disease, which may be either primary or secondary in its origin. Generally, however, it occurs as a secondary affection. It arises in connection with acute rheumatism or Bright's disease; or from extension of adjoining inflammation; or secondarily to new growths such as cancer or tubercle.

The *anatomical changes* resemble, on the whole, those met with in inflammation of the pleura (see Pleurisy). The effusion is sero-fibrinous as a rule; and when bloody, is generally the result of new growths. Complete resolution is rare, and more or less extensive adhesion and agglutination usually persist.

SYMPTOMS.—Symptoms are entirely absent in some cases; while in others they are masked by symptoms belonging to the primary affection. In a typical case, however, the attack is ushered in by pain and oppression over the region of the heart, palpitation, dyspnœa, and fever. The pain varies much in intensity, and usually subsides on the occurrence of effusion. It may be accompanied with tenderness on localised pressure. The amount of fever varies in proportion to the severity of the inflammation, and is attended with the usual febrile symptoms. The face wears an anxious expression, and the decubitus is generally dorsal. The breathing is accelerated and restrained at the outset, and becomes distressing and difficult on the occurrence of effusion, sometimes amounting to orthopnœa. It is accompanied with a dry irritable cough. The pulse is frequently out of proportion to the breathing; and is liable to sudden variations from slight causes. There is usually more or less nervous disturbance, indicated by headache, sleeplessness, delirium, and sometimes convulsions; and occasionally the nervous symptoms are so prominent as altogether to mask the local affection.

The *physical signs* during the *dry stage* consist of diffused impulse with excited action of the heart. In the *stage of exudation* we meet in addition with pericardial friction-sounds; and occasionally with friction-fremitus. In the *stage of effusion* the precordia is often bulged; the apex-beat (if it can be felt) is displaced upwards, undulating, and irregular in force and rhythm. More frequently it is absent. The cardiac dulness is increased, first in an *upward* direction, then laterally. The shape of the dull area is very characteristic, being triangular, the base resting on the diaphragm. Any friction-sounds previously heard become weaker or disappear altogether. The heart-sounds are feeble, distant, and muffled, and are heard better at the base than at the apex of the heart. Adjacent organs

are displaced, viz., the lungs, liver, and diaphragm. In the *stage of absorption* the cardiac impulse disappears, the apex-beat falls, the friction returns, and the area of dullness diminishes in extent. The most important sign of *pericardial adhesion* is an undulating recession of the intercostal spaces over the heart, at each systole.

The distinctions between endocardial murmurs and pericardial friction-sounds have already been given when treating of the diagnosis of chronic valvular affections of the heart. The increased area of dullness may be distinguished from that due to cardiac enlargement by the shape of the area, the feeble or absent apex-beat—which is never displaced downwards and outwards in simple pericardial effusion—and the absence of dropsy and venous stagnation.

Pericarditis may *terminate* in recovery with or without adhesions, or in death (usually by syncopé). Permanent adhesions are apt to lead to hypertrophy and dilatation of the heart. The prognosis as a rule is not unfavourable; but when pericarditis is secondary to Bright's disease it is especially fatal.

The *treatment* in the early stages consists of rest, warm and moist applications to the chest. The pain when severe may be relieved by a hypodermic injection of morphia, or the application of a few leeches to the precordia. No medicinal remedies are specially indicated beyond those employed for the disease to which pericarditis is secondary. Plenty of nourishment is required; and sometimes alcoholic stimulants also, especially in the later stages. In exceptional cases the effusion may be drawn off by the operation of paracentesis, in order to relieve urgent symptoms. During convalescence tonics are called for.

SUB-SECTION II.

DISEASES OF THE ARTERIES AND
MEDIASTINUM.

ARTERIAL DEGENERATION.

Primary fatty degeneration of the arteries is one amongst the many indications of senile decay. It may affect any of the arteries, and occurs in the form of yellow, irregular, slightly-elevated patches on the inner surface of the vessel. The process is quite superficial, the epithelial layer alone being affected in the first instance, but later on the deeper cells are attacked. These patches may ultimately break down and leave superficial erosions.

Primary calcification of the arteries is another variety of senile change, and commonly affects the muscular fibre-cells of the middle coat. Small calcareous plates are thus formed; and in time the vessel becomes narrowed, rigid, and brittle.

Atheroma in its earliest stages consists of a chronic inflammation of the deeper layers of the intima, which become infiltrated with young cells. Flattened nodules which encroach on the lumen of the vessel are thus formed. The subsequent progress varies according to circumstances. If the process be rapid, softening of the inflammatory products takes place, and a *pseudo-abscess*, or atheromatous ulcer is formed. In more chronic forms a caseous mass remains imbedded in the walls of the artery, and sometimes calcification takes place. The arch of the aorta is a favourite seat of atheroma, but no artery is exempt from it.

Atheroma diminishes the calibre of a vessel, destroys its

elasticity, interferes with its contractility, and renders it less resistant, and more fragile. These faults respectively create a liability to thrombosis, difficult capillary circulation, interference with the regulation of local blood-supply, aneurism, and hæmorrhage. Atheroma of superficial arteries may be readily made out by manipulation. When deeper vessels are affected we can only infer the probability of its existence from other conditions.

AORTIC ANEURISM.

AN aneurism is an abrupt dilatation of a vessel, with or without rupture of its coats. It generally occurs as a result of atheroma, or primary fatty degeneration of the arterial walls, which thus become weakened, and finally give way under the centrifugal pressure of the blood within. Aneurism is rare in the young; and is much more common in men than in women, especially in those given to violent exertion.

The student is referred to larger text-books on the subject for a full description of all the varieties of aneurism. Suffice it to say here that the majority of aortic aneurisms are irregularly saccular, involving the whole or a part of the circumference of the vessel; and in the latter case communicating with the artery by an opening of variable size and shape. The arterial coats, as a rule, can only be traced a short distance into the walls of the aneurism, which are formed for the most part by modification of the structures with which it is in contact. As the tumour grows all soft parts are first compressed by it, then altered, and finally blended inseparably with its walls. Hard, resistant structures, such as bone, are gradually laid bare, eroded, and absorbed. The cavity of the aneurism almost always contains more or less fibrin deposited in layers upon its inner surface in various stages of consolidation.

The size of the tumour varies widely. Its effects mainly depend on pressure and displacements of the structures and organs around it; while as to its results it is generally fatal sooner or later. Sometimes it undergoes a spontaneous cure by coagulation of its contents, and sometimes its progress may be arrested by artificially bringing about a similar result; but such cases are quite exceptional.

SYMPTOMS.—Sometimes no symptoms occur during life, or if present are often so obscure as to render a diagnosis impossible. In such cases, sudden death from rupture of the sac may first reveal the nature of the case.

THORACIC AORTIC ANEURISM.—As the symptoms mainly depend upon pressure of the surrounding parts, they necessarily vary according to the situation of the sac. It will be convenient to consider them *en bloc*.

Pressure on the air-passages.—The trachea may be displaced laterally, or its calibre may be diminished. In the latter case there is stridor, dyspnoea, and cough, all of which are increased by excitement or exertion. The cough is paroxysmal and suffocative, and is attended with scanty viscid expectoration. Pressure on a large bronchus is apt to be attended with imperfect expansion and feeble respiration on the same side, and may ultimately induce congestion or pneumonia.

Pressure on the œsophagus is indicated by the ordinary symptoms of œsophageal stricture.

Pressure on the nerves.—Compression of the intercostal nerves or of the brachial plexus causes gnawing, burning, or shooting pains in the parts to which they are distributed. Compression of the trunk of the vagus nerve is sometimes credited with the production of dyspnoea, and inflammatory changes in the lungs. Pressure on either recurrent nerve is attended with paralysis of the laryngeal muscles, causing dysphonia or aphonia. Pressure on the sympathetic nerve gives rise to inequality of the pupils.

Pressure on the vessels.—Compression of the left subclavian or innominate artery may diminish, obliterate, or retard the pulse at one or other wrist. Pressure on the vena cava causes dilatation and engorgement of the veins above, and sometimes dropsical swelling of the neck; while pressure on the left innominate vein leads to distension of the veins on the upper half of the left chest-front.

Physical Signs.—(1) Various degrees of local bulging and expansile pulsation may be observed; the site depending on the position of the aneurism. In the ascending part of the arch, it usually occurs to the right of the sternum in the second intercostal space; in the transverse part, at the upper end of the sternum; in the descending aorta, to the left of the dorsal spine. When the aneurism is deep-seated, as in the concavity of the arch, both external bulging and pulsation may be absent. (2) Dulness, with increased resistance on percussion, is obtained over the tumour. (3) On auscultation, systolic or diastolic “murmurs” may be heard, but a single diastolic murmur is very rare. These murmurs require careful distinction from those due to valvular disease of the heart, which so often co-exists with aneurism. (4) A thrill may sometimes be felt. Cardiac hypertrophy is rare in uncomplicated cases of thoracic aneurism.

The ascending part of the aortic arch is the most common seat of thoracic aneurism, but any part of the vessel may be affected. Death is the usual termination, and may be due either to rupture followed by hæmorrhage, to asthenia, or to secondary complications.

The most common affections from which thoracic aneurism must be distinguished are—aortic valvular disease with cardiac hypertrophy and dilatation, mediastinal tumours, and abscesses or new growths in the thoracic wall.

ABDOMINAL ANEURISM may occur in connection with the

abdominal aorta, or one of its large branches. It may usually be recognised as a pulsating expansile tumour in the abdomen, of rounded shape and very variable size. Like aneurism elsewhere, it causes displacement, compression or erosion of the parts with which it comes in contact. Among the more common symptoms are, pain from compression or tension of the nerves; persistent vomiting from pressure on the stomach or bowel; œdema of the lower half of the body from pressure on the vena cava; and jaundice from pressure on the bile ducts. It may ultimately burst into the peritoneal cavity, or one of the hollow viscera.

The affections most liable to be mistaken for abdominal aneurism are—pulsating aorta, and solid tumours with pulsation communicated from the aorta.

The *treatment* of aneurisms (thoracic and abdominal) is very unsatisfactory. Rest should be strictly enjoined; and only a limited supply of food allowed. To relieve the pain, hot fomentations, lead and opium lotions, or hypodermic injections of morphia may be used. Sedatives, such as chloral, or small doses of opium, are often of value. Medicinally, iodide of potassium in full doses, acetate of lead, and digitalis (?) have been recommended. The bowels require attention. Of operative measures galvano-puncture is the most promising; but with regard to the indications for its use, and the mode of operation, reference must be made to special works on the subject.

MEDIASTINAL TUMOURS.

PRIMARY new growths in the mediastinum are not uncommon, and originate for the most part in the lymphatic glands of the posterior mediastinum, or in the connective tissue around. They consist sometimes of cancer, but

perhaps more frequently of sarcoma or lymphadenoma. Increasing in size they implicate the surrounding parts either by extension of the morbid process into their structure, or by exerting pressure upon them and thus disturbing their functions.

As a rule, a mediastinal tumour can only be diagnosed with certainty, when it has attained some considerable size. Speaking generally, the most characteristic features consist of the pressure-signs already described under the head of thoracic aneurism, together with such manifestations of general disturbance as may be peculiar to the growth in question. The diagnosis is further assisted, if we find on physical examination that the mediastinal dulness is increased in breadth, that the heart is displaced, that the glands of the neck are enlarged, or that the original disease is extending to the lungs or pleura, or forming secondary deposits elsewhere. Solid mediastinal tumours differ from aneurism in the absence of expansile pulsation and "blood-murmurs."

The *treatment* is purely palliative.

SECTION VI.
DISEASES OF THE ALIMENTARY
SYSTEM.

SUB-SECTION I.
DISEASES OF THE MOUTH AND
THROAT.

STOMATITIS.

INFLAMMATION of the mouth chiefly occurs in young children, and presents three varieties.

Catarrhal stomatitis.—In its simpler forms, it is characterised by general redness swelling and increased secretion of the mucous membrane, together with a good deal of local tenderness. In more severe cases, it is attended with the formation of vesicles which rupture and discharge their contents, leaving a rounded ulcer, with well-defined margins, and a greyish floor. There is always more or less disturbance of the general health, with feverishness, and digestive derangement. This variety is commonly associated with difficult dentition, gastro-intestinal irritation, or certain specific fevers.

Ulcerative stomatitis consists of yellowish patches or spots of diphtheritic inflammation on the mucous membrane of the gums, lips, cheek, or tongue, followed by more or less extensive unhealthy-looking ulcers, with raised and congested margins which bleed readily when touched. If properly treated they generally heal quickly. It is common in unhealthy cachectic children who are badly fed and tended; and as a result of mercurialism it may occur

at any age. There is always considerable soreness, especially on chewing food; the breath is fetid and the neighbouring glands are enlarged. It is attended with general depression and debility. Ulcerative stomatitis is undoubtedly of a specific nature, and is sometimes epidemic.

Gangrenous stomatitis or *noma* is a rare affection which is almost confined to children of weak and delicate habit. The first indication of mischief is fetor of the breath, attended with the formation of a hard swelling in one cheek. The skin outside is red and shining, and on the mucous membrane within is an unhealthy sloughing ulcer. The inflammation includes the whole thickness of the cheek, then involves the gums and loosens the teeth, and if not checked the bones are laid bare, the soft parts become gangrenous, and extensive destruction follows. If properly treated healing with cicatrisation usually takes place, but sometimes it is directly or indirectly fatal. Strangely enough there is but little fever, and the constitutional disturbance is trivial in comparison with the local mischief.

TREATMENT.—In all cases, the general state of health, the mode of life, and the hygienic surroundings require careful consideration. The food should be simple, light, and nutritious. The bowels should be carefully regulated. Medicinally, antacids, or rhubarb, with soda or magnesia, are often of value, but the drug which is useful above all others is chlorate of potash, to which a little tincture of steel may be added with advantage. The local application of chlorate of potash or borax lotion is beneficial, and obstinate ulcers may be touched with nitrate of silver. In *noma* the ulcer should be freely touched with strong nitric acid, followed by the use of antiseptic washes for the mouth, and external application of hot fomentations or poultices.

THRUSH.

THRUSH is a term applied to an inflammatory condition of the buccal mucous membrane in association with the growth of a fungus known as *oidium albicans*. It is a common disorder of children in connection with digestive derangements, but it is sometimes met with in adults. As a result of fungoid growth, the tongue and mucous membrane of the mouth become covered with flaky white spots and patches. The mouth is hot and sore, the saliva dribbles away, and in infants, diarrhoea with acid green stools often co-exists, causing inflammation of the skin of the nates. Though it runs a tedious course if neglected, it is not in itself a dangerous disorder, and is usually very readily cured. In adults it is often a sign of ill-omen and impending death after long exhausting disease.

The *treatment* is essentially that already recommended for other forms of stomatitis.

GLOSSITIS.

INFLAMMATION of the whole thickness of the tongue is not a common affection, and is generally due to injury, stings, or mercurial poisoning. Sometimes, however, it is idiopathic.

The tongue becomes swollen, stiff, and incapable of executing its normal movements. It fills the mouth, and often projects considerably beyond the teeth in front. There is a good deal of pain; and mastication, articulation, and swallowing become difficult or impossible. Sometimes suppuration occurs. It generally subsides spontaneously in the course of about a week; but now and then it proves fatal by extension of the inflammation and cedema to the throat, causing suffocation.

As to *treatment*, ice may be sucked, and the mouth should be frequently washed out with chlorate of potash lotion; the food should be liquid and nutritious, and if it cannot be swallowed, should be administered *per rectum*. In some cases, longitudinal free incisions of the dorsum of the tongue are required; and if suffocation threaten, tracheotomy may be necessary. If an abscess form, of course it should be opened.

PAROTITIS.

PAROTITIS or inflammation of the parotid gland occurs in two forms—(1) primary parotitis, and (2) symptomatic parotitis.

PRIMARY PAROTITIS or "MUMPS" is a specific disease, and almost always occurs in an *epilemic* form. It is most common in the young. Although the change in the glands partakes of the nature of inflammation, there is no tendency to suppuration. Some amount of febrile disturbance precedes or occurs simultaneously with the glandular affection. The neighbourhood of the parotid swells and becomes painful, hot, and tender, and renders all movements of the jaw difficult and painful. Towards the end of a week the inflammation subsides, but in the meantime the opposite gland is apt to become affected in like manner. Not infrequently the inflammation leaves the parotid and flies to the testicles in males, or to the ovaries or mammary gland in females. This peculiar transference of symptoms is termed "*metastasis*."

The *treatment* is exceedingly simple. Rest indoors for a day or two, a little mild saline aperient, together with the application of hot poultices or fomentations to the affected part include all that is generally required.

SYMPTOMATIC PAROTITIS or PAROTID BUBO differs from the

preceding form, in the fact that it is not specific or epidemic, and in its proneness to suppurate. It is not an infrequent sequela of typhus, typhoid, and other specific fevers, and is usually regarded as being of very ill-omen. The suppuration often extends into the neighbouring parts and may lead to very serious complications. The inflammation comes on very insidiously, and presents the usual features of abscess. The pus may be discharged externally, or find its way into the throat, or external auditory meatus. The general symptoms are of a low adynamic type.

By way of *treatment* hot fomentations or poultices should be employed, and when pus has formed it should at once be liberated by incision. A stimulating and supporting plan of treatment is necessary from the outset.

PTYALISM—SALIVATION.

ALTHOUGH strictly speaking salivation is only a symptom, it is one of sufficient importance to require separate notice. Secretory activity is always dependent on nervous stimuli brought to the gland from some peripheral source; in a word, it is essentially a reflex process. The causes of increased secretion of saliva will therefore depend either upon undue excitability of the salivary nervous centre, or on some abnormal peripheral irritation, or on both of these conditions together. Teething, stomatitis, facial neuralgia, pregnancy, uterine or ovarian derangement, and worms, are thus common exciting causes. Mercurial salivation comes into the same category, since it is due to the irritation and inflammation of the buccal mucous membrane which is set up by the prolonged use of mercury. Infancy, hysteria, and an emotional temperament rank as predisposing causes. Cases of ptyalism sometimes occur, *e.g.*, in the course of certain acute fevers, in which the mechanism

is not clear. Increased secretion of saliva should be carefully distinguished from the constant dribbling which is so often met with in facial paralysis, general paralysis of the insane, and glosso-labial palsy, due to a difficulty in retaining the saliva in the mouth, or in swallowing it.

The *treatment* primarily consists in the removal of the cause wherever this is possible. Mouth-washes of alum, chlorate of potash, or borax, are useful; and in many cases great relief is experienced by the internal or hypodermic employment of belladonna, atropine, or even morphia.

TONSILLITIS.

INFLAMMATION of the tonsils is a common occurrence in the course of ordinary or mercurial stomatitis, measles, scarlet fever, diphtheria, and syphilis, but the present description applies exclusively to tonsillitis as a more or less independent affection. It is most common in the young, is peculiarly apt to recur, and in some instances, it is distinctly epidemic in character. Exposure to cold or damp is by far the most frequent exciting cause.

Two forms of tonsillitis must be distinguished. 1. *Catarrhal tonsillitis* consists of a superficial catarrh of the tonsil, soft palate, uvula, and upper part of the pharynx, and constitutes the common "sore" or "relaxed throat." In such cases there is a slight febrile disturbance accompanied with irritation, soreness, or pain in the throat, and discomfort on swallowing. The secretion is scanty at first but afterwards more abundant. The voice is nasal and articulation is often difficult. The above symptoms usually subside altogether in the course of a few days.

2. In *parenchymatous tonsillitis* or *quinsy* the tonsil as a whole is involved and is a far more serious affection than

the foregoing. The inflammation may affect one or both tonsils, but when both are involved, the affection generally begins in the second as that of the first is subsiding. The tonsil becomes greatly enlarged and congested. Its follicles become filled with yellowish-coloured plugs consisting of accumulated and altered epithelium. The soft palate and fauces are red, swollen, and more or less displaced by the enlarged tonsil, to which the elongated uvula often clings. The tissue of the tonsil is very apt to undergo suppuration. The disorder is ushered in with chilliness or an actual rigor quickly followed by high fever (102° — 105°), and the usual signs of febrile disturbance. Simultaneously, or soon afterwards, attention is attracted to the throat, which becomes very sore and painful, especially on attempting to swallow or on separating the jaws. When fluids are taken they are apt to regurgitate through the nose. On examination of the throat at this stage the appearances are such as have already been described. The salivary secretion is much increased and often dribbles from the mouth, the voice is nasal and characteristic, the hearing is impaired, and the glands at the angle of the jaw are always more or less tender and swollen. The tongue is furred, the appetite is lost, and the bowels are confined. The swelling of the throat often causes great difficulty in breathing, especially when both tonsils are simultaneously affected.

It is a noteworthy fact that the urine often contains albumen, and sometimes in large quantity; but this condition disappears almost invariably with the other symptoms. In a few days the malady attains its height and then subsides either with or without suppuration. The prognosis is almost always favourable.

The *treatment* of both forms may be considered together. Among the more important general measures are, rest in a warm room, sucking ice, hot fomentations to the throat,

steam inhalations, and good nutritious food. Owing to the difficulty in swallowing, the nourishment taken is often inadequate. It should be given in the fluid form, in small quantities at a time, and frequently repeated. Alcoholic stimulants are usually indicated in moderation, even from the first. Medicinally, much may be done. The bowels should at the onset be freely opened by a saline aperient, or a calomel and jalap powder. In the early stages drop or half-drop doses of tincture of aconite with or without the same quantity of tincture of belladonna given every hour, or oftener, are of great service, and will sometimes cut short an impending attack when taken early enough. Chlorate of potash with a few drops of the tincture of steel is also a useful formula. Dr. Ringer speaks very highly of hyd. c. cret. (gr. $\frac{1}{2}$ every hour) when suppuration has occurred, or when suffocation seems imminent from the swelling of the throat. To ensure rest at night, a moderate dose of Dover's powder, or chloral is sometimes required. During convalescence steel, quinine, and the like, together with an occasional local application of glycerine and tannin are of service. Opening an abscess of the tonsil may be resorted to in severe cases, but it is an operation which requires careful performance.

Chronic enlargement of the tonsils not infrequently succeeds acute tonsillitis, and occasions much annoyance by the obstruction and irritation of the throat to which the condition gives rise. If change of air, tonics, and local astringent applications fail to reduce the size of the tonsils, they should unhesitatingly be removed by the knife.

RETRO-PHARYNGEAL ABSCESS.

THIS affection as its name implies consists of suppuration behind the pharynx, between it and the vertebral column, and is generally connected with caries of the spine. A

soft fluctuating tumour is thus formed at the back of the throat, which by its size may render swallowing and breathing difficult. It generally "breaks" into the throat. Its treatment is essentially surgical.

SUB-SECTION II.

DISEASES OF THE ŒSOPHAGUS.

THE Œsophagus may be *acutely* inflamed by the passage through it of hot, irritating, or corrosive matters; and also in connection with inflammation of adjacent parts (croup, diphtheria, &c.). Febrile disturbance, with pain along the Œsophagus which is increased on swallowing, form the most prominent symptoms.

The *chronic* affections of the Œsophagus claim our consideration at greater length, and may be classified as follows:—

1. Functional disorders—(a) spasm, and (b) paralysis.
2. Organic diseases—(a) ulceration, and (b) new growths.

Two important secondary conditions may be added to the above, viz. :—stricture, and dilatation of the Œsophagus.

Spasm of the Œsophagus is most often met with in hysterical women who are the subjects of uterine or ovarian derangement; and it is usually of reflex origin.

Paralysis of the Œsophagus is a common occurrence just before death, but it is also met with as a symptom of "bulbar paralysis."

Ulceration of the Œsophagus. Simple ulcers may arise from mechanical violence, or the action of corrosive fluids. A perforating ulcer, similar to that met with in the stomach, is sometimes observed.

New growths of the Œsophagus. Of these cancer is by far

the most common. It is usually primary, and of the scirrho-encephaloid variety. Epithelioma is rare. Syphilitic deposits followed by ulceration, and fibroid tumours are exceptionally met with.

STRICTURE OF THE OESOPHAGUS.—The causes of oesophageal stricture may be thus classified :

STRICTURE OF THE GULLET MAY DE- PEND ON	}	1. Simple nervous spasm.	
		2. Changes in walls.	{ Thickening of walls from catarrh. Cicatrisation of ulcers.
		3. New growths.	{ Cancer. Fibroid polypi.
		4. External pressure.	{ Aneurisms. Bronchocele. Enlarged glands. New growth.

The upper third of the oesophagus is the most frequent seat of stricture. Above the obstruction the tube is dilated and its walls are thickened; while below it is collapsed, and its walls are often thinned.

Excluding cases of simple spasm, the *symptoms* develop *gradually*, and essentially consist of difficulty in swallowing — with or without pain. The dysphagia is at first slight, and is only felt on attempting to swallow large solid morsels; but as the obstruction becomes more complete, both liquids and solids pass with difficulty. Before long, regurgitation of the food takes place; either as soon as it is swallowed, or after an interval, the length of which is in direct proportion to the low position of the stricture, and the amount of dilatation above it. A good deal of mucus is also regurgitated with the food, together with blood or pus if there be ulceration. Pain or discomfort when present is generally referred to a point behind the manubrium sterni. Unable to take adequate nourishment, the patient becomes weak and emaciated (though probably retaining a good appetite),

until finally he dies of starvation. The course and progress of any given case largely depends on the nature of the condition leading to stricture.

Dilatation of the gullet sometimes occurs independently of stricture, and it should be noted that in such cases as well as in those of paralysis of the tube, the chief symptom is difficulty of swallowing owing to the defective propulsion of its contents.

General diagnosis.—The use of the *bougie* will serve to distinguish organic stricture from simple spasm, paralysis, and dilatation. Moreover, simple spasmodic stricture comes on *suddenly* and runs an irregular intermittent course. The history of the patient, his age, temperament, and the progress of his case should be carefully enquired into. Advanced age, pain, cachectic appearance, and a rapid course point to cancerous stricture; while regurgitation of blood or pus usually point to ulceration of some kind (malignant or otherwise). The neck and thorax should also be carefully explored for bronchocele, aneurism, mediastinal and other tumours.

TREATMENT.—Functional obstruction may often be overcome by the passage of a single *bougie*; but treatment should also be directed to the nervous condition on which it depends. In organic stricture the treatment is very unsatisfactory. Bougies should never be used except for diagnostic purposes (and then only with great caution), where there is any reason to suspect ulceration; but in simple fibroid stricture its systematic use is sometimes beneficial. When the strength fails from want of proper nourishment, nutrient enemata should be given. In some cases gastrotomy has been performed, but without much success.

SUB-SECTION III.

DISEASES OF THE STOMACH.

SYMPTOMATOLOGY.

It will in the first place be well to enumerate some of the more important *disturbances of function* arising from gastric disorder, with brief comments on their nature. Of these, *pain, flatulence, water-brash* or *pyrosis, heartburn, vomiting,* and *hæmatemesis* are referable to the stomach itself.

1. *Pain* is seldom altogether absent. Its seat is at the epigastrium, often radiating towards the spine, shoulders, or angles of scapulæ. It varies from mere uneasiness or a sense of oppression to an intense degree of severity—with or without *tenderness*. It may arise (*a*) from direct irritation of the stomach by flatulent distension, the products of fermentation, undigested food, &c.; (*b*) from organic disease of its walls; (*c*) from excess or alteration in the quality of its secretions; or (*d*) as a neuralgic affection (see *Gastralgia*). It is important to note that, as a rule, pain from functional disturbance is temporarily relieved by food, does not recur until some time after food, and is relieved by pressure; while pain from organic disease comes on immediately after food, is not relieved until the latter is ejected, and is aggravated by pressure.

2. *Flatulence*, or gaseous distension of the stomach and bowels, is a result of fermentation processes, in the course of which gases are evolved, consisting mainly of carbonic acid, occasionally mixed with sulphuretted and carburetted hydrogen. Perfectly healthy digestion is probably inconsistent with fermentation of this kind, but alterations in the quality of the gastric juice, excessive secretion of mucus, feeble movements of the stomach and bowels,

pyloric or intestinal obstruction, by impeding digestion and delaying the food, favour fermentative and putrefactive change, and lead to the formation of "wind."

8. *Water-brash* or *pyrosis* consists in the ejection—by simple regurgitation without retching, or by vomiting—of a clear, watery, alkaline, or neutral fluid, which consists of altered gastric secretions mixed with saliva, and varies in amount from a mouthful to half a pint. It commonly occurs when the stomach contains no food, especially on first rising in the morning. It appears to be dependent upon long-standing irritation of the stomach.

4. *Heartburn* is the term applied to a disagreeable and peculiar burning sensation along the entire gullet, associated with the regurgitation of an acrid fluid from the stomach, which in all probability consists of butyric acid, a product of abnormal digestion.

5. *Vomiting* may be conveniently classified according to its causes. (1). *Stomachic* vomiting—which depends on reflex irritation and is due to functional or organic disease of the stomach. (2). *Nervous* vomiting—which may be divided into two minor groups:—(a) *Reflex* nervous vomiting from peripheral irritation occurring elsewhere than at the stomach, as in hepatic and renal colic, strangulated hernia, ovarian and uterine disorders. Vomiting also from meningeal irritation, giddiness, and certain cerebral tumours is also, from a physiological point of view, truly reflex. (b) *Central* nervous vomiting is exclusively due to *direct* irritation of the vomiting-centre (presumed to exist in the medulla) from certain brain diseases, toxic agents (as tartar-emetic), or altered conditions of blood (as in uræmia), onset of acute fevers, &c.

Stomachic vomiting is usually preceded by nausea, attended with a furred tongue and other indications of gastric disorder, and usually gives relief to any nausea, vertigo, or headache which may precede it. In *nervous*

vomiting, nausea is usually absent, the tongue is clean, and symptoms of brain disease, if present, are not relieved by it.

Vomited matters vary much in quantity, and may consist of food either unaltered, or partially digested; or it may be frothy and present evidences of fermentation; or may contain bile, mucus, blood, or pus. Its reaction is generally acid. Fæcal vomiting only occurs as the result of intestinal obstruction, or of some direct communication between the stomach and colon. Examined *microscopically*, peculiar little square or oblong vegetable organisms like woolpacks, called *sarcinæ*, may be found, especially in connection with pyloric obstruction.

6. *Hæmatemesis*, or blood-vomiting, is characteristic of bleeding into the stomach, only excepting those cases in which blood from the nose, mouth, or air-passages, has been previously swallowed. This may arise from (a) external injury; (b) acute congestion due to acute inflammation, or suppressed menstruation; (c) mechanical congestion from *cirrhosis of the liver*, pressure on the portal vein, or long-standing disease of the heart or lungs; (d) erosion of vessels, from *ulcer* or *cancer*; (e) disordered state of the blood, as in scurvy, or yellow fever; and (f) in rare cases from the bursting of aneurism into the stomach.

SYMPTOMS.—Small hæmorrhages which are not followed by vomiting may pass unnoticed. In other cases, small quantities of blood in the vomit may be the sole indication that hæmorrhage has occurred. When the bleeding is more profuse, there is at first a sense of sinking at the epigastrium, sudden pallor, a small pulse, and faintness, which is followed by nausea, till the blood, partly clotted and dark coloured, is thrown up either by simple regurgitation, or violent vomiting. The next stool contains blackened blood, and for some days after, the motions may be

black and "tarry." When the hæmorrhage is scanty, the vomit is darker and more granular than when profuse, closely resembling "coffee-grounds." Though serious prostration may persist for a considerable period, a single attack is seldom fatal.

Hæmatemesis may be distinguished from hæmoptysis by (a) its blackish colour and acid reaction; (b) the frequent mixture with food; (c) the nausea which usually precedes it; (d) its expulsion by vomiting; (e) the evidence of blood in the subsequent stools; and (f) by symptoms indicating gastric disorder.

We may now briefly consider those *disturbances of function* which are *secondary* to the disorder of the stomach.

1. *Digestive system.*—The *tongue* may be variously affected; thus it may be red and irritable looking, or covered with white or yellow fur; or broad, flabby, and pale; or fissured; or patchy. The *appetite* is impaired or lost (*anorexia*). *Thirst* is common. The *bowels* act irregularly, and the appearance of the *stools* is altered.

2. *Nervous system.*—Weakness, weariness, troubled sleep, headache, depression, irritability, loss of memory, dimness of sight, vertigo, and hypochondriasis.

3. *Respiratory system.*—Asthmatic symptoms, and dry cough.

4. *Circulatory system.*—Palpitation, and intermittent action of the heart.

5. *Urinary system.*—The urine may be altered in quantity and quality. Sometimes it is very acid, and deposits urates, uric acid, oxalate of lime, &c.; in other cases it is alkaline after meals, and deposits amorphous phosphates.

6. The *skin* may be harsh, or greasy, or hot and dry; and is liable to eruptions—especially in children.

7. The *general nutrition* is impaired, as shown by emaciation, and anæmia.

FUNCTIONAL DISEASES OF THE STOMACH.

DYSPEPSIA.

THIS term is applied to those forms of indigestion which are not attended with structural changes of the stomach. Dyspepsia is proximately due to one or both of two conditions—(a) *defective secretion*, and (b) *impaired movements of the stomach*.

The *causes* of each may be taken together. 1. Defective quality of the food. 2. Excessive quantity of food. 3. General weakness from any cause. 4. Disordered blood-states. 5. Causes operating through the nervous system—mental and physical exhaustion, shock, narcotic drugs, &c.

SYMPTOMS.—The leading symptoms of the two forms may be thus contrasted.*

IMPAIRED MOTION.

Uneasiness after meals.—A constant symptom; generally soon replaced by the sense of tension accompanying flatulence.

Flatulence.—This is the most characteristic symptom of impaired motion.

Gastric pain.—Infrequent, but occurs occasionally as a result of flatulence, and is peculiar in kind.

Constipation.—Almost always a marked symptom.

DEFECTIVE SECRETION.

Uneasiness after meals.—Not infrequent, but soon merged in actual pain.

Flatulence.—Comparatively infrequent. Some of the worst cases in which pain after food and other symptoms are particularly severe, are entirely free from flatus. The tendency is to forms of fermentation in which gases are not evolved.

Gastric pain.—Variously described as sharp, shooting, dull, or dragging; is the most characteristic symptom of defective secretion.

Constipation.—Not generally present; and the bowels are often relaxed.

* For this table I am indebted to a paper by Dr. Leared.

In both there is loss of appetite. The tongue is broad, pale, and flabby. The pulse is weak, soft, and compressible, and palpitation is common. There may be dyspnoea on exertion, and a dry cough. The complexion is pale. Nervous symptoms, as already enumerated, may be present; and the general nutrition suffers.

GASTRALGIA.

GASTRALGIA is a *chronic neuralgic affection* of the stomach especially frequent in hysterical females. It is also associated with general debility, mental strain or worry, shock, sedentary habits, gout and rheumatism, and abuse of stimulants and tea.

SYMPTOMS.—*Pain* at the epigastrium, often very severe, relieved at first by food, and also by firm pressure. The *appetite is depraved* or lost; there is *frequent vomiting*, especially in hysterical subjects; and the *bowels are very constipated*. Over and above these symptoms we meet with those of ordinary indigestion.

SPASM OR CRAMP OF THE STOMACH.

THIS is an acute affection due to painful spasmodic contractions of the stomach, brought on by over-distension of the organ by food or flatus, by irritating ingesta, or by taking iced drinks in excess, especially when heated, or immediately after meals.

SYMPTOMS.—The patient tosses or rolls about with *severe pain* at the pit of the stomach, which comes on *suddenly*, is of a griping or twisting character, and is markedly relieved by firm pressure, or vomiting. It is often attended with prostration, clammy sweats, a small thready pulse and palpitation. Some soreness over the stomach is apt to persist for a few days afterwards. In rare cases it may be fatal.

GENERAL TREATMENT OF FUNCTIONAL DISEASE.

Dietetic.—All indigestible food, as pork, veal, and salt meats, and rich made dishes should be avoided. Vegetables and fruit should only be taken sparingly, and pastry or sweets are especially harmful in acid forms of dyspepsia. In some cases an exclusively *milk diet* is necessary for a time, with the addition of lime- or barley-water to prevent its coagulation into lumps. *Water* should be the habitual drink. Cocoa (free from fat) is often preferable to either tea or coffee. If the latter are taken at all, they should be *weak, cool, and well diluted with milk*. Rich or effervescent wines should be avoided, but light wine or ale is often useful in atonic dyspepsia.

Hygienic.—Exercise, fresh air, avoidance of hard mental or sedentary work, cold or tepid bathing, and warm clothing.

Medicinal.—For *undue acidity* with scanty and loaded urine, alkalies are useful, and are best taken three or four hours after a meal; in acidity with anæmia and debility, mineral acids are better. Vegetable bitters (of which calumba is the mildest) and strychnia or nux vomica are good *digestive tonics*. In *slow digestion* ipecacuanha (gr. $\frac{1}{2}$ before meals) may be tried. For *vomiting*, ice to suck, effervescent with hydrocyanic acid, bismuth, morphia (subcutaneously), liq. arsenicalis ($\mathfrak{m}\frac{1}{2}$ -1 before food in irritative dyspepsia), nux vomica ($\mathfrak{m}\frac{1}{2}$ -1 every few hours, when the tongue is coated), counter-irritation at epigastrium. For *flatulence*, warm carminatives, charcoal, bismuth, nux vomica and alterative aperients. For *pain*, gr. v of the carbonate of iron with aloes, minute doses of liq. arsenicalis, morphia (subcutaneous only), or bismuth. *Pepsine* (gr. iii-x taken at meal times) is very useful in some forms of weak digestion.

GASTRIC CATARRH.

ACUTE GASTRIC CATARRH is commonly caused by indigestible food (especially in children), irritant poisons, or alcoholic excess. It also occurs in connection with gout, or as a symptom of acute fevers.

The *anatomical changes* are, active congestion (leading sometimes to small extravasations) swelling, and occasionally superficial or follicular ulceration of the mucous membrane, especially in the neighbourhood of the pylorus; increased secretion of mucus; and infiltration of the membrane with young cells.

Symptoms.—There is *pain* at the epigastrium which is often severe, shoots to the back, is increased by food and is relieved by vomiting. *Tenderness* is always present; *nausea and vomiting* are also prominent symptoms; the vomit consisting of glairy mucus stained with bile. The *tongue* is foul, while the edges and tip are not infrequently red and irritable-looking. The bowels are generally confined, and the urine is scanty and high-coloured.

The above symptoms set in with chilliness, followed by *fever* with restlessness, headache, and insomnia. In bad cases there may be great collapse, with cold, clammy skin, a rapid weak pulse, and obstinate hiccup with some dyspnoea.

The symptoms, as described, usually subside after a variable time, but sometimes the disorder passes into a chronic form. In uncomplicated cases, the prognosis is generally favourable.

Treatment.—If due to poison or irritant matter still remaining in the stomach, this must be got rid of by an *emetic*, followed by a *purgative*. The *diet should be entirely liquid*, and only given in small quantities at a time. The *thirst* should be relieved by sucking small pieces of ice.

Stimulants are rarely required except in threatening collapse; but champagne is recommended where the vomiting is persistent, and apparently due to sheer exhaustion. Medicinally, bismuth and hydrocyanic acid, or effervescents may be given to relieve the pain and allay excitement. In obstinate cases, the hypodermic injection of morphia is sometimes of valuable service. *Locally*, the application of poultices or fomentations to the abdomen, or of a few leeches to the epigastrium may give relief. The *convalescence* is slow and requires care.

CHRONIC GASTRIC CATARRH or irritative dyspepsia, may occur as a sequel of the acute form; but more commonly it arises from severe or frequently recurring irritation by improper food or alcohol, from imperfect mastication, from portal congestion, or in connection with some organic disease of the stomach.

Anatomical changes.—Increased vascularity of the lining membrane, which is covered with thick tenacious mucus. The membrane itself is firmer and thicker than usual, from an increase of its interstitial tissue. Its gland-structures are also variously altered.

Symptoms.—These so closely resemble the symptoms of simple dyspepsia that it will suffice here to direct attention to the main points of difference, viz.:—The greater amount of epigastric discomfort generally accompanied with *tenderness*; the existence of *thirst*; a large *tongue* indented by the teeth at its edges, and usually coated with a thick brownish fur; the greater frequency of acidity, heart-burn, water-brash, and vomiting; and the greater severity of the constitutional symptoms.

Treatment.—Successful treatment of these cases largely depends on the ability to detect and remove the source of irritation. As a rule, aperients are needed; those of the saline type assisted by mild mercurial alteratives suiting best. When vomiting is a prominent symptom, purgatives

of any kind generally do harm. In the early and more urgent stage alkalies, bismuth, oxide of silver, with nuxvomica or calumba are indicated; but later on, quinine, iron, and the mineral acids are to be preferred. The same general principles must be observed, which have been described under the head of functional gastric disease.

ULCER OF THE STOMACH.

THE simple or non-inflammatory ulcer of the stomach is due to the destructive action of the gastric juice upon localised areas of mucous membrane, the vitality of which has been impaired or arrested—usually as the result of submucous extravasation or of thrombosis. It is very rare in children, but afterwards becomes more frequent as age advances.

ANATOMICAL APPEARANCES.—A simple gastric ulcer is round, from one-fourth to one-half an inch in diameter, with thin, clean-cut margins, deepest in the centre like a shallow funnel, but varying in depth from mere destruction of the mucous membrane to complete perforation. It is usually single, and most commonly situated on the posterior wall near the pyloric end. Erosion of important vessels may occur, leading to serious hæmorrhage.

As to its terminations—(a) it may cicatrise with or without puckering; or (b) *perforation* may occur, with escape of the contents of the stomach into the peritoneal cavity, unless this be prevented by *adhesions* with neighbouring parts.

The gastric mucous membrane elsewhere may exhibit changes indicative of chronic catarrh.

SYMPTOMS.—Epigastric *pain* and *tenderness* are the most constant and important symptoms of gastric ulcer. The pain comes on shortly *after* food, and increases till the stomach is emptied by vomiting. Sometimes it extends to

the back. The seat of tenderness coincides with that of the pain, and is strictly *localised*. *Vomiting* is a frequent symptom. *Hæmatemesis* occurs in about one third of all cases; and though not so frequent as in cancer, is far more profuse. The bowels are generally constipated. Various dyspeptic symptoms are also met with, and in chronic cases the *general nutrition* suffers considerably.

The above symptoms vary somewhat according to the position of the ulcer, and in rare cases may be altogether latent.

The duration of gastric ulcer varies widely. The disease terminates in one of three ways:—(1) gradual recovery by cicatrisation, which is the rule; (2) sudden death from perforation, peritonitis, or from hæmorrhage; (3) gradual death from exhaustion.

DIAGNOSIS.—Careful attention to the symptoms as enumerated will usually suffice to distinguish ulcer from gastralgia. The diagnosis from cancer will be given in the description of the latter.

TREATMENT.—To attain physiological rest for the stomach is of the very first importance; hence food should only be given *in small quantities* at one time, and in a *liquid* form. In grave cases it is necessary to administer nourishment for a time exclusively by nutrient injections *per rectum*. For *pain*—morphia should be given (subcutaneously by preference). *To empty the stomach of acid products of digestion*—the saline aperient mineral waters, notably Carlsbad, Pullna, and Hunyadi Janos waters may be periodically exhibited. For *vomiting*—bismuth, prussic acid, creosote, or ice to suck. For *hæmatemesis*—ice, ergot, gallic acid, turpentine, or acetate of lead and opium, &c. *Enemata* may be needed to relieve the *constipation*.

CANCER OF THE STOMACH.

THE stomach is one of the most frequent seats of cancer. Hereditary tendency, advanced life, the male sex, and chronic irritation form the more important predisposing causes.

ANATOMICAL APPEARANCES.—Cancer commonly affects the orifices of the stomach, notably the pylorus. It extends transversely, and hence is very apt to lead to annular stricture with obstruction.

Scirrhus is the most frequent form, *encephaloid* coming next, and still more rarely *colloid*. Of these, the first two originate in the sub-mucous tissue, while colloid is said to begin in the glands. The mucous membrane is soon merged in the growth, breaks down, the cancer is laid bare, and presents an irregular, ulcerous, and highly vascular surface. It is almost always primary, and is apt to involve neighbouring organs and structures, either by direct extension, or as a secondary deposit.

The stomach is variously affected, according to the form, extent and progress of the growth. More often the pylorus is displaced downwards by its own weight, the stomach is dilated, and its walls are hypertrophied.

SYMPTOMS.—There is almost constant *pain* at the epigastrium, gnawing or lancinating in quality, and radiating to the back and shoulders. It may be aggravated by food, and relieved by vomiting, but in neither case so distinctly as in ulcer. *Tenderness* is almost invariable. Vomiting is seldom absent, especially if the orifices be obstructed. When the pylorus is affected the vomit is brownish, frothy, contains *sarcinae* and is not ejected for some considerable time after food; while with obstruction of the cardia, food is returned almost immediately, and but little altered. *Hæmatemesis* is an early symptom, and occurs in the

majority of cases. The hæmorrhage is generally scanty ; and as it oozes away, it becomes coagulated and blackened by the action of the gastric fluids, giving rise to a "coffee-ground" appearance in the vomit.

The stools under such circumstances present indications of the presence of blood (*melæna*). Various dyspeptic symptoms are also met with.

The following physical signs may be observed, viz., *epigastric fulness with increased resistance* ; a *tumour* in the pyloric region, which is usually hard, irregular, more or less fixed, and tender on pressure ; and the *signs of dilatation of the stomach* (see below).

Constitutional disturbance is indicated by early and rapid emaciation, progressive debility, a dirty sallow complexion, an anxious countenance, and pinched features constituting together what is called the cancerous cachexia.

The average *duration* is about one year, and it is always fatal. Death occurs from exhaustion, and is sometimes preceded by femoral thrombosis.

DIAGNOSIS.—The chief points which serve to distinguish *cancer* from *ulcer* of the stomach are—its non-occurrence in the young ; hereditary taint ; constancy of the pain ; the greater diffusion of the tenderness ; frequently recurring and scanty hæmatemesis ; marked constitutional symptoms beginning early ; and later on, the *presence of a tumour*, with the signs of pyloric obstruction and gastric dilatation.

TREATMENT can only be palliative, and in principle is similar to that already given for ulcer of the stomach. It is deserving of mention, that great relief, and sometimes for a long period, can often be given in the early stages, by confining the diet to artificially digested foods.

PYLORIC OBSTRUCTION.—GASTRIC DILATATION.

CANCER is the most common cause of pyloric stenosis, but it sometimes arises from sub-mucous induration and thickening, or a contracted cicatrix after ulcer. As a necessary effect of the obstruction, the stomach *dilates* and its walls hypertrophy. The only positive evidence of the condition as a whole is (1) *vomiting* some hours after food (or at intervals of some days) of a large amount of *frothy, highly acid matters, free from bile*, but containing *sarcinæ* in abundance; with (2) the physical signs of dilatation of the stomach, *viz.*:—(a) convex prominence of the epigastrium, (b) extension of the limits of the stomach as ascertained by percussion; and (c) splashing sounds readily produced by succussion.

SUB-SECTION IV.

DISEASES OF THE INTESTINES.

BEFORE proceeding to describe the diseases proper to the intestines, four important symptomatic conditions must be briefly discussed.

I. DIARRHŒA.

The *proximate* causes of diarrhœa are—unusual fluidity of the intestinal contents from excessive secretion, combined with increased peristaltic action of the intestines. These results may be brought about in the following ways:—1. *Active congestion* from irritation, inflammation, ulceration, or new growths. 2. *Mechanical congestion* owing to obstruction in the portal circulation. 3. *Collatera*

congestion from the sudden arrest of profuse discharges, or of perspiration by chill. 4. As a *symptom* of other diseases. 5. As a *specific disorder* (cholera, dysentery, and summer diarrhoea).

The *characters* of the stools vary greatly according to circumstances. They may be (a) *fæculent*, or contain no true fæcal matter; (b) *brown, green, or yellow*, due to various alterations of bile pigment; (c) *slimy*, due to admixture with mucus; (d) *serous*; (e) *bloody*; or (f) *lienteric*, containing scarcely altered food. They may be alkaline or acid; in the latter case they are very apt to irritate the anus and surrounding parts. They may be passed easily, or with straining (*tenesmus*). Diarrhoea may also be associated with various digestive disturbances, griping (*tormina*), or borborygmi. If it continues for any considerable period it is attended with debility, wasting, or prostration.

The *treatment* depends entirely on the cause. In some cases it is inadvisable to check it, as in *uræmic* diarrhoea. If due to irritating matter which still remains in the intestine, it is well to give a dose of castor oil in the first place. Under other circumstances it may be checked by opium, with or without such astringents as sulphuric acid, catechu, &c. The food should be light and unirritating.

II. CONSTIPATION.

Constipation may arise from—(1) intestinal obstruction (this will be separately considered); (2) diminished peristaltic action; or (3) deficient secretions. Independently of organic disease, constipation is a frequent result of sluggish action of the bowels, associated with weak states of health, sedentary employments, want of exercise, anæmia, or habitual neglect of the calls of nature. It leads to loss of appetite, bad complexion, imperfect digestion, and mental depression. When fæces accumulate in large quantities, an abdominal tumour may form, recognizable

by palpation. In certain cases, hard impacted fæces may set up irritation, inflammation, and even ulceration of the gut, or lead to diarrhœa.

TREATMENT.—1. Careful regulation of the diet in which it is often well to include bran bread, oatmeal and certain fruits. 2. The cultivation of the habit of regular defæcation. 3. Plenty of exercise in the open air. 4. The administration of aperients, being at the same time careful to avoid *the habit* of depending upon them. In many cases *tonics* combined with *nux vomica*, *belladonna*, or small doses of *aloes* are preferable when once the bowels have been opened by an aperient. 5. Purgative *mineral waters*, as Carlsbad, Pullna, Hunyadi Janos, &c., are often useful. They should be taken before breakfast. 6. *Enemata* of soap and water (to which castor oil, &c., may be added), are sometimes of great service.

III. MELÆNA.

Melæna, or the discharge of blood per rectum, as already pointed out, always follows hæmorrhage into the stomach. But it may also be due to intestinal hæmorrhage, arising from causes similar to those mentioned when describing hæmatemesis.

When the bleeding is slight, comes from the small intestine, and is discharged slowly, the blood becomes altered, and the fæces are uniformly blackened or "tarry." If from the same source, but copious, and quickly removed, the tarry character is not nearly so marked. When coming from the rectum or the anus it is bright and unaltered, and *not* uniformly mixed with the fæces.

By attention to these points, and to the symptoms and signs associated with them, the cause and origin may usually be determined.

The *treatment* is similar to that already given for hæma-

tmesis. Oil of turpentine is especially useful. Fissures, ulcers at the anus, or hæmorrhoids require surgical interference.

IV. COLIC.

Colic or painful spasmodic contractions of the bowels may arise from the following causes:—1. Irritation from improper or undigested food, altered secretions, foreign bodies, or retained fæces. 2. Organic disease and intestinal obstruction. 3. Reflex irritation from uterine or ovarian affections, &c. 4. Lead-poisoning. 5. Exposure to cold.

SYMPTOMS.—The most characteristic feature of colic consists of griping, twisting *pains*, which generally begin about the navel and spread thence over the belly, but *frequently change their position*. They are *relieved by pressure*. The patient is doubled up, or tosses about restlessly. The belly is generally hard, tense, and retracted, but sometimes it is distended. The pain comes on suddenly, and presents remissions or intermissions. The bowels are usually constipated. There is *no fever*. These symptoms may be associated with faintness, nausea or vomiting. The *duration* is very variable.

TREATMENT.—It is often well to begin with an enema, either simple, or combined with castor oil or turpentine. In mild cases a brisk purgative may be administered by the mouth. A very convenient form is a full dose of castor oil with laudanum. When the stomach contains irritating matter, it should be emptied by an emetic. To relieve pain and spasm, opium with diffusible stimulants, such as spirits of chloroform, or tincture of cardamoms may be given; or morphia may be subcutaneously injected. Hot fomentations or turpentine stupes applied to the abdomen are useful adjuvants. The general condition on which the colic depends may subsequently require attention.

INTESTINAL INFLAMMATION.

ENTERITIS—INTESTINAL CATARRH.

THESE terms are used so vaguely that a systematic description is a matter of no small difficulty. Its *causes* are similar to those of gastric catarrh; with the addition of impacted fæces, peritonitis, and intestinal obstruction. The morbid changes also resemble those met with in gastric catarrh. Special terms are employed to distinguish the inflammation of different parts, viz., *duodenitis*, *ileitis*, *colitis*, *typhlitis* (cæcum), and *proctitis* (rectum). When the inflammation is more intense, a superficial membranous exudation may form on the inner surface of the bowel.

Though the mucous membrane only is involved in simple cases, yet when the local inflammation is severe, the walls of the gut may be affected in their whole thickness, and become dark-coloured, thickened, and infiltrated with serum or pus, with lymph on their serous aspect, and ultimately (if not relieved) gangrenous. (Typhlitis and proctitis will be separately considered).

The *symptoms* of acute intestinal catarrh vary according to the degree and the seat of the inflammation. In most cases, but especially when the colon is affected, there are remittent colicky *pains* in the bowels, together with some little *tenderness* on pressure, flatulent distension, and borborygmi. *Diarrhœa* is usually present, the stools varying much in frequency and appearance, very rarely containing blood unless there be ulceration. In other cases there may be constipation. The general health is apt to suffer, as indicated by fever, anæmia, depression, loss of appetite, and some emaciation.

Duodenitis is distinguished by the jaundice which accompanies it, other causes of jaundice having been excluded;

and also by its frequent association with gastric catarrh. Catarrh confined to the ileum (*ileitis*) does not necessarily cause diarrhœa. The presence in the stools of unaltered bile, a considerable amount of undigested food, especially fat, points to this variety. *Colitis* is indicated by tenesmus, the presence of mucus, unaltered blood, or pus in the stools, and tenderness over certain parts in the course of the colon.

The severer cases of inflammatory diarrhœa in children (*cholera infantum*) is due to acute catarrh of the whole gastro-intestinal tract, and is characterised by fever, vomiting, diarrhœa, which is at first fœulent, then slimy from admixture with mucus, and lastly profuse and watery, and is rapidly followed by collapse.

In the limited intense form of inflammation involving all the coats, the gut becomes paralysed, and its peristaltic movements cease so that its contents cannot pass onwards. The symptoms therefore are those of acute obstruction, and will be described hereafter.

In *chronic intestinal catarrh* the main symptoms are chronic diarrhœa with liquid offensive or lienteric stools, with general indications of stomach derangement and malnutrition.

DIAGNOSIS.—*Simple diarrhœa* does not admit of any precise separation from that due to mild catarrh. The presence, however, of slimy mucus in the stools is a sure indication of inflammation of the colon. The features of *typhoid* and *dysentery* are sufficiently distinctive. In *colic* there is no fever. In *peritonitis* the pain and tenderness is much more marked, the bowels are *constipated*, and the constitutional disturbance much greater.

TYPHLITIS AND PERITYPHLITIS.

Inflammation of the cœcum (*typhlitis*) or of the connective tissue around (*perityphlitis*) results usually from the

irritation set up by retained fæces, or the impaction of a foreign body, either in the cæcum or in the *vermiform appendix*. Typhlitis is frequently followed by perforative ulceration, with the escape of the cæcal contents either into the peritoneal cavity causing fatal peritonitis, or into the surrounding tissue leading to abscess. The latter may open either into the rectum, above the groin, or at the upper part of the thigh.

SYMPTOMS.—The most characteristic symptoms are *pain, tenderness*, with *increased resistance* on palpation in the right iliac region, and more or less *fever*. The patient lies on the right side with the legs drawn up. The bowels are usually confined, but diarrhœa may come on later. Sudden onset of pain extending over the abdomen, with symptoms of collapse, indicate perforation into the peritoneum. Redness and swelling of the integuments over the cæcum indicate the commencement of suppuration in the abdominal walls, also arising from perforation. The abscess thus formed generally opens externally, but not always.

It should be borne in mind that symptoms closely resembling those of typhlitis may occur in connection with pelvic abscess, psoas abscess, or perinephric abscess; and further, that in such cases communication with the cæcum or colon sometimes takes place.

PROCTITIS AND PERIPROCTITIS.

The causes of *proctitis* (inflammation of the rectum) and *periproctitis* are analogous to those of typhlitis, but in many cases these disorders *originate* with perinæal suppuration and they sometimes occur in the course of phthisis as a result of tubercular ulceration.

The chief *symptoms* are *tumefaction* and *induration* of the rectum (ascertainable by digital examination) or of the surrounding perinæal tissue; with local *pain and tenderness* greatly aggravated on defæcation. When an abscess has

formed it generally communicates with the rectum just within the external sphincter ani. It may subside spontaneously, or terminate in fistula. The tubercular form is eminently unfavourable.

ULCERATION OF INTESTINES.

The various ulcers met with in the intestines may be divided into two groups. I. *Non-specific*, including (1) superficial and follicular ulcers from inflammation; and (2) duodenal round ulcer analogous to simple gastric ulcer. II. *Specific*, including (1) tubercular; (2) typhoid; (3) dysenteric; (4) cancerous; and (5) syphilitic.

The *symptoms*, which taken together indicate ulceration, are:—abdominal pain and tenderness, obstinate diarrhœa, and the presence of blood, pus, or mucous masses in the stools. But ulceration frequently occurs without any characteristic symptoms, especially when it affects the small intestine only.

TREATMENT OF INTESTINAL INFLAMMATION. The *diet* must be light and unirritating. In simple catarrh bismuth or the alkaline carbonates appear to be of service. It is not always prudent at once to endeavour to check diarrhœa by opium or astringents. In those forms where irritating matters still remain in the bowels, a preliminary dose of castor oil is useful: and again, where it is associated with portal congestion, the diarrhœa should be rather encouraged than repressed. On the other hand, *dysenteric diarrhœa* with blood or mucus in the stools, and *cholera infantum* always call for opiates. For this purpose laudanum, or Dover's powder may be usefully combined with nitrate of bismuth or oxide of zinc; or the opiate may be given in the form of an enema. *Chronic diarrhœa* generally requires astringents. When there is *constipation*, purgatives should be only employed with great caution, especially if ulceration be suspected. It is better in these cases to

trust to opium; but if really necessary the bowels may be opened by simple enemata. As substitutes for opium when this cannot be tolerated, henbane or conium may be tried. As *external applications* in *typhlitis*, hot fomentations, poultices, or a few leeches often give great relief. When suppuration is superficial, the pus should be liberated by the knife.

INTESTINAL OBSTRUCTION.

THE numerous causes of intestinal obstruction may be classified as follows:—I. Causes acting within the gut:—impacted fæces, gall-stones, or foreign bodies. II. Causes acting in the walls of the gut:—1. Contracted cicatrix following ulceration. 2. Contraction due to inflammatory thickening. 3. Cancer. III. Causes acting on the gut from without:—1. Internal and external herniæ. 2. Compression by bands of lymph, tumours, or diverticula. IV. Causes resulting in altered relation of proportions of the gut:—1. Intussusception. 2. Twists or displacements.

Morbid anatomy and pathology.—Above the point of obstruction the intestine is greatly distended, while below this point it is empty and retracted. In acute strangulation or intussusception, peritonitis occurs which is limited to a part and liable to end in gangrene; but in other cases it is general and gangrene is far less common. In chronic cases the muscular coat above the obstruction is hypertrophied, coupled with chronic catarrh of the mucous membrane.

Intussusception calls for separate consideration. It consists in the slipping of one part of the bowel into that immediately below it. The intussusception is thus made up of three tubes, the outer and middle of which are in contact by their mucous surfaces, and connected with each other at their upper ends; while the inner and middle

tubes (*intussusceptum*) are in contact by their serous surfaces and connected at their lower ends. A fold of the mesentery is imprisoned between the inner and middle tubes which drags the *intussusceptum* to one side, so that the orifice of the latter looks towards the outer tube.

Two varieties may be distinguished. 1. One variety is only met with *post mortem*, and is usually multiple. It is associated with the death-struggle, and causes no symptoms during life. 2. The other is the so-called *inflammatory intussusception*. The most common form is that in which the ileo-cæcal orifice descends into the cæcum, and as it passes into the colon drags down more and more of the ileum to an extent varying from a few inches to several feet, so that it may even protrude at the anus. Usually the ileo-cæcal valve forms the lowest part of the *intussusceptum*, but in rare cases part of the small intestine slips through this opening.

The after effects are as follows:—(1) *compression* at the neck of the invagination by the outer tube; (2) intense mechanical *congestion* followed by œdema or extravasations which increase the obstruction; (3) violent *inflammation* not infrequently leading to (4) *gangrene* of the *intussusceptum* which sometimes becomes detached, and is then expelled completely or in part *per rectum*. In this way rupture of the bowel may occur; but this may be obviated by adhesions which have formed between the outer tube and the intestine above, and recovery may follow; but even in this case there is great risk of stricture at the point of union. The events above described occur with variable rapidity and severity according to the completeness of the obstruction.

General symptoms of obstruction.—1. *Vomiting* which is apt to become fæcal. 2. Gripping *pains* of variable severity, associated with tenderness. 3. More or less tympanitis. 4. Obstinate constipation. 5. Hiccup. 6. Inflammatory signs, with small thready pulse and tendency to collapse.

Diagnosis of the seat of obstruction may be aided by the following considerations. 1. *Upper part of small intestine.*—Obstructive symptoms are marked and appear early; the course is rapid; tympanitis is often absent, and when present is limited to the epigastrium, and always relieved by vomiting; and the vomit though bilious is never fæculent. 2. *Lower part of ileum.*—Obstructive symptoms appear early, and the course is rapid; the tympanitis is marked, especially in part, the flanks being comparatively flat; and the vomit soon becomes fæculent. 3. *Lower colon.*—Generally (but by no means always) the course is less rapid, and obstructive symptoms appear later; the tympanitis is extreme and well-marked in the flanks; and the vomit is always fæculent before the close. In addition to which we have often the results of physical examination by the hand, sound, or injections. It is often said that scanty secretion of urine indicates obstruction high up in the bowel, while lower down it is copious. Recent observations, however, seem to show that these differences have relation rather to the acuteness of the condition operating through the nervous system than to the locality of the lesion.

Diagnosis of the nature of the obstruction. Obstruction from strangulation, intussusception, and twists usually sets in suddenly, while in the vast majority of other cases the onset is gradual. An examination of the usual seats of external herniæ and of the rectum, serves to eliminate obstructive lesions in those parts.

Impaction by fæcal masses is most frequent in elderly people, is generally preceded by habitual constipation, and may be accompanied by a soft sausage-shaped painless abdominal tumour. It is sometimes complicated, however, with twisting or displacement of the loaded gut, which falls over by its own weight, and in this way the signs of acute strangulation may supervene. Impacted gall-stones may sometimes be diagnosed when elderly per-

sons suddenly exhibit signs of obstruction with previous history of hepatic colic.

Constrictions and *compressions* are gradual in their progress, and are often preceded by gradually increasing constipation with (when affecting the lower bowel) small cylindrical stools. Aid may be derived from the previous history.

Strangulations are acute in their onset, and rapidly lead to complete obstruction followed by inflammation, gangrene, or perforation. They are more common over 80 years of age.

Intussusception is most common in children. The diagnosis rests upon the sudden onset, with violent intermitting colic, bloody mucous stools with tenesmus, association with a sausage-shaped abdominal tumour, and ability (in some cases) to reach the intussusception on rectal examination. Intussusception high up in the bowels usually defies diagnosis.

TREATMENT.—At first, when the diagnosis is still uncertain, an enema may be given to relieve the constipation, but purgatives should be avoided. If nourishment cannot be retained in any form when taken by the mouth, nutrient enemata should be employed. Opium in these cases is our sheet-anchor. It should be given boldly and frequently, but with especial caution in children. It is advantageously combined with full doses of belladonna. The *thirst* may be allayed by sucking ice. Hot fomentations or poultices applied to the abdomen are useful to relieve *pain*.

In many cases endeavours may be made to reduce the obstruction by full and prolonged injection of warm water or air per rectum, combined with gentle kneading of the abdomen—the patient being previously put under the influence of chloroform. Finally surgical interference may be necessary for the gradual dilatation of certain fibroid strictures of the rectum, or to make an artificial anus, or on the abdomen and reduce the obstruction.

CANCER OF THE INTESTINES.

CANCER of the intestines is almost always primary; and is rarely met with under 40 years of age. It is usually of the scirrhus variety, and most commonly affects the rectum or sigmoid flexure. As in the stomach—it begins in the sub-mucosa, and soon merges with the mucous membrane; ulceration follows and a raw bleeding surface is exposed. Since it extends transversely, annular stricture is a frequent result. Secondary deposits are frequently found in the liver, &c.

SYMPTOMS.—*Pain* variable in character and intensity (in some cases this is absent), with tenderness, habitual constipation or irregular action of the bowels, and tympanitis constitute the usual symptoms. In some cases, an abdominal tumour may be observed on palpation, but it is more often altogether wanting. Sooner or later the cancerous cachexia is usually manifested. Cancerous ulceration is indicated by diarrhoea, bloody mucous stools, and tenesmus; while stricture of the intestine necessarily gives rise to symptoms of obstruction. The symptoms of rectal cancer are often so insignificant, that a digital examination of the rectum should always be made on the least appearance of rectal discomfort in elderly persons. The duration of the disease is variable, but it seldom exceeds a year and a half; when death occurs from exhaustion, or from the secondary local effects of hæmorrhage, or from obstruction.

The *treatment* is purely palliative and symptomatic. An artificial opening into the colon may prolong life in some cases.

INTESTINAL TUBERCULOSIS.

INTESTINAL TUBERCULOSIS probably never occurs as a primary disease, and is almost always secondary to pulmonary phthisis, being found in more than half of all cases of this affection. The tubercular virus, in the first instance, attacks the solitary and agminated follicles of the intestine, which accordingly become enlarged and afterwards caseate and break down, forming an ulcer with indurated floor and margins. The ulceration extends much more rapidly in a transverse than in a longitudinal direction, so that it sometimes forms a complete ring around the inside of the gut. Tubercles are found in the tissue forming the edge and floor of the ulcer, which in their turn degenerate and break down, and constitute the mode by which the ulceration extends. Inflammatory adhesions between adjacent coils of intestine at the seat of ulceration are nearly always present; and sometimes a perforative communication is set up between them. The ulcers have little tendency to heal, though occasionally imperfect cicatrisation occurs, and causes some intestinal constriction.

More or less abdominal pain and tenderness, with obstinate diarrhoea, and bloody stools observed in a patient suffering from phthisis would at once suggest tubercular implication of the intestine. But in many cases the symptoms are not so clear, and the condition is first revealed in the *post-mortem* room.

The course of the affection is progressively fatal, and treatment can only be palliative.

EPIDEMIC CHOLERA.

CHOLERA is an *epidemic* disease, sometimes *endemic*, and dependent on a *specific poison*. As to the nature of the

latter our knowledge is very limited. It briefly amounts to this: that it exhibits the characters of an organised contagium which is present in the rice-water stools of those suffering from cholera; that the discharges when quite fresh are inoperative, but become virulently infective in the course of from two to five days, after which they lose their poisonous influence; that the poison is taken up by, or acts upon the bowels, which it reaches through the mouth; that it may be conveyed through the atmosphere, by contaminated fomites, or on a large scale by infected drinking-water; and that its operations are favoured by obscure meteorological conditions, by insanitation, and by individual debility, however it may be engendered. One attack does not confer protection against another.

ANATOMICAL CHARACTERS.—When death occurs during the stage of *collapse*, the *body* is shrivelled and shrunken, and the dependent parts are congested. *Rigor mortis* is well marked and prolonged. The *blood* is thicker and darker than usual. The *left heart*, *systemic arteries*, and *pulmonary veins* are empty or nearly so, while the *right heart*, *systemic veins*, and *pulmonary artery* are gorged with blood. The organs generally are pale and shrunken, *except the kidneys* and *alimentary canal*, which are more commonly injected. The intestinal mucous membrane has a sodden appearance and its follicles are enlarged and prominent. The contents of the bowels resemble the discharges during life, added to which there is *abundance of shed epithelium* (probably a post-mortem change). The large bowel is usually contracted.

If death occurs during *reaction*, the tissues are moister, and the blood is more equally distributed. Various secondary inflammations may be met with which will be enumerated hereafter, as complications.

SYMPTOMS.—After an *incubation* of uncertain length, there are usually some premonitory symptoms for a day

or so, characterised by malaise, depression, and slight diarrhœa, but the onset is sometimes sudden.

1. *Evacuation stage*.—*Purging* (with or without pain) is the first symptom. The *stools* are watery and profuse, at first fœcal, but soon become thin, colourless, and almost odourless, with whitish flakes in suspension (*rice-water stools*). The quantity of fluid thus discharged is enormous. *Vomiting* comes on a little later. The vomit is at first bile-stained, but soon resembles the rice-water stools and is very abundant. Painful *cramps* in the limbs and abdomen, and *intense thirst* soon follow, culminating in the collapse which is characteristic of the next stage.

2. The "*algide*" stage is marked by profound *collapse*. The *tissues* shrink, the features are pinched, the eyeballs become sunken, and the cheeks hollow. The *surface* is more or less livid, cold, and clammy. The *surface temperature* falls to 94° or 95° or lower, while in the rectum it may be as high as 101° or more. The *pulse* is small, rapid, and almost imperceptible; the *respirations* are rapid, and shallow; the expired air is cool; and the *voice* is faint and whispering. The *urinary* and *biliary secretions* are totally suppressed. The patient throws his arms about, and becomes restless, and wakeful, and singularly apathetic. He complains of intense *thirst* and heat at the epigastrium. Finally, the vomiting and purging cease, or are greatly diminished, and the patient lies helpless as a corpse. The *mind* is clear at first, but in fatal cases *stupor* sets in, followed by *coma*.

The *duration* of this stage varies from 2 to 24 hours, and it also varies much in intensity. In severe cases the symptoms are well marked, and death occurs from coma, most often between the 10th and 14th hours. In more favourable cases reaction may take place.

3. The *stage of reaction* sets in gradually with general improvement; the pulse becomes stronger, the respiration

slower, and the skin loses its livid and shrunken aspect. The thirst, diarrhœa and restlessness subside ; the secretion of urine returns, and the stools are once more stained with bile. The body temperature is more equally distributed—that of the surface rises, while in interior parts it falls. The patient may fall asleep, and recovery may be re-established in the course of 12 to 24 hours. More often, however, the reaction assumes a febrile type, and is more severe and prolonged (“cholera-typhoid”).

Even now recovery is not assured, and death may occur from complications arising during the stage of reaction, such as suppression of urine, inflammation of the bowels, low forms of pneumonia, cholera-typhoid, or cardiac thrombosis.

Variations.—Cholera sometimes sets in suddenly with no premonitory symptoms, and death occurs speedily from collapse. The term “choleraic diarrhœa,” or “cholérine” is sometimes applied to those cases occurring during an epidemic of cholera which are characterised by milder symptoms, and far less mortality. Some again recognise a relationship between epidemic cholera and bad cases of summer diarrhœa (English cholera).

The *diagnosis* of true cholera rests upon its epidemic character, the abundant rice-water stools, the rapid tendency to prostration and collapse, and the high mortality.

The *prognosis* is necessarily very grave ; and the mortality is on the average about 50 per cent.

TREATMENT.—It is impossible to over estimate the importance of *preventive treatment*, by careful attention to the purity of drinking water, strict sanitation, domestic cleanliness, and immediate disinfection of all evacuations and contaminated articles. All diarrhœas during an epidemic should receive prompt attention.

During the stages of evacuation and collapse, the patient should rest in bed, and take nothing but ice to suck ; a

large mustard poultice may be applied to the abdomen ; and frictions and hot bottles should be used to maintain warmth. Medicinally, nothing is said to act better than opium in grain doses frequently repeated, in combination with two or three grains of acetate of lead. When the purging and vomiting are severe it is worse than useless to attempt to give anything beyond the ice ; but if it can be retained, a little beef-tea, chicken-broth, or milk may be given either by the mouth or the rectum.

When *reaction* sets in the diet should be very bland and light, and only increased and improved with great care. Stimulants are not necessarily required, but should the "typhoid state" supervene they may be needed. Water may be freely allowed, to which the addition of salt and carbonate of soda is recommended. Complications and sequelæ must be treated as they arise. Tonics and preparations of iron are often serviceable during convalescence.

Innumerable *specifics* have from time to time been advocated, but have not justified the expectations formed of them.

DYSENTERY.

It is not yet settled whether dysentery is a *specific* disease or not, but the evidence is mainly on the affirmative side. Dysentery occurs both in an *epidemic*, and in a *sporadic* or scattered form. Both forms are much more frequent in tropical, than in temperate climates. Foul water, polluted air, insufficient food, exposure, and fatigue are all highly favourable to the occurrence of dysentery, but our knowledge is not equal to the discrimination of predisposing from exciting causes of the disease. It is probably not directly infectious.

MORBID ANATOMY.—The essential feature consists in an inflammation of the mucous membrane of the colon, especially towards its lower end. The small intestine is rarely implicated. The local appearance chiefly depends on the severity of the inflammatory process. In mild cases there is mere catarrh, of patchy distribution, and characterised as usual by congestion and swelling of the mucous membrane, mucous exudation, and cellular proliferation. The solitary follicles are unduly large and prominent. Superficial erosions or follicular ulcers may occur here and there, the peritoneal aspect of which may exhibit signs of slight inflammation. In severe cases, the inflammation is of the diphtheritic type; and it is characterised by patches of fibrinous exudation on the surface and into the substance of the mucous membrane, which is followed by sloughing and ulceration. As a rule only the mucous membrane is involved, but the slough sometimes includes the deeper tissue and may thus lead to hæmorrhage or perforation. In favourable cases the ulcers ultimately cicatrise, but the process is liable to be followed by puckering and more or less contraction of the intestine. In other cases they may heal imperfectly, and lapse into a chronic form, with a tendency to the recurrence of active inflammation from slight causes.

Multiple abscesses of the liver, enlargement and softening of the mesenteric glands, bronchitis, pneumonia, etc., are not infrequently met with in association with dysentery.

SYMPTOMS.—The symptoms of acute dysentery—like the morbid changes—exhibit every variety, from a mild sporadic case to an epidemic of the most virulent type.

The following description applies to a moderately severe case. Irregular action of the bowels, griping pains, lassitude, and anorexia generally precede the special symptoms for a few days. The actual attack is ushered in by shiver-

ing or rigors with fever. Gripping pains (*tormina*) are felt in the abdomen, with a strong desire to evacuate the bowels. The stools are at first fæcal, and abundant; but they soon lose this character, becoming scanty, bloody, and slimy from the presence of mucus, with a most offensive characteristic odour. Still later, they become thin, watery, and dirty-looking, and perhaps contain fragments of sloughy mucous membrane, or dark-coloured particles of blood. Profuse hæmorrhage sometimes occurs about this period. The desire to defæcate now becomes almost constant, and is attended with much tenesmus, irritation of the anus, and sometimes with very frequent micturition and dysuria. The tongue is furred, and complaint is made of thirst, loss of appetite, and occasionally of nausea and vomiting. The abdomen is tender, but not markedly tympanitic. There is always more or less febrile disturbance of a depressing type, which varies in amount and duration, according to the extent and severity of the local mischief.

In favourable cases improvement begins about the end of the first week, but the convalescence is usually protracted. When a fatal termination threatens, the symptoms assume an adynamic or typhoid character, with great prostration, a dry brown tongue, hiccup and vomiting and more or less tympanitis; the patient finally becoming comatose. In the event of hæmorrhage, perforation, or the formation of abscesses in the liver, the symptoms preceding death will vary accordingly.

In other cases the disease may become *chronic* and continue for an indefinite time. The action of the bowels is irregular; the stools are offensive, and present from time to time a mucous, bloody, or serous appearance according to circumstances. The general health suffers, as indicated by anæmia, loss of flesh, with a sallow and aged expression.

DIAGNOSIS.—The symptoms and the characters of the stools as described are quite characteristic.

PROGNOSIS.—Sporadic dysentery is not nearly so fatal as the epidemic form. Much depends too on the type of the epidemic, the general condition of the patient, the presence or absence of complications, and the mode of treatment adopted. Very chronic cases are extremely troublesome.

TREATMENT.—In the first place it is necessary to remove the patient to cool, clean, and healthy quarters; rest in bed being enjoined. In mild cases it is well to begin the treatment with a dose of castor oil to empty the bowels, and sometimes small doses of the oil ($\mathfrak{m}\nu\text{-x}$) combined with laudanum may be continued afterwards with good effects. In more severe cases preliminary purgation should be omitted, or employed with great caution. At the outset, hot fomentations or 10 to 20 leeches may be applied to the abdomen, to relieve local pain and tenderness. Opium should be given, either by the mouth, or in a small enema of starch, in sufficient quantity to relieve the pain and tenesmus.

Ipecacuanha (with or without opium) has been strongly recommended, in doses of gr. xxv-xxx with a little syrup of orange. If absolute rest in the recumbent posture be observed, and no fluid (beyond perhaps a little ice to relieve the thirst) be taken for some three hours after, sickness rarely follows. It should be repeated at intervals of 8 to 10 hours according to the urgency of the case. The diet should consist of milk, gruel, broth, eggs, soups and the like, with stimulants in accordance with the usual indications for alcohol.

In the *chronic* form astringents and tonics are needed, especially iron in full doses. Enemata containing copper, lead, nitrate of silver (gr. $\frac{1}{2}$ ad $\frac{3}{4}$ j), or sulphate of zinc are very serviceable at this stage. A flannel bandage round

the belly should be worn, and cold or tepid bathing with friction is recommended.

INTESTINAL WORMS.

THE worms which infest the intestinal tract may be divided into two main groups.—1. The *Tæniada* or *Cestoda* or *Tape-worms* including (a) *Tænia solium*, (b) *T. mediocanellata*, and (c) *Bothriocephalus latus*. 2. The *Nematoda* or *Round-worms* including (a) *Ascaris lumbricoides* (round worms), (b) *Oxyuris vermicularis* (thread worms), and (c) *Trichina spiralis*.

1. TÆNIADA.—*General remarks.* All members of this group have two phases of existence. Segments of the fully developed worm containing ripe ova become detached, and on being discharged from the body are scattered about. Sooner or later they find their way into the intestine of some appropriate animal. The embryo contained within each ovum then bursts its shell, passes through the intestinal wall, and works its way into the tissues. On reaching a suitable spot it further develops and presents a *head* resembling that of a perfect worm, a *neck* with a vesicular or bladder-like appendage filled with clear fluid. In this stage it is called a *cysticercus*. It possesses no sexual organs, and is only capable of further development by its removal into the human intestine. This takes place when the tissue containing the cysticercus is eaten as food. Under these circumstances it fixes itself to the mucous membrane, drops its vesicular appendage, and develops from its hinder end the series of segments which characterise the adult worm. Thus *two distinct forms* are needed to complete the cycle of existence of these worms.

(a) *Tænia solium* or the common tape worm is of an elongated, flat shape, from 5 to 30 feet in length, and dwells in the small intestine. Its head (*scolex*) is about the size of a pin's head and is furnished with a circle of

hooks surrounded by four suckers, by which it attaches itself to the intestine. From the head backwards it is made up of a series of soft white segments (*proglottides*), at first very small (*the neck*) but gradually enlarging as they become more mature. The segments of the neck are much broader than long, and nearly homogeneous: but proceeding backwards they gradually become longer than they are broad ($\frac{1}{2}$ in. \times $\frac{1}{4}$ in.) and about one foot from the head, male and female sexual organs are visible, which open into a common aperture, and contain ova. Usually only one worm is present in the intestine at the same time.

Its *cysticercus* (cyst. cellulosa) gives the well-known appearance of "measly" pork, from eating which when badly cooked, tape-worms exclusively arise. The head exactly resembles that of *tænia solium*, and is joined to a roundish vesicle about the size of a pea by a short wrinkled neck.

(b) *Tænia mediocanellata* very closely resembles the former species, but it is longer, its head is three times as large, and it is not provided with hooklets. The *cysticercus* of this worm especially affects the ox, and is apt to be introduced into the human body by eating badly-cooked beef. It is of very common occurrence.

(c) *Bothriocephalus latus* is peculiar to certain parts of Europe and is the largest of all tape worms. The head is club-shaped, with a longitudinal slit by which it attaches itself, and has no suckers or hooks. Its *cysticercus* is not definitely known, but is supposed to inhabit fish.

SYMPTOMS.—In many cases there are no symptoms whatever. In others, however, there are indications of more or less nervous and digestive derangement. Thus pains in the bowels, irregular appetite, thirst, headache, vertigo, mental depression or irritability, and itching of the arms or nose are common symptoms. More rarely, the nervous disturbance assumes a grave type. The appearance of the ripe segments in the stools is characteristic.

TREATMENT.—The best way to get rid of the worm is to administer from ʒ ss. to ʒ j of the extract of the male fern early in the morning on an empty stomach, which should be shortly followed by a full dose of castor oil. Milk is a convenient vehicle for the drug. No absolute cure is effected unless the *head* is expelled. The bark of the pomegranate root, kousso, or oil of turpentine have also been recommended, but are inferior to male fern.

2. **NEMATODA.**—*General remarks.* The members of this group are solid and rounded in shape, and possess a distinct alimentary canal provided with mouth and anus. The sexes are always separate. Much has yet to be learnt respecting the development of these worms, but it is certain that many of them exhibit a double phase of existence like *tæniada*.

(a) *Ascaris lumbricoides* or common round worm closely resembles, in its form, the common earth worm. The female is nearly twice as large as the male, measuring 10 to 14 inches in length. It is cylindrical, pointed at each end, of a white colour. The ova, of which thousands are discharged daily, are oval, about $\frac{1}{400}$ inch in diameter, with a thick irregular shell. More than 5 or 6 worms are rarely present at the same time. Their special habitat is the small intestine, but they are peculiarly apt to wander in every conceivable direction.

SYMPTOMS.—These may be altogether wanting, or when present may be in no way characteristic, consisting chiefly in slight fever, disturbed sleep, thirst, and depraved appetite, with itching at the nose and anus. Occasionally a mass of them may give rise to temporary intestinal obstruction; or they may be vomited. Ova may be readily detected by the microscope in the stools.

TREATMENT.—The best remedy is *santonin* (gr j-ij for a child or twice this quantity for an adult), which should be given the first thing every morning on an empty stomach.

An occasional dose of castor oil during the treatment is to be recommended.

(b) *Oxyuris vermicularis* or common thread worm is small, white, and thread-like. The female is twice the length of the male and measures from $\frac{1}{8}$ to $\frac{1}{4}$ inch. They dwell in the cæcum and colon, but sometimes appear to be confined to the rectum. They are the most common of all worms, are chiefly met with in badly-fed children and always exist in great numbers. They are apt to migrate through the anus and may find their way into the vagina, setting up leucorrhœa or eczema.

SYMPTOMS.—The most important sign is a troublesome itching about the anus, worse at night, and sometimes almost intolerable. There may be also itching at the nose, digestive disturbance and indifferent general health. The worms and their ova are readily detected in the fæces.

TREATMENT.—Enemata of salt and water, quassia, perchloride of iron, or lime water repeated daily for a short period are of most service. I have usually found it advantageous to administer internally at the same time, santonin powders every or every other morning, and the compound decoction of aloes (3 j to $\bar{3}$ j) twice or three times a day, if there be no diarrhœa.

(c) * *TRICHINA SPIRALIS*. *Trichinosis*.—This worm is met with in the muscular tissue, coiled up within an oval cyst, the walls of which are thick, laminated, and semi-calcareous, each cyst being visible to the naked eye, as a minute granule. They are found chiefly in the flesh of pigs, and it is from the eating trichinous pork that man is affected. The cysts are dissolved by the gastric juice, the embryos are liberated, and speedily reaching maturity, give birth to a vast number of living embryos which perforate the intestinal wall, and migrate to the tissues where they become again encapsuled.

* Though not strictly speaking an intestinal worm, it is convenient to describe *trichina spiralis* in this place.

SYMPTOMS.—These at first consist of gastro-intestinal disturbance of an acute form not unlike typhoid fever, with coated tongue, diarrhoea, pain in the bowels and fever. In the course of a few days signs of general muscular inflammation, viz., pain, tenderness, swelling, and stiffness of the voluntary muscles supervene. Dropsy beginning in the face and particularly in the eyelids soon develops, extends to the limbs, and may subsequently become general.

The duration and severity of trichinosis varies greatly. In mild cases recovery may take place in the course of a month, in others after three or four months.

In other cases again, the mortality is high, and death occurs from peritonitis, pneumonia, or general debility at any time between one and six weeks.

If the introduction of the parasites into the body be discovered quite early, prompt administration of a brisk aperient is likely to expel them before they have entered the tissues. Otherwise, the indications for treatment are purely symptomatic, as no specific remedy is known.

SUB-SECTION V.

DISEASES OF THE PERITONEUM.

PERITONITIS.

IDIOPATHIC or primary inflammation of the peritoneum rarely affects those in robust health; but in those who are anæmic or weak, or in the subjects of blood poisoning, slight causes such as exposure to cold may determine an attack. Most commonly it may be traced to (1) external injury; (2) perforation or rupture of organs covered by peritoneum; (3) propagation of inflammation from other organs, viz.:—ulceration of the stomach or bowel, strangu-

lation and intussusception of the bowel, typhlitis, metritis, &c. ; or (4) new growths in the peritoneum, viz., tubercle, or cancer.

MORBID ANATOMY.—*Acute* peritonitis may be either general or local. Like inflammation of other serous membranes, congestion is followed by exudation of lymph with or without fluid. The lymph is yellowish and forms a layer of variable thickness over the membrane, and leads to adhesion between its opposed surfaces which become more coherent with age. The fluid is usually scanty, more or less turbid, and generally holds flakes of lymph in suspension. Sometimes it is actually purulent, or it contains blood. *Chronic* peritonitis may also be either general or local. It is characterised by thickening and opacity of the membrane, with or without the effusion of fluid, while agglutinations and adhesions are apt to form and give rise to subsequent trouble.

SYMPTOMS.—The onset of acute diffuse peritonitis varies according to its cause. That of the puerperal and idiopathic forms is usually abrupt and attended with rigors : in the perforative variety it is characterised by sudden collapse ; while in other cases,—*e.g.*, after paracentesis abdominis,—it is very often insidious. Whatever its mode of onset, the following symptoms quickly supervene. Severe pain with extreme tenderness sets in, which begins generally at one part and rapidly extends over the whole of the abdomen. The patient consequently lies on his back, with his knees drawn up, dreading the least pressure or movement of any kind. The tongue is coated and clammy, or red and irritable ; there is great thirst ; the appetite is lost ; nausea and vomiting are often distressing ; and the bowels are constipated as a rule, but are sometimes relaxed, especially in the puerperal form. The expression is one of extreme anxiety, and the features are pinched and drawn. There is *almost always* distinct fever ; the pulse is

rapid, weak, and small; the respiration is hurried and shallow; the urine is scanty, and the bladder is sometimes very irritable. As a rule there is but little nervous disturbance, and the mind remains clear. The abdomen is tumid, hot, and tympanitic; its respiratory movements cease; and the signs of fluid effusion (ascites) may be present.

In favourable cases the above symptoms gradually subside at the end of a few days, and convalescence sets in. On the other hand, in fatal cases, signs of rapidly increasing collapse supervene; the pain and tympanitis often subside or disappear; the skin becomes cold and clammy; the pulse becomes more frequent, weaker, and often irregular; and low nervous symptoms set in, though the mind may be clear to the end. Lastly, it may become chronic.

The symptoms of *acute partial peritonitis* are essentially the same as those of the diffuse form, but are less marked, are more localised, and consequently vary somewhat according to the seat of the primary mischief.

The diagnosis of acute peritonitis mainly turns on the fever, the extreme superficial abdominal tenderness, the tympanitis, and extreme constitutional disturbance.

TREATMENT.—In the few cases where peritonitis is traceable to some distinct cause, *e.g.*, strangulated hernia, which can be removed, it is our duty to do so without delay. In the vast majority of cases we can only fall back on three principal therapeutic measures, *viz.*, perfect rest, free administration of opium, and local applications to the abdomen. The patient should be in bed in the position most comfortable to him, and protected from the pressure of the clothes by means of a bed-cradle. Opium in full doses (gr. $\frac{1}{4}$ —1 every hour), or preferably hypodermic injections of morphia (gr. $\frac{1}{4}$ — $\frac{1}{2}$ every 3 or 4 hours) should be administered, until contraction of the pupils clearly manifests its physiological action. Locally, if the constitution be good,

and the case is taken in hand early, it is a good plan to apply from ten to twenty leeches on the abdomen; but such depletive measures should only be practised with caution. When they can be borne, hot and moist fomentations, poultices, sinapisms, or stupes may be employed; while others again prefer evaporating lotions, cold compresses, and ice-bags. The food should be light, fluid, and nutritious, taken only in small quantities at a time, and frequently repeated. On the slightest threatening of collapse, alcohol should be exhibited. Under no circumstances should purgatives be given.

Chronic general peritonitis may occur as the sequel of the acute form, but otherwise it is rarely observed, except in connection with cancer or tubercle of the peritoneum. In a *partial* form it frequently accompanies chronic disease of the abdominal viscera. It is characterised by opacity, thickening, and adhesions of the membrane, either with or without some fluid effusion. The chief symptoms to which it gives rise are—abdominal discomfort, colicky pains, tenderness, irregular action of the bowels, together with emaciation, debility, and other signs of constitutional disturbance.

TUBERCLE AND CANCER OF THE PERITONEUM.

General tubercular peritonitis seldom occurs alone, and is usually associated with phthisis or tubercle elsewhere. The tubercles are sometimes of the typical miliary form, and sometimes occur as large yellowish-white nodules rapidly undergoing fatty changes. The peritoneum exhibits the signs of inflammation already described.

Tubercular peritonitis as a rule develops insidiously and is characterised by moderate fever of the hectic type. Occasionally however, the disorder assumes a decidedly acute form. The symptoms are those of ordinary peri-

tonitis, associated with the general manifestations of tuberculosis. Abdominal pain and tenderness are generally, but not always, present. The quantity of effusion is sometimes quite small, but more often it is abundant. The effused fluid is turbid, and frequently more or less blood-stained; it is also remarkably apt to be shut off in closed cavities formed by intestinal adhesions (*encysted ascites*). Its course is tedious and, as a rule, it terminates fatally. The diagnosis mainly rests on the proved existence of tubercle elsewhere. The writer has known it mistaken for typhoid fever.

The treatment is that already recommended for peritonitis, and tuberculosis.

Cancer of the peritoneum is usually secondary to cancer elsewhere, and is commonly of the scirrhus type; but encephaloid and colloid cancers are sometimes met with. The symptoms are those of general peritonitis with or without effusion; together with an abdominal tumour or tumours, and indications of the cancerous cachexia. Abdominal pain and tenderness are well-marked, and the effusion is frequently hæmorrhagic. The treatment is purely palliative.

TABES MESENTERICA.

TABES MESENTERICA is a term applied both to scrofulous enlargement, and to tubercular disease of the mesenteric glands. The scrofulous form is essentially a disease of young children, and is generally secondary to chronic intestinal catarrh. The remarks on scrofulosis in a previous chapter must be applied to the affection now under consideration. True tubercular disease of these glands is either secondary to the strumous condition, or (in adults) to tubercular ulceration of the intestine. The special

feature of the disorder consists in the rapid and marked malnutrition which arises from interference with the entry of chyle into the thoracic duct. Since chronic peritonitis is always associated with tabes, the symptoms of each are very similar in many respects; and a certain diagnosis is impossible in the absence of an abdominal tumour caused by the glandular enlargement.

ASCITES.

ASCITES strictly implies a *dropsical* effusion into the peritoneum, but the term is very generally employed to indicate fluid effusions of *any* kind into that cavity. The causes of ascites may be grouped in three classes. It may arise (1) as a part of general dropsy due to cardiac, pulmonary, or renal disease; (2) from portal obstruction commonly caused by hepatic cirrhosis, or by pressure on the trunk of the portal vein in the hilus of the liver; or (3) from diseases of the peritoneum as inflammation, cancer, or tubercle. The amount of fluid varies from a few ounces to several gallons; and is usually clear, slightly viscid, alkaline, of a yellow or greenish tinge, and contains a large quantity of albumen. Its specific gravity is about 1015. When resulting from inflammation the fluid is turbid and flaky.

SYMPTOMS.—If the fluid be fairly abundant, we find on *inspection* that the abdomen is enlarged, its shape varying according to the posture. In the recumbent position the flanks are symmetrically bulged, and the belly is broad and somewhat flattened. The skin is smooth, tense, frequently marked with whitish striæ, and covered with a network of distended superficial veins. The navel is flattened out, obliterated, or everted. On *palpation* a peculiar thrill (fluctuation) may be felt on placing the hand flat on the abdomen, while the opposite side is

smartly tapped with the fingers of the other hand. To get this result it is necessary that both points should be immediately over the effused fluid. The *percussion-note* is dull wherever the fluid is in contact with the abdominal walls. Further, since the fluid sinks to the most dependent parts, while the intestines float on the surface, the distribution of the dull and resonant areas varies according to posture. Lying on the back, the flanks are dull and the neighbourhood of the umbilicus is resonant; lying on one side the uppermost flank becomes resonant, and so on.

Other symptoms arise indirectly. Thus dyspnoea and palpitation occur from pressure upon and displacement of the diaphragm and heart respectively. Pressure on the vena cava is apt to cause anasarca of the lower limbs and albuminuria, while congestion of the radicles of the portal vein always leads to functional derangements of the stomach and bowels.

Much however, depends upon the amount of effusion. When it is scanty, recognition is difficult or impossible; and when the amount of fluid and consequent abdominal distension are excessive, the shape of the abdomen is more globular, and the dulness on percussion is more or less general in *all* positions.

DIAGNOSIS.—Ascites may be confounded with an ovarian cyst, pregnancy, a distended bladder, a hydatid cyst, or a renal cyst; but space will not allow its distinctions from each to be mentioned in detail. Suffice it to say that the most typical features of ascites are, the symmetrical distension of the abdomen, a flattened navel, dulness in both flanks with resonance in front, the shifting of the limits of dulness on alteration of posture, the shape (concave upwards) of the upper line of dulness in the erect position and the results of mensuration. In ascites the maximum circumference of the belly is *never below* the level of the umbilicus, and the distance between the pubes and umbili-

cus is *never greater* than that between the umbilicus and xiphoid cartilage. Lastly the characters of the fluid (already given) afford valuable information.

Having established the existence of ascites it yet remains to ascertain its cause. In the first place it is necessary to separate inflammatory from simple dropsical effusions. Pyrexia, pain and tenderness of the abdomen, sweating, and vomiting are commonly present in greater or less degree in the former, but absent in the latter. The nature of the fluid in each also differs as already shown. Non-inflammatory dropsical effusions may be either renal, cardiac or pulmonary, or hepatic. In the *first*, the ascites is preceded by anasarca which usually begins in the face; fluid is present as a rule in other serous cavities, the countenance is pale and pasty, and there are signs of renal disease. In the *second*, ascites is preceded by anasarca which begins at the ankles and extends upwards, the countenance is dusky or livid, and there are signs of pulmonary or cardiac disease. In the *third*, anasarca is absent or follows the ascites, and is confined to the lower limbs; and there are the signs of hepatic disease. Cancer and cirrhosis are practically the chief hepatic diseases which are attended with ascites, and as to the diagnosis between them the reader is referred to another page.

The *treatment* of ascites for the most part is that of the affection on which it depends, but special measures are often called for, which essentially consist in the employment of diuretics, diaphoretics, and hydragogue purges. In the selection of such remedies, due regard should be paid to the general condition of the patient; thus strong diuretics, copaiba resin for instance, are out of the question in renal disease. Paracentesis abdominis may be resorted to in extreme effusions, but it should be borne in mind that the operation is sometimes followed by peritonitis, and that it is often worse than useless in ascites dependent on cancer.

SUB-SECTION VI.

DISEASES OF THE LIVER.

I. CONGESTION OF THE LIVER.—INTERSTITIAL HEPATITIS.

Active congestion of the liver always accompanies the digestive act, but is apt to exceed its normal limits whenever food is taken in excess, or when it is of an irritating nature; and it is more especially frequent as a result of alcoholic abuse. It also occurs in connection with malarial and other fevers, injury, or new growths. *Mechanical* congestion may be caused by any obstructive disease of the lungs or heart. *Passive* congestion may arise from sluggish portal circulation, associated with constipation or debility from any cause. Severe or long-continued congestion is apt to lead to diffuse inflammation of the liver.

ANATOMICAL CHARACTERS.—When congested the liver is uniformly enlarged, dark-coloured, and gorged with blood; these effects being best marked when due to mechanical congestion. The term “nutmeg-liver” is applied to the peculiar variegated appearance of the surface on section which is found in cases of *long-standing mechanical congestion*. The centre of each lobule is dark from engorgement of the intra-lobular branches of the hepatic vein, while the periphery is pale, partly from anæmia of the portal capillaries and partly from fatty changes in the peripheral hepatic cells. Interstitial hepatic inflammation is characterised by more or less abundant exudation and cell-formation in the connective tissue of the organ; and the hepatic cells become swollen and cloudy. If resolution be long deferred, changes of a cirrhotic kind are apt to supervene.

SYMPTOMS,—1. Smooth and uniform *enlargement* of the liver to a moderate extent, with *tenderness* on pressure. 2. A *feeling of painful tension* in the right side, often radiating to the right shoulder. 3. Slight *jaundice* is usually present, but the stools generally contain bile. 4. Signs of *digestive disturbance*—foul tongue, anorexia, flatulence, nausea or vomiting, and irregular action of the bowels. 5. The *urine* is scanty, high-coloured, deposits urates abundantly, and often contains bile-pigment.

II. CIRCUMSCRIBED HEPATITIS.—HEPATIC ABSCESS.

EXCEPTING in connection with pyæmia, suppurative hepatitis rarely occurs but in tropical climates, especially in India and China, and then mainly in association with dysentery. It is most apt to affect persons of indolent and intemperate habits. But there is good reason to think that it sometimes occurs independently of either pyæmia or dysentery, as the result of the *direct effect of continued intense heat*, combined with *malarial influences* and *sudden chill*.

ANATOMICAL CHARACTERS.—Circumscribed inflammation of the liver begins with active congestion, which is followed by infiltration of the part with leucocytes, and a development of embryonic tissue. The hepatic cells are swollen and cloudy. The inflamed part is pale, of doughy consistence, and surrounded by a zone of congestion. When suppuration occurs it begins in the centres of the lobules, and the patch soon softens and breaks down. Murchison distinguishes two forms of hepatic suppuration (1) *pyæmic abscesses*, which are numerous, of small size, and arise in a similar way to pyæmic abscesses elsewhere; and (2) *tropical abscesses*, which usually occur singly, are often of

large size, and follow acute local hepatitis as above described. An abscess of this kind may burst into the peritoneal cavity causing fatal peritonitis, or open into the biliary ducts. More often, however, as it approaches the surface of the gland, adhesive inflammation is set up which glues the organ to adjacent parts, and the pus is discharged either externally, or into the lung, pleura, or stomach.

SYMPTOMS.—In the early stages there is nothing characteristic, the symptoms resembling a severe case of active congestion. Suppuration is signalled by *chills*, and *hectic fever*. If the abscess be superficial *bulging* may occur in the right hypochondrium or epigastrium which soon yields a sensation of *fluctuation*, with signs of inflammatory change in the integuments. The *liver* is not only enlarged, but *altered in shape*, as may be ascertained by percussion. In doubtful cases aspiration with a capillary trocar may be practised to aid the diagnosis.

III. INFLAMMATION OF THE BILE-DUCTS.

Catarrhal inflammation of the bile-ducts is a very common affection, and is generally due to an extension of a similar process from the duodenum. It may also result from the irritation set up by passing gall-stones, or from hepatic congestion. The anatomical changes resemble those met with in other catarrhs.

The *symptoms* are indicative of obstruction of the duct caused by the swollen mucous lining, and consist of *jaundice* (v. page 257) and *enlargement of the liver and gall-bladder*, generally preceded by signs of *gastric catarrh*.

GENERAL TREATMENT.—In the treatment of hepatic congestion and inflammation rest must be enjoined; the diet should be bland and unirritating; stimulants as a rule are unnecessary, and in the first instance salines, and mild

aperients (sulphate of soda or magnesia, tartrate of potash, senna, &c.) are indicated. Local pain and tenderness may be relieved by fomentations or poultices, or by the application of 10 or 20 leeches to the abdomen. When less acute, iodide of potassium, chloride of ammonium, taraxacum, and nitro-muriatic acid are recommended. When the bile-ducts are involved, medicines directed to the gastro-duodenal catarrh are of service, such as soda, potash, or bismuth with rhubarb, ginger, or vegetable bitters.

When suppuration has occurred, and the abscess can be got at, removal of the pus is desirable—by incision (with antiseptic precautions) when superficial, or by the aspirator and capillary trocar when deep-seated.

CIRRHOSIS OF THE LIVER.

CIRRHOSIS or “gin-drinker’s” liver may be described as a chronic interstitial hepatitis, characterised by an overgrowth of the interlobular connective tissue, which tends to undergo cicatricial contraction, and thus to constrict and partly destroy the proper tissue of the liver with many of its ducts and vessels. It is most common in males between the ages of 30 and 50; and is almost invariably induced by habitual spirit-drinking.

ANATOMICAL APPEARANCES.—In the early stages of the disease the liver is enlarged from the development of a soft vascular connective tissue (rich in young cells) in the course of Glisson’s capsule, in the intervals between the lobules, and in the periphery of the lobules themselves. At a more advanced stage this new tissue becomes fibrous and contracts, and thus the liver not only becomes *smaller*, but altered in form. Its surface is more or less covered with prominences separated by depressions, which are

sometimes small and fairly uniform in size (*granular*) but more often they are large, unequal in size, and separated by deep cicatricial contractions. The consistence of the organ is firm and dense, and the surface on section is also granular, and of a dirty yellow colour.

The hepatic cells undergo fatty degeneration, and the lobular vessels and ducts are compressed and obliterated.

SYMPTOMS AND COURSE.—In the early stages the condition is similar to that described as arising from hepatic congestion.

Sooner or later, however, a series of characteristic events occur, which are traceable to the impeded circulation of blood through the liver, caused by the vascular compression and obliteration above mentioned. Thus, there is (*a*) diminution in the area of hepatic dulness, often more marked over the left than the right lobe. (*b*) The surface is irregular (*hob-nailed*) on palpation—when this is possible. (*c*) Ascites is very common. (*d*) The spleen is enlarged in a half of all cases. (*e*) The superficial veins of the abdomen are enlarged. (*f*) Hæmorrhoids are not uncommon. (*g*) Hæmorrhage into the stomach or bowels may occur. (*h*) Catarrh of the stomach and bowels with digestive disturbance in some degree is a constant feature. (*i*) Pain is usually absent at this stage. (*j*) Though decided jaundice is rare, a peculiar yellowish tinge of the skin is very often observed. (*k*) The urine is scanty, high-coloured, and deposits urates abundantly. (*l*) Cerebral symptoms may supervene. (*m*) There is in all cases progressive emaciation and debility.

DIAGNOSIS.—In some cases a difficulty in diagnosis may arise where the ascites is so considerable as to prevent physical examination of the liver. Under such circumstances it may be confounded with cancer or tubercle of the peritoneum, but is distinguishable by (*a*) the enlargement of the spleen; (*b*) the condition of the urine; (*c*) the

absence of marked pain or tenderness ; (*d*) the absence of flakes of lymph in the ascitic fluid ; and (*e*) by the history of spirit-drinking.

TREATMENT.—In early stages all stimulants should be avoided ; the diet should be bland and simple ; regular exercise in the open air is desirable ; and the secretions require attention. *Medicinally*, iodide of potassium, chloride of ammonium, mineral acids, and vegetable bitters are principally recommended. Murchison speaks highly of mercurial treatment—green iodide of mercury, (gr. $\frac{1}{2}$ —1 *ter die*) internally, with inunction of iodide of mercury ointment over the right hypochondrium.

In advanced stages, similar general principles are indicated. Spontaneous diarrhoea should not be checked unless excessive. To reduce the ascites, saline and hydragogue aperients, and diuretics, such as the acetate or bitartrate of potash, with spirits of nitrous ether, digitalis, and decoction of broom, are useful. A pill containing mercury, squill, and digitalis, is a formula of great value, and the resin of copaiba (gr. x—xv *ter die*) in almond emulsion, is an excellent diuretic *when there is no albuminuria*. Quinine, or iron, combined with digitalis, or the external application of linimentum hydrargyri, or fomentations of fresh infusion of digitalis (four times B.P. strength) may prove useful in some cases. Should these measures fail, recourse to tapping is necessary. Acute gastric disturbance must be treated as occasion requires.

Note on other forms of chronic atrophy of the liver.—1. As a result of long-standing hepatic congestion from disease of the heart or lungs, a new formation of fibrous tissue with atrophy of hepatic cells takes place *in the centre* of the lobules. As this new tissue contracts and the atrophy proceeds, the liver diminishes in size, and its consistence becomes firm and dense.

It differs from cirrhosis as follows:—There is a previous

history with present signs of cardiac or pulmonary disease; the ascites is *preceded* by dyspnoea and œdema of the legs; and there is no history of spirit-drinking.

2. The tissue of the liver may become indurated, or its surface may be marked with deep cicatricial contractions, as the result of chronic inflammation of Glisson's capsule (*peri-hepatitis*). This is *most common* in the subjects of constitutional *syphilis*.

8. An indurated and atrophic condition of the liver is sometimes met with after prolonged or repeated attacks of malarial fevers; and is characterised by dark pigmentation of its substance, and by the absence of any granulation of the surface (*red atrophy*).

All these diseased conditions resemble each other in destroying to a greater or less extent the minute branches of the portal vein within the liver; which thus accounts for the general similarity of their symptoms during life as a result of impeded portal circulation.

DEGENERATIONS OF THE LIVER.

FATTY LIVER.

This affection is strictly speaking a *fatty infiltration*, consisting of the free deposit of oil-globules within the hepatic cells (page 15). It is met with in two very opposite conditions, (1) in large eaters and drinkers (especially of spirits) who lead indolent lives; and (2) in diseases attended with rapid emaciation, especially in *phthisis*. The paradox lies only on the surface. In both, the blood is loaded with fatty matter, traceable in the first case to an excessive supply of materials capable of being converted into fat; and in the second case to the patient's own tissues. The additional fact of respiratory interference explains the greater frequency of the affection in *phthisis* than in other wasting diseases.

ANATOMICAL CHARACTERS.—Enlargement and increase in weight of the organ; thickened rounded margins; smooth surface: soft doughy consistence; and a pale and greasy surface on section. *Microscopic examination* reveals enlargement of the cells which are loaded with fat globules. The process *begins at the circumference of the lobules* and extends inwards.

SYMPTOMS.—The constitutional symptoms are few and not characteristic. The physical signs are—(a) smooth uniform hepatic enlargement; (b) soft rounded lower edge; (c) *no pain, no ascites, and no jaundice.*

ALBUMINOID OR LARDACEOUS LIVER.

As the above terms imply, this affection consists in a lardaceous infiltration of the hepatic tissue. It is met with especially as a result of (a) long-standing suppuration; (b) constitutional syphilis; (c) phthisis; and (d) chronic diseases which impair the general nutrition, such as ague, cancer, &c.

ANATOMICAL CHARACTERS.—Enlargement and increase in weight of the organ, thickened rounded edges; smooth surface; firm resistant consistence; dry glistening aspect on section; the cut surface sometimes exhibiting no trace of lobular structure; and responding to the chemical tests for lardaceous change before described (page 15). *Microscopical examination* reveals the characteristic change in the hepatic cells, and also in the minute arteries and capillaries of the lobule. The process begins in the *middle zone of the lobules* corresponding with the distribution of the hepatic artery.

SYMPTOMS.—As a rule these are not characteristic, and cannot be separated from those of the disease on which the degeneration depends.

The *physical signs* consist of smooth, uniform hepatic en-

largement, with firm rounded resistant lower edge. There is *no* pain or tenderness; and when jaundice or ascites are present they are due to pressure on the bile duct and portal vein respectively, by lymphatic glands in the hilus of the liver, which are enlarged from lardaceous deposit. The implication of other organs with a similar deposit, notably the spleen, kidneys, and bowels, is of considerable diagnostic importance.

TREATMENT.—This chiefly merges in the treatment of the diseases with which the condition is associated. In albuminoid liver tincture of iodine, iodide of potassium, iodide of iron, and chloride of ammonium have been more especially recommended.

HYDATID TUMOUR OF THE LIVER.

THIS affection is due to the development in the liver of the *cysticercal embryo* of a tape-worm, known as *Tenia echinococcus*, which infests dogs and wolves. The relationship between a cysticercus and a fully-developed tape-worm will be understood on reference to the description already given of intestinal worms. It will then be seen that, contrary to the usual rule, it is the asexual cysticercus in this case which inhabits man, while its corresponding *Tenia* is found elsewhere. The ova discharged by the dog in the usual way are introduced into the human body through the medium of water or food, and on arriving in the stomach are set free, migrate, and usually settle in the liver. Sheep are affected in a similar way, and it is through eating their flesh that dogs become the seat of this tape-worm.

A hydatid tumour consists of a primary sac or vesicle (mother-cyst) with thick, soft, transparent, and laminated walls, the innermost layer of which is formed by a delicate cellular membrane. The cavity of the mother-cyst is filled

with clear, limpid fluid of low specific gravity, which contains a large amount of chloride of sodium, but *no* albumen. Floating in this fluid are numerous "daughter-cysts" also containing fluid, and within the larger there may be a third and sometimes even a fourth generation of cysts. These secondary cysts have a similar structure to that of the primary cyst. Further on the inner surface of the sacs several little prominences may be seen, about $\frac{1}{8}$ inch in height. These consist of a small vesicular body which is surmounted by a head furnished with four suckers, and a row of curved hooks, and is attached at its base to the cyst-wall by a narrow pedicle. The whole tumour thus constituted is enclosed by a zone of connective tissue of irritative origin. Such tumours usually occur singly, and vary indefinitely in size.

MODES OF TERMINATION.—1. In small tumours the parasite is apt to die; whereupon the cyst with its contents degenerates and shrinks. 2. The cyst may burst in any direction. 3. It may inflame and suppurate.

SYMPTOMS.—Hydatid tumour of the liver usually runs a latent course, unless by reason of its size it presses upon or otherwise interferes with the functions of surrounding parts.

PHYSICAL SIGNS.—(a) Gradual enlargement of the liver, which is not uniform but irregular, so that the natural form of the organ is altered. (b) Occasionally there is bulging of the ribs. (c) When the tumour can be felt it is elastic and fluctuating, and as a rule it is quite painless.

It must be remembered that these signs vary according to the size, position, and progress of the tumour. In doubtful cases an exploratory puncture may be made with a small trocar.

TREATMENT.—Where practicable an attempt should be made to remove the fluid with a fine trocar and canula which may be employed either with or without aspiration.

The removal even of a portion of the fluid has been found sufficient to cause the death of the parasite. Medicinal treatment beyond that which may be directed to the relief of symptoms is of no service whatever.

CANCER OF THE LIVER.

CANCER of the liver is usually *secondary* to cancer elsewhere, but it is sometimes *primary*. It is most often met with in those of middle or advanced life.

ANATOMICAL CHARACTERS.—The *encephaloid* variety is most common. It usually occurs in the form of isolated, rounded nodules, which are scattered through the organ, and vary greatly in size. Those which are superficial are flattened and depressed in the centre, and generally give rise to more or less local peritonitis. The nodules grow at the periphery, and at their centres soon undergo degeneration. The unaffected parts of the liver are congested and often stained with bile.

More rarely hepatic cancer takes the form of a diffuse infiltration; when the irregularity of surface, so characteristic of the vast majority of cases, is wanting.

SYMPTOMS.—(a) The liver is *enlarged irregularly* as may be ascertained both by percussion and palpation. (b) It is *hard* and *resistant* to the touch. (c) It is both painful, and tender on pressure. (d) Jaundice and ascites are present in about half of all cases, and when once developed rarely disappear. These conditions are usually the result of pressure on the bile-duct and portal vein by enlarged glands in the portal fissure. (e) The spleen is rarely enlarged. (f) Constitutional symptoms, digestive disturbance, irregular action of the bowels, aching pains in the limbs, and progressive anæmia and emaciation (*cancerous cachexia*) are always present more or less. The urine is scanty, high-coloured, and deposits urates in abundance.

The *duration* rarely exceeds one year, and the *termination* is always fatal.

The *treatment* is necessarily purely palliative, and symptomatic.

TUBERCULOSIS OF THE LIVER.

THIS affection is never primary, and is only met with as part of general tuberculosis, or as secondary to chronic tubercle elsewhere. It cannot be recognised during life.

JAUNDICE.

JAUNDICE properly speaking is only a *symptom*, yet it is one of sufficient importance to merit a separate description. Jaundice denotes a yellow discolouration of the skin and conjunctiva due to impregnation with bile-pigment. Various discolourations of the skin in some measure resemble that of jaundice, but can always be distinguished by the absence of bile-pigment from the urine, and by the usually natural colour of the conjunctiva.

Under ordinary circumstances we know that bile is being constantly absorbed by the vessels of the liver, gall-bladder, and intestines, and yet jaundice does not occur. The conclusion necessarily follows that it must undergo metamorphosis in the blood as soon as it is taken up. It is clear then that the accumulation of bile in the blood on which jaundice depends will arise (1) when more bile enters the blood than can undergo metamorphosis, or (2) when there is any interference with the process of metamorphosis itself. In this way we arrive at a basis for the classification of the causes of jaundice.

I. JAUNDICE DUE TO EXCESS OF BILE IN THE BLOOD may be caused by—1. *Obstruction of the bile duct (obstructive jaundice)*, by (a) foreign bodies within it as gall-stones, &c.;

(b) alteration in its walls from catarrhal inflammation, from cicatricial contraction after ulceration, or from new growths; or (c) pressure on the bile duct from without by enlarged glands in the portal fissure, aneurism, or other tumours. 2. *Excessive secretion of bile*, such as occurs in hepatic congestion. 3. *Excessive absorption of bile* from habitual constipation.

II. JAUNDICE DUE TO CAUSES INTERFERING WITH THE METAMORPHOSIS OF BILE, *viz.*:—1. *Poisons in the blood*:—(a) poisons of specific fevers (yellow fever, ague, &c.); (b) animal poisons (snake-bites, pyæmia); (c) mineral poisons (phosphorus, copper, &c.); (d?) acute atrophy of the liver. 2. *Impaired or deranged innervation*:—(a) severe mental emotion, fright, &c.; (b) concussion of the brain. 3. *Deficient oxygenation of the blood*, such as may be met with occasionally in acute pneumonia, &c.

SYMPTOMS.—It will suffice to enumerate those symptoms which occur irrespectively of the cause of the jaundice. 1. *External discolouration*. As a result of impregnation with bile pigment, the tissues soon become stained with a yellowish or olive-green colour. This is well shown in the conjunctivæ and skin. 2. The *urine* is also altered in colour from the presence of bile, and will stain the linen. The colour varies from saffron-yellow to brownish-black according to the quantity of bile which it contains. The chemical tests for bile in the urine are two, *viz.*:—(a) *For bile pigment*:—A drop or two of strong nitric acid added to a small quantity of urine containing bile, on a piece of white porcelain, will give a play of colours, passing through green, blue, violet, and red, into a dirty yellow. (b) *For bile acids*:—To about two drachms of urine in a test-tube add a *very little* cane-sugar or syrup, and afterwards pour in some strong sulphuric acid so slowly that the two liquids shall not mix. A *deep purple* colour is produced where the acid and urine meet, if bile acids be present. The urine

also sometimes deposits crystals of leucin and tyrosin, on being evaporated down to a syrupy consistence. 3. A *bitter taste* is sometimes complained of. 4. *Derangements of digestion*.—When bile is absent from the intestines there is usually flatulence, constipation, and the motions are of a pale drab or clay colour. The digestion of fats is also interfered with. 5. Troublesome *itching of the skin* is often observed, and *cutaneous eruptions* of various kinds are not infrequent. 6. The *temperature*, in the absence of any concurrent cause of fever, is slightly *lower* than normal. 7. The pulse is also slower, and may fall to 50, 40, or even 20 per minute. 8. Impairment of *general nutrition* is manifested by debility, emaciation, anæmia, and a not infrequent tendency to hæmorrhages from the various mucous membranes. 9. *Nervous symptoms*. There is always some languor, depression, and incapacity for exertion; and sometimes signs of more severe disturbance are met with, such as delirium, stupor, coma, convulsions, muscular tremors, &c.

DIAGNOSIS.—In practice it is important first of all to ascertain whether the bile-duct is obstructed or not. Where there is obstruction, the stools contain no bile, the jaundice speedily becomes intense, and an enlargement of the gall bladder can be sometimes detected; but where there is no obstruction, the stools contain bile, the jaundice is slight, and the gall bladder is not enlarged. Jaundice which comes on *suddenly* is probably due either to obstruction of the duct by a gall stone, or (when the signs of obstruction are wanting) to nervous causes. Intense jaundice which has developed *very gradually* probably results from pressure on the bile-duct from without. Intermittent attacks of jaundice point to gall stones in elderly people; and to catarrh of the bile ducts in children. Paroxysmal pain *preceding* jaundice points to gall stones—*following* jaundice, to cancer. Pain and tenderness over the right hypochon-

drium concurring with jaundice, probably indicate (a) congestion, (b) catarrh of bile ducts, or (c) cancer. Jaundice with great enlargement of the liver is, if the latter be painful and tender, probably due to cancer; if painless, to lardaceous liver. When jaundice co-exists with ascites, there is usually either cancer or cirrhosis. Febrile obstructive jaundice is almost always due to catarrh of the bile ducts.

ACUTE ATROPHY OF THE LIVER—MALIGNANT JAUNDICE.

THE etiology of this rare disease is very obscure. It is most common in pregnant females, and rarely occurs in childhood or after 90 years of age. Intense emotion, syphilis, typhus, and intemperance, have been mentioned as predisposing causes. It is characterised by rapid atrophy and disintegration of the secreting tissue of the liver.

SYMPTOMS.—Premonitory signs are slight or absent altogether. It usually begins with jaundice, which is rarely intense, and is independent of any obstruction of the bile duct. The area of hepatic dulness very rapidly diminishes. Pain and tenderness at the epigastrium and over the liver, vomiting, and constipation, are usual symptoms. More characteristic features are presented in the *prominent nervous symptoms of the "typhoid state"*; the absence (in most cases) of fever; the almost complete disappearance from the urine of urea, and uric acid, with the substitution of leucin and tyrosin; and the great liability to hæmorrhage from the nose, stomach, and bowels, with subcutaneous ecchymoses.

The course is rapid, and the termination fatal. When it arises during pregnancy, abortion or miscarriage usually follows.

TREATMENT is generally of little avail, and must be necessarily symptomatic. Smart purgation has been recommended.

GALL-STONES.

GALL-STONES or biliary concretions are met with in the gall bladder, or far more rarely in the biliary passages elsewhere. They may exist singly, but are more often multiple. Their size varies from a mere grain to a complete mould of the gall bladder. At first they are rounded in form, but when many gall stones develop simultaneously, their opposed surfaces become flattened against each other. Taken together, the tendency is to form a mould of the cavity which they occupy. Their surfaces are commonly smooth, but sometimes tubercular; and they vary in colour from a pale yellow to a deep brownish-black. When fresh, they sink in water. Their consistence varies also, but they are usually soft enough to be cut with a knife. They consist mainly of *cholesterine* impregnated with pigment and lime salts, which is deposited around a small central nucleus, generally formed of particles of mucus. The cortex frequently presents a laminated structure.

The *effects* of gall-stones are various. 1. They may gradually fill the gall-bladder and remain inert. 2. They may excite inflammation, ulceration, or suppuration of the gall-bladder; and in the latter case the pus may be discharged externally through the abdominal parietes, or into the peritoneal cavity or into some adjacent hollow viscus. 3. More frequently, one or more gall-stones are dislodged, and escape into the ducts, and either gradually pass on into the duodenum, or become impacted and lead to obstruction of the flow of bile.

SYMPTOMS.—These necessarily vary according to the circumstances just enumerated. 1. Nothing may be detected beyond a hard irregular lump, which can sometimes be felt in the situation of the gall-bladder. 2. When inflammation occurs, we may expect to find pain, tenderness, and

some fulness of this part, together with more or less febrile disturbance. 3. The passage of a gall-stone along the duct is indicated by griping, tearing pain in the belly, which is often excruciating (*hepatic colic*), lasting from a few hours to a day or so, and accompanied by faintness, prostration, a small thready pulse, and vomiting. The pain is further characterised by its sudden onset, its occurrence two or three hours after a meal, and the relief given by pressure. The attack often ends as abruptly as it began, by the slipping back of the stone into the bladder, or its escape into the duodenum.

If the passage be at all protracted the flow of bile is sufficiently impeded to lead to jaundice, which supervenes about twenty-four to thirty-six hours *after the pain*, and is accompanied by the usual signs of obstruction of the bile-ducts. Some fever with the continuance of pain and jaundice points to secondary inflammation of the duct. Such attacks are apt to recur, but are then usually shorter and milder than at first.

In doubtful cases the gall-stones should be sought for in the *fæces* by diluting the latter with water, and afterwards by straining through a sieve.

TREATMENT.—During the passage of a gall-stone, the pain is best relieved by hypodermic injection of morphia to which a little atropia may be added with advantage. In certain cases it may be necessary to induce anæsthesia by chloroform. Hot fomentations should be applied to the abdomen, or a hot bath may be given.

Between the attacks, the administration of a solution composed of three parts of ether and two parts of turpentine in doses of $\text{ʒ}x\text{-xx}$ three times a day in capsules, has been recommended. Benefit is sometimes derived from drachm doses of sulphate of soda, three times a day, well diluted. Cases are on record where gall-stones have been successfully removed by abdominal section.

SUB-SECTION VII.

DISEASES OF THE SPLEEN.

SPLENIC ENLARGEMENTS.

THE spleen is liable to many diseases; but since none of them can be recognised with certainty in the absence of enlargement, and since a splenic tumour is often the first or only indication of disease, it will be convenient to group them all under this head.

Enlargements of the spleen may either be acute or chronic. Acute enlargement may be due to inflammation or active congestion; while chronic enlargement may occur from mechanical congestion, simple hypertrophy, lardaceous degeneration, cancer, or hydatids, (Tubercle of the spleen is also met with either as a part of general miliary tuberculosis, or as secondary to chronic phthisis, but it cannot be recognised clinically).

The spleen normally lies in the left hypochondrium in the hollow of the diaphragm, and is partly covered by lung, and partly in direct contact with the thoracic wall. It extends in the axillary line from the seventh rib above to the eleventh or twelfth rib below; and its anterior margin coincides largely with the line of the ninth rib (fore-part). It cannot be reached on palpation, and is only recognisable by percussion, the dull area varying much according to the amount of distension of the stomach and bowels. For such reasons, slight degrees of splenic enlargement cannot be recognised with precision. The enlarged organ mainly extends downwards and inwards towards the pelvis and umbilicus, and may form a tumour of immense size, with protrusion of the abdominal walls. When once it has extended beyond the lower costal border

it can be reached by palpation. We find that it follows the respiratory motion of the diaphragm; that it is moveable and that it shifts its position according to the posture of the body. Its anterior edge is well-marked and presents one or more characteristic notches.

INFLAMMATION OF THE SPLEEN is exceedingly rare except as a result of embolism or pyæmia. Splenic embolism is generally associated with valvular disease of the heart, and forms one or more wedge-shaped hæmorrhagic masses in the substance of the organ, which are at first dark-red, but afterwards get paler, and finally almost white and cicatricial in character. More rarely the infarct becomes cheesy, or even suppurates. The peritoneum is usually inflamed over the affected part. Pyæmic infarcts are analogous to the foregoing, but are smaller and more numerous, and suppuration is the rule. The spleen as a whole presents a deep purple colour, and its tissue is very soft.

Pain and tenderness in the left hypochondrium, sympathetic vomiting, together with more or less splenic enlargement, occurring in the course of heart disease or pyæmia, would suggest the occurrence of splenic embolism.

CONGESTION OF THE SPLEEN may be either active or mechanical. The former, as a morbid condition, chiefly occurs in connection with acute febrile disorders, especially malarial and typhoid fevers. The latter is a common result of obstructed circulation from hepatic, pulmonary, or cardiac disease. In congestion the organ is engorged with blood, and more or less enlarged, sometimes very much so. In continued or oft-repeated congestion chronic hypertrophy of the organ takes place.

The only indication of splenic congestion during life is enlargement of the organ, together with a sense of weight or tension, and some tenderness in the left hypochondrium.

SIMPLE HYPERTROPHY of the spleen is for the most part the result of chronic congestion. It is of common occur-

rence in the subjects of malarial affection, hepatic cirrhosis and rickets. Frequently, however, no adequate cause can be found.

The spleen is enlarged from an increase in all the tissue-elements of the organ. This form of enlargement cannot be anatomically distinguished from that met with in leucocythæmia, which is described elsewhere.

Apart from leucocythæmia the symptoms of splenic hypertrophy are vague and unsatisfactory, and consist of a painless enlargement of the organ, anæmia, general debility, and a proneness to hæmorrhage from some one or other of the mucous surfaces.

LIARDACEOUS DEGENERATION OF THE SPLEEN is of common occurrence, and is generally associated with a similar change in the liver, and other parts. As to its etiology and morbid characters, the general description already given may be referred to (page 15). It first affects the Malpighian bodies and the small vessels in connection with them. The affected organ is much enlarged, smooth, firm, and heavy. On section the surface, in the earlier stages, is studded with translucent granulations like boiled sago-grains (sago-spleen); but later on the degeneration is more or less uniformly distributed.

The symptoms are those of simple hypertrophy, but a distinction can readily be made, as a rule, by the history of the case, and the evidence of a similar change in other organs.

CANCER OF THE SPLEEN is very rare, and is almost always secondary to cancer of the stomach. It occurs in the form of nodular masses of the encephaloid type. The condition may readily be overlooked, owing to the indefinite character of the signs and symptoms to which it gives rise. Sometimes, however, it occasions a painful, tender, and irregularly-shaped tumour in the left hypochondrium.

HYDATIDS are exceptionally met with in the spleen, but

the condition is not one which calls for any special description.

General treatment of splenic enlargements.—This mainly resolves itself into the treatment of the condition to which the enlargement is due. Quinine and arsenic have often a marked influence in reducing enlargement traceable to malarial influence; but for the most part splenic enlargements admit of no direct treatment. In hypertrophy and lardaceous degeneration, iron, mineral acids, good food, change of air, and bathing followed by frictions are indicated.

SECTION VII.

DISEASES OF THE URINARY SYSTEM.

THE URINE.

RENAL disease and modifications in the characters of the urinary secretion are so intimately connected with each other, that a short account at least of urine in health and disease is absolutely necessary.

URINE IN HEALTH.—Healthy urine is a clear, watery, amber-coloured fluid of acid reaction, with a specific gravity of about 1020. The average amount passed in the 24 hours is about 50 ounces in an adult, but it varies within wide limits according to the amount of fluid drunk, and the amount of water which escapes by other excretory channels. This amount contains from 300 to 500 grains of urea, about 10 grains of uric acid, and still less hippuric acid, creatin and creatinine. In addition it contains a considerable amount of chlorides, phosphates, and sulphates, of which the bases are soda, potash, lime, and

magnesia, together with a minute quantity of oxalic and lactic acids.

On standing it undergoes certain fermentative and putrefactive changes. At first it becomes more acid, chiefly due to lactic acid fermentation; but after a variable period it becomes alkaline from the conversion of urea into carbonate of ammonia, is cloudy, and emits an offensive and characteristic odour.

URINE IN DISEASE.—*Physical characters.* The urine is always scanty in febrile conditions, acute renal inflammation, or renal congestion; and in collapse it is sometimes almost or quite suppressed. On the other hand it is abundant in diabetes, some forms of chronic renal disease, and after hysterical paroxysms. The sp. gr. as a rule is in inverse relation to the quantity of urine, but sometimes we get a high sp. gr. with abundant urine as in diabetes. The reaction is nearly always acid except in certain forms of dyspepsia, or where alkalies are taken in large quantity, or in vesical inflammation attended with premature decomposition of the urine. If the urine be turbid when passed, it is due either to the presence of earthy phosphates, mucus, or pus. In the first case the turbidity clears up at once on the addition of an acid. Pus may be distinguished from mucus by the presence of albumen in the former.

Urea is derived from destructive metamorphosis of the nitrogenous elements of the food and tissues. It is largely increased in most febrile disorders, and in diabetes; while it is diminished in most organic diseases of the kidney, and is absolutely suppressed in acute atrophy of the liver. The quantity is best ascertained by a cheap apparatus devised by Russell and West, based on the principle of the decomposition of the urea by hypobromite of soda, and collection of the nitrogen gas which is given off.

Uric acid and urates only occur as deposits in acid urines. Uric acid represents a certain stage in nitrogenous meta-

morphosis; when in excess, as in gout, it is often found as a reddish-brown, sandy, crystalline deposit. The crystals are generally lozenge-shaped, occurring singly or in clusters. It is important because it is apt to lead to the formation of urinary concretions. Urates of ammonia and soda often occur as an amorphous deposit in scanty acid urines, and though not necessarily morbid they generally indicate some hepatic, catarrhal, or febrile derangement. They are readily dissolved by heat or the addition of an alkali.

Leucin, *tyrosin*, and *cystin* are exceptionally observed in the urine of disease, but the reader is referred to special text-books on the subject for their characters and the conditions under which they are found.

Salts.—The most important from a clinical point of view are the phosphates and oxalate of lime. *Phosphates*. Three varieties are found in the urine:—(1) Amorphous phosphate of lime, as a deposit, only occurs in alkaline or neutral urine. It does not dissolve on boiling, but a drop or so of nitric acid at once clears up the urine. (2) Ammonio-magnesian or triple phosphates are only thrown down in alkaline ammoniacal urine. It usually occurs in the crystalline form of a three-sided prism with bevelled ends. (3) Stellar phosphate of lime is of rare occurrence, and assumes the form of crystalline rods or needles, single or grouped in rosettes. *Oxalate of lime* in small quantity is of no morbid significance, but when of habitual occurrence there is usually some obvious departure from health. Its crystals are octahedral or dumb-bell shaped. They are rarely found in other than acid urines.

Albumen in the urine in any quantity is always of pathological significance. It is found under one of three conditions; (a) structural changes in the kidney; (b) renal congestion; and (c) the presence of blood or pus in the urine. The tests for albumen are based on the fact of its coagulation by heat or nitric acid. If urine containing

albumen be boiled it becomes turbid, or a dense precipitate is thrown down (according to the amount present), which is *not* redissolved on the addition of a few drops of acetic or dilute nitric acid. Again, if a little urine containing albumen be poured gently down the side of a test-tube containing strong nitric acid, a white layer of coagulated albumen forms at the line of contact between the two fluids. The relative quantity of albumen in any specimen of urine may be fairly estimated by thoroughly boiling a small quantity of acidified urine, and then allowing it to stand for some time, for the precipitate to subside. In forming an opinion as to whether albumen is the result of organic renal disease we should be mainly guided by the amount and duration of the albuminuria, and the associated presence of renal epithelium and casts.

Grape-Sugar in minute quantity is probably always present even in normal urine, but its persistent presence in considerable amount is only found in diabetes. The general characters of diabetic urine will be described with that disease. The principal tests for grape-sugar are:— (1) *Fermentation test*. Urine to which a little yeast has been added, and allowed to stand for some time in a warm place, ferments if sugar be present, with the disengagement of carbonic acid gas. (2) *Moore's test* consists in boiling a small quantity of saccharine urine with an equal quantity of liquor potassæ, when a deep reddish-brown colour is developed. (3) *Fehling's test* consists in boiling a little of the suspected urine with rather more than an equal bulk of Fehling's solution (potassio-tartrate of copper) when a brick-dust precipitate of sub-oxide of copper is thrown down if sugar be present. The most convenient method of estimating the quantity of sugar passed in 24 hours is as follows. A sample of the collected urine should be fermented with yeast, and the sp. gr. *before* fermentation, should be compared with that *after* fermentation, and the

difference in the number of degrees represents approximately the number of grains of sugar per ounce. A standard Fehling's solution may also be employed for the same purpose, the calculation being based on the quantity of urine necessary to decolourise a given measure of the copper solution.

Blood.—Blood in the urine (*hæmaturia*) may arise from hæmorrhage in any part of the urinary tract.—(1) The kidney or its ducts, (2) the bladder, or (3) the urethra. In *renal hæmorrhage* the blood is uniformly diffused throughout the urine, which is of a dark smoky tint, and deposits a chocolate-coloured sediment on standing, in which blood-casts may often be found. Its causes may be grouped in three classes: (a) *local lesions*—of which the more important are acute Bright's disease, cancer, calculous concretions, and acute congestion; (b) *symptomatic*—as in purpura, scurvy, and certain fevers; and more rarely (c) *supplementary*—as in sudden suppression of menstruation, or a hæmorrhoidal flux. In hæmorrhage from the *bladder* the blood is much less intimately mixed with the urine, often appearing only towards the *end* of micturition, while the urine is of a pinkish or blood-red colour, and is associated with the symptoms of vesicle disease. Hæmorrhage from the *urethra* is distinguished by its occurrence independently of micturition.

The detection of blood corpuscles on microscopic examination is the safest test for blood. The appearance of the blood-cells varies according to the sp. gr. of the urine; if it be high the cells are small and shrivelled, if it be low they are large, transparent, and circular; in other cases the appearance may be normal. The urine is necessarily albuminous.

The *treatment* of hæmaturia will depend on its causation. If the hæmorrhage become serious in itself, cold applications to the loin or abdomen, the internal administration

of turpentine, ergot, acetate of lead with opium, gallic acid or sulphuric acid, and absolute rest are required.

Mucus.—A light cloud of mucus is often present in healthy urine, but the quantity is sometimes largely increased, especially in inflammation of the bladder. The urine is then very apt to become ammoniacal, turbid, and ropy. Between mucus and pus the gradation is imperceptible.

Pus.—Urine containing pus is turbid and does not clear on boiling, and can be readily recognised on microscopical examination. When present in quantity it forms a yellowish white deposit, which becomes ropy on boiling with liquor potassæ. Pus in the urine may be derived from inflammation of any part of the mucous urinary tract, from renal abscess, or from direct communication with some neighbouring abscess.

Casts.—One of the most frequent accompaniments of structural change in the kidneys is the formation of fibrinous moulds of the urinary tubules, fragments of which are washed onwards by the urine, where they may be detected on microscopic examination. Sometimes the little plugs are clear and transparent (*hyaline casts*); or they may be more or less covered by epithelial cells from the tubules (*epithelial casts*); or they may exhibit granules (*granular casts*); or they may contain globules of fat (*fatty casts*); or lastly they may be almost entirely made up of blood-cells (*blood casts*).

URÆMIA.

THE term uræmia is applied to an assemblage of symptoms which attaches to an interference with urinary excretion, and is associated for the most part with organic renal disease, though not infrequently it is related to some obstruction in the outflow of urine. It essentially depends on

the retention within the system of the products of retrograde metamorphosis of the tissues and food.

The usual indications of uræmia consist of a peculiar ammoniacal odour of the breath, headache, drowsiness, muscular twitchings, dimness of sight, nausea or vomiting, and diarrhœa, succeeded by general convulsions or coma. The onset is generally insidious and marked by headache and drowsiness; but sometimes the patient is suddenly struck down with epileptoid convulsions, or insensibility, or he may become suddenly blind. Such cases are occasionally mistaken for apoplexy, epilepsy, or opium-poisoning; hence the great importance of testing the urine carefully under these circumstances.

In treating uræmia every endeavour should be made to renew the flow of urine, and to excite the action of the skin. For the former dry-cupping, with hot and moist applications over the loins; for the latter warm baths, and wet-packs are of great service. Free purgation with hydragogue cathartics, such as elaterium, and compound jalap powder, is also indicated. When convulsions suddenly supervene the inhalation of chloroform is useful; and in cases of sudden insensibility, venesection may be employed, unless there is advanced chronic disease of the kidneys. Any removable cause of retention of urine of course requires special attention.

RENAL CONGESTION.

CONGESTION of the kidney may be either active or mechanical. The former constitutes the first stage of nephritis, is a common condition in acute fevers, and also results from certain substances such as turpentine, cantharides or copaiba when taken in excess. The latter depends on venous obstruction from pulmonary or valvular disease, and from pressure on the lower vena cava or renal veins.

In renal congestion, pure and simple, the kidneys are merely enlarged, and engorged with blood; but if the process be severe or long-continued, structural changes follow. Thus, the acute form is apt to merge into inflammation by insensible gradations; while mechanical congestion leads to disintegration and degeneration of the renal epithelium, accompanied with overgrowth of interstitial connective tissue.

Renal congestion is usually attended with a scanty secretion of high-coloured urine, which deposits urates on standing. If the congestion be sufficiently intense, the urine contains a small quantity of albumen, blood, renal epithelium, and a few hyaline casts. In cases of active congestion which are not attended with fever, and in which the process falls short of actual inflammation, the urine is copious, pale, and of low specific gravity.

The general principles to be observed in the *treatment* are absolute rest, bland unirritating food, warm and moist applications to the loin, warm baths, and free purgation.

ACUTE BRIGHT'S DISEASE.

ACUTE BRIGHT'S disease is an acute inflammation of the kidney (*acute nephritis*). It is most frequently met with as a sequela of scarlet fever, diphtheria or other specific diseases; as the result of exposure to cold; or in connection with pregnancy.

MORBID ANATOMY.—The kidneys are greatly enlarged, and engorged with blood; but the surface is smooth, and the capsule remains thin and non-adherent. On section the colour is at first of a deep dusky red throughout, the Malpighian bodies appearing as still darker points. At a later stage, the cortex becomes paler or mottled, and contrasts strongly with the dark-red bases of the pyramids.

On microscopic examination, both the interstitial tissue and the tubular parenchyma are found to be affected. The glomeruli are crowded with small round cells (*leucocytes*), which extend to the adjacent interstitial tissue. The tubules are distended with epithelium in various stages of degeneration, and they also contain blood, and fibrinous casts. These changes are most marked in the cortex of the kidney, but they also involve the straight tubes to a less extent.

The *symptoms* essentially consist of fever, dropsy, and albuminuria. The disorder is usually ushered in more or less abruptly with chilliness or shivering, headache, nausea or vomiting. There is more or less febrile disturbance attended with a hot dry skin, thirst, loss of appetite, constipation, and perhaps some pain or tenderness in the loins. The *urine* is very scanty, turbid, abnormally dark or smoky in colour, with a high sp. gr., and contains albumen, blood, and a diminished quantity of urea. On standing it deposits a copious sediment, which, on microscopic examination, is found to consist of blood-cells, loose renal epithelium, epithelial, hyaline, granular, or blood casts, and amorphous urates. The *dropsy* generally comes on early, and is sometimes the first indication of mischief. It generally begins in the eyelids or scrotum, and rapidly becomes general. The serous cavities and internal organs are also liable to be involved in the dropsical process.

The progress and results of acute Bright's disease vary greatly. In favourable cases (which constitute the large majority) the symptoms subside in the course of a few weeks, the anasarca usually disappearing long before the albumen has quite vanished from the urine, and convalescence is gradually re-established. On the other hand, death may occur (1) from inflammation of the lungs, pleura, or peritoneum; (2) from anæmia and asthenia; (3) from œdema of the lungs or larynx; or (4) from the

supervention of uræmia. Lastly, it may become chronic. Owing to the tendency to recurrence, great care should be taken during convalescence.

TREATMENT.—The patient should be kept warm in bed at an equable temperature. In the early stages the bowels should be kept fairly open; the action of the skin should be maintained by occasional warm baths; and dry-cupping or hot fomentations may be employed over the loins. Medicinally, full doses of the acetate or citrate of potash, well diluted, together with digitalis and nitric ether are of service. As the more acute symptoms subside vegetable tonics and iron are indicated. The diet should be light, nutritious, and unstimulating, and alcohol is rarely needed. No restraint should be exercised with regard to the amount of water to be taken, for the more freely it is drunk, the better. If the dropsy be so excessive as urgently to call for relief, acupuncture may be resorted to. Only one or two punctures should be made, owing to the readiness with which erysipelatous inflammation takes place. Complications must be treated as they arise.

CHRONIC BRIGHT'S DISEASE.

CHRONIC Bright's disease occurs either as the sequel of an acute attack, or is chronic from the outset. In the latter case, it must be regarded as the expression of a general malnutrition, which is sometimes traceable to one cause, and sometimes to another. Irregular living, frequent exposure to cold and damp, intemperance, gout, and syphilis, are common remote causes of this affection.

PATHOLOGY AND MORBID ANATOMY.—The renal changes are essentially of a chronic inflammatory nature, and in all cases tend to become diffuse and to affect the organ as a whole. Clinical observation, however, justifies the recog-

nition of at least two distinct forms, according as the tubular or parenchymatous portion of the kidney, or its interstitial connective tissue is first and mainly affected. To the former is given the name of the "smooth white kidney;" to the latter that of "granular" or "contracted kidney."

The *smooth white kidney* whether preceded by acute inflammation or not, presents appearances which do not essentially differ from those already described as pertaining to the later stages of acute Bright's disease. The weight of the organ may be doubled, its surface is smooth and pale, and the capsule is not adherent. On section the cortex is seen to be much thickened, pale or yellowish, and the pyramids too may be paler than normal. On microscopic examination, the tubes are found stuffed with epithelium in various stages of disintegration and often markedly fatty; while here and there they contain fibrinous material. In all long-standing cases the interstitial tissue is in excess, and if life be sufficiently prolonged, subsequent contraction and atrophy bring about a condition indistinguishable from true granular kidney.

The *granular contracted kidney*, in its typical form, is small, its surface is granular or nodulated, and its capsule is firmly adherent. On section the cortex is seen to be of a red colour, and much thinner than normal; the tissue generally is hard and resistant, and may be studded with small cysts. On microscopic examination, the connective tissue is relatively in great excess, and the tubules are variously altered—some are denuded of epithelium and distended with fibrinous material or greatly atrophied, while others are little changed. The primary change thus appears to consist of proliferation with subsequent contraction of the interstitial tissue, the tubules with their epithelium being involved at a later period. Certain cardio-vascular alterations are often met with, which are characterised by thickening of the walls and reduction in the calibre of the

small systemic arteries, together with hypertrophy of the left ventricle of the heart. Both conditions are closely related to increased resistance from the difficulty with which the blood, rendered impure by long-standing renal insufficiency, circulates through the tissues. The above changes are also observed in that form of granular kidney which *succeeds* parenchymatous inflammation.

GENERAL SYMPTOMATOLOGY.—Excluding those cases of chronic Bright's disease which occur as the sequel of an acute attack, the onset is usually very insidious, and characterised by frequent micturition (especially at night), gradual failure of strength, increasing pallor, a little fulness about the ankles at night, or puffiness of the eyelids in the morning. More rarely the disease is suddenly revealed by the supervention of coma or general convulsions.

When fully established, the following constitute the more important symptoms:—albuminous urine containing renal epithelium and casts; more or less œdema or dropsical effusion; anæmia and shortness of breath; dryness of the skin; digestive derangements; headache and giddiness, together with a tendency to dimness of sight and retinitis; uræmia; secondary inflammations; and cardiac hypertrophy. The disease is essentially chronic, and is subject to sub-acute exacerbations from time to time. Death ultimately takes place from uræmia, œdema of the lungs or larynx, secondary inflammations, asthenia, or the occurrence of apoplexy or phthisis.

SMOOTH WHITE KIDNEY. CHRONIC TUBAL NEPHRITIS.—This form generally follows an attack occurring in connection with scarlet fever, exposure to cold, or pregnancy. The *average* age at which it occurs is 28 years. The urine is scanty, its sp. gr. is normal or slightly increased, it is turbid or smoky, is highly albuminous, and on standing deposits a copious sediment containing abundant epithelium,

with epithelial, fatty, granular, or hyaline casts. Dropsy is also abundant. The face is pale and pasty, and there is a marked tendency to secondary inflammations, and uræmia. The average duration of fatal cases is under six months, after it has once become fully established. Favourable cases are more chronic, some albuminuria often persisting long after the other symptoms have subsided.

GRANULAR KIDNEY is almost always chronic from the commencement and begins very insidiously. The *average* age at which it occurs is 40-50 years. The urine is copious, of low sp. gr., clear, contains but little albumen, and on standing deposits a very slight sediment containing a few hyaline or granular casts, and some epithelium. Dropsy is altogether absent in many cases, and when present is usually slight, and limited to some puffiness of the eyelids or ankles. The face though pale, is not white and pasty. The course is much more chronic, and there is less tendency to uræmia and secondary inflammations than in the former variety, while hypertrophy of the heart and thickened arteries are commonly found. The latter are apt to become atheromatous, and thus may lead to apoplexy. The prognosis is ultimately very unfavourable.

The TREATMENT of chronic Bright's disease is not very satisfactory. The body should be kept warm and be clothed in flannel. All exposure to cold must be carefully avoided, and residence in a warm equable climate is desirable. The food should be light, bland, and nutritious; and a diet of milk or skimmed milk often answers better than anything else. Alcohol is not necessary as a rule, but sometimes digestion is carried on more efficiently with the aid of a little light wine such as claret or hock. Medicinally, iron given persistently and in full doses, with or without quinine, has perhaps the most beneficial effect. The tincture of the perchloride is the best preparation, but where this disagrees with digestion, it must give place to

the blander ammonia-citrate, or tartarated iron. Extreme dropsy is most effectually combated by purgatives and baths. Of the former, compound jalap powder, bitartrate of potash, elaterium, and gamboge are among the best; while the action of the skin may be excited by warm baths or warm wet-sheet packs. Sometimes puncture or incision of dropsical parts gives great relief, but from the readiness with which erysipelatous inflammation takes place, it requires great caution in its employment. The treatment of uræmia has already been alluded to, and secondary inflammations must be dealt with as they arise.

RENAL ABSCESS.

RENAL abscess is generally due to injury, an impacted concretion in the renal substance, or to suppuration in the urinary passages, *e.g.*, pyelitis and gonorrhœa. Numerous scattered abscesses also sometimes occur in pyæmia, but rarely admit of certain diagnosis during life. Whatever its mode of origin, the abscess may ultimately destroy the organ and convert it into a mere bag of pus. The most favourable termination is rupture into the pelvis of the kidney with discharge of its contents in the urine, or inspissation followed by caseation and calcification. More rarely it bursts externally in the loin, into the peritoneum, bowel, or surrounding tissues. Only one kidney is usually affected, and in the event of its destruction the other kidney undergoes compensatory enlargement.

The usual *symptoms* are pain and tenderness in the renal region, fever, successive chills, with the occasional presence of a little blood or pus in the urine. If the abscess be large, a fulness or fluctuating tumour may be observed in the loin. At a later stage the symptoms necessarily vary according to the course and mode of termination of

the abscess. Thus, if the abscess burst into the pelvis of the kidney, there is a copious discharge of pus in the urine, followed by subsidence of the renal tumour. Not infrequently characteristic symptoms are entirely wanting.

The *treatment* essentially resembles that of pyelitis.

PYELITIS AND PYO-NEPHROSIS.

CATARRHAL inflammation of the pelvis of the kidney, or pyelitis, most frequently arises from the irritation set up by the presence of a renal calculus, or by retention of decomposed urine. Less frequently it is due to extension of inflammation from the bladder, or to the elimination of medicinal irritants (such as turpentine and cantharides), or to mere exposure to cold.

MORBID ANATOMY.—The *acute* form is characterised by redness, swelling, and ecchymosis of the lining mucous membrane with shedding of its epithelium, and a discharge of muco-pus. In more *chronic* cases the membrane is grey or slate-coloured, much thickened, and sometimes ulcerated or covered with a layer of phosphatic deposit. The opening into the ureter, already much narrowed by inflammation is very apt to become permanently blocked by the impaction within it of a calculus, a blood-clot, or thickened pus. Under these circumstances the pelvis becomes greatly dilated, and its cavity gradually encroaches on the substance of the kidney which atrophies, and is ultimately converted into a multilocular sac filled with pus and decomposing urine (*pyo-nephrosis*). The abscess thus formed may burst externally, or burrow in various directions, or the whole mass may become inspissated and more or less calcified.

The *symptoms* immediately due to the pelvic inflammation are an aching pain or weakness in one or both loins, with tenderness on pressure. At first the urine is acid, and

often contains a little blood or pus with pelvic epithelium (cells spindle-shaped, tailed, elongated, or irregularly rounded). Later on the urine may be ammoniacal and contain pus in large quantity. When the ureter is blocked the urine may be temporarily quite normal; but should the obstacle give way, it becomes suddenly loaded with pus. Micturition is often frequent. As a late event, a renal tumour may be observed, which is variable in size, tender on pressure, and obscurely fluctuating. More or less febrile disturbance of the hectic type is commonly present, with diarrhœa, or constipation (due to pressure on the colon).

If only one kidney be affected recovery may sometimes take place, but more frequently death ultimately occurs from exhaustion or (when both kidneys are involved) from uræmia. Should the sac burst the symptoms vary accordingly.

The *diagnosis* of pyelitis as a complication of cystitis, enlarged prostate, or old urethral stricture, and in the absence of a renal tumour is often impossible. The presence of pus in the urine, independently of vesical, prostatic, or urethral disease, with irregularly-shaped epithelia—especially when associated with tenderness or aching in either loin—would indicate pyelitis. The presence of a tender, throbbing, renal tumour, the sudden appearance or disappearance of pus in the urine with fever and shivering, make the diagnosis comparatively simple.

The *treatment* for the most part consists in ascertaining and removing the cause when this is possible. To relieve the pain, we may employ poultices or fomentations to the loin, hot hip-baths, or the administration of opium. To check the discharge of pus the mineral acids, perchloride of iron, alum, pareira, or acetate of lead may prove useful. Tonics, cod-liver oil, nutritious food, and change of air are perhaps the most trustworthy remedies. Considerable

success has recently attended the surgical treatment of these cases, and therefore when the diagnosis is assured, the abscess may be opened from the loin.

PERI-NEPHRIC ABSCESS.

WE have already seen that suppuration, beginning in the pelvis of the kidney or in the renal substance, may extend beyond the limits of the organ into the surrounding tissue. More rarely peri-nephric abscess occurs primarily from external injury or exposure to cold. Its main distinctions from renal suppuration lie in the normal condition of the urine, and greater superficiality of the pain, tenderness, and swelling. The abscess may burst internally into the peritoneum or pleura, or externally in the loin or at Poupart's ligament. The treatment consists of free incision or aspiration as soon as the abscess is sufficiently superficial.

HYDRO-NEPHROSIS.

A PERMANENT obstruction at any part of the urinary passages may be followed by dilatation of the cavities above the impediment, and thickening of their walls. This is succeeded by gradual compression and atrophy of the renal substance, with distension of its fibrous capsule, until at last the kidney is converted into a sacculated chamber, sometimes of enormous size, which is filled with fluid. The latter consists of altered urine, is pale, watery, of low specific gravity, more or less albuminous, and sometimes contains a little blood or pus. The sac rarely bursts, but it either remains as a chronic cystic tumour, or the obstacle becomes dislodged, and is followed by discharge of

the fluid *per vias naturales*, and shrivelling up of the remains of the organ. As a rule only one kidney is affected, and the other becomes hypertrophied. The affection is not unfrequently congenital, as the result of an imperforate ureter.

The only sign of hydro-nephrosis is the formation of a painless, soft, fluctuating tumour occupying the loin, and displacing the colon which lies in front of it. A sudden subsidence of the tumour with a copious discharge of somewhat altered urine, though very rare, is highly characteristic.

If by reason of its size any *treatment* is required, it is purely of a surgical nature. Relief can be attained by aspiration, but a radical cure is only possible by abdominal section and removal, an operation which has been done successfully within my own experience.

LARDACEOUS KIDNEY.

On pathological grounds lardaceous kidney should be distinguished from chronic Bright's disease, notwithstanding their clinical relationship. The conditions under which it occurs, and its morbid characters are identical with those of lardaceous degeneration elsewhere (*v.* page 15). The kidney is smooth, pale, and gradually increases in size and weight. On section, the cortex is thicker, and the Malpighian tufts in which the change first begins appear as glistening points. At a later stage the renal substance as a whole becomes more or less uniformly waxy. The liver and spleen are usually concurrently affected.

When the degeneration has sufficiently advanced, the urine is increased in quantity, pale, with a specific gravity from about 1012 to 1015, more or less albuminous, and may contain a few hyaline or granular casts. Dropsy as

a rule is not well-marked, but is commonly present. Mic-turition is frequent. It differs from the granular form of Bright's disease in the absence of cardio-vascular hyper-trophy, the slight tendency to uræmic phenomena, and its common association with lardaceous changes in other organs—liver, spleen, and intestines. In its later stages owing to diffuse inflammatory changes set up in the kidney the symptoms resemble those of ordinary chronic Bright's disease, and call for similar treatment.

CANCER OF THE KIDNEY.

CANCER of the kidney may be either primary or secondary. Primary cancer is almost always of the soft or encephaloid type, and occurs either in nodules or as a diffuse infiltration. As a rule only one kidney is affected, but secondary deposits are apt to occur in the neighbouring glands. It is most frequent in young children, but it also occurs less frequently in adults. Secondary cancer usually affects both kidneys, and rarely causes much enlargement, which renders it difficult to be diagnosed during life.

The main *symptoms* of primary renal cancer consist of a renal tumour, hæmaturia, and general constitutional disturbance. The tumour occupies one or other loin, grows rapidly, and generally attains a very large size. It is rounded but irregular in outline, and generally of firm but unequal consistence. It is almost invariably *crossed by the colon*; and owing to adhesion with surrounding parts it is immovable. In some cases it is painless, but as a rule there is severe lumbar pain and tenderness from the onset. The superficial abdominal veins are enlarged, and the lower limbs may become œdematous from pressure on the vena cava. Profuse and intermittent *hæmaturia*, when present, is a sign of very great value; but in many cases

it is altogether absent. The constitutional symptoms are those which generally accompany cancerous growths. Death occurs from exhaustion. The average duration in children is about seven months, and in adults about 2½ years.

The *treatment* is purely palliative and symptomatic.

TUBERCLE OF THE KIDNEY.

TUBERCLE of the kidney may occur as part of acute general miliary tuberculosis, or secondarily to tubercular affections elsewhere, or as a primary affection. In the latter, tubercles first appear as grey granulations, situated mainly in the cortex, afterwards coalescing to form larger masses which become cheesy, soften, and perhaps suppurate. Both kidneys are usually affected. Side by side with these changes tubercles are also often observed in the mucous membrane of the lower urinary passages, which run a similar course to those in the kidney.

Renal tubercles give rise to no symptoms until softening and disintegration have commenced. When symptoms do supervene they are essentially the same as those met with in pyelitis, with which renal tuberculosis is always associated. The urine usually deposits an abundant sediment on standing, which consists mainly of pus, together with granular cheesy fragments and epithelium. If blood be present, it is only in small quantity. The diagnosis is chiefly based on the discovery of tubercular mischief in the lungs, bowel, or elsewhere, concurrently with the indications of pyelitis.

RENAL ENTOZOA.

ENTOZOA are rarely met with in the urinary organs in this country; and *hydatid cysts of the kidney* alone call for some brief comment. The general characters and mode of development of hydatids have already been described as they affect the liver. In the kidney they give rise to a painless, soft, fluctuating tumour in the loin, unaccompanied as a rule with any changes in the urine. Should however the cysts burst into the pelvis of the organ, their contents may be discharged with symptoms of "renal colic," or become permanently impacted in the ureter. Suppuration of the kidney may also occur from inflammation of the sac. The *treatment* resembles that of hydatids of the liver.

RENAL CALCULUS.

URIC acid or oxalate of lime are not unfrequently deposited from the urine in the secreting tubules of the kidney, in the form of minute concretions. These may remain lodged in its substance, but more frequently they are washed on into the calices and pelvis of the organ, remaining there and growing by progressive deposit. As to shape, size, and number, they vary greatly. They are apt to become large, and moulded to the cavities in which they lie; occurring singly or in great numbers. By reason of irritation and obstruction of the urinary passages, congestion and suppuration of the kidney, pyelitis, pyo- and hydro-nephrosis are frequent sequelæ of renal calculus. When the urine from any cause becomes ammoniacal, a secondary deposit of mixed phosphates is thrown down, and the calculus thus becomes covered with a thick phosphatic incrustation.

Renal calculus may occasion no symptoms of any kind. More often, however, there are darting pains, or aching in one or other lumbar region, radiating to the groin and thigh of the same side; with retraction of the testicle, faintness, nausea or vomiting, irritation of the end of the penis and frequent micturition. These symptoms recur from time to time in a paroxysmal form, and are especially induced by any sudden movement or effort which displaces the calculus. The most severe attacks are met with when the stone enters or passes along the ureter. The sudden onset of intense lumbar radiating pains, vomiting, collapse, or even general convulsions is very characteristic. Usually, after a few hours the attack ceases as suddenly as it began, coinciding with the arrival of the stone in the bladder, where it may either remain or be presently discharged by the urethra. Less often the stone becomes impacted in the ureter, and in that case the attack lasts longer, subsides more slowly, and may be followed by pyo- or hydro-nephrosis. The urine in cases of renal calculus is apt from time to time to contain blood, pus, and epithelium from the urinary passages, together with crystalline deposits corresponding to the nature of the concretion.

TREATMENT.—During the paroxysms of renal colic, warm baths and the free administration of opium are mainly indicated. Belladonna is recommended where opium disagrees.

During the intervals between the paroxysms, the treatment will vary according to circumstances. If there be reason to think that the concretion is composed of uric acid, much benefit may be anticipated from the solvent effects of alkalinised urine. For this purpose citrate or acetate of potash should be given in doses of ℥ii-ʒi repeated every three or four hours, and continued for a long period. Oxalate of lime concretions cannot be dissolved in this way; general tonic treatment, a plain bland

dietary, and avoidance of pastry and sweets are mainly indicated. The sequelæ of renal calculus must be treated according to the principles already laid down when describing them.

CHYLURIA.

CHYLURIA, so called from the chylous or milky condition of the urine is a rare affection in this country, occurring most frequently in adult females. It is characterised by the discharge of milky urine, which on standing coagulates into a tremulous jelly, an event which sometimes occurs before leaving the bladder. The urine contains a large quantity of molecular fat which is readily soluble in and separable by ether, with fibrin, albumen, and often a little blood. There are no casts. Sometimes the fat is quite absent, while the other conditions persist. The urine is then no longer milky, though it still clots and contains albumen.

The source of this impregnation of the urine with chyle or lymph is not clear, but there appears to be some direct communication in such cases between the lymphatic and urinary systems, which some have ascribed, though on questionable grounds, to the ravages of a small nematoid worm.

It is not inconsistent with apparent good health, and even a long life, though no form of treatment is attended with much benefit.

PAROXYSMAL HÆMATINURIA.

THIS is an uncommon disease and is almost always met with in connection with exposure to cold. It occurs most frequently in adult males.

It is characterised by the occurrence at irregular inter-

vals of paroxysmal attacks, ushered in abruptly with severe chills. The temperature is *lower* than normal, with a subjective sensation of cold, general malaise, yawning, and nausea. This is shortly followed by the discharge of dark, porter-coloured urine, which deposits an abundant sediment consisting of granular matter (disintegrated blood) with few—if any—blood-cells, oxalate of lime crystals, and granular casts. The symptoms afterwards speedily abate, unaccompanied with sweating, and the urine which is next passed may be normal, or nearly so.

The periodicity of recurrence is regular in some cases while in others it is very irregular. The length of intermission varies greatly, and relapse is common on the slightest exposure to cold. The pathology is extremely obscure.

As to *treatment*—during the paroxysm the patient should be placed in bed and kept warm, and at all times he should be warmly clad, and carefully avoid any exposure to draughts. The results of medicinal remedies are not very satisfactory, but the administration of quinine, arsenic, or iron has been recommended.

SUPPRESSION OF URINE.

SUPPRESSION of urine may depend on a direct suspension of the secretory functions of the kidney (*functional suppression*); or on the other hand it may be due to some mechanical obstacle to the out-flow of urine (*obstructive suppression*).

Functional suppression of urine is often met with in the algide stage of cholera, in many specific fevers, and in acute Bright's disease. It also occurs sometimes from an over-dose of certain drugs, such as turpentine or corrosive sublimate; or as the result of general shock, especially

after injuries of the urethra. The suppression is frequently incomplete; and in this case the scanty urine which is passed, is high-coloured, and contains albumen, blood, and casts. The course is rapid, ending in death or recovery before very long. Death perhaps is more often due to the general condition, of which the suppression is a part, than to the direct effects of suspension of the secretion.

The best treatment is immediate immersion in a hot bath, with hot gruel enemata, and hot drinks if the patient can swallow and retain them.

Obstructive suppression of urine generally arises from impaction of a stone in one ureter, when the other has previously become blocked. Cancer of the bladder may sometimes block up the lower orifices of both ureters. Strange to say, no symptoms of any importance occur during the first week, but about this time trembling and muscular weakness, contraction of the pupils, slow laboured respiration, dryness of the mouth, and complete anorexia supervene. Death usually takes place at the end of two or three days from the first appearance of symptoms. In most cases a little urine is passed from time to time, which is pale, watery, and devoid of albumen and casts. Obstructive suppression, dependent on urethral stricture, is a purely surgical affection.

As to treatment we can do but little. If there be much pain we may employ the treatment already recommended for renal colic. Mechanical means such as shampooing, or kneading the abdomen, have been strongly recommended. With improved methods of operating it may become possible to entertain the idea of surgical interference.

POLYURIA. DIABETES INSIPIDUS.

THIS rare condition is characterised by the secretion and discharge of large quantities of pale watery urine, of very low sp. gr. (1002-4), containing no sugar or other unusual ingredient. There is also marked thirst in proportion to the diuresis. In some cases the health is not impaired, but in others there may be a voracious appetite, harsh skin, with progressive weakness and emaciation. These symptoms may supervene gradually or quite suddenly. The etiology of the affection is very obscure, and its treatment is very unsatisfactory.

CYSTITIS.

CYSTITIS or inflammation of the bladder may arise from a variety of causes, but the form which occurs in connection with certain diseases of the spinal cord is of most interest to the physician. In some cases the inflammation may be attributed to retention and decomposition of the urine from paralysis of the bladder, but more often it is the result of trophic disturbance directly dependent upon the nervous lesion.

The mucous lining of the organ presents the usual appearances of acute or chronic catarrh, attended with more or less abundant secretion of mucus or muco-pus, and rapid ammoniacal decomposition of the urine.

The main *symptoms* are, pain and tenderness at the hypogastrium and adjacent parts, frequent scalding micturition, and the discharge of urine which contains more or less mucus or muco-pus. If the urine be ammoniacal, it is apt to become very offensive and ofropy consistence. Cystitis may be either acute or chronic, and when acute is

attended with considerable febrile and constitutional disturbance.

The *treatment* of the acute form consists of hot hip-baths and fomentations, careful regulation of the bowels, a light unstimulating diet with suppositories of opium and belladonna. Great relief is often obtained by washing out the bladder from time to time with a saturated solution of boracic acid, or weak solutions of quinine or carbolic acid. When the urine is retained it must be drawn off. It is obviously of the first importance to discover and remove the cause when possible. Similar principles are applicable to the chronic form.

SECTION VIII.

DISEASES OF THE NERVOUS SYSTEM.

SYMPTOMATOLOGY.

1. GENERAL STRUCTURE AND FUNCTIONS OF THE NERVOUS SYSTEM.

The fundamental principle underlying the structure of the nervous system consists in the association of nerve-cells or centres with nerve fibres. The nervous apparatus of man consists of two sets of centres and fibres which are closely related to each other, namely, the *cerebro-spinal* and the *sympathetic* systems. The former includes the brain and spinal cord with the cranial and spinal nerves, while the latter comprises the chain of sympathetic ganglia and the nerves in connection with them.

For the minute structure of the nervous apparatus the student must be referred to anatomical text-books, but

some few general considerations are indispensable to the proper study of nervous diseases.

Cerebro-spinal system.—Since nerve-cells alone are capable of exhibiting independent nervous activity, whether in the shape of receiving impressions or of generating nervous force, it follows that true physiological nerve-centres are exclusively confined to the grey matter of the brain and cord. The white fibres on the other hand wherever they are found, merely serve to conduct impulses to and from the nerve-centres in connection with them.

The grey matter of the cerebral convolutions constitutes the centre for the various forms of psychical activity. Recent researches have, however, also shown that combined movements uniformly follow excitation of certain parts of the cerebral surface over a definite area, which includes the *hinder* parts of the three transverse frontal, the ascending frontal, and the ascending parietal convolutions, with the parietal and para-central lobules. Conversely, destructive lesions of similar parts are followed by hemiplegia or by paralysis of special groups of muscles. It would appear probable that the cerebral surface which is *anterior* to the motor area (as above defined) is chiefly concerned with the higher manifestations of intelligence, while the lower part of that which is *posterior* to the motor area is similarly related to sensation, since destructive lesions of this part are followed by impairment or loss of sensation.

From the whole of the cerebral surface, white connecting fibres converge to the large ganglionic masses at the base of the brain, the corpora striata, optic thalami, corpora geniculata, and the corpora quadrigemina. Of these ganglia, the first (corpora striata) mainly receive fibres from the anterior or psycho-motor half of the brain, are chiefly concerned with motor functions, and are connected below with the "*crust*" of the crura cerebri, and through them

with the motor tracts of the medulla and cord. The other ganglia mainly receive fibres from the posterior or sensory half of the brain, are chiefly concerned with sensory functions, and are connected below with the "*tegmentum*" of the *crura cerebri*, and through them with the sensory tracts of the cord and medulla. In addition to the important ganglia already mentioned, we find collections of grey matter constituting a series of subordinate centres closely succeeding and connected with each other, from the *corpora quadrigemina* above, to the termination of the cord below, each either giving origin to motor fibres, or receiving sensory fibres. Each of these centres is concerned with the reception of nervous impressions, or is capable of generating efferent (motor) impulses of some kind or other. The most important function of the *cerebellum* is undoubtedly that of exercising a coördinating influence over volitional movements.

With regard to the courses taken respectively by *motor* and *sensory* impulses in the cord and medulla, it must be remembered that *in both cases decussation occurs*. The former on arriving at the medulla, cross over to the opposite side with the anterior pyramids, and pass down the antero-lateral columns of the cord, and out by the anterior roots of the spinal nerves; while the latter enter the cord by the posterior roots of the spinal nerves, *cross over at once* to the opposite side, and are conveyed upwards to the medulla through the grey matter of the cord. Hence it follows, that destruction of one side of the brain causes loss of motion and sensation on the *opposite* side of the body; while destruction of one side of the cord (below the medulla) causes loss of motion on the same side as the lesion, with loss of sensation on the opposite side.

The *Sympathetic system* is so closely related to the cerebro-spinal system both from an anatomical and physiological point of view, that it is difficult to consider it separately.

While we have in the sympathetic ganglia, centres which preside over the organic functions of the parts with which they are in connection, it would seem that in the medulla oblongata there is a supreme controlling centre for the whole system, operating through the communicating branches of the latter with the spinal nerves. The most important function of this system arises from its relation to unstriated muscular tissue, which contracts on stimulation of the sympathetic nerves by which it is supplied, while section of the latter is followed by its relaxation. In this way the length and calibre of the blood-vessels, and therefore the amount of blood supplied to various parts, may be regulated. Apart from the *indirect* influence thus brought to bear upon tissue-nutrition by the sympathetic nervous system, there is reason to think that it may also exert a *direct* influence on the functional activity of the cells in secreting glands and elsewhere.

2. DISTURBANCES OF NUTRITION.

Though we have yet much to learn with regard to the influence of the nervous system on nutrition, it would appear that tissue-nutrition is largely under the control of certain trophic ganglionic centres, damage to which, or separation from which is followed by changes in the tissues under their influence. These changes are partly degenerative and partly proliferative in their nature. The following are the most important :—

1. *Peripheral nerves*.—When a nerve is divided, or otherwise badly injured, changes rapidly ensue in both the efferent and afferent fibres on the distal side of the injury. The medullary substance coagulates, and breaks up into drops, which in course of time disappear by absorption. The axis-cylinders are also destroyed, but more slowly.

The nuclei of the neurilemma proliferate, and become converted into connective tissue (*sclerosis*).

2. *Secondary nervous degenerations*.—The nutrition of the motor tract in the brain and cord depends upon the integrity of its connection with trophic centres at its upper end; while the nutrition of the sensory tract depends on its connection with trophic centres at its lower end. Thus, if the motor tract be interrupted by disease or injury at any part, degeneration of the motor nerve-fibres, together with connective-tissue new-formation (*sclerosis*), extends downwards from the point of interruption (*descending degeneration*). Similarly if the sensory tract be interrupted, sclerosis of the same extends upwards from the point of interruption (*ascending degeneration*).

3. *Muscles*.—In addition to the changes in peripheral nerves above described, rapid atrophy, with loss of electric contractility of voluntary muscles also takes place when either (a) the nerves supplied to them are damaged (*e.g.*, the rapid atrophy of the deltoid muscle after dislocation of the shoulder attended with stretching, bruising, or laceration of the circumflex nerve); or (b) when there is disease of the *anterior* cornua of the cord (*e.g.*, progressive muscular atrophy, and infantile paralysis).

4. *Joints*.—Central nervous lesions similar to those just described may lead to inflammatory changes in the joints—especially in the knees—resembling certain forms of rheumatism, but distinguished from the latter by the paralysis and atrophy of adjoining muscles which are also usually present.

5. *Skin*.—Analogous lesions of *sensory* nerves, or of the *posterior* grey cornua of the cord, or sometimes even of the brain itself, may be followed by inflammatory affections of the skin (*e.g.*, herpes zoster in neuralgia, acute sacral bed-sore in acute central myelitis, and acute bed-sore of the buttock in certain cases of cerebral hæmorrhage).

6. *Viscera*—The supervention of acute inflammation of the bladder and kidneys, with the discharge of purulent bloody ammoniacal urine in the course of certain spinal diseases, may probably be explained in a similar way, and quite independently of retention of urine with decomposition.

3. HEADACHE.

Headache is not only one of the commonest, but often one of the most distressing symptoms of cerebral disorder. The pain is variously described as dull, heavy, shooting, throbbing, constricting, &c. It may be either more or less widely diffused, or localised to a particular spot, or confined to the course of some sensory nerve. As to its seat it may be general, frontal, vertical, occipital, or one-sided.

Cases of headache may be arranged in two groups: (1) *cranial headache*—due to some disorder of the cranial structures, *e.g.*, neuralgia of the scalp, otitis, or periostitis; and (2) *cerebral headache*—arising either from inflammation or organic disease of the brain, or of the membranes which cover it; or from some alteration in the quality or quantity of the blood supplied to the brain. In the latter case it often occurs in connection with affections of remote parts.

In practice, it is frequently a matter of great difficulty to relegate a headache to its precise cause. When the pain is severe, constant, and localised, disease of the bone or subjacent membranes may be indicated. In neuralgia of the scalp the pain is superficial, paroxysmal, associated with tender points, and almost always one-sided, since its distribution corresponds with that of a sensory nerve. Headache, from structural diseases of the brain, is usually severe, fixed, persistent (though sometimes paroxysmal), aggravated by the recumbent posture, and often associated with convulsive or paralytic symptoms. In doubtful cases,

valuable information may be gained by the use of the ophthalmoscope, showing the presence or absence of inflammatory changes in the optic nerve or retina. Headache from gastro-hepatic disorder is generally frontal, while that of anæmia and exhaustion is vertical and often associated with a feeling of burning or tingling at the same spot. Congestive headaches are aggravated on lying down or stooping, while the reverse obtains in those dependent upon anæmia. It is also worth bearing in mind that persistent headaches in children are sometimes caused by refractive defects of vision, and such cases are readily cured by the use of appropriate spectacles.

4. DELIRIUM.

Delirium is an acute disorder of the mind, resulting, in general terms, from irritation of the cortical grey matter of the cerebrum; but as to the precise nature of the mode of disturbance very little is known. Delirium varies in degree from mere incoherence of ideas to the most complete mental derangement. It may be either mild and quiet, busy and garrulous, low and muttering, or wildly maniacal. It may arise in connection with inflammation or organic disease of the brain, toxic conditions of the blood, reflex irritation (especially when accompanied with severe pain) or from violent mental shock. It must be borne in mind that the liability to the occurrence of delirium, its character, and its intensity, are largely dependent on the general nervous constitution of the patient. Intemperate persons also are liable to attacks resembling "delirium tremens" in connection with any kind of febrile disturbance.

5. VERTIGO.

Vertigo or giddiness is a peculiar sensation of movement, attributed in some cases to the individual himself, in others to surrounding objects, and is characterised by a feeling of instability and fear of falling. Giddiness implies a disorderly action of the cerebellum, pons Varolii, corpora quadrigemina, and adjacent parts, which, as physiology teaches us, are concerned in the co-ordination of muscular movements, and in the maintenance of equilibrium.

Vertigo may be produced by direct disturbance of the co-ordinating centres. Thus sudden variations in the amount of blood supplied to the brain, a slowness on the part of the vascular walls to adapt themselves to alterations in the posture of the body, certain toxic influences (*e.g.*, tobacco), inflammation or structural disease of the brain are common causes of giddiness. Other cases again, depend upon peripheral causes, such as disturbances of vision and hearing, gastro-hepatic derangements, worms, and the like.

One of the most important disorders in which vertigo constitutes the principal symptom is the so-called *Menière's disease*. It is characterised by tinnitus, deafness, vertigo, nausea or vomiting, and in some cases by a tendency to syncope. As a rule the symptoms disappear after a while, with the exception of the deafness, which in most cases is permanent. Recurrence is common.

6. INSENSIBILITY—STUPOR—COMA.

These terms are used to express different degrees of functional incapacity, beginning at the cerebrum, and characterised at the outset by loss of consciousness, perception, and voluntary motion. In this stage, automatic

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and reflex movements continue. Afterwards the large ganglionic masses at the base of the brain become involved, and the capacity for automatic movements becomes more and more limited. In still more serious cases the loss of function extends to the medulla (which is the seat of the centres presiding over the important functions of circulation and respiration amongst others), and death ensues.

Pathologically, stupor and coma may be induced by disturbance of the cerebral circulation (*e.g.*, extreme congestion or anæmia); deficient oxygenation of the blood (*e.g.*, asphyxia); toxic conditions (*e.g.*, opium poisoning); or by inflammation, structural disease, or injuries of the brain.

7. CONVULSIONS.

The term "convulsion" in its widest sense indicates any spasmodic muscular contraction beyond the control of the will. Convulsion may affect a single muscle, a group of muscles, a limb, one half of the body, or the whole of it, and may vary in intensity from a mere trembling of a single muscle to the most violent contortions of the whole body. When the contractions are intermittent they are termed *clonic*, and *tonic* when persistent.

It will be convenient to consider "convulsion" under three heads. 1. *Tremor*.—There are two kinds of tremor. The first exclusively accompanies voluntary movements, ceasing during sleep, and is indicative of debility of the nerve-centres concerned. Examples of simple tremor from debility are to be found in the trembling of the tongue when protruded, or of the lips on speaking in those who are very weak or feeble; also in certain paralytic conditions, as disseminated sclerosis of the nerve-centres.

The *second* variety is a true convulsive condition, and differs from simple tremor in occurring independently of

voluntary movements, and in bad cases it persists during sleep. It depends on irritation of the nerve-centres concerned. We have familiar examples of it in trembling from cold, the tremulousness which accompanies certain kinds of delirium, and the persistent tremor of paralysis agitans, mercurial poisoning, &c.

2. *Choreic movements* resemble simple tremor in ceasing during sleep, and in being aggravated by attempts at voluntary movement. At the same time they differ from the irregular movements of true convulsions, in their tendency to affect muscles more or less according to their physiological grouping, and in being moulded, as it were, to definite purposive movements. They vary in degree from a simple grimace to violent contortions. In some cases they are limited to a single limb, or to one half of the body.

8. *True convulsions* consist in irregular displays of activity on the part of motor centres as the result of some kind of irritation. These centres are found not only in the spinal cord, medulla, and the large ganglia at the base of the brain, but also in certain of the cerebral convolutions; and convulsions occur as the result of either *direct* or *remote* irritation of such centres.

Convulsions may be either *clonic* or *tonic*, but no sharp division of the one from the other is possible. *Clonic convulsions* consist of intermittent, irregular, purposeless, muscular contractions, which vary greatly in degree and in the extent of their distribution. Examples are met with in epilepsy, convulsions from teething, or worms, or during the passage of biliary or renal calculus, &c. *Tonic spasm* consists in more or less *persistent* muscular contraction, and is exemplified in common "cramp" of the legs, and constitutes also the characteristic feature of tetanus and strychnia poisoning.

8. PARALYSIS.

Paralysis is the opposite of spasm, and denotes an impairment (*paresis*) or loss of motor power. As applied to voluntary muscles it implies an impairment or loss of the power of the will to determine movement. If the paralysis be incomplete, attempts to move the affected part may be attended with tremor. The condition of paralysed muscles varies; they may be normal, flaccid, or rigidly contracted; and again the muscular substance may be normal, or may waste more or less rapidly, with an alteration in its reaction to electricity.

1. *General paralysis* only occurs in connection with general cerebral enfeeblement, and is for the most part incomplete (*General paralysis of the insane*).

2. *Hemiplegia*, strictly speaking, implies a paralysis of all the muscles of one half of the body, but in this perfect form it is never met with in practice, certain groups of muscles always remaining unaffected. In the latter limited sense, hemiplegia may occur from a variety of lesions, which will now be briefly considered.

(a). *Spinal hemiplegia* occasionally occurs as a result of injury or disease, affecting one side of the cord at its upper end. If the loss of function is complete it follows that there will be *loss of motion on the same side, with loss of sensation on the opposite side*, in all the parts supplied by nerves given off from the cord below the lesion. There is no facial paralysis. (b.) *Hemiplegia from disease of the cerebral convolutions*. In connection with the motor functions of the cerebral convolutions this form of hemiplegia acquires a special interest. It generally arises as a result of injury or localised inflammation following injuries of the head. The paralysis occurs on the side which is *opposite* to the lesion, but it is usually incomplete and only of temporary duration. Signs of cerebral disturbance are always present, and in

some cases sensation is also impaired, probably indicating the inclusion of the temporo-sphenoidal convolutions in the morbid process. (c.) *Ordinary hemiplegia* most commonly results from disease of the corpus striatum, generally due either to an extravasation of blood into its substance (*apoplexy*) or to a cutting off of its supply of blood by embolism or thrombosis of the middle cerebral artery. It is characterised by a paralysis of the opposite side of the body, but only to a partial extent. The arm, leg, lower part of the face, and tongue alone are paralysed; whereas the muscles of the abdomen and thorax, certain of the facial muscles (notably the *orbicularis palpebrarum*), the muscles of the eye-ball, and those supplied by the eighth nerve (Willis) are unaffected. This partial distribution will be understood when we reflect that the muscles which suffer are those which are most under voluntary control, and capable of executing independent movements; while the muscles which escape are those which, as a rule, act co-ordinately with corresponding muscles on the opposite side, and whose combined actions they can only imperfectly restrain. The *signs* of hemiplegia are as follows:—The arm and leg (in severe cases) are equally motionless; but it is worth noting that if there is a difference between them *the leg is generally the least affected, the last to be attacked, and the first to recover*. The angle of the mouth is drawn upwards and to the sound side, the cheek hangs loosely, the face is expressionless, there is difficulty in wrinkling the forehead and in pursing the lips; and the tongue when protruded, diverges to the paralysed side. Owing to the weakness of the tongue and lips the utterance is often defective; but this must not be confounded with the aphasia which so frequently accompanies right hemiplegia. The head and eyes often *deviate* in such cases *to the sound side*. (d.) *Hemiplegia from lesions of the motor tract below the corpus striatum* is characterised by its frequent association with paralysis

of special cranial nerves, the nuclei of which are directly involved. Hence it is that, in lesions of the *crus cerebri*, the *pons*, or the *medulla*, cross paralysis is so common,—*i.e.*, a paralysed state of *one side* of the body, with that of some cranial nerve on the *opposite side*. Lower down, where the motor tracts of each side approach each other, a lesion may cause paralysis of *both sides* of the body; and from the vital importance of the nerve-centres in this locality, special danger attaches to paralysis of this kind. (*e.*) *Functional hemiplegia* generally occurs in association with hysteria, and is quite independent of any organic lesion. It will be again referred to in the description of hysterical phenomena.

8. *Paraplegia* depends commonly on disease of the spinal cord, and denotes a defect or loss of power in all parts below the level of the lesion. The spinal cord not only serves to conduct motor but sensory impulses, so that if it be affected in its whole thickness, there is not only loss of motion but also of sensation in the parts below. Again, the centres which preside over the important reflex acts of micturition and defæcation are seated in the lumbar region of the cord, and thus paraplegia is very apt to be attended with retention or incontinence of urine or fæces. The precise signs of paraplegia will depend mainly upon the seat and distribution of the lesion which gives rise to it:—thus, disease beginning in the substance of the cord is attended with gradual loss of motion and sensation; when it begins in the membranes and cortex of the cord, tonic muscular spasm with great pain are the earliest symptoms; if only one half of the cord be affected, there will be loss of motion on the same side, with loss of sensation on the opposite side, and so on.

9. HYPERÆSTHESIA AND DYSESTHESIA.

Hyperæsthesia signifies an exalted irritability of the recipient nerve-centres, by reason of which the effects of sense-impressions are exaggerated and painful. When the skin is thus affected, the slightest touch causes pain, and similarly the eye may be unable to bear bright light, or the ear loud sounds, without much distress. It is of common occurrence in hysteria, and in certain inflammatory and other affections of the brain and cord.

Dysæsthesia or perverted sensibility includes such sensations as tingling, numbness and itching; burning, stabbing, shooting, and other pains; and singing noises in the ears, sparks of light in the eyes, &c.

10. ANÆSTHESIA.

Anæsthesia denotes an impairment or loss of sensibility which may be either superficial, deep seated, or involve the whole thickness of a part. Its degree and extent vary greatly. It is often attended with numbness, tingling, or pricking sensations. Sensibility to variations in temperature and the muscular sense are not necessarily lost with tactile sensibility. Anæsthesia may arise from organic disease of the brain, cord, or nerves; or from some kinds of functional nervous disease such as hysteria.

General anæsthesia only occurs in connection with general paralysis of the insane.

Hemianæsthesia signifies a loss of sensibility over one side of the body. In its complete form, (including the loss on one side not only of *common* but also of *special* sensation) it is always functional, and is associated with the hysterical condition. It is further characterised—according to Charcot—by great tenderness over one ovary. As affecting com-

mon sensation only, hemianæsthesia, due to disease of the brain, sometimes accompanies hemiplegia, and rarely occurs independently of it. Observations seem to show that it may result from lesions of the optic thalamus and adjacent parts, but further proof of this is yet required. Unilateral or localised anæsthesia would also presumably follow disease affecting the temporal convolutions of the cerebrum.

Anæsthesia may also arise from diseased conditions of the pons, médulla, spinal cord, and peripheral nerves. Under these circumstances it is, for obvious reasons, usually associated with motor paralysis.

11. APHASIA.

Authorities are not agreed as to the precise signification of the term aphasia, but for our purpose it may be held to denote an inability to express thoughts by means of language. Loss of articulate language may arise (1) from mental incapacity, or an absence of ideas; (2) from inability to recollect or call up words for the expression of ideas; (3) from an inability to co-ordinate the complex movements of articulation; or (4) from some local defect in the apparatus of articulation. The second and third of these defects are alone included in the term *aphasia*.

In a typical case of complete aphasia the patient's mind is intact, he understands what is said to him, and apparently what he reads, but he is totally unable to express his ideas in words, either spoken or written, by reason of his inability to recollect words (*amnesia*). In other and more numerous cases the loss is less complete, and there may be only partial forgetfulness of some words; or the vocabulary may be limited to certain interjectional or automatic words and phrases which involve no intellectual process. Yet again, we may assume that the difficulty in some

cases is mainly due to an inability to co-ordinate the complex movements involved in the expression of ideas by articulate language or writing. Such a condition has been termed "*ataxic aphasia*." Thus, he may speak, but cannot write (*agraphia*); or, he may write, but cannot speak (*aphemia*).

Aphasia is intimately associated with destruction of the hinder ends of the *second and third left frontal convolutions* of the cerebrum, which lie over the corpus striatum, both of which are supplied by the same artery (middle cerebral). These anatomical considerations explain at a glance the relationship between aphasia and right hemiplegia, caused by an extensive extravasation into the left corpus striatum, or by embolism or thrombosis of the left middle cerebral artery. But while this relationship between aphasia and hemiplegia forms the rule, in exceptional cases aphasia may occur independently of hemiplegia, either from an actual lesion limited to the convolutions mentioned, or from a mere temporary suspension of their function in common with those of other parts of the brain. Occasionally aphasia is associated with left hemiplegia.

12. CONDITION OF PARALYSED MUSCLES.

Tone.—It is necessary in the first place to distinguish between the results of paralysis which arises from a lesion of the central organs (*central paralysis*), and of that which is due to a lesion of a motor nerve or of the nucleus from which it springs (*peripheral paralysis*).¹ In most cases of central paralysis the muscles preserve their normal tonicity; but in certain cases, especially where the lesion is suddenly produced and extensive, they may at first be limp and flaccid. Sometimes again we meet with muscular rigidity and contraction; but "early rigidity" must be distinguished from that which develops at a later period in

the history of the case. "Early rigidity" depends upon irritation at the seat of disease, and is especially common in disease of the membranes of the brain and cord, and in hæmorrhage into the ventricles of the brain. "Late rigidity," on the other hand, comes on in cases of old paralysis, and is due to secondary fibroid degeneration in the motor tract of the spinal cord. In peripheral paralysis, the muscles soon become flaccid and atrophied.

Electrical reaction.—This may be ascertained in two ways:—(1) by *Faradisation*, in which the currents are of momentary duration and of high tension; or (2) by *Galvanism*, in which they are continuous and of comparatively low tension. In the majority of cases of "central paralysis" the "electrical contractility" is unaffected; but in some few cases it is exalted, while in others it is impaired just at first. In all such cases the muscles tend very slowly to undergo slight atrophy from disuse, with a loss of electrical contractility *in direct proportion to the amount of atrophy*. In "peripheral paralysis" the muscles quickly atrophy, while their electrical behaviour is peculiar and characteristic. For about the first week the reaction of the affected muscles both to faradism and galvanism becomes diminished—much more rapidly, however, in the case of the former than the latter. From the second to the fourth week all response to faradism is lost, while the galvanic irritability is increased, that is to say, contraction is elicited with fewer cells than before. This state of things is maintained for a few weeks, when at last galvanic irritability gradually passes off, and by that time muscular action is irretrievably lost. This series of electrical phenomena is known as the "reaction of degeneration."

Electro-sensibility is usually increased or diminished with electro-contractility; but occasionally, as in hysteria, the former may be lost while the latter remains; and more rarely still the reverse is the case.

Reflex irritability in the majority of cases of "central paralysis" is unimpaired. But in lesions of the spinal cord which cut off all connection between the paralysed part and the brain it is markedly increased. This is also the case in certain irritative lesions of the central nervous system. In "peripheral paralysis," for obvious reasons, reflex irritability is abolished.

There are two muscular phenomena, on which a good deal of attention has been bestowed of late, and to which some reference must be made, viz., tendon-reflex, and ankle-clonus.

1. The most important tendon-reflex is the so-called *knee-jerk*, which is elicited in health by sharply striking the patellar tendon with some blunt object, while the leg hangs loosely from the knee. It is essentially a reflex phenomenon, and the afferent and efferent fibres concerned in it join the cord with the second and third lumbar nerves. If this reflex arc be interrupted at any point, by disease of the cord or otherwise, the phenomenon is absent, as in locomotor ataxy. On the other hand, when the nervous centre of the arc is cut off from the inhibitory influence of the brain, by any lesion higher up in the cord, it is exaggerated, as in spinal sclerosis.

2. *Ankle-clonus* is characterised by a persistent series of rapid rhythmical contractions at the ankle-joint, on sudden and forcible passive flexion of the foot on the leg. It cannot be obtained in health, but under similar conditions to those in which the knee-jerk is exaggerated, it may be readily elicited. This too is a reflex act, the primary source of which is a stimulus afforded by sudden tension of a highly irritable muscle. The reflex centre is situated in the cord at the level of the first and second sacral nerves.

SUB-SECTION I.

DISEASES OF THE BRAIN.

CEREBRAL MENINGITIS.

MENINGITIS broadly denotes an inflammation of the meninges; but it rarely happens that all these membranes are simultaneously involved, and therefore special terms are necessary to distinguish inflammation of one membrane from that of another. Thus inflammation of the dura mater is called *pachymeningitis*; of the surface of the arachnoid—*arachnitis*; of the pia-mater and sub-arachnoid tissue—*leptomeningitis*. Now the first two are probably *always* secondary to surgical injury or disease of the skull, and therefore need not occupy consideration here. The simple and tubercular meningitis about to be described are forms of lepto-meningitis. Acute simple meningitis, although often secondary to disease or injury of the bones of the skull, also occurs in connection with certain acute specific fevers, erysipelas, conditions of profound debility, nervous shock, or syphilis. In a chronic form it may also be due to syphilis. But of all forms of meningitis, that set up by tuberculosis is the most common, and is especially frequent during childhood.

ANATOMICAL CHARACTERS.—*Acute simple meningitis* generally affects the *convexity* of the brain. It is characterised at first by acute congestion of the pia-mater, which is soon followed by the formation in the sub-arachnoid space and in the intervals between the convolutions of a firm yellowish green exudation of lymph and inflammatory cells. In this form, the ventricles are generally empty; but when the base of the brain is involved, they are apt to contain an excess of fluid. When occurring as the result of injury, *all* the membranes are involved.

In *chronic meningitis* the membranes are thickened, opaque, and more or less adherent to each other and to the brain-substance beneath.

Tubercular meningitis is usually limited to the *base* of the brain, and is characterised by the presence of grey miliary tubercles in the pia-mater in association with ordinary inflammatory changes, consisting of an opaque yellowish exudation in the sub-arachnoid space. These changes are especially abundant around the optic commissure, extending thence into the adjoining fissures of Sylvius, and backwards towards the medulla. As in simple meningitis the arachnoid cavity is empty, but the ventricles are more or less distended with clear or flocculent serum, which leads to flattening of the convolutions by outward pressure against the skull.

The *symptoms of acute meningitis* (both simple and tubercular) may be conveniently considered together. *Premonitory symptoms* lasting a very variable time are observed in tubercular meningitis, but are usually absent in the simple form. The patient is fretful, restless, loses his appetite, suffers from a furred tongue, constipation, headache, and feverishness, with a quick and irregular pulse. The *invasion* is sometimes marked by rigors or chilliness, followed by fever, and intense headache; in other cases, by obstinate vomiting, by a strange wild manner, or by an epileptic seizure.

The established disease may be divided into three stages.

1. *Stage of irritation.*—This begins with the symptoms of invasion (variously combined) which have been enumerated.

General.—There is marked fever, often of a very irregular type; a frequent pulse, subject to *sudden variations independently of the fever*; irregular and moaning breathing; nausea and obstinate vomiting with great thirst, loss of appetite, and constipation. *Local.*—Headache is constant, and often so severe that the patient shrieks with the pain,

and supports his head with his hands. This is often associated with tenderness of the scalp and radiating pains in the limbs. *Mental*.—The patient is fretful, restless, with a tendency to active delirium. *Motor*.—There may be tremor or twitchings of the face and limbs; strabismus with contracted pupils; general convulsions, or tonic muscular contractions. *Sensory*.—Not infrequently there is also some general hyperæsthesia, with intolerance of light and sound.

2. *Stage of transition*.—The headache and other marked symptoms of the first stage now gradually subside, and the patient becomes for the most part quiet and drowsy. The temperature generally falls, sometimes to normal, or even below it. The pulse is slow and irregular; the respiration is also irregular and sighing. The patient is dull and apathetic; food is only taken when offered, and then often with difficulty. He rolls his head uneasily from side to side, and picks at the bed-clothes. The pupils are dilated; paralysis may supervene, especially ptosis, and paralytic strabismus; and he usually suffers from quiet delirium. At this time some rather characteristic phenomena may be observed: (a) a short, sharp, shrill scream occurring at intervals and known as the “hydrocephalic cry”; (b) retraction of the abdomen; (c) a red blush which persists after irritation of the skin, known as the *tache cérébrale*; and (d) optic neuritis.

3. *Stage of coma*.—Many of the preceding symptoms continue, but this stage is mainly characterised by coma and convulsions. Absolute insensibility prevails, the patient can no longer be roused, and common and special sensation are lost. The pulse once more becomes rapid, but it is now very feeble. The breathing is also frequent and irregular. The temperature varies greatly—in some cases it rises rapidly as death approaches, in others it falls even below normal. The tongue is brown and coated, and the lips and teeth are covered with sordes. Convulsions recur more and more

frequently, and often constitute the closing scene of a disease which is almost always fatal.

It should be borne in mind that numerous departures from the above general description are met with in practice; that the division into stages is by no means always well-marked; that the passage from one stage to another is, as a rule, gradual; and that their absolute and relative duration vary much, the total duration being from one to three weeks.

Such differences as may exist between simple and tubercular meningitis are largely due to the fact that the former is generally limited to the *convexity*, and the latter to the *base* of the brain. In the *simple* form the onset is usually sudden; delirium comes on early and is of an active kind; well-marked remissions in the fever are wanting; and the course is rapid. In the *tubercular* form on the other hand, the onset is insidious, irritation followed by paralysis of cranial nerves is a prominent and early feature; delirium does not come on till late, and is then comparatively quiet; there are well-marked remissions in the fever and other symptoms; the temperature in the last stage is low; and the general development of the symptoms is slow.

From *typhoid fever*, to which acute meningitis has some resemblance at the onset, the distinction rests upon the nervous features of the premonitory symptoms, the irregular course of the temperature, the retracted abdomen, and the absence of diarrhœa, splenic enlargement and rash in the latter affection.

It is also perhaps necessary to call attention to the similarity of the symptoms sometimes caused by worms or severe diarrhœa in young children, and those of meningitis.

The *symptoms* of *chronic meningitis* are obscure, and in some respects resemble those of cerebral softening. At the outset they consist of constant headache with indications

of cerebral irritation. At a more advanced period the memory is obviously impaired, the mind is feeble, and the gait is tottering. Incomplete paralysis of the limbs, of variable distribution, may supervene.

CEREBRAL CONGESTION AND ANÆMIA:

THE proper functions of the brain (as of all other tissues) are closely related to its blood-supply. The symptoms of active congestion are mainly characterised by cerebral *irritation*; and those of anæmia, by cerebral *depression*. But when congestion is of the mechanical type, or is long-continued in any form, signs of cerebral depression become a prominent feature. The error however must be avoided of attributing all functional disorders of the brain to circulatory troubles, which would ignore the profound disturbance so often arising from morbid changes in the blood itself.

The *causes* of cerebral congestion and anæmia are, in the main, the same as those of congestion and anæmia generally. The following account refers to *general* congestion and anæmia of the brain; but either condition may be *partial* in distribution, and the symptoms will then necessarily vary according to the seat of the disturbance.

The chief *symptoms* of *active* cerebral congestion are, extreme wakefulness, incapacity and disinclination for mental work, confusion of ideas, defective memory, emotional excitability with occasional temporary illusions or hallucinations. Headache and dizziness are prominent symptoms, with a feeling of heat and fulness about the head, flushing of the face and throbbing of the carotids, which is exaggerated on stooping or lying down. Strong light and noise cause annoyance, and sparks before the eyes, singing noises in the ears, with tingling sensations in the limbs may be complained of. There is usually great

restlessness with occasional startings and twitchings of the limbs. The pupils are contracted.

Special paroxysms are apt to occur in the course of cerebral congestion, of which there are three chief varieties. 1. The *apoplectic* form is the most frequent and important. The patient becomes giddy, and falls in a condition of partial insensibility which is followed by paralysis of one or more limbs, or of one side of the body. The paralysis is never complete, rarely involves the facial muscles, and passes off comparatively soon. 2. The *epileptic* form resembles, in the main, an ordinary epileptic fit, but is preceded by no "aura," is attended with no peculiar cry; the subsequent stupor is not complete and is of short duration; it never occurs during sleep, and is most frequent in advanced middle age. 3. The *maniacal* form resembles an attack of acute mania of an active type, and usually lasts but a few hours.

The general symptoms of *mechanical* cerebral congestion are, on the whole, very similar to the above: but drowsiness with a tendency to stupor is the most prominent feature, while the other symptoms are less strongly marked. Similar paroxysms are also apt to occur, but the *apoplectic* form is usually not so suddenly developed, lasts longer, and the stupor is more complete; the *epileptic* variety is also of longer duration, and the stupor is more profound; and lastly, the *maniacal* form (which is rare) is characterised by delirium of a *low* type.

In cerebral *anæmia* we also meet with severe headache, dizziness, sparks before the eyes, singing noises in the ear, numbness, mental confusion, loss of memory, inaptitude for mental work, and occasionally loss of consciousness. The headache is usually more localised than in congestion, the face is pale, the carotids do not throb, the pulse is feeble, the pupils are dilated, and anæmic murmurs are heard at the base of the heart, and over the veins of the neck.

ACUTE ENCEPHALITIS.

ENCEPHALITIS or inflammation of the brain may be either general or local, but in neither case does it probably occur as a primary affection. General encephalitis may be caused for instance by general meningitis, or by thickly-scattered embolic abscesses as in pyæmia. Local inflammation is usually secondary to injury or disease of the skull (*especially disease of the internal ear*), or to irritation set up by new growths or extravasated blood, or to pyæmic abscesses.

ANATOMICAL CHARACTERS.—The inflamed brain-substance is at first red and congested, afterwards becoming swollen, pulpy, and more or less disorganised (*acute softening or ramollissement*). The surrounding tissue is congested and œdematous.

In course of time the inflammation subsides, or it terminates in suppuration. When occurring as the result of cranial injury or disease, a cerebral abscess is usually single, and occurs in the white substance of the cerebrum. It may be quite small, or it may occupy the whole of one cerebral hemisphere, compressing and flattening the convolutions against the skull. In recent cases, the pus is fairly healthy, and the abscess is only surrounded by softened brain substance; but in more chronic cases it is often enclosed in a firm fibrous capsule containing unhealthy and fœtid pus. Such abscesses usually increase in size till they burst either on the surface of the brain, or into a ventricle, or into the tympanum, or in rare cases externally. The multiple abscesses of pyæmia are usually small, and scattered promiscuously throughout the substance of the brain.

SYMPTOMS.—A systematic description of the symptoms of encephalitis is almost impossible, not only on account

of the wide variations according to the seat and extent of the mischief, but on account of the difficulty of isolating the symptoms proper to encephalitis from those of the affection to which it is secondary.

In the milder forms of inflammation they are exceedingly vague, and amount to little beyond slight febrile disturbance, headache, giddiness, some exaggeration of any motor or sensory disturbance due to the original lesion, and mental incapacity; perhaps together with slight delirium, or an intercurrent attack of convulsions, or of coma. Cerebral abscess often runs an entirely latent course, but it may be assumed to have occurred when, after some disease or injury to the head, or in the course of a chronic otorrhœa, inflammatory and febrile symptoms supervene accompanied with localised headache, vomiting, convulsions, or coma, or other cerebral symptoms. Its progress sometimes admits of a division into a stage of irritation, and one of depression such as described under the head of meningitis. Cerebral abscess usually proves fatal in from one to four weeks, and death is commonly preceded by coma. In pyæmic abscess death is due to the primary disease, rather than to the cerebral complication.

CEREBRAL HÆMORRHAGE.

CEREBRAL hæmorrhage (or extravasal apoplexy as it was formerly called) exclusively arises from rupture of a vessel in the brain, and is brought about by one or more of the following conditions: (1) *diseases of the vascular walls* such as fatty degeneration, chronic endarteritis, or small aneurismal dilatations, by which their fragility is increased; (2) *increased pressure of the blood within the vessels*, such as occurs in chronic Bright's disease, or as a result of over-strain or prolonged effort; and (3) *any change in the*

surrounding parts by which the vessels are deprived of their natural support, such as may be assumed to arise from cerebral softening. Cerebral hæmorrhage is essentially a disease of advanced life, and is more common in men than in women.

ANATOMICAL CHARACTERS.—Capillary hæmorrhages consist of a cluster of punctate extravasations over an area of variable extent. When due to the rupture of larger vessels, the hæmorrhage varies greatly in size according to the calibre of the vessel concerned. When of small size the nerve-fibres are merely pushed asunder; but when large, the brain substance is ploughed up, and a potential cavity is formed, of roundish shape, with ragged walls, and filled with blood which soon clots. The hæmorrhage may break through into a ventricle, or, more rarely, through the cortex of the brain. Usually there is only a single hæmorrhage, which is most frequently seated at the junction of the external capsule with the grey matter of the corpus striatum, in the optic thalamus, or in the mass of a cerebral hemisphere; sometimes in the crus cerebri, pons varolii, or cerebellum; most rarely in the corpora quadrigemina and medulla.

Should the patient survive, the *clot* undergoes certain changes. It first shrinks, and the serum separates out. It then undergoes disintegration together with the broken nerve-tissue, and forms a dark-red liquid which first becomes brown, and afterwards yellow. Meanwhile, the cavity becomes rounded, and its boundary more defined. As a result of reactive inflammation a fibroid cyst is ultimately formed, the cavity of which is traversed by delicate threads of connective tissue, and contains clear serum. This condition may persist; or the fluid may be absorbed, followed by approximation of the cyst-wall, until a pigmented cicatrix alone remains. Crystals of hæmatoidin are often met with. The secondary effects on the *surround-*

ing tissue are :—(1) flattening of the convolutions and cerebral anæmia which at once result from the outward pressure of the clot ; (2) local encephalitis due to irritation set up by the clot, which sets in after 4—8 days ; and (3) at a much later period, atrophic changes which affect the motor tract of the damaged side from above downwards (*secondary degeneration*).

SYMPTOMS.—*Premonitory* symptoms are not common, but when present, consist of headache, giddiness, slight hesitation of speech, forgetfulness of words, mental dullness, sensory disturbances (*muscæ volitantes*, tinnitus aurium, numbness or tingling in the limbs, &c.), weakness of the limbs on one side of the body, or nose-bleeding.

The symptoms of cerebral hæmorrhage may for the most part be included in two groups : (1) *paralysis* which directly depends upon the local injury ; and (2) an "*apopleptic stroke*," which is probably due to the sudden functional disturbance of the brain as a whole.

The nature of the paralysis obviously varies with the extent and seat of the hæmorrhage. In capillary hæmorrhage it may be absent, or so slight as to escape recognition, but such cases are of exceptional occurrence. The *corpus striatum* is by far the most frequent seat of hæmorrhage, and is attended with the paralysis, *on the opposite side of the body*, of the arm, and leg, those muscles of the face going to the angle of the mouth and to the nose, and the muscles which protrude the tongue (*hemiplegia*). It is important to note that, on the affected side, *the eye can be closed*, and *the rhythmical movements of the thorax and abdomen continue*. Sometimes *hemi-anæsthesia* of the same side is also present, and is said to indicate the extension of the hæmorrhage to the *optic thalamus*, or its immediate neighbourhood. Similar symptoms attend hæmorrhage into the *white substance of the cerebrum*, but with this difference, that whereas in any extensive destruction of the corpus

striatum or optic thalamus, the hemiplegia is *permanent*, that which arises from a lesion of the white cerebral substance is only *temporary*. When the coma is profound and accompanied with general rigidity of the limbs, the hæmorrhage has probably extended into the lateral ventricles. Hæmorrhage into the *crus cerebri* is characterised by paralysis of the third or fourth cranial nerves on the *same* side, together with hemiplegia—and sometimes hemianæsthesia too—on the *opposite* side of the body. Cross-paralysis of a similar kind may follow certain cases of hæmorrhage into the *pons*, and the cranial nerves concerned in deglutition and articulation are in this case especially apt to be involved. More often there is general paralysis. Lesions of this part are usually quickly fatal. In hæmorrhage into the *cerebellum* paralysis is often absent but on attempting to walk, the patient is apt to stagger; and severe pain at the back of the head, vomiting, together with vertigo, are also of frequent occurrence.

The “apoplectic stroke” is characterised by coma. The patient falls more or less suddenly, and for the time all consciousness, sensation, and motion are lost. The pulse is slow but full; the breathing is slow, laboured, and stertorous; the cheeks are puffed out at each expiration; the face is usually flushed, and the carotids may throb violently; the eye-lids are closed; the eyes—and sometimes the head—are turned to the side opposite to the paralysis, and the pupils are unequal or contracted. Reflex irritability is often abolished at first, but returns in a few moments. The sphincters are often temporarily paralysed, so that the urine and fæces may be passed involuntarily.

The *clinical history* of cerebral hæmorrhage varies greatly according to its seat, extent, and rapidity of occurrence.

1. Occasionally profound coma supervenes, with or without premonitory symptoms, in which the patient dies

in a few minutes or after some hours—*never instantaneously*. This variety is often ushered in with convulsions.

2. More often there is first an apoplectic fit, but after some hours consciousness gradually returns; but hemiplegia with or without aphasia remains, and persists for a long time or for the remainder of life.

3. Partial recovery may occur as before, but owing to fresh hæmorrhage the coma returns and proves fatal.

4. In cases where the hæmorrhage occurs slowly in the first instance, symptoms of paralysis may precede the apoplectic attack, if the latter takes place at all.

5. Lastly, there may be no apoplectic fit at all, temporary hemiplegia affording the only sign of hæmorrhage having taken place.

There are, in conclusion, certain secondary phenomena which deserve mention. 1. As the result of *local encephalitis* set up by the clot towards the end of the first week, febrile symptoms attended with headache, mental confusion, or even delirium, a tendency to coma, and sometimes convulsive movements may be observed. These symptoms usually continue for four or five days and then pass off.

2. A *peculiar permanent change of manner* with loss of memory and emotional perversion is apt to occur after cerebral hæmorrhage. 3. *Bed-sores* sometimes appear on the buttock of the paralysed side, from the second to the fourth day, and are of very unfavourable augury. 4. *Inflammation of internal organs—e.g., the lungs—*sometimes supervenes. 5. After the second or third week, or later, rigidity with flexions of the paralysed limbs may occur, accompanied with atrophy of the muscles (*late rigidity*). This is due to degenerative changes in the motor tract of the cord. 6. *Other nervous symptoms* more rarely occur, such as convulsions, delirium, mania or dementia, which are due to secondary changes in the nervous centres.

The prognosis of cerebral hæmorrhage depends upon

the seat of the mischief, and the severity of the symptoms. Hæmorrhage for instance into the ventricles, or medulla is always fatal. Speaking generally, cases in which insensibility persists for over twelve hours are also always fatal. Cheyne-Stokes' respiration is a very unfavourable sign, and for obvious reasons the co-existence of organic disease in other parts renders recovery less probable.

MENINGEAL HÆMORRHAGE.

UNDER this head are included hæmorrhage into the sub-arachnoid space, and into the arachnoid cavity. Traumatic injury is its most common cause; but sometimes it is due to arterial degeneration and rupture from persistent abuse of alcohol, or to the bursting of an aneurism at the base of the brain; and more rarely it is met with in connection with paralysis of the insane.

SYMPTOMS.—Slight hæmorrhage may give rise to no recognisable symptoms whatever. In more severe cases, the most prominent symptom is *coma*, which may come on suddenly, or be preceded for awhile by headache, vertigo, or convulsions. The coma is usually profound, and resembles, on the whole, that observed in cerebral hæmorrhage. There is complete resolution of all the limbs, but *there is no hemiplegia*—at any rate in the first instance. Later on, however, temporary weakness of the opposite limbs is not uncommon. Reflex irritability remains intact. This condition may pass on directly to death, but more often partial recovery takes place until a renewal of the bleeding once more plunges the patient into a state of coma. This sequence may be repeated several times until death at last occurs. Under these circumstances, vomiting, incontinence of urine and fæces, and convulsions may be observed. In exceptional cases the coma may be deferred for a considerable period after the injury has occurred. Complete recovery is rare.

CEREBRAL EMBOLISM AND THROMBOSIS—
SOFTENING.

CEREBRAL EMBOLISM is caused by plugging of one of the cerebral arteries—almost always the *left middle cerebral* artery. The embolus usually takes the form of a small vegetation or particle of fibrin which becomes detached from the heart or aorta, and is swept into the current of the circulation. Accordingly it is found most frequently in connection with *valvular disease of the left heart*, or (less often) with degeneration or aneurism of the aorta. Pyæmic abscesses are, strictly speaking, the result of cerebral embolism, but they are not included in the present description.

CEREBRAL THROMBOSIS is almost always associated with chronic, inflammatory, syphilitic, or other disease of the cerebral vessels which leads to a local coagulation of blood within them. Its frequency increases with age.

Both embolism and thrombosis have this feature in common—that *the supply of blood is cut off* from that part of the brain to which the obstructed vessel is distributed, and that consequently, if collateral circulation is not quickly established, and if death does not intervene, *softening* and *necrosis* of the same area necessarily follow. The affected part becomes soft, pulpy, or even diffuent, and is of a yellowish colour, due to altered blood-pigment (*yellow-softening*). Microscopic examination reveals granulation-corpuscles and nerve-fibres in various stages of fatty degeneration. In softened patches of small size *absorption* may occur, and only a small scar may be left behind; in other cases the absorption is not complete, and a cyst is formed traversed by loose cellular tissue, and containing a turbid fluid.*

* An undue importance has, in my opinion, been attached to the epithets *red*, *yellow*, and *white*, as applied to varieties of cerebral softening,

SYMPTOMS.—In embolism *premonitory symptoms* are wanting; but in thrombosis, owing to the general arterial disease with which it is associated, premonitory symptoms may be observed similar to those which sometimes precede cerebral hæmorrhage.

In *embolism* the onset is more or less sudden, and is marked by loss of consciousness which varies greatly in degree, but is rarely altogether wanting. This condition may pass on into that of death, but more commonly consciousness returns, and the patient is then found to be paralysed. Of course the paralysis will vary according to the seat and extent of the obstruction; but as already pointed out, by far the most frequent seat of embolism is the left middle cerebral artery, which supplies the greater part of the corpus striatum, the anterior half of the optic thalamus, and nearly the whole of the antero-lateral region of the brain. Hence there is usually right hemiplegia with aphasia.

In *thrombosis* a sudden onset is exceptional, and the coma is *gradually* developed, and *incomplete*. Headache, vertigo, mental confusion, and faintness may be also observed. The coma may be followed by paralysis as in embolism. In many cases such attacks are repeated, with partial restoration in the intervals, until at last absolute coma supervenes, which is followed by death. Convulsive movements not infrequently occur in the early stages.

Both in embolism and thrombosis the paralysis often persists, and symptoms indicative of softening are deve-

and it would be well if they were discarded. Those who may still desire to attach some definite meaning to them may regard (1) *red softening* as exclusively arising from *acute inflammation*; (2) *yellow softening* as indicating a *non-inflammatory process* such as that due to *embolism* or *thrombosis*; and (3) *white softening* as that met with in hydrocephalus, which is partly the result of maceration and partly of slow inflammatory change.

loped ; in which case, there is generally more or less persistent frontal headache, with loss of memory, and general mental enfeeblement which may pass on to complete dementia. Bed-sores on the buttock are also apt to appear, as after cerebral hæmorrhage. Similarly, "late rigidity" with contractions of the paralysed limbs may occur, from secondary lesions of the motor tract in the spinal cord, which may be followed by nutritive lesions in the joints and muscles. The prognosis is therefore very unsatisfactory, death ultimately occurring from asthenia, or from some complication.

TUMOURS OF THE BRAIN AND MEMBRANES.

THE more important of the new formations to which the brain and membranes are liable are as follows :—

1. *Tubercle*.—This constitutes the commonest form of cerebral tumour. They are single or multiple, and consist of rounded cheesy masses, resulting from the degeneration of aggregated groups of tubercle. They vary from the size of a mustard-seed to that of a hen's egg, and sometimes are even still larger. Their usual seat is in the cortical grey matter of the cerebrum or cerebellum.

2. *Glioma*.—This is also a frequent form of cerebral tumour, and arises in connection with the neuroglia, or supporting connective tissue of the brain-substance. It consists of fibres and cells, and it is usual to distinguish a hard and a soft variety, according to the predominance of fibres or cells respectively. Glioma is apt to undergo mucous changes, and is closely related to sarcoma. It may occur in any part of the brain.

3. *Syphilis*.—Syphilitic gummata frequently occur in the membranes of the brain, especially over the base of the latter.

Much more rarely they occur in the substance of the brain. They are almost always multiple, vary much in size, and are accompanied with a good deal of inflammatory change in the parts around, thus leading to caries, meningitis, and encephalitis. The cranial nerves are also particularly liable to become involved. The *small arteries* moreover are often narrowed by fibro-nuclear infiltration of their walls, and are thus very liable to become blocked by thrombosis. Other kinds of cerebral tumour are sometimes met with, *e.g.*, cancer, myxoma, lipoma, hydatids, and aneurism; but, on account of their rarity, no special description of each is necessary here.

SYMPTOMS.—First, it may happen that even a large tumour may exist without giving rise to any symptoms whatever during life, especially when its growth has been very slow. In other cases tumours of large size may exist and cause no symptoms until a few days before death, when convulsions occur followed by fatal coma. Lastly, it is obvious that in all cases the symptoms will vary much according to the size, seat, and rapidity of growth of the tumour.

1. *Headache* is usually the earliest and most prominent symptom. It is *intense*, and is *apt to occur in paroxysms, associated with giddiness and sickness*. Its character is very variable, and its seat by no means always corresponds with that of the disease. 2. *Vertigo* is rarely absent, and frequently constitutes an early symptom. 3. *Vomiting* is also of common occurrence. It is not preceded by nausea as a rule, is unattended by the signs of gastric derangement, and is generally associated with constipation. 4. *Sensory disturbances*. The *eye* is often the first to suffer. There may be dimness of sight, *muscæ volitantes*, hemiopia, or double vision. The ophthalmoscope moreover, almost always reveals a more or less well-marked inflammation of *both optic discs (optic neuritis)*. The *hearing* is often af-

fect, and there may be deafness in one or both ears, with buzzing noises. Disorders of sensibility characterised by anæsthesia or hyperæsthesia may be experienced in several parts of the body, especially in the face and extremities. 5. *Motor disturbances.* Paralysis may be entirely absent. When present it may take the form of *hemiplegia* which under these circumstances, usually *comes on gradually*. It is sometimes associated with a defect in one or more of the conjugate movements of the eyes. Partial recovery alternating with relapse is not uncommon. Sometimes the paralysis is limited to a single limb, or to the face. *Local paralyses* are of very common occurrence (whether hemiplegia be present or not) and are due to direct implication of the affected nerves or their nuclei of origin. Thus there may be paralysis of the 6th nerve, causing internal squint; or paralysis of the 3rd nerve, causing external squint with ptosis and dilatation of the pupil; or of the facial nerve; and so on. *Convulsions* are also common and often constitute the first sign of mischief. They may be general, but are more frequently *limited to a single part or to one side of the body*. 6. *Mental disturbance* is generally a late symptom, and is characterised by gradually-advancing imbecility. *Death* usually occurs from convulsions or coma, or a combination of both.

CEREBRO-SPINAL SCLEROSIS.

SCLEROSIS is characterised by atrophy and degeneration of the proper nerve-elements, associated with a secondary overgrowth of the neuroglia. It occurs most frequently between 20 and 30 years of age, and is sometimes traceable to cold or alcoholic abuse.

ANATOMICAL CHARACTERS.—This form of sclerosis consists of small, rounded, dense, and well-defined nodules of a

greyish translucent appearance, scattered here and there in the *white* substance of the brain or cord, or both. The grey matter is rarely affected. Microscopic examination reveals a fibro-nuclear overgrowth of the neuroglia, with loss of the medullary substance of the nerve-fibres. It is probable that the axis-cylinders of the latter persist to a great extent.

SYMPTOMS.—From the above remarks, it is obvious that the symptoms will vary in different cases according to the distribution of the sclerotic nodules. In a typical case the motor tract both of the brain and spinal cord is mainly affected, and the following description will therefore be based on that fact.

As a rule, the first indication of mischief consists in the gradual onset of muscular weakness and trembling. The weakness generally begins in one of the lower limbs, and shortly afterwards extends to the other. As time goes on, it gets worse and worse and amounts to positive paralysis, though temporary remissions in its progress are not infrequent. There is no loss of power over the rectum or bladder, and it is not accompanied with any disturbance of sensibility. The tremor occurs only on attempting any voluntary movement of the affected part, and ceases entirely when the muscles are at rest, and also during sleep. Later on, similar paralysis and tremor extend to the muscles of the upper limbs, trunk, head, face, tongue, and lips. There is no loss of muscular sense, neither is the unsteadiness increased by closure of the eyes. There is some increase in the reflex irritability; thus the knee-jerk is exaggerated, and ankle-clonus is readily obtained. The nutrition and electric excitability of the muscles are unaffected. The speech is slow, syllabic, and hesitating; which is partly due to a mental defect, and partly to a difficulty of articulation. Oscillation of the eyeballs (*nystagmus*) is a frequent symptom. The mind at this

stage is usually fairly clear, but there may be some amount of headache and vertigo.

As the case proceeds, attacks of *tonic spasm* are apt to occur in the paralysed muscles, which tend to become more and more frequent, till at last the limbs become permanently rigid. Also as the brain becomes more involved, the mind begins to suffer, the memory fails, the will becomes weak, and the emotions are readily excited. Ultimately the patient lapses into a condition of paralytic dementia. The progress of the disease is tedious, the duration sometimes extending to eight or ten years; and death ultimately occurs from asthenia, or some complication.

If the lesion extends to the posterior columns, or to the anterior cornua of the cord, staxic or atrophic symptoms respectively may complicate the case.

HYDROCEPHALUS.

THE term hydrocephalus, or "water on the brain" may be applied to any excess of fluid in or beneath the arachnoid, or within the ventricles. It occurs sometimes in connection with the shrunken brains met with in old and demented persons; or again with inflammatory affections of the brain and membranes, notably tubercular meningitis, which is sometimes termed *acute hydrocephalus*. In the present chapter, the term is limited to chronic non-inflammatory effusions into the ventricles, which are met with for the most part, but not quite invariably, in young children, in whom the affection is usually congenital. Sometimes, however, it is acquired; and then it appears to be most commonly associated with rickets. The pathology of these cases is very obscure. Occasionally the condition occurs in adults, as the result of pressure on or occlusion of the *vena Galeni*.

ANATOMICAL CHARACTERS.—The ventricles are distended with a clear, limpid serum, which varies in quantity from a few ounces to several pints. The lining membrane is often rough and somewhat granular. If, as usually happens, the cranial sutures are not yet united, the effect on the surrounding parts is very striking. The convolutions are effaced and flattened against the skull, which meanwhile greatly enlarges in its upper part; the fontanelles and sutures greatly widen, and the bones are thinned.

The symptoms may be arranged in three groups. 1. *The appearance of the head.*—This becomes enormously enlarged, and is only supported with difficulty; the forehead is broad and projecting; and the orbital plates are depressed so that the eyes are prominent, and look downwards. The fontanelles and sutures are wide, and may fluctuate on palpation; and the superficial veins are very distinct. The face appears very small by contrast, and wears a curious careworn aspect. 2. *Secondary nervous symptoms.*—Convulsions often constitute the earliest symptom, and are apt to recur from time to time. The child is fretful and dull, and the mind gradually fails, culminating, it may be in imbecility. The gait is tottering, and the limbs are weak and subject to convulsive twitching. Sight and hearing may be impaired or lost. 3. *Failure of nutrition.* The body wastes though food is often taken greedily, and the bowels are generally constipated.

The duration of the disease varies much. Death more often occurs during the first or second year from convulsions, coma, or some complication; but it is occasionally deferred till much later. When hydrocephalus comes on subsequently to the union of the cranial bones, the symptoms are very obscure, and a correct diagnosis is a matter of great difficulty.

SUB-SECTION II.

DISEASES OF THE SPINAL CORD.

SPINAL MENINGITIS.

For reasons set forth in the chapter on cerebral meningitis it is convenient to distinguish between spinal pachymeningitis, arachnitis, and lepto-meningitis respectively; and like that disease, the first two varieties are exclusively caused by surgical disease or injury, and so need not be further alluded to here. Lepto-meningitis often arises in a similar way, but in this case—as in the cerebral form, all the membranes are involved. Simple or idiopathic and tubercular spinal meningitis are examples of pure lepto-meningitis. The former occurs in connection with certain acute diseases or from exposure to cold and wet, and may be either acute or chronic. The tubercular form is always acute. Spinal meningitis may exist alone, or be associated with cerebral meningitis.

ANATOMICAL CHARACTERS.—The *acute* form is characterised by active congestion of the pia-mater, and effusion of turbid, flocculent, or semi-purulent products beneath the arachnoid. These changes are of course associated with tubercles in the tubercular variety. In *chronic* meningitis, the membranes are thickened and opaque, and more or less adherent to each other and adjacent parts, with or without effusion. Acute inflammation generally involves the whole length of the meninges, while the chronic form is frequently limited to some one part.

The **SYMPTOMS** of simple and tubercular meningitis are alike on the whole, and are mainly due to direct irritation of the surface of the cord with the motor and sensory roots

of the spinal nerves. *Acute meningitis* begins with chilliness, followed by fever. At the same time there is *pain in the back*, which is aggravated much more by movement than by pressure, and accompanied with sharp radiating pains in the limbs. The sensibility of the skin is painfully exaggerated. Another prominent feature is tonic muscular spasm, affecting the trunk and limbs, and causing various contractions of those parts. The above signs of irritation gradually give place to those of depression. Thus, paralysis slowly supervenes in the limbs, and the hyperæsthesia becomes much less marked, or may disappear. The paralysis is incomplete, and the bladder and rectum are rarely involved to any great extent.

Recovery is quite exceptional, and in the course of two or three weeks, death occurs from asphyxia (by paralysis of the respiratory muscles), or asthenia. Sometimes the case passes into a chronic form.

The symptoms of *chronic meningitis* are not very unlike those of the acute form, but the onset is more gradual, there is no fever, and the progress is slower. The *pain* in the limbs is frequently much more marked than that in the back, and resembles so-called "rheumatic pains." It is commonly associated with more or less *tonic or clonic spasm*, and exaggerated sensibility. Incomplete paralysis gradually develops, and the bladder and rectum are more often involved than in the acute form. Reflex excitability is often increased. *Marked remission of all symptoms from time to time* constitutes an important feature of chronic meningitis. Death is the usual termination, and is often preceded by bed-sores, purulent cystitis, or pulmonary complications.

SPINAL CONGESTION AND ANÆMIA.

THE SYMPTOMS of spinal congestion and anæmia respectively, are briefly as follows:— *Spinal congestion* is characterised by *dull aching pain in the back*, increased by a sudden blow or shock, but not by firm pressure or movement; numbness, “pins and needles,” and other *sensory disturbances* in the lower limbs; *incomplete paraplegia* which develops rapidly, and is increased by the recumbent posture; and occasionally by some difficulty in the expulsion of the urine, and fæces. There is no fever or spasmodic contraction of the limbs. The duration is variable, and unless further pathological changes ensue, recovery usually takes place.

Spinal anæmia—better known as *spinal irritation*—is not uncommon in anæmic women of a hysterical temperament; but is not confined to this sex or temperament. It is characterised by marked *localised tenderness over some part of the spine*, which is sometimes associated with extraordinary sensitiveness of the skin, in the immediate neighbourhood. Functional disturbances of the stomach and heart, tonic and choreic movements in the limbs, pseudo-paraplegia, and flushes alternating with pallor are also commonly met with. There is no elevation of temperature.

SPINAL HÆMORRHAGE.

HÆMORRHAGE either in the substance of the cord, or the membranes, is almost always the result of injury. Occasionally, however, it arises from the rupture of an aneurism.

SYMPTOMS.—Hæmorrhage into the substance of the cord is followed by the *sudden* suspension of motion and sensation in the lower half of the body, together with paralysis

of the bladder and rectum. Unless the lesion be so high up as to cause asphyxia by paralysis of the respiratory muscles, death may be deferred for years, ultimately occurring from bed-sores, cystitis, or some complication.

In meningeal hæmorrhage such complete functional annihilation develops more gradually, and is due to compression of the cord by the effused blood. The earlier symptoms consist of pain in the back with tonic and clonic spasms indicative of severe spinal irritation. Under all circumstances the diagnosis rests upon the history of the case, and the *sudden* onset of symptoms.

ACUTE MYELITIS.

MYELITIS denotes an acute inflammation of the *substance* of the spinal cord, and may be caused by injury, spinal caries, meningitis, exposure to extreme heat or cold, &c.

The *anatomical changes* consist of active congestion, followed by softening which is frequently combined with hæmorrhagic extravasation. Suppuration is very rare. When secondary to meningitis the superficial white substance is first affected, and the more deeply-seated grey substance is not involved till later on. Idiopathic inflammation, on the other hand, generally begins in the central grey substance. In either case the tendency is to implicate the whole thickness of the cord together with its membranes in a variable part of its length.

SYMPTOMS.—Acute myelitis generally begins with chilliness, followed by a considerable rise of temperature and general febrile disturbance. *Pain in the back* (not so intense as in meningitis) is an early and prominent symptom. It is increased by sharp percussion, and often by the application of a hot or cold sponge to the part, but not so much by movement. This is usually accompanied with a sense of

painful constriction, extending round the body like a girdle, at the level of the upper limit of inflammation. Anæsthesia and paralysis occur early, and rapidly become complete. Both begin in the lower limbs (in one usually before the other) and extend upwards. The bladder and rectum are early involved, resulting in incontinence of urine and fæces. The temperature of the paralysed parts is always depressed. Reflex and electric irritability may be exaggerated just at the outset, but soon become impaired and finally lost. Similarly, the affected muscles are flaccid, and rapidly atrophy; visceral lesions occur, of which cystitis and acute nephritis are the most common; and acute bed-sores are of frequent occurrence. In those cases of myelitis which are secondary to meningitis, as so frequently happens, the early stages will of course be characterised by the symptoms peculiar to the latter affection; and under any circumstances there are generally indications of meningeal irritation at the upper level of the lesion. Acute myelitis is always fatal sooner or later, death usually taking place in the course of one to four weeks, from exhaustion or some complication.

SPINAL SCLEROSIS.

SCLEROSIS is a chronic process which primarily consists of atrophy of the proper nerve-elements, accompanied with overgrowth of the neuroglia. It appears in the spinal cord in three forms:—(1) *Multiple sclerosis*, in which the lesions are several in number, and isolated from each other; (2) *cortical sclerosis*, in which the lesion is confined to the cortical substance of the cord; and (3) *funicular sclerosis*, in which one or more of the white columns of the cord are involved for a part or the whole of their length. Multiple sclerosis has been already described under the head of cerebro-spinal sclerosis; and since cortical sclerosis is al-

ways associated with chronic meningitis, the symptoms are closely analogous to those of the latter affection. It now remains to describe funicular sclerosis under two heads, according as the lesion is seated in the antero-lateral, or in the posterior columns of the cord.

The *causes* of sclerosis are often obscure, but middle age, hereditary taint, gout, syphilis, alcoholic or sexual excesses, are among those which appear to exert most influence. In some cases it appears to be secondary to inflammatory affections such as meningitis, spinal curvature, spinal tumours, &c.

{ 1. ANTERO-LATERAL SPINAL SCLEROSIS.

When associated with meningitis, the disease may be ushered in with local and radiating pains and muscular contractions. As a rule however, the first symptom consists of progressive weakness of the legs, which at an early period becomes associated with spasmodic muscular contractions, gradually developing into more or less permanent tonic rigidity of these parts, thus rendering walking difficult or impossible. On attempting to walk, the gait is peculiar and characteristic, the legs are kept close together, with a curious tendency to step on tip-toe, and a bending of the body as if about to fall forward. The difficulty of walking is out of all proportion to the amount of paralysis. Ankle-clonus can be readily elicited, and the knee-jerk is greatly exaggerated. The bladder and rectum are not materially affected, though there is often obstinate constipation. So long as the lesion is limited to the antero-lateral columns there is no disturbance of sensibility, and the nutrition and electric behaviour of the muscles remain normal. The legs are first affected—generally one before the other—but later on the arms

may also become involved. The course is very slow and extends over many years as a rule. Death usually takes place from some intercurrent disease. It must not be forgotten that the lesion may extend to other parts of the cord, *e.g.*, to the posterior columns, or to the grey cornua. Under these circumstances the symptoms vary accordingly. The disease often goes by the name of "spastic paralysis," and the peculiar gait is called the "spastic gait." It is most common from 30 to 50 years of age.

2. POSTERIOR SPINAL SCLEROSIS—LOCOMOTOR ATAXY— TABES DORSALIS.

The sclerosis here occupies a more or less considerable length of the *posterior white columns of the cord*, but it frequently extends into the adjacent posterior grey cornua. The posterior columns, it should be remembered, are mainly composed of longitudinal commissural fibres which connect the various segments of the cord, and are also pierced by the fibres of the posterior or sensory roots of the spinal nerves on their way to the grey matter of the cord. These columns in no sense serve to conduct sensory impressions, but are chiefly concerned in the co-ordination of muscular movements.

Changes of an analogous kind are also met with in the brain and cranial nerves, notably in the restiform bodies, inferior cerebellar peduncles, optic thalami, and in the optic, auditory, 3rd, and 6th nerves. It is most common in men, between the ages of 20 and 45.

SYMPTOMS.—The *onset* is always insidious, and is characterised by one or more of the following symptoms:—(1) dull pain in the back, *sharp "lightning pains" down the limbs*, or a sense of constriction round the body; (2) weakness in the limbs, or unusual fatigue after slight exertion; (3) dimness of sight, diplopia, strabismus or ptosis, with

atrophy of the disc; or deafness; (4) impairment or loss of sexual desire, or (less frequently) persistent erections, or increased capacity for frequently repeated intercourse; (5) gastrodynia and vomiting, with constipation or diarrhœa.

However posterior spinal sclerosis may begin, sooner or later it is characterised by *gradually increasing muscular in-co-ordination*. The patient usually first notices a gradually increasing awkwardness in walking, especially on attempting to rise or turn suddenly, or to go upstairs, which obliges him to guide his movements with the eye. Hence he is worse in the dark; and if directed to stand erect with his feet close together and his eyes closed, he will totter and fall. Later on, the gait is very peculiar. As he walks the leg which is in movement is thrown irregularly forward with unnecessary violence, and brought to the ground—heel first—with unnecessary force; until at last his movements become so uncertain and tumultuous, that walking is impossible. *There is no paralysis*. The nutrition of the muscles, and their electric contractility, remain intact. *Anæsthesia* of the feet is also often observed, which gradually extends from below upwards, and frequently gives to the patient the impression that his feet are swollen, or that he is walking on wool, etc. *Muscular sense is also impaired or lost* in the affected parts, so that he is unaware of the position of his legs when lying down, and is unable to appreciate even great differences in weights attached to the limb. Disturbances of sight and hearing if not present from the onset, may subsequently develop. The progress of the disease is always very slow, often extending over many years. In many cases the arms become similarly affected, and in the later stages there is often some loss of control over the bladder and rectum with loss of sexual desire and power. Death ultimately occurs from asthenia, or some complication.

TUMOURS OF THE CORD.

New growths or tumours similar to those which are met with in the brain may also occur in the spinal cord. The symptoms to which a tumour gives rise will necessarily vary according to its seat, size, and rapidity of growth; in one case resembling those of meningitis, and in another those of some form of chronic myelitis, as the membranes or the substance of the cord respectively happen to be involved. Thus a certain diagnosis is only possible in exceptional cases.

GLOSSO-LABIO-PHARYNGEAL PALSY—BULBAR PARALYSIS.

THIS disease as its name implies, is characterised by a paralysis of the tongue, lips, soft palate, and pharynx. Though it occurs as a separate affection, it sometimes forms a part of other nervous disorders, *e.g.*, multiple cerebro-spinal sclerosis, and progressive muscular atrophy. Its causes are very obscure. *Pathologically*, it depends upon pigmentary degeneration and atrophy with some secondary sclerosis of the nuclei of the hypoglossal, facial, spinal accessory, and vagus nerves in the medulla oblongata.

SYMPTOMS.—The onset is gradual. The first symptom usually consists of a difficulty in articulation due to a want of precision in the movements of the tip of the tongue. The *paralysis of the tongue* increases till at last it can no longer be protruded, and lies motionless, or nearly so, in the mouth. Meanwhile the paralysis slowly involves other parts. The *soft palate* hangs loosely and gives a nasal twang to the voice. The *constrictors of the pharynx* fail to grasp the food properly, and cause a difficulty in swallow-

ing. The muscles of the larynx also become weakened. Curiously enough while the orbicularis oris becomes paralysed, so that the lips cannot be kept together, the other facial muscles are not affected. As the symptoms get worse, the condition of the patient is pitiable indeed. Articulate speech is impossible, though phonation is not entirely lost; the saliva cannot be properly swallowed, and accumulating dribbles from the open mouth; food collects in the sides of the mouth, can only be swallowed with great difficulty, and is apt (especially if liquid) to enter the larynx or return through the nose. As a rule the nutrition of the affected muscles, as well as their electrical behaviour, remains normal; but sometimes they undergo atrophy, and exhibit the reaction of degeneration (Erb). The *general health*, though good in the early stages, gradually suffers from insufficient nutrition and imperfect respiration.

It is always fatal, the average duration being about two years. Death occurs either from starvation, asphyxia, syncope, or some intercurrent disease as bronchitis.

ANTERIOR POLIO-MYELITIS.

THIS somewhat unwieldy term literally means inflammation of the anterior grey substance of the cord, and is now generally used to denote certain pretty-well-defined lesions of the large nerve-cells of the anterior cornua followed by paralysis and muscular atrophy. The acute form includes the disease usually described as "infantile paralysis," and acute spinal paralysis of adults; while the chronic form is better known as "progressive muscular atrophy."

ACUTE ANTERIOR POLIO-MYELITIS.

Acute anterior polio-myelitis is an acute form of paralysis chiefly met with in young children, especially

during the second year of life ; but adults are occasionally affected. It may sometimes be traced to exposure to cold or wet, difficult dentition, or to some acute febrile disorder ; but more often its causes are obscure.

The lesion on which this disease depends, is an acute inflammation of the anterior cornua of the cord, which results in the atrophy and destruction of the ganglion-cells, with an infiltration of small round cells, and granular corpuscles. This is followed at a later stage, by sclerosis of the cornua, the adjacent parts of the antero-lateral columns, and of the anterior nerve-roots.

SYMPTOMS.—The onset is *sudden*, and marked by *fever* which may be considerable and continue for some days, or be so slight as not to attract attention. The *paralysis* develops quickly, and may be limited to a single group of muscles, or to one limb ; or it may affect both arms or legs, or all four limbs at once. From the first the muscles are flaccid, and both reflex and faradic excitability quickly become impaired and lost. Galvanic irritability is at first increased. The bladder and rectum are not involved ; there is no pain ; and cutaneous sensibility is not affected. Having arrived at this stage, the paralysis may gradually pass off, with complete recovery. This favourable termination is more common in adults than in young children. More frequently in the latter, special groups of muscles, or the whole of one or more limbs remain permanently paralysed. In this case *the affected muscles rapidly atrophy* ; the temperature of the part falls, with more or less arrest of its development ; and *deformities* may arise from the unrestrained action of non-paralysed muscles. The *general health* is not impaired. The disease is never fatal, but its duration is extremely variable.

CHRONIC ANTERIOR POLIO-MYELITIS—PROGRESSIVE MUSCULAR ATROPHY.

This affection is most common in males between 25 and 35 years of age, and appears to be frequently hereditary. Sometimes the exciting cause is excessive exertion, sometimes exposure to cold and wet, but more often it is quite obscure.

The lesions found in the cord essentially consist in sclerosis of some part or parts of the anterior cornua. The motor nerves arising from these parts, and the muscles in connection with them, rapidly atrophy and degenerate.

SYMPTOMS.—The onset is insidious. Attention is first attracted by weakness (sometimes accompanied with pain) in the affected muscles, which are then found to be somewhat atrophied. This atrophy and weakness slowly increase. The change usually begins in the right hand, the thenar and hypothenar eminences of which are flattened, and the outline of the metacarpal bones becomes more distinct from atrophy of the interossei and adjacent muscles. In other cases the muscles of the forearm or shoulder, or—more rarely—analogue muscular groups in the leg are first attacked, the atrophy of which leads to striking changes in the appearance and outline of the part. Wherever the disease begins, it first extends to corresponding muscles on the opposite side of the body, and then in like manner to the trunk and all the limbs. It should be clearly understood that *the paralysis results exclusively from muscular atrophy and is in direct proportion to its extent.* *Fibrillary oscillations* are of common occurrence in the atrophied muscles, and when absent may usually be evoked on irritating them by tapping, pinching, etc. Since all the muscles of a limb are not involved simultaneously or to an equal extent, *deformities* occur from their unequal tension.

The *electric contractility* is only diminished in proportion to the amount of atrophy, and the *temperature* of the affected part is always lowered.

The course is always slow, and advances by fits and starts. Its duration is very indefinite. Death ultimately takes place from the respiratory muscles becoming involved, from exhaustion, or from some intercurrent affection.

PSEUDO-HYPERTROPHIC PARALYSIS.

ALTHOUGH no precise pathological position has as yet been assigned to this disease, it will be convenient to consider it in this place. It is characterised by progressive weakness of certain muscles, associated with their enlargement. It has only been observed in children, and most frequently in boys. As regards its pathology little is definitely known, but there is evidently a pretty close relationship with "progressive muscular atrophy," and perhaps it is essentially the same.

The muscular enlargement, as the name implies, is not a true muscular hypertrophy, but is due to an excessive overgrowth of the connective tissue between the fibres, which ultimately atrophy and degenerate. Certain atrophic changes of the anterior cornua and motor roots of the spinal nerves have also been observed in a few cases.

SYMPTOMS.—The earliest symptoms consist of weakness of the legs, and a peculiar, straddling, waddling gait. The spine is arched backwards and the belly is thrust forward. Soon the calves of the legs are found to be unduly large and prominent; and subsequently the thighs and gluteal muscles. As the enlargement increases, the paralysis becomes more marked until at last both walking and standing are impossible. Though usually confined to the

parts mentioned, the muscles of the trunk and arms are sometimes involved. Later on, the enlargement of the muscles ceases, and they may even diminish in size. The course of the disease is slow, the average duration being about five or six years. Death takes place from exhaustion, implication of the respiratory muscles, or some intercurrent disease.

PARALYSIS AGITANS.

THIS is an affection of advanced life, and is mainly characterised by trembling. Little or nothing is definitely known respecting its causation or morbid anatomy.

SYMPTOMS.—The onset is almost always insidious, and is first manifested by *trembling*, which usually begins in the hand or foot of one side. It is present whether voluntary movements are performed or not, but is increased by mental excitement or physical exertion. It ceases during sleep. It may be confined to the part in which it began for months; but sooner or later it extends to the rest of the limb, then usually to the other limb of the same side, and ultimately to the limbs of the opposite side. As a rule, it is not until the tremor has lasted a long time, that weakness of the affected muscles is observed, but when once it has begun, it slowly becomes more marked. The *muscles are apt to become more or less rigid* as the disease proceeds. The *speech* is not characteristically altered, but may be a little trembling. The *gait* also is peculiar; the patient appears to be losing his balance and running forward to save himself, scarcely lifting his feet from the ground (*festination*). The muscles of the face are not involved; there is no nystagmus; there is no alteration of sensibility; and there are no head-symptoms. Death does not usually occur till after some years, and is then caused by exhaustion, or some intercurrent disorder.

GENERAL TREATMENT OF CENTRAL NERVOUS DISORDERS.

IN *acute inflammation of the brain and membranes* very little can be done in the way of direct treatment. The patient's room should be cool, well-ventilated, and quiet; the hair should be cut short, or shaved from the scalp in severe cases, followed by the application of cold in the form of an ice or cold-water cap, or by the application of a few leeches to the temple if there be much pain and irritation. The diet should be bland, plain, and nutritious. Alcohol is not necessary in the early stages; but later on, if there be marked prostration, stimulants are needed, and under similar circumstances sinapisms, blisters, etc. to the limbs or scalp have been recommended with a view of rousing the patient. Opiates are contra-indicated, but bromide of potash and chloral are useful in convulsive conditions. Inflammation succeeding local injury may require surgical interference. The bladder should be systematically examined, and if there be retention of urine the catheter must be used.

Acute *inflammation of the cord and membranes* requires analogous treatment. The application of leeches or of cold to the spine is often useful. It is of especial importance in such cases to attend carefully to the bladder and bowels. Bromide of potassium, belladonna, and ergot are of doubtful value.

The treatment of *delirium* will vary according to its cause. When it is due to cerebral inflammation, the measures already mentioned must be adopted; when it results from exhaustion and the skin is cool with a feeble pulse, good food and stimulants are called for, and not infrequently an opiate is of great service unless there be coma, renal disease, or pulmonary congestion.

In the "typhoid state" alcohol, nourishing food, and tepid sheet-packs with careful attention to the excretions are necessary. In delirium from high fever the cold bath or cold sheet-packs are of most benefit; and lastly, if traceable to reflex irritation, the cause of the latter should be carefully investigated and removed if possible, and opium, chloral, or bromide of potassium should be given internally.

The treatment of *coma* also varies according to its cause. In apoplectic coma the patient should be placed in the recumbent posture with the head high, allowed plenty of fresh air, and the clothing loosened. Venæsection may be of benefit if the circulation be vigorous and the breathing free; but under other circumstances it is more harmful than otherwise. The bowels should be freely opened, by placing a drop or so of croton oil in a little butter on the back of the tongue. If the coma be associated with renal disease, it may be uræmia, and then calls for the treatment already described under that head. Coma from opium poisoning etc. requires the prompt use of the stomach-pump, followed by the administration of strong coffee, and constant flipping and movement in order to keep the patient roused.

The treatment of *chronic cerebral and spinal disease* is also far from satisfactory. Physiological rest of the body generally should be aimed at; the general health must be supported as far as possible by good food, fresh air, and the use of tonics and cod-liver oil. In many cases the internal administration of iodide of potassium, bichloride of mercury, and other mercurial preparations is beneficial, especially in those of a syphilitic nature. Various symptoms must be treated as they arise. Phosphorus, phosphide of zinc, Donovan's solution, and nitrate or oxide of silver are serviceable tonics of the nerve-centres in many cases. Local counter-irritation is also frequently beneficial.

SUB-SECTION III.

DISEASES OF THE NERVES.

NEURALGIA.

THE term neuralgia is applied to pain seated in the course of a nerve. It may arise from exposure to cold; from injury of, or pressure upon the nerve; or from direct implication of a nerve in some morbid process; but very frequently no adequate cause can be discovered. It is especially apt to occur in those of a nervous or hysterical temperament, and in those who are debilitated from any cause. Its pathology is unknown.

SYMPTOMS.—Wherever seated, neuralgia presents certain characteristic features. The *pain* may be variously described as aching, boring, shooting, burning, etc.; but *it is always more or less paroxysmal*. It is generally severe, and sometimes of horrible intensity. On palpation, one or more *tender spots* are very constantly observed, with an invariable relation for each nerve, which are usually determined by the exit of the nerve from a bony foramen, or its passage through some dense fascia. The pain is frequently associated (1) with local abolition of tactile sensibility; (2) with reflex muscular twitchings; (3) with congestion of the affected surface; and (4) with nutritive lesions of the skin, especially erythematous and herpetic eruptions. The pain of neuralgia is further characterised by its *tendency to shift from one spot to another*, in the course of the same or of some other nerve; and also by being *almost invariably unilateral*. As to the general health, neuralgia is *always attended with debility* from one cause or another, *e.g.*, mental anxiety, anæmia, gout, rheumatism, syphilis, and dyspepsia.

Neuralgia may attack any sensory nerve, whether it supplies the skin or the viscera. Special terms are employed to indicate neuralgia of special nerves: thus—tic-douloureux (5th cranial nerve); sciatica (sciatic nerve); brachialgia (nerves of the arm); gastralgia (nerves of the stomach); and so on. Separate description of each is here beyond our purpose.

TREATMENT.—Wherever possible the cause should be ascertained and an endeavour be made to obviate or remove it. Food should be abundant and nutritious, and should include a good proportion of fatty ingredients. It is scarcely necessary to add that rest, and freedom from worry, exhaustion or excitement are urgently indicated. To relieve the pain we may have recourse to internal or external remedies, or to both combined. Internally, the most important are—Quinine (in large doses at first, followed by lesser ones); arsenic (℥ iij- ν of the liquor three times a day); tr. gelsemium (℥ xv-xx every 4 or 6 hours); sal ammoniac (gr. xv three or four times a day); chloral or croton-chloral; or alcoholic stimulants (best avoided if possible). Externally, counter-irritation, or the application of belladonna, aconite, or veratria ointments. Should all these fail, hypodermic injections of morphia, or the local application of electricity (galvanism by preference) may be employed.

MIGRAINE.

MIGRAINE is a peculiar paroxysmal form of headache, which is otherwise known as megrim, hemicrania, or sick headache. It is markedly hereditary, and usually first declares itself at some time between puberty and 30 years of age. A close atmosphere, intense heat, mental worry, excitement, fatigue, sexual excesses, and gastric derange-

ment are common exciting causes. The immediate pathological cause of migraine is supposed to be a vaso-motor disturbance of some part of the brain, the effect of which is to cause constriction, followed by dilatation of the vessels; the remote cause consisting in a disturbance of the inhibitory and controlling functions of the brain.

Symptoms.—The attack begins somewhat suddenly with pain which is usually fixed to one spot, such as the temple, or one eye, from which it extends over the whole of one side of the head. The pain is commonly dull, sickening, and *throbbing*; but sometimes it is extremely sharp and violent. It is associated with tenderness of the scalp, a sense of heat about the head, and often with some injection of the eye and lachrymation. It is aggravated on lying down. Meanwhile the patient is pale, his extremities are chilly, he both looks and feels exceedingly ill, and the pupils are contracted. The pulse at the wrist is feeble, while on the affected side of the head it is strong. Anorexia is complete. After a while nausea and vomiting supervene, followed by sleep, after which he awakes much relieved. The duration of an attack rarely exceeds 24 hours. Relapses are of frequent occurrence. Migraine usually appears for the first time between puberty and 25 years of age, and disappears as a rule in old age.

The general plan of *treatment* is the same as that for neuralgia. Relief may be often afforded during a paroxysm, by a cup of strong tea or coffee, by occasional doses of guarana (gr. xv), bromide of potassium, or chloride of ammonium, or by the application to the head of cold compresses. Pressure on the carotid in the neck will temporarily stop the pain.

LOCAL PARALYSIS.

THE signs of paralysis of peripheral nerves are as follows :

CRANIAL NERVES.—*Olfactory nerve.*—Loss of smell. It must however be remembered that an unhealthy condition of the nasal mucous membrane may have a similar effect, *e.g.*, common nasal catarrh.

Optic nerve.—Dimness or loss of vision usually the result of optic neuritis, or simple atrophy of the optic disc.

Third nerve.—Divergent squint from paralysis of the eye excepting the superior oblique and external rectus ; ptosis from paralysis of the levator palpebrarum ; and dilatation of the pupil from paralysis of the sphincter of the iris.

Fourth nerve.—By paralysis of the superior oblique muscle of the eye, the pupil is slightly raised above the lower lid, and there is no power of rotating the eye. *Test.*—If the patient be directed to look at an object below the horizontal median plane, he sees double, and the image formed by the affected eye is displaced downwards and inclined on one side.

Fifth nerve.—*Ophthalmic division.*—Loss of sensation over one half of the forehead, the upper eyelid, conjunctiva, and a part of the mucous membrane and integument of the nose. The pupil also is often contracted. *Superior maxillary division.*—Anæsthesia of the lower eyelid, cheek, side of the nose, and half of the upper lip, gums, and palate. *Inferior maxillary division.*—Anæsthesia of the lateral part of the head and of ear, half of the lower lip and gums, and half of the tongue, with paralysis of the muscles of mastication. The nutritive lesions of the skin and conjunctiva which so frequently accompany lesions of the fifth nerve or its nucleus, are due rather to *irritation* than paralysis of the nerve.

Sixth nerve.—Convergent squint from paralysis of the external rectus muscle of the eye.

Facial nerve.—Facial or Bell's paralysis may arise from disease affecting it (1) within the cranium; (2) in its course through the temporal bone; or (3) at its periphery. The first form, which is rare, may be caused by disease of the medulla, or by the pressure of some tumour. The second form is more common, and is generally due to disease of the temporal bone following inflammation of the middle ear. The third form is most common, and usually arises from exposure to cold.

SYMPTOMS.—The following symptoms are common to all three forms.—The facial muscles of the paralysed side are motionless and flaccid; the lines of expression are lost; the eyelids cannot be closed, and remain open; the tears overflow the lower eyelid; the cheek is puffed out on forcible expiration; the mouth is drawn to the opposite side, and food lodges between the teeth and the cheek on the affected side. The paralysis becomes at once apparent on the patient attempting to frown, purse the lips, or show the teeth. Reflex and faradic irritability are quickly lost, but galvanic irritability is at first increased. There is no anæsthesia.

In the *second form*—over and above the symptoms already mentioned—the parts supplied by the chorda tympani and large petrosal branches of the facial nerve are also paralysed. Thus we find disturbances of hearing, flattening of the arch of the palate on one side, with deviation of the uvula to the sound side; and also some impairment of taste, owing to the suppression of the salivary secretion on one side, or to some obscure direct influence of the chorda tympani on the tongue itself.

In the *first form* we may further meet with head symptoms and signs of implication of other cranial nerves.

The facial paralysis which accompanies hemiplegia differs from the above as follows:—(1) the orbicularis palpebrarum is not involved, so that the eye can be closed as

usual; (2) it is usually attended with paralysis of the hypoglossal, so that the tongue deviates when protruded; and (3) the tone of the muscles, and their reflex and electric irritability are normal.

TREATMENT.—When due to disease of the brain or of the temporal bone, treatment must be directed to these conditions. In the third form electricity is most to be relied on. If the muscles respond to faradism that form of current is the best; but if otherwise, slowly interrupted galvanism offers the only chance of doing good.

Auditory nerve.—Here paralysis merely implies deafness.

The effects of paralysis of the *eighth* and *ninth cranial nerves* have already been sufficiently indicated in the description of glosso-labio-pharyngeal paralysis.

SPINAL NERVES.—It is impossible to describe here in detail the various paralysees of spinal nerves. It must be remembered that each nerve conducts both motor and sensory impulses, and hence paralysis is always associated with anæsthesia in the parts supplied by the nerve below the seat of the lesion; and further, when the latter is of an irritative kind, trophic troubles are not unlikely to arise within the area of its distribution. Injury, pressure, and direct implication in disease are common causes of local spinal paralysis. It may perhaps be well to mention that paralysis of the *musculo-spiral nerve*, which is of very frequent occurrence from sleeping on the arm over the back of a chair, closely resembles the paralysis which results from lead-poisoning. The history of the case, the association with the paralysis of more or less anæsthesia, and the inclusion of the supinator longus (which almost always escapes paralysis from lead-poisoning) will, however, suffice to distinguish it.

LOCAL NERVOUS SPASMODIC AFFECTIONS.

I propose under this head to include brief descriptions of "writer's cramp," and "wry-neck."

"WRITER'S CRAMP," or "SCRIVENER'S PALSY," as the terms imply, is especially common in those who write inordinately, and is characterised by intermittent pain, weakness, and spasm of the muscles of the hand and arm. It is also met with in violinists, tailors, and others whose occupations involve the prolonged use of similar muscles. Its pathology is obscure.

Symptoms.—Its earliest indication is a painful sense of fatigue and weakness, which comes on shortly after commencing to write. Sooner or later this is accompanied with clonic involuntary spasms of the muscles employed, so that the hand-writing is unsteady and scrawly. At first it can be more or less controlled by voluntary effort, but it becomes worse and worse till at last the use of the pen is impossible. Patients then often learn to write with the other hand, but only to find that, after a while, this becomes affected in a similar manner. Different muscles are affected in different cases. Thus it may be confined to the muscles of the hand or of the forearm; or it may extend from one part to another till the whole arm becomes involved. Sensation is not affected, and for all other acts than that which has induced the disorder the muscles behave properly. The prognosis is unfavourable.

"WRY-NECK," or TORTICOLLIS, consists of clonic or tonic spasm of one or more of the following muscles—sternomastoid, splenius, trapezius. Its pathology is equally obscure.

It comes on for the most part insidiously, with uneasiness or pain in the affected side, and jerking of the head from time to time. The direction of the head varies

according to the muscles which are involved. At first the spasms are distinctly intermittent, and can be more or less controlled by the will. But they gradually tend to become more permanent and uncontrollable, till the head is permanently twisted to one side. Spasm of the facial muscles, or of those of mastication, or of the arm, may sometimes be superadded to the above.

The TREATMENT of these affections is very unsatisfactory. Most improvement may be expected from the employment of electricity. The constant current should be selected, and the poles applied to the nerve of the part, during which the patient should be directed to perform rhythmical movements of the muscles concerned (Poore).

SUB-SECTION IV.

FUNCTIONAL DISEASES OF THE NERVOUS SYSTEM.

EPILEPSY.

THE term epilepsy denotes a temporary loss of consciousness, of sudden onset, and associated for the most part with a convulsive attack of short duration, which cannot be attributed to any substantive disease. It commonly makes its first appearance some time between 10 and 20 years of age, and its onset is less frequent as age advances. There is often a distinct history in the family either of epilepsy, or of some other nervous disease, insanity, or intemperance. Anxiety, over-work, injuries of the

head, and masturbation are common remote causes, but often none can be discovered. As to its pathology, many theories have been advanced from time to time, but the opinion now prevailing would appear to attribute epilepsy to an explosive functional disturbance of the brain, which is successively followed by anæmia and congestion of that organ, through the medium of the vaso-motor system.

SYMPTOMS.—A detailed description of all the variations exhibited by epilepsy is here out of the question. Only two typical forms will be considered, the difference between which essentially consists of a difference in severity:—(1) *epilepsia mitior*, or *petit mal*; and (2) *epilepsia gravior*, or *haut mal*.

1. **PETIT MAL.**—The attack comes on *suddenly*, without warning, and is only of momentary duration. It is characterised by loss of consciousness, pallor (sometimes succeeded by trifling duskiness) of the face, a slight stare, and dilatation of the pupils. Any voluntary act in which the patient may be engaged is abruptly stopped, while involuntary acts, such as walking, continue. He does not fall, and at most after a few seconds recovers himself, quite oblivious of anything having occurred.

2. **HAUT MAL.**—The attack is in this case very frequently preceded by *premonitory symptoms* which vary widely, but are remarkably constant for the same person. The most characteristic of these is known as the *epileptic aura*; which is for the most part a purely subjective sensation of coldness, heat, tingling, etc., usually ascends from the extremity of a limb towards the head, and immediately precedes the fit.

The *actual attack* or "*fit*" may be conveniently described in three stages. The *first stage* is often ushered in by a piercing shriek, which is followed by absolute and instantaneous loss of consciousness, in which the patient falls more or less violently. *Tonic* muscular contractions of

certain parts now supervene, by which the hands are clenched, the limbs twisted, and the face hideously distorted; the breath is held; the face is first pale then dusky; the pulse at the wrist is excessively feeble; and the pupils are contracted. This stage usually lasts from 30 to 40 seconds.

The *second stage* begins abruptly with the return of the breathing, which is violent and irregular. Loss of consciousness continues. Clonic spasms replace the tonic spasm, causing the features to work, the eyes to roll, the jaws to champ, the tongue to be frequently bitten, the limbs and trunk to be more or less violently convulsed, and the pupils to oscillate. The mouth foams; the face is livid; profuse perspirations break out; the pulse is full, and the heart beats violently; and both urine and fæces may e involuntarily discharged. This stage subsides gradually, and lasts from 1 to 3 or 4 minutes.

The *third stage* is marked by a gradual return of consciousness. The muscular spasms cease; while the patient opens his eyes, perhaps tries to get up, and looks bewildered. He is very exhausted and mentally confused; and shortly after, he usually falls into a deep sleep which may continue for some hours. After the attack a large quantity of pale limpid urine may be passed.

The fit may not be repeated, but occasionally two or more occur in succession. More often it occurs periodically at intervals of a week, a month, or a year. It may come on by night as well as by day. During the intervals the patient may feel quite well, but the general health is defective as a rule. The memory may fail, the mind become dull, or acute mania or dementia may supervene. A single fit is rarely fatal, but the indirect risks of epilepsy are considerable. The most hopeful cases are those which occur in the young, and are due to some ascertainable and removable cause, and come under treatment early.

The main points on which a *diagnosis* is based are :—the infrequency of its first occurrence late in life ; its sudden onset ; the insensibility of the conjunctiva ; the dilatation of the pupil ; the frequency with which the tongue is bitten, or the occurrence of injury ; the subsequent sleep ; and the short duration ; coupled with the absence of severe or continued headache, paralysis, or emotional display.

TREATMENT.—The history should be carefully inquired into, and treatment should be directed to any discoverable cause. The most useful medicinal remedy is undoubtedly bromide of potassium, which should be given in full doses and for a long period. Some have recommended the addition of a small dose of laudanum. It should, however, be remembered that this treatment is liable to cause general depression, and at best it is rarely curative. It is therefore advisable to combine tonic treatment with it, such as arsenic or strychnia (to be given after meals, well diluted) and cod-liver oil. Should any troublesome eruption be caused by the bromide, which does not pass off on stopping the drug, it may readily be cured, as a rule, by a short course of arsenic. Iron in any form generally does more harm than good. Mercury and iodide of potassium are indicated, when there is a syphilitic taint. In some obstinate cases, counter-irritation to the nape of the neck by a seton or blister may be tried. Rest, good nutritious food, and avoidance of stimulants are urgently necessary.

During a fit, but little can be done beyond loosening the clothing, and gentle restraint to prevent injury.

HYSTERIA.

HYSTERIA is a disorder characterised by disturbances or perversions of the nervous functions which cannot be referred to any substantive disease, and in which weakness of the will plays a prominent part.

Hysteria usually first appears at some time between puberty and 25 years of age, and chiefly (though not exclusively) in females. Of the causes of hysteria we know very little, but strong emotional excitement, certain sexual conditions, and absence of definite occupation stand out, one or all, as having an important influence in its development. There is no necessary connection between hysteria and sexual disturbance, but when we bear in mind the large share which such functions assume in the physiological constitution of the female, it is not surprising that any profound impression of the one should be associated with disturbance of the other.

The *symptoms* of hysteria may be conveniently arranged in groups which may occur separately, or in every possible combination.

1. The "*hysterical fit*" is a convulsive paroxysm, of *gradual* onset, beginning with sobbing, laughing, or other emotional displays, and often associated with a feeling of a ball in the throat (*globus*); till, with a scream, the patient falls to the ground violently convulsed and apparently insensible. This continues for a while—often for some hours—when recovery takes place with more sobbing, etc., and a feeling of exhaustion. The insensibility is very rarely complete; the convulsions are never tonic; the eyelids are closed and tremulous, and the pupils respond to light; the patient does not bite her tongue, and rarely injures herself; there is no foaming at the mouth; the fit is not followed by coma; and it never comes on during sleep.

2. *Mental disturbances*.—The controlling power of the will is always much weakened, and thus the emotions, relieved from proper restraint, are readily excited by trivial causes. In other cases there is absolute moral perversion, and we then observe extraordinary whims and caprices; morbid self-consciousness, and a great anxiety to create interest and sympathy at any cost, which often leads to most out-

rageous acts of deception. Not infrequently hysterical patients take to drinking in excess.

3. *Sensory disturbances.*—These consist of (a) *neuralgic pains* with tenderness on pressure in various parts, which are often limited to a single spot, e.g., the scalp (*clavus hystericus*), the breast (*mastodynia*), the spine, the ovary, or the joints; (b) various *perverted and morbid sensations*, as noises in the ears, flashes before the eyes, tingling in the limbs, or a peculiar sense of choking or constriction, as if from a ball in the throat (*globus hystericus*); (c) *exaggerated sensibility (hyperæsthesia)*—thus, one or more of the special senses may be excessively acute, or there may be intolerance of light and sound, or the skin may be so sensitive that no part can be touched without shrinking; or (d) *anæsthesia* of the skin (generally limited in extent and irregularly distributed, but occasionally hemiplegic or paraplegic in distribution), or of the special senses.

Motor disturbances. Spasm.—In addition to the convulsions already described, we may meet with tonic spasm in various parts, notably in the limbs where it causes more or less persistent contractions. Rhythmical movements of the limbs are sometimes observed. *Paralysis.*—This is of very common occurrence, and may appear as hemiplegia or paraplegia, or be limited to a particular region, as in aphonia from paralysis of the laryngeal muscles. Hysterical paralysis may usually be distinguished by the history of the case; its liability to follow a hysterical fit; its tendency to go and come suddenly and to shift its seat; its frequent association with complete anæsthesia, or with persistent rigidity from the beginning, and the absence of bed-sores, or cystitis.

General functional disturbances.—The stomach is most often affected, giving rise to obstinate vomiting, flatulence, or dyspepsia; or the bowels may be persistently constipated or (more rarely) relaxed; or enormous quantities of pale

limpid urine may be passed. Palpitation, hurried irregular respiration, and menstrual derangements are of common occurrence.

TREATMENT.—Firm and considerate behaviour, assisted perhaps by a douche of cold water, will generally suffice to rouse the patient from the fit. In bad cases chloroform may be given.

During the intervals between the fits, the great aim should be to get the patient's confidence and respect, the moral effect of which will often alone determine a cure, and will always enhance the favourable influence of any other treatment which may be employed. In severe cases, it is of the utmost importance to remove the patient from her usual surroundings, and to transfer her from the care of her friends to that of a professional nurse. For all kinds of undue excitability, bromide of potassium is very useful, and may be combined or not with Indian hemp or valerian; for paralysis—strychnia, phosphorus, and faradisation; for anæsthesia—faradism with the wire brush. The importance of attention to the general health and mode of life cannot be over-estimated. As a general rule, alcoholic stimulants do more harm than good in hysterical subjects.

HYPOCHONDRIASIS.

HYPOCHONDRIASIS is an obscure mental condition which is most common in men of middle age. The hypochondriac pays such excessive attention to his bodily functions that he becomes a prey to his own feelings, and believes himself to be the subject of any or every conceivable disorder, real or imaginary. For the most part he has a healthy appearance, but sometimes he is languid, sallow, and the victim of dyspepsia, or constipation. The general plan of *treatment* resembles that for hysteria. The best thing is to get him to take up some definite occupation which will serve to divert his attention from himself and his feelings.

CHOREA.

CHOREA is essentially a disease of childhood. The first attack rarely occurs before 6 or after 15 years of age, though isolated cases are now and then met with in advanced life. It is most common in females. A peculiar association exists between chorea, acute rheumatism, and heart-disease. Thus (1) chorea often develops in the course of acute rheumatism, and *vice versa*; (2) many choreic patients have previously suffered from acute rheumatism with or without complication; and (3) cardiac defects are common in chorea independently of rheumatism. Among the chief exciting causes may be mentioned *fright*, violent excitement, worms, menstrual troubles, and pregnancy.

Little or nothing is definitely known respecting the pathology of chorea, and it is beyond our purpose here to discuss the various theories which have been from time to time advanced. Three views, however, may be mentioned. 1. That the disorder is proximately occasioned by the lodgment of minute emboli in the corpus striatum and adjacent parts. 2. That it is due to disease of the small vessels, and ultimate tissue-elements of the central nervous organs, allied to inflammation. 3. That it is the effect of vaso-motor disturbance resulting in a widely-spread hyperæmia of the nervous centres.

SYMPTOMS.—Chorea usually comes on insidiously. The child is noticed to be restless and fidgetty, awkward in any movements requiring delicacy of adjustment, apt to jerk the limbs, make grimaces, or to drop things from the hand. There may also be some slight mental defect and emotional excitability. The movements are at first slight, and limited to some part, as the face or arm, but afterwards become more violent and often involve the whole body

The condition is then very characteristic. In a well-marked case the head, trunk, and limbs may be twisted and jerked about in every conceivable form, but these movements differ from true convulsions (as has already been pointed out), in being moulded, as it were, to definite purposive acts. Thus the features work; the eyes roll, the lips are in turn pursed, separated, and drawn out; the tongue is now and again thrust from the mouth; the head is jerked from side to side; the limbs, especially the arms, are variously and irregularly flexed, extended or abducted, so that walking or even standing may become impossible; and the trunk may be tossed about so violently that the patient cannot be kept in bed. Food cannot be taken at all, or only with difficulty. Speech is difficult or prevented by the movements of the lips and tongue. These movements are intensified by any attempted voluntary act, by excitement, or when watched; but they cease during sleep. Automatic acts, such as respiration and deglutition, are rarely affected. Chorea may be limited to the face, a single limb, or to one side (hemi-chorea), or may involve the whole body.

Further, the affected muscles are always weakened, and actual paralysis of one or more limbs may supervene. Cutaneous sensibility is often impaired. The expression is always blank and fatuous, and in cases of long duration there may be actual mental defect.

As to the general health, the appetite is bad or capricious, the bowels are confined, and nutrition is impaired. Cardiac bruits from functional or organic disease are often heard. There is no fever.

The average duration is from four to six weeks. Chorea is rarely fatal except indirectly as the result of exhaustion from inability to take food, or from bed-sores due to friction. Relapses, however, are extremely common.

TREATMENT.—Rest in bed and strict avoidance of excite-

ment are absolutely essential in all but the mildest cases. Any discoverable source of irritation should be removed if possible. A brisk purgative is useful at the outset.

The drugs employed may be divided into two classes, viz. :—*sedatives*, as chloral and bromide of potassium, and *nervine tonics*, as arsenic, zinc, iron, and silver. In the worst cases it is well to bring the patient thoroughly under the influence of chloral for some few days, giving food in the short intervals between sleep. As improvement takes place, the sedative must give place to a tonic plan of treatment; and in the milder cases, remedies of the latter kind are alone necessary. Of these, liq. arsenicalis is the most useful in my experience, and it is advantageously combined with steel wine or the ammonio-citrate of iron. In chronic cases a course of cod-liver oil and general tonics, good food, and change of air are of most service. When paralysis occurs, friction and faradisation of the limb should be employed and the patient encouraged to use it.

SUN-STROKE.

SUN-STROKE, or *INSOLATIA*, is the term applied to nervous disturbance arising from prolonged exposure to a high temperature. The temperature of the body is practically constant, and this uniformity is due to equilibrium between heat-formation and heat-loss. If, by the direct or indirect influence of the sun's-rays more heat is produced than can be got rid of by the ordinary channels, sudden elevation of the body-temperature occurs, which is the immediate cause of the symptoms which characterise sun-stroke. This effect will be obviously enhanced by heavy or tight clothing, severe exertion, or deficiency of drinking-water.

SYMPTOMS.—Not infrequently the onset is sudden, the patient falling down insensible and collapsed, with gasp-

ing respiration, extreme feebleness of pulse, and *elevation of the temperature*. This form is sometimes rapidly fatal.

More often the onset is less abrupt, and the attack sets in with exhaustion, nausea, restlessness, a high temperature, and the usual febrile symptoms. In severe cases death takes place from coma, perhaps ushered in by delirium or mania, or more rarely by convulsions, and it is rarely deferred beyond 24 or 48 hours. Even should recovery take place, troublesome nervous symptoms or confirmed epilepsy may subsequently appear.

TREATMENT.—The early employment of cold water is of the first importance, either in the form of a cold bath, a douche to the head, or a wet-sheet pack. The bowels should be freely opened by enemata, and good nourishment is afterwards necessary.

SUB-SECTION V.

TOXIC DISEASES OF THE NERVOUS SYSTEM.

ALCOHOLISM.

AN excessive dose of alcohol behaves as an active poison and may immediately destroy life. But short of this, when taken in large quantity, or oft-repeated, it is apt to induce more or less characteristic disorders of the nervous system and body generally, which will now be considered under the two heads of *delirium tremens* and *chronic alcoholism*.

DELIRIUM TREMENS.

True delirium tremens is the result of drinking alcohol in excess. Its onset is gradual. The patient becomes irri-

table and restless, he is wakeful and his sleep is troubled by horrid dreams, his volitional power is impaired, he loses his appetite, and his bowels are confined.

The actual attack is characterised by sleeplessness, delirium, and tremor, with prostration and general functional disturbance. The mind is confused and excited, and soon begins to wander. The delirium is of a peculiar kind. It is of a busy garrulous type; the patient is suspicious of all around him, he sees all kinds of hideous forms, he fancies himself watched by enemies, or threatened by disaster. He is perpetually trying to get out of bed, and if not watched may leave the room or the house, or attempt to injure others, or to destroy himself. Occasionally he is wildly maniacal, while in other cases he is sullen and morose. The muscles of the limbs and body generally tremble and twitch, especially on the least attempt at voluntary movement. The body is prostrated, the face is pale or congested, the skin is clammy, the temperature is normal or only slightly elevated, the tongue is furred, the breath is fœtid, there is thirst, loss of appetite, and constipation, and the pulse is large, soft, and dicrotous. The above symptoms usually become worse towards night.

Most cases terminate favourably about the third or fourth day, when the patient passes into a sound sleep from which he awakes with a clear mind, but still very feeble. A marked rise of temperature, general and persistent trembling, and great prostration are very unfavourable signs.

It should be borne in mind that slight febrile disturbance, especially traumatic fever and pneumonia, are very apt to determine an attack of delirium tremens in habitual drinkers.

TREATMENT.—Alcohol should be absolutely prohibited in any form; liquid nourishing food should be given frequently; and the bowels should be regulated. Though

by no means necessary in all cases, yet great benefit is sometimes derived from the employment of a medicinal sedative. Opium is preferable to chloral, and should be given in a fairly full dose in the first instance, and not repeated unless really necessary. The hypodermic injection of morphia is the best method.

Personal supervision by a competent attendant is far superior to any form of mechanical restraint, which should be avoided if possible. When there is great excitement a tepid wet-sheet-pack is sometimes of service; and while soothing the nervous system, it acts as a means of restraint. During convalescence quinine and other tonics are indicated.

CHRONIC ALCOHOLISM.

Among the chief results of chronic alcoholism we find obesity or emaciation, flabby and congested features, suffusion of the conjunctivæ, with a liability to various forms of acne. The appetite is bad, especially in the morning, the tongue is foul, the breath fœtid, with water-brash and other indications of digestive derangement. The implication of the nervous system is manifested by volitional weakness, emotional susceptibility, trembling which is worse in the early morning and on movement, restless and troubled sleep, various forms of headache and vertigo, with disturbances of vision and hearing.

Later on, structural changes in various tissues and organs may supervene, especially in the liver, kidneys, and nervous centres. It should also be recollected that the power of resisting morbid influences of any kind is greatly impaired in habitual drinkers, and thus intemperance becomes an important element in the prognosis of all diseases.

LEAD POISONING—PLUMBISM.

THOUGH the susceptibility to the influence of lead varies much in different individuals, the symptoms to which it gives rise are tolerably characteristic when once they have developed. The condition is of frequent occurrence in painters, plumbers, glass-cutters, lapidaries, and others whose employment brings them into habitual contact with lead in some form or other. Drinking-water also, which has been stored in leaden cisterns, or conveyed through leaden pipes may become the vehicle of contamination.

The subjects of lead-poisoning are pale, sallow, and as a rule ill-nourished, with a liability to digestive disturbances. The *gums exhibit a peculiar blue line* at their margins adjoining the teeth, due to the precipitation of sulphide of lead by sulphuretted hydrogen, which is generated by decomposing matters accumulating around the teeth. Attacks of *colic*, characterised by severe gripping pains in the abdomen, with obstinate constipation are of frequent occurrence. The most common form of nervous disturbance consists of a paralysis of the extensor muscles of the forearm, giving rise to a *dropping of the wrist*. As a rule both fore-arms are affected; the muscles rapidly waste, forming a hollow on the back of each fore-arm; and their electro-contractility is quickly impaired and ultimately lost. The cutaneous sensibility is not affected, though in some cases there may be tenderness and pain over the muscles in the early stage of paralysis. The other muscles of the fore-arm and even those of the upper arm are apt to become enfeebled. Sometimes, too, the lower limbs may be similarly affected, as well as muscles in other parts.

The duration of these symptoms varies greatly, and their recurrence is frequent. The paralysis if neglected is

very apt to become obstinate and even incurable. Chronic lead-poisoning is a common predisposing cause of gout, and is often associated with chronic albuminuria.

TREATMENT.—Those who work with lead should be careful to cleanse their hands and nails after work, and the habitual use of lemonade with sulphuric acid is probably of service by converting any lead in the alimentary canal into an insoluble sulphate. In the treatment of lead colic it is usually sufficient to relieve the pain with opiates and hot fomentations, the bowels generally acting without purgatives in the course of a few days. Should an aperient be thought necessary an enema is preferable to anything else. A little castor-oil with opium is also a valuable formula. For the paralysis, local galvanism is the only effectual remedy. When taken in hand quite early, faradism will suffice; but if no reaction occurs by this method, the slowly interrupted constant current is far more useful. With a view of eliminating lead from the system, iodide of potassium should be freely administered, together with an occasional aperient draught in the morning of sulphate of magnesia.

MERCURIAL TREMORS.

A PECULIAR tremor sometimes occurs in connection with chronic exposure to the influence of mercury, which supervenes gradually, usually beginning in the arms, and accompanied with numbness or tingling and pain in the joints. Afterwards they become worse especially under the influence of any excitement, and then extend to all the voluntary muscles of the body except those of the eyeball. All voluntary movements thus become uncertain, jerky, spasmodic, and feeble, until at last the patient is quite helpless. The tremors cease in the recumbent posture, and during sleep, except at a very advanced period of the disease. After a

while, cachectic symptoms supervene, which are sometimes accompanied with grave nervous disturbance. There is no necessary association with mercurial stomatitis or salivation, though they are present, or have previously occurred, in a majority of cases.

If the patient be withdrawn from contamination sufficiently early, the progress is generally favourable in the course of a few weeks. Iodide of potassium, with quinine, iron, or other tonics may be given with advantage.

SECTION IX.

DISEASES OF THE SKIN.

TABULAR CLASSIFICATION.

Inflammations - - - -	{	Erythematous	{	Erythema.
		Catarrha	{	Roseola.
		Vesicular	{	Urticaria.
			{	Eczema.
		Pustular	{	Herpes.
			{	Pempbigus.
			{	Impetigo.
			{	Ecthyma.
		Papular	{	Boils.
			{	Strophulus.
		Scaly	{	Lichen.
			{	Prurigo.
			{	Psoriasis.
			{	Pityriasis.
Diathetic Eruptions	{	Syphilodermata.		
		Scrofulodermata		
Hypertrophies - - - -	{	Ichthyosis and Xeroderma.		
		Verrucæ or Warts.		
		Corns.		
		Scleroderma.		
		Elephantiasis, etc.		
Neuroses - - - - -		Pruritus.		
New Growths - - - -	{	Lupus.		
		Rodent Ulcer.		
		Cancer.		

Pigmentary Anomalies	{	Ephelides. Melanoderma. Leucoderma. Addison's disease.	
Glandular Anomalies	{	Sweat-glands	{ Hyperidrosis. Anidrosis. Sudamina. Miliaria. Seborrhoea.
		Sebaceous-glands	{ Acne. Molluscum.
Parasitic Affections	{	Animal	{ Scabies. Phtheiriasis. Tinea tonsurans. Tinea sycosis.
		Vegetable	{ Tinea circinata. Tinea favosa. Tinea versicolor. Tinea decalvans?

ERYTHEMATOUS INFLAMMATION.

THE essential feature of erythematous inflammation is acute congestion, of a superficial character, occurring in patches and attended with more or less serous exudation. The skin is rosy red (the redness disappearing on pressure), hot, sometimes swollen, but always smooth and unbroken. It is further distinguished by symmetrical distribution, frequent association with cutaneous hæmorrhages, and close dependence on constitutional and general causes. In this group are included erythema, roseola, and urticaria.

ERYTHEMA.—*Simple erythema* consists of a superficial inflammation of the skin. In appearance it is identical with the early stages of erysipelas, but the latter differs in the circumstances under which it occurs, and in the results by which it is followed. The following sub-varieties are recognised. *E. simplex*—arising from any local irritation, set up by friction, heat, uncleanliness, etc.; *E. intertrigo* due to friction of opposed surfaces of tender skin, which tend later on to become raw, moist, and irritable; *E. leve*

—the blush which is so often met with in œdematous parts, and is liable to be followed by sloughing.

Erythema multiforme is more obviously related to constitutional disturbance than the preceding variety. It consists of reddish inflammatory patches, which are more or less elevated as the result of œdema, and are also attended with itching, and tenderness on pressure. The patches are usually small and round (*E. papulatum*); more rarely they form rings which may be small and discrete (*E. iris*), or large and intersecting (*E. gyratum*). They soon subside, leaving a slight temporary stain. The back of the hands and dorsum of the feet are most often affected, and *always* symmetrically.

Erythema nodosum is closely allied to the foregoing; and consists of large oval, reddish, tender, elevated patches, which commonly occur on the front of both legs in girls and young women. It is attended with slight feverishness and constitutional disturbance, and sometimes with pains in the joints which closely simulate those of acute rheumatism.

ROSEOLA.—Roseola is a trifling affection characterised by transient superficial redness of the skin. It is especially frequent in young infants, when it is usually dependent upon digestive disturbance. It is well to remember that roseola of the lower half of the body sometimes precedes the eruption of small-pox, or occurs a few days after vaccination, and is sometimes mistaken for scarlet fever.

URTICARIA.—Urticaria is essentially characterised by the formation of *wheals*, which vary greatly in size and shape, and are attended with stinging, or itching sensations,—hence the common term *nettle-rash*. There is usually very little constitutional disturbance of an obvious kind. It may be either acute or chronic. It may arise from direct irritation of the skin by scratching, the bites and stings of insects, etc.; or from reflex irritation set up by worms or

uterine diseases ; or from certain kinds of food, especially shell-fish ; or lastly, after the administration of certain drugs such as *copaiba*.

Certain departures from the above type should be noticed. Thus the wheals may subside leaving a crop of irritable papules behind (*lichen urticatus*). This variety is almost confined to children, and is sometimes exceedingly chronic and troublesome to treat. It is apt to be mistaken for scabies. Again, sub-cutaneous hæmorrhages may accompany the wheals (*purpura urticans*).

TREATMENT.—*Locally* soothing applications are required, such as lotions of lead, calamine, benzoic acid (gr. 40 ad Oj), borax, hydrocyanic acid, or emollient and alkaline baths. Dusting powders of starch with or without the addition of oxide of zinc or camphor, or of lycopodium, are often very useful. The *general* treatment will vary according to the cause. Thus, the diet should be carefully regulated ; the alimentary canal should be cleared of any irritating ingesta by emetics and aperients ; digestive defects should be corrected ; and if traceable to general debility, tonics such as quinine and steel are indicated. All sources of local irritation should be avoided as far as possible.

CATARRHAL INFLAMMATION.—ECZEMA.

ECZEMA consists of a catarrhal inflammation of the skin, which in the most typical cases presents an irritable, red, abraded surface, and discharges a fluid which, on drying, forms crusts or scabs. These features are well marked in the acute and early stages of the disease ; but later on the patches become dry, infiltrated, scaly, and often fissured. It is a noteworthy fact that vesicles, papules, or pustules, may be observed together with the above.

Its course as a rule is tedious, and it is very liable to

recur. Local irritation of any kind, a varicose condition of the veins of the leg, dyspepsia, and gout may be mentioned among the most frequent causes of eczema.

The most important varieties are as follows:—(1) *E. simplex*, consisting merely of a moist, red, abraded surface, which in its severer forms is sometimes distinguished as *E. rubrum*. (2) *E. impetiginodes* is characterised by the formation of pustules which discharge a fluid drying into thick yellow crusts. It generally attacks the head, and is especially common in children. (3) *E. rimosum* is the term applied to a hard, thickened, and fissured condition of the skin, which is most often met with on the palms of the hands and soles of the feet. (4) *E. marginatum* occurs as a rounded patch with elevated margins, and extending at its circumference, and is usually situated on the inner side of the thigh. It is now generally believed to be parasitic in its nature.

The treatment of eczema is too wide a subject to be described in detail here. Only general principles can be given, with a few hints as to local management.

Setting aside the comparatively few cases which are due to direct irritation from scratching, etc., *eczema requires both general and local treatment*. The general health should be thoroughly enquired into, particular attention being paid to the quantity and quality of the food, the habits with regard to stimulants, digestive errors, and the indications of gout or rheumatism. Spices, malt liquors, wine and spirits, and rich foods should be avoided. The bowels require careful regulation, and exercise in the fresh air should be enjoined. As to medicinal remedies, arsenic, steel, quinine, alkalies with colchicum (in gouty cases), cod-liver oil (especially in children) are particularly valuable. With regard to arsenic—it should never be given in the acute and early stages; it is most useful in the chronic and scaly forms; it is rarely of benefit in gouty

cases; and it should be given at first in small doses, gradually increased.

The indications for local treatment vary according to the stage of the affection. At first, and so long as the skin is red, moist and hot, soothing and emollient applications should alone be employed. Lotions of lead, borax, bicarbonate of soda, and absorbent powders with camphor usually agree at this time better than ointments. Soap should be avoided. When the inflammation is subsiding mild mercurial ointments are of value, especially ungu. hyd. ammon. (gr. v. ad ʒ i). Still later, when the skin is dry itching and scaly, tarry applications are especially useful, e.g., pitch, oil of cade, creasote, and carbolic acid. Ointments of all kinds should be applied on strips of lint. Crusts should be removed by a poultice, or by soaking with oil. Repeated washing in water, or poulticing is harmful, and such cleansing as is necessary may be carried out with weak gruel or milk.

VESICULAR INFLAMMATIONS.

HERPES.—Herpes is an acute inflammatory affection consisting of groups of distinct vesicles, each of which is situated on an inflamed base. The vesicles are generally few in number, of the average size of a small split-pea, with clear watery contents which soon become milky, and dry up in a few days to a small scab. Its chief varieties are:—(1) *H. labialis* which is characterised by one or more small groups of vesicles seated about the lips, some smarting pain, and slight febrile disturbance. It is a common occurrence in connection with catarrh, pneumonia, cerebro-spinal and other fevers. (2) *H. progenitalis* is observed most commonly on the prepuce (*preputialis*), but occasionally on the glans or dorsum of the penis, or in the female on the labia of the vulva. (3) *H. zoster, zona*,

or *shingles* is peculiar in following the course of some cutaneous nerve, generally one of the intercostal nerves, but it may attack the face, belly, shoulder, or thigh. It is almost always unilateral in position, and is preceded by neuralgic pains which (especially in the old) are apt to remain long after the eruption has disappeared. It never relapses and seldom recurs.

The *treatment* of herpes is, as a rule, very simple indeed. Locally some soothing or anodyne ointment is usually all that is necessary. In zoster a good plan is to foment the part with hot water, to apply some starch powder with a little oxide of zinc and camphor, and finally to protect the whole surface from the air and from external injury by a layer of cotton-wool, which may be kept in place by a light bandage. Occasionally the neuralgic pain is so severe as to call for hypodermic injections of morphia. The general health should be attended to, and tonic remedies such as quinine, steel, or arsenic, are of great service.

PEMPHIGUS.—The essential feature of pemphigus consists in the formation of large blebs, resting upon slightly reddened surfaces. There are two varieties which require separate description. (1) *P. vulgaris* may attack any part of the body, but is most common on the limbs. The bullæ are generally few in number, come out in successive crops, and are generally attended with intense itching. They are filled at first with clear albuminous fluid which soon becomes opaque. Rupture occurs in the course of a few days, often leaving an excoriated surface followed by a pigmented stain which may persist for some time. It runs a very tedious course, the health and strength are gradually lost, and death may ultimately occur from exhaustion. It is more common in children than adults. (2) *P. foliaceus* is a rare disease, and is almost always fatal. The bullæ are flaccid and imperfectly formed. As they dry up, thin yellowish crusts and parchment-like scales are formed,

which cover a large, and sometimes the whole, surface of the body.

The *treatment* should be tonic and supporting. Of medicinal remedies arsenic is the most important. Locally, absorbent powders, soothing ointments, bran or gelatine baths (warm) may prove useful.

PUSTULAR INFLAMMATIONS.

IMPETIGO.—This is the name of a disease which is characterised by the formation of discrete pustules, seated on a slightly reddened base. They may occur on any part of the surface, but they attack the face or limbs by preference; are generally few in number at any one time, and appear at irregular intervals. In a few days they rupture or shrivel up, and scabs are formed. If the parts be irritated by scratching, slight superficial ulceration may take place under the scab. The general health is also slightly disturbed. Impetigo is for the most part confined to children, but occasionally it attacks the follicles of the beard in men (*I. menti,—sycosis?*). There is also a variety which appears to be specially contagious, and is thus readily conveyed from part to part by inoculation in the act of scratching (*I. contagiosa*).

ECTHYMA.—In this disease the pustules are large, and are seated on elevated, reddened, and slightly indurated bases. The buttocks and lower limbs are most frequently attacked. This eruption is always associated with general debility, defective nutrition, or hygienic neglect.

TREATMENT.—The general health requires close attention, and good food, tonics, with cod-liver oil, are especially useful. Stimulants are often needed. Cleanliness, bathing, fresh air, and exercise are also of importance. As to local treatment, soothing applications are preferable at first, but as soon as the more acute symptoms have sub-

sided, a mild mercurial ointment will usually be found to agree best. Epilation is often desirable in *impetigo menti*.

BOILS.—CARBUNCLES.—In the pustular affections already described, the inflammation is merely superficial, but in boils and carbuncles the whole thickness of the skin is involved. The process begins with circumscribed redness, swelling, and induration, which in a few days may occupy an area from $\frac{1}{2}$ to 2 or 3 inches in diameter; and this is followed by suppuration and sloughing. On the separation of the slough the wound gradually heals, leaving a permanent scar. Carbuncles only differ from boils in the larger area involved.

There is great local pain, tenderness, and throbbing, together with more or less general and febrile disturbance. Not infrequently the adjacent lymphatic glands become enlarged. Any part of the body may be attacked, recurrence is frequent, and no period of life is exempt from them. The frequent association of boils and carbuncles with diabetes should always be remembered. General debility, worry, overwork, exhaustion, bad food, and deficient exercise, are common causes of this affection.

TREATMENT.—In accordance with what has just been said as to the usual causes of boils, the general health should be closely inquired into, and carefully attended to. Yeast, quinine, mineral acids, and sulphide of calcium (gr. $\frac{1}{4}$ three or four times a day) have been specially recommended. Locally, hot fomentation, poultices, and anodyne ointments are of service. It is wise to protect the surrounding skin with a belladonna or opium plaster during the application of a poultice, otherwise fresh crops of boils may be induced. Free incisions undoubtedly relieve pain and tension, and may be resorted to in severe cases.

PAPULAR INFLAMMATIONS.

STROPHULUS, red-gum, or tooth-rash is peculiar to infants, and consists of an eruption of innumerable small, reddish papules which occur for the most part on the face, neck, and arms. The irritation and general disturbance are slight. The disease is always caused by digestive disturbance of some kind. Accordingly the quality and quantity of the milk taken by the child require attention. Internally, a simple aperient followed by some alkali in dill-water is all that is necessary. Locally, irritation of all kinds should be avoided, the parts should be kept clean and dry, and if the itching be troublesome a mild alkaline lotion with a little glycerine is very useful.

LICHEN.—This affection may be recognised by the formation of small papules of a reddish colour, distinct or arranged in groups, attended with itching, and undergoing but little change till they disappear with slight desquamation.

L. simplex is common in summer-time, and consists of reddish papules on the face, trunk, or limbs, disappearing in a week or so with slight desquamation. It may, however, become chronic, and is very apt to recur. Sometimes the papules are arranged in circular patches with elevated margins (*L. circumscriptus*). *L. agrius* is characterised by much inflammatory heat and redness, attended with most intolerable itching and considerable febrile disturbance. *L. tropicus* is common in tropical climates, and is better known as "prickly heat." Tilbury Fox regarded this as an affection of the sweat-glands; and therefore not a true lichen.

TREATMENT.—In mild cases tepid bathing, plain and light food, an occasional saline aperient, and the internal administration of alkalies with some vegetable bitter will

usually suffice. To relieve the itching recourse may be had to lotions of borax with hydrocyanic acid, diluted nitric acid, vinegar, or carbolic acid. In the more chronic cases a course of steel, quinine, or arsenic, with cod-liver oil is often of great service.

PRURIGO.—This affection is characterised by pale, slightly elevated papules, generally seated on the trunk, and attended with great irritation, which leads to scratching. The apices of the papules are very apt to be scratched off, and thus little hæmorrhagic points are formed, which give a very characteristic appearance to the eruption. Not unfrequently it is associated with *pediculi corporis*.

TREATMENT.—If due to *pediculi* the skin should be well washed, the under-linen changed, and the surface anointed with carbolic acid or white precipitate ($\frac{1}{2}$ B.P. strength) ointment. Under other circumstances alkaline baths and sedative lotions are beneficial. As to general treatment, the diet should be nourishing, and tonics should be administered internally.

SCALY INFLAMMATIONS.

PSORIASIS or LEPRA is a chronic inflammatory affection of the cutis, attended with free epidermic exfoliation. It first appears in the form of small, round, slightly elevated, well-defined spots of a dusky-red colour, which are covered with white silvery scales. Later on, by enlargement and fusion of one spot into another, large irregular patches are apt to be formed. At no time is there any watery discharge. Some itching, tingling, or burning sensations may be complained of, especially in the earlier stages. The eruption is usually more or less symmetrically distributed; any part of the body may be attacked, but the points of the elbows, the front of the knees, and the scalp are its favourite seats. It is essentially a chronic affection,

and is very prone to recur, but it is not contagious. It is often hereditary, and though frequently associated with some obvious constitutional defect, such as rheumatism or gout, it may occur in those who otherwise appear to enjoy the best of health. It may be met with at any time of life after early childhood, but is most common about the age of twenty.

The varieties of psoriasis are of little clinical importance, and are mainly based on the variations in the character of the patches. Thus when they are small, round, and scattered, it is termed *P. guttata*; when spreading at the margins and healing at the centres, *P. circinata*; when adjoining rings coalesce, *P. gyrata*.

TREATMENT.—When associated with dyspepsia, gout, struma, rheumatism, etc., these defects require special attention. The diet should be plain but nutritious; alcoholic stimulants are *as a rule* best avoided; and exercise, fresh air, and bathing should be enjoined. Of specific remedies, arsenic is the most important, and is chiefly indicated in very chronic cases with free scaly formation. The internal administration of tar, or carbolic acid, has been recommended. As to local treatment, so long as the patches are very red and irritable, soothing applications should be employed; but in chronic cases tarry preparations are of great service.

PITYRIASIS SIMPLEX consists of a superficial inflammation of the skin, attended with the formation of a large quantity of fine branny scales. The scalp is its favourite seat. It is best treated by frequent washing, followed by the use of a borax lotion, or by a mild mercurial or tarry ointment. General treatment of a tonic kind is also indicated.

PITYRIASIS RUBRA. In this rare affection the whole surface of the body is of a vivid red colour, and covered with thin scales which are being continually shed and formed again. The skin is not thickened, and is always dry.

There are as a rule few, if any, local or general symptoms. The disease is often very chronic, and according to Hebra, "invariably terminates fatally after a duration of many years."

The DIATHETIC affections of the skin include the eruptions associated with the syphilitic and strumous diatheses which have been already described on another page.

HYPERTROPHIES.

ICHTHYOSIS (*ἰχθύς*—a fish) is a hypertrophic affection of the whole thickness of the skin, and is attended with an excessive formation of epidermis, which, mixed with sebaceous matter, forms hard, dark-coloured plates, cracked in all directions, and supposed to resemble the scales of a fish. The secreting functions of the skin are greatly disturbed. The neighbourhood of the knees, ankles, elbows, or wrists, is chiefly affected. It is often congenital. XERODERMA is but a milder form of ichthyosis.

Though incurable, much relief may be afforded by removal of the scales by means of alkaline baths or fomentations, followed by free inunction with oil. Cod-liver oil and tonics have been recommended internally.

VERRUCEÆ or WARTS consist of a hypertrophy of the papillary layer of the skin, forming raised tumours of small size and rounded shape. They may be sessile or pedunculated. It would seem that they are sometimes contagious. The best treatment is by caustic applications repeated at intervals, of which nitric acid (fuming), the acid nitrate of mercury, and potassa fusa are the best.

CORNS are essentially similar to warts, but the overgrowth of the epithelial is much greater than that of the papillary layer of the skin.

SCLERODERMA or "hide-bound" disease is a rare affection especially prone to attack adult females, but is also met with in infants. The skin becomes thickened and indurated over a considerable area. Subsequent contraction gives a characteristic puckered and cicatricial aspect to the affected part. The prognosis is ultimately very unfavourable. Tonic remedies, and cod-liver oil with oily inunctions, have been recommended.

Other hypertrophic diseases are occasionally met with, viz., elephantiasis, keloid, and fibroma, but are so rare as not to call for detailed description here.

NEUROSES OF THE SKIN.

PRURITUS is the only affection which will be mentioned among those cutaneous disorders which are the immediate expression of a morbid condition of the nerves themselves. It is essentially characterised by itching sensations, and is not necessarily accompanied with any alteration in the appearance of the skin. A pruriginous eruption, however, is very apt to be caused by scratching, which in these cases is irresistible. Pruritus may be general or local. The anus, scrotum, and pudenda, are common seats of this affection. It is most frequently met with in elderly people. Among usual general causes, dirty habits, bad living, digestive derangements, and jaundice, may be mentioned; while local pruritus may often be traced to leucorrhœa, ascarides, hæmorrhoids, and sometimes (but by no means necessarily) to pediculi.

TREATMENT.—Any discoverable exciting cause should at once be removed if possible. Thorough cleanliness, good but plain food, are absolutely necessary. Medicinally, tonics and cod-liver oil are of great service. The relief of the troublesome itching will often tax the ingenuity of

the practitioner. Among the most useful applications may be mentioned lotions containing borax, boracic acid, hydrocyanic acid, or carbolic acid; ointments of oxide of zinc, with camphor, calomel, belladonna, or morphia; and alkaline baths.

NEW GROWTHS.

UNDER this head may be included lupus, rodent ulcer, and cancer, of which the first only comes within the true province of the physician.

LUPUS.—The essential feature of all forms of lupus consists of a soft vascular cell-infiltration of the skin, which closely resembles granulation tissue, extends to a variable depth, and in the graver forms of the disease is followed by ulceration of an intractable kind.

Lupus erythematosus is a purely local affection, which usually affects some part of the face and seldom occurs before adult age. It consists of one or more rounded patches of variable size, and reddish colour, with slightly elevated edges. The surface is covered with thin adherent scales, on removal of which, the openings of the sebaceous glands are found to be wide and patulous. It runs a very chronic course, and on healing leaves a slight superficial scar.

Lupus vulgaris is a very chronic skin disease which almost always makes its first appearance *before* puberty, and is especially common in those of a scrofulous habit. It begins in the form of small, gelatinous-looking tubercles, of a reddish colour, covered with thin scales or scabs, and usually seated on the nose. The tubercles increase in number and size, and often merge into each other. They may afterwards be slowly absorbed, and merely leave a superficial scar (*L. non-exedens*); or on the other hand they may soften and break down at one or more points, and

result in the formation of open ulcers (*L. exedens*). The ulcers vary much in depth, sometimes being quite superficial, while in other cases there may be great destruction of tissue. Recovery takes place very slowly, and leaves ugly scars, which have, however, but *little tendency to contract*.

As to general *treatment* tonics, cod-liver oil, good food, moderate use of stimulants, fresh air, and healthy surroundings, are of prime importance. Locally, unless contra-indicated by inflammation and irritability of the part, caustics may be used with advantage. The best and safest are the acid nitrate of mercury, and solid nitrate of silver; but they should not be employed oftener than once a week. I have often found painting the surface with collodion of service in mild cases.

PIGMENTARY ANOMALIES.

THIS group of cutaneous disorders is not of sufficient clinical importance to require more than a mere allusion here.

EPHELIDES or FRECKLES are a familiar result of exposure to the rays of the sun. MELANODERMA in the form of brown mottling is often met with on the legs of those who are fond of roasting themselves by the fire. LEUCODERMA is an affection where, as the result of an unequal distribution of pigment, white patches are formed with sharp convex edges, while the skin around is darker than usual. ADDISON'S DISEASE has been referred to elsewhere.

GLANDULAR ANOMALIES.

SWEAT GLANDS.—The secretion of sweat may be in excess (HYPERIDROSIS); or it may be deficient (ANIDROSIS). Associated with the former, especially in the course of rheumatic and other fevers, minute transparent vesicles are

often formed in great numbers (SUDAMINA), looking like drops of water, and are due to collection of drops of sweat between the layers of the epidermis. Under similar circumstances minute inflammatory pimples may occur (MILIARIA). No special treatment is necessary.

SEBACEOUS GLANDS.—SEBORRHOEA.—Here the secretion of sebum is very free, and is apt to accumulate on the surface in the form of thin yellowish scales. It is especially common on the heads of young infants. Good washing with soap and hot water, followed by the inunction of mild carbofic or mercurial ointment is all that is required.

ACNE is a chronic disease, in the mildest form of which the sebum is merely retained and cannot escape from the gland; and a little elevation is formed, the apex of which is marked by a black point corresponding with the opening of the follicle (*A. punctata*). Frequently as the result of irritation, some inflammation and induration of the follicle takes place (*A. indurata*), which is sometimes followed by suppuration (*A. pustulosa*). The above varieties occur for the most part on the face and back, and are most common in girls and youths about the time of puberty. When the acne nodules are closely grouped and attended with great vascularity, and free new formation of connective tissue around, the condition is known as *A. rosacea*. This form is rarely met with before middle life; generally affects the nose, and is apt to cause great disfigurement. It is sometimes (but by no means necessarily) connected with alcoholic abuse.

TREATMENT.—Functional derangements of any kind require prompt and careful attention, special regard being paid to the digestive and (in the case of girls) menstrual functions. The contents of *A. punctata* pimples should be squeezed out, and the surface freely washed with soap and hot water at least twice daily. Ointments of precipitated sulphur or bichloride of mercury (gr. $\frac{1}{2}$ -ii ad $\frac{3}{4}$ i) with

vaseline are of great service. Indolent pimples may be lightly touched with acid nitrate of mercury. *A. rosacea* must be treated on similar principles. Incision of varicose vessels has been recommended in obstinate cases.

MOLLUSCUM CONTAGIOSUM consists of roundish tumours, sessile or pedunculated, of the average size of a pea, surmounted by a small opening corresponding with the orifice of the affected gland. They are filled with soft sebum which may be squeezed out on pressure. It most commonly attacks the face and trunk, and is probably contagious. The *treatment* consists in squeezing out the contents, afterwards applying lunar caustic to the inside of the follicle ; but the latter proceeding is often superfluous.

PARASITIC AFFECTIONS.

ANIMAL PARASITES.—The only diseases which will be discussed under this head are, (a) *Scabies* produced by the *acarus scabiei*, and (b) *Phtheiriasis* produced by the various forms of *pediculi*.

SCABIES.—In this affection the female *acarus* penetrates the epidermis, forming a *cuniculus* or furrow, in which its eggs are laid. The male lives on the surface, and does not burrow. It is distinguished from the female by its smaller size, and by the presence of terminal suckers on the hindermost pair of legs. From the irritation set up by the parasite and by scratching, vesicles, papules, and pustules are formed, grouped together in every variety. It is attended with severe itching, which is worse at night when warm in bed. Its favourite situations are the flexor aspects of the limbs, the front of the wrists, the intervals between the fingers and toes, the palms of the hands, the soles of the feet, the pudenda, and buttocks. In the vast majority of cases it will be found that a discrete eruption on the palms

or soles is due either to scabies or syphilis. The presence of itching in the former and its absence in the latter will serve to distinguish them. *Treatment.*—This consists of thorough scouring of the skin with flannel, soap, and hot water, followed by free inunction with sulphur ointment (sublimed or precipitated). When the skin is very irritable the application of Peruvian balsam or mild carbolic acid ointment is preferable to sulphur in the first instance. It must be remembered that the sulphur treatment if used vigorously is very apt to induce an eczematous eruption, which quickly subsides, however, on cessation of the application. The general health requires attention, especially in the pustular forms of the disease.

PHTHEIRIASIS may be occasioned by at least three different varieties of pediculi. (1) The *pediculus capitis* affects the hairy scalp, and gives rise to great irritation and variable degrees of eczema, with enlargement of neighbouring lymphatic glands. (2) The *pediculus corporis* affects the body and clothes, and gives rise to an eruption similar to that already described as met with in pruritus. It is especially common in old people. (3) The *pediculus pubis* affects the hairy parts of the pudenda. *Treatment.*—Absolute cleanliness, frequent change of linen (in the secondary variety), and local applications of mercurial or carbolic ointments, or lotions. Tonic remedies and good food greatly enhance the recovery in the old and debilitated.

VEGETABLE PARASITES.—The following diseases are due to the development and growth of a vegetable fungus, which not only affects the skin, but also invades the hairs and hair-follicles. Though the variety of fungus differs in different diseases, yet each presents the same general features, and is made up of *spores* and *mycelium*. The spores are little round or oval bodies, on the average of $\frac{1}{4000}$ inch in size, with sharply refracting outline, solitary or arranged

in rows. The mycelium consists of fine branching filaments which are often freely interlaced together. Both spores and mycelium resist the action of cold caustic potash, which dissolves and renders all epidermic tissue transparent. Microscopic examination of a suspected specimen is therefore much facilitated by the use of this reagent.

TINEA TONSURANS, or RINGWORM, depends on the presence of a fungus known as the *Tricophyton tonsurans*, and chiefly affects the hairy scalp. It begins in the form of circular scaly patches, in which the hairs become thickened, dry, and for the most part broken off close to the skin. Later on the circular form of the patches is often lost, the whole scalp becoming more or less dry and scurfy. It is essentially a disease of children. TINEA SYCOSIS is ringworm as it affects the hairs and hair-follicles of the beard. TINEA KERION is the term applied to an inflammatory condition of ringworm in which the patch becomes red, swollen, boggy to the touch, and pours out a viscid secretion. TINEA CIRCINATA is the name given to ringworm as it affects non-hairy parts of the surface. When fully developed it presents circular, reddish, scaly patches of variable size, with slightly elevated margins.

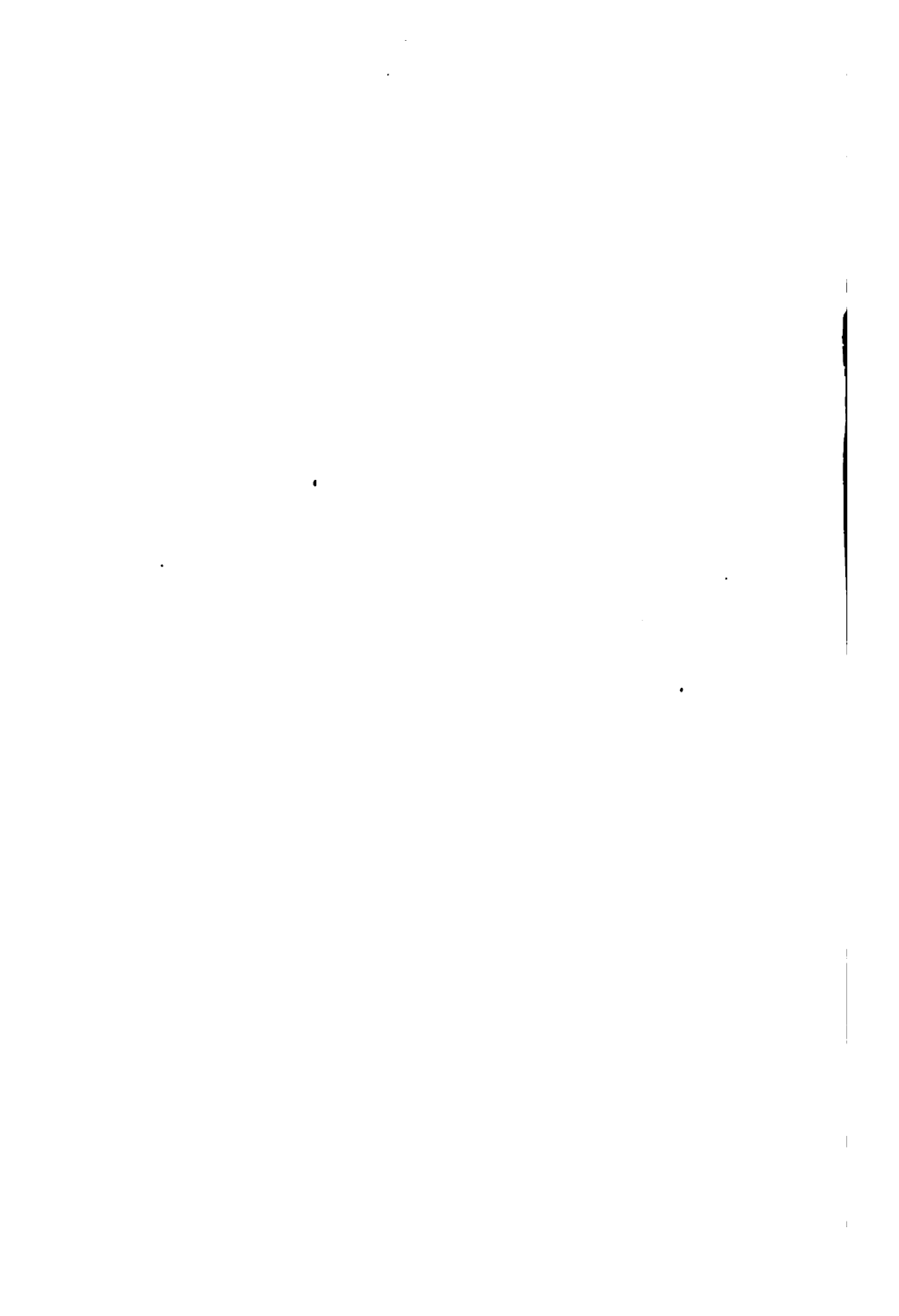
TINEA FAVOSA, or FAVUS, is a rare disease which is for the most part confined to children, and is due to the presence of a fungus called *Achorion Schönleini*. The scalp is the usual seat, but other parts may be attacked. It presents sulphur-yellow, cup-shaped crusts, which usually coalesce to form yellow masses with a peculiar mouse-like odour.

TINEA VERSICOLOR or CHLOASMA depends on the presence of the *Microsporon furfur*, and is characterised by fawn-coloured, slightly scaly, irregular patches which are especially common on the front of the chest; but it may affect other parts.

TINEA DECALVANS.—Some regard this disease as essen-

tially parasitic, but there appears to be great difficulty in demonstrating microscopically the existence of the parasite, and thus many regard it as a mere malnutrition of the scalp, and call it *alopecia areata*. It is characterised by the formation on the scalp of one or more smooth, white, bald patches which vary in number and size. Although tedious, it almost always terminates in recovery.

TREATMENT.—The general principles of treatment, consist in attempts to remove and destroy the fungus by repeated washings, followed by the application of parasiticide remedies, such as lotions or ointments containing sulphurous acid, carbolic acid, salicylic acid, perchloride of mercury, etc. In *T. tonsurans* the patches may be blistered with acetum cantharidis if of small size, few in number, and taken early. When it has become chronic nothing is more generally useful than daily application of oleate of mercury (5 to 10 per cent strength). But the same remedy will not suit all cases, and a selection of formulæ will be given in the therapeutic appendix. In obstinate cases epilation of diseased hairs should be practised. In *T. decalvans* stimulating applications are necessary. The state of the general health is always important and must not be overlooked.



THERAPEUTIC INDEX.

NOTE.—In submitting the following therapeutic index, my intention has been merely to provide examples of prescriptions which have been found useful by myself and others, and to suggest in a general way the lines of treatment hitherto adopted. Any slavish adhesion to fixed formulæ is strongly to be deprecated as tending to stifle the spirit of original enquiry on the part of the practitioner, and taking the place of that which personal practice and experience alone can properly give. The suggestions made under each heading should be read in conjunction with the paragraphs in the text which relate to the same subject.

Acne.

1. Hot fomentations and repeated washings with soap and water.
2. Contents of follicles to be systematically squeezed out.
3. ℞ Ung. Sulphuris (precip.)
B. P.
4. ℞ Sulph. hypochlorid. ʒj.
Potass. carb., gr. x.
Vaseline, ʒj. ft. ung.
5. ℞ Ung. sulph. iodid. (half B.P. strength). Useful in severe forms.
6. ℞ Sulph. precip., ʒj.
Glycerine, ʒj.
Aq. rosæ ad Oss.
7. ℞ Potass. sulphuret.
Zinci sulphat. āā ʒj.
Aq. rosæ, ad ʒiv.
Useful lotions in acne punctata.
8. Indolent indurated nodules may be touched with acid nitrate of mercury.

9. ℞ Conf. sulphuris, ʒj. Every morning. Useful internally.
10. ℞ Vin. ferri, ʒj.
Liq. arsenicalis, ℥iij.
Three times a day in water after meals.

Ague.

1. ℞ Pulv. rhei.
Pulv. jalapæ āā gr. vi.
Hydrarg. subchlor.
Quiniæ sulph. āā gr. iv.
A useful powder at first onset.
2. ℞ Quiniæ sulph. gr. iij-x.
Acid. sulph. dil. ℥x-xv.
Potass. bromid., gr. x-xx.
Aq. et syr. ad ʒj. ter die.
3. ℞ Quin. sulph., gr. x.
Acid sulph. dil. ℥x.
Aq. distillat. ℥roo.
A useful hypodermic solution.
4. ℞ Pil. ferri carb. gr. iij.
Acidi arseniosi, gr. ʒv.
ft. pil. j.
To be taken thrice daily.

5. ℞ Quinæ sulph. gr. ij.
Ferri sulph. exsic. gr. j.
Acidi arseniosi, gr. ʒʒ.
ft. pil. j.
To be taken thrice daily.
6. Warburg's tincture.
Give ʒss undiluted, after opening the bowels. Repeat in 3 hours.
7. Chloroformi, ʒss-j. In milk.
Taken at time of chill, may abort it.
8. An emetic of ipecacuanha taken in the morning sometimes enhances effect of quinine.
9. ℞ Ammonii iodid. ʒj
Liq. arsenicalis, ʒss.
Tr. calumb. ʒss.
Aq. ʒiss. M.
One teaspoonful three times a day. In malarial enlargement of spleen.

Alcoholism.

1. ℞ Ammon. carb. ʒj.
Table vinegar, ʒj.
A useful reviver from drunkenness.
2. ℞ Liq. arsenicalis, ʒj.
Tr. capsici, ʒj.
Aquam ad ʒj.
Every hour. Useful in persistent vomiting after a debauch.
3. ℞ Camphor. monobrom. gr. v.
Ext. rosæ caninæ q.s.s.
ft. pil. j.
Useful in headache and wakefulness after a debauch. One or two as required.
4. ℞ Chloral hydrat. ʒiss.
Potass. bromid. ʒij.
Sp. Æth. sulph. co. ʒij.
Tr. valerianæ, ʒiij.
Aquam ad ʒvj.
ʒss every 2 or 3 hours. Sometimes used in commencing D.T.
5. ℞ Potass. bromid. ʒiss.
Tr. digitalis, ʒj.
Tr. capsici, ʒss.
Aquam camph. ad ʒvj.
ʒj. thrice daily.

- ℞ Potass. bromid. ʒiss.
Inf. quassia, ʒvj.
ʒj. thrice daily.
- ℞ Acid phosph. dil. ʒiss.
Infus. cinchonæ, ʒvj.
ʒj. thrice daily.
- ℞ Zinci oxid. gr. iij.
Ext. gentianæ, q.s.s.
ft. pil. j. thrice daily.
Useful in chronic alcoholism.

Anæmia

1. All forms of iron.
2. ℞ Ferri sulph. gr. ij.
Magnes. sulph. gr. x-xx.
Acidi sulph. dil. ʒx.
Aq. menth. pip. ʒj.
Thrice daily.
℞ Pil. aloes cum ferro (B.P.)
gr. v.
In constipation with anæmia.
3. ℞ Potass. bromid. ʒj.
Ferri et am. cit. ʒss.
Sp. ammon. ar. ʒj.
Aquam ad ʒvj.
ʒj. thrice daily. In anæmia with nervousness.
4. ℞ Liq. arsenicalis, ʒiii-v.
Tr. ferri perch. ʒv.
Aquam ad ʒss.
Thrice daily in anæmia after hæmorrhage—diluted.
5. ℞ Easton's syrup, ʒss-j.
Thrice daily in water.
6. ℞ Calcii phosph. gr. ii.
In milk 3 or 4 times daily. In anæmia of rapidly growing children.
7. Oleum morrhuæ.

Angina Pectoris.

1. ℞ Sp. ætheris co. ʒj.
Liq. opii sed. ʒx.
Aq. camph. ad ʒss.
Occasionally in water as required.
2. ℞ Liq. arsenicalis, ʒiij-vj.
Aq. ad ʒj.
Every 4 or 6 hours as required.

3. \mathcal{R} Quinæ sulph. gr. j.
Acid. arseniosi, gr. $\frac{1}{8}$.
Ext. hyoscyami, q.s.s.
ft. pil. j.
From 2 to 4 a day in chronic
angina.
4. \mathcal{R} Nitro-glycerine, mj.
Sp. vini rect. μ 100.
One to six drops on sugar every
four hours.
5. Nitrite of amyl.
Four or five drops to be in-
haled from a handkerchief
during paroxysm.

Apoplexy.

1. *Croton oil*, μ i-ij. with a little
butter and placed on the back
of the tongue. A useful pur-
gative.

Ascarides.

1. Santonin, gr. ij-iv.
Every morning before food.
To be followed by a purga-
tive in 3 or 4 days. For
round or thread-worms.
2. \mathcal{R} Olei terebinth.
Sp. æth. nitrosi $\bar{a}\bar{a}$, ζ ijj.
Magnesiæ, Θ j.
Mucilaginis, ζ ij.
Sacch. alb. ζ j.
Aq. menth. pip. ζ j.
One tea-spoonful for a child. In
chronic intestinal catarrh with
round worms.
3. \mathcal{R} Aquæ calcis.
or \mathcal{R} Sodii chlorid. ζ j, ad aq. Oj.
or \mathcal{R} Tr. ferri perch. ζ j. ad aq. Oj.
or \mathcal{R} Infusi quassiæ.
As enemata for thread worms.
4. \mathcal{R} Potass. bromid. gr. iv-x.
Decoc. aloes co. ζ ij-iv.
Twice or thrice daily. Useful
both for round and thread-
worms.
5. \mathcal{R} Pulv. scammon. co. gr. v-x.
Pulv. aromat. gr. v.
A useful purgative in cases of
thread-worms.

Ascites.

1. \mathcal{R} Elaterii, gr. $\frac{1}{4}$.
Pulv. scillæ,
Pulv. digitalis, $\bar{a}\bar{a}$ gr. j.
Ext. hyoscyami, gr. iss.
ft. pil. j. To be taken every
other night.
2. \mathcal{R} Copaibæ resinæ, gr. x-xv.
Ætheris, q. s. s.
Mist. amygdalæ, ζ j.
Thrice daily. Not admissible
with albuminuria.

Asthma.

1. \mathcal{R} Tr. lobeliæ.
Tr. hyoscyami.
Sp. æth. co.
Syr. tolutani, $\bar{a}\bar{a}$ ζ j.
One tea-spoonful in water every
half an hour during the paro-
xysm.
2. \mathcal{R} Potass. iodid. ζ ij.
Liq. morph. hyd. ζ iss.
Tr. scillæ.
Tr. lobeliæ.
Syrupi, $\bar{a}\bar{a}$ ζ j.
One tea-spoonful in water thrice
daily in asthma with emphy-
sema and bronchitis.
3. \mathcal{R} Liq. arsenicalis, mj.
Aquam ad ζ j.
Every 6 or 8 hours in asthma
with sneezing and coryza.
4. *Hypodermic injections* of mor-
phia or atropia.
5. Strong hot *coffee* without sugar
and milk, given on an empty
stomach.
6. *Inhalation* of smoke from to-
bacco, or stramonium cigar-
ettes.
7. \mathcal{R} Potass. iodid. gr. v-x.
Vini. colchici, μ xv.
Aq. camphoræ, ζ j.
Thrice daily in gouty bronchitic
asthma.
8. *Inhalation* of the spray of ipe-
cacuanha wine, in bronchitic
asthma.
9. *Inhalation* of the smoke of burn-
ing nitre-paper.

10. ℞ Potass. nitrat. ℥ss.
Pulv. anisi fruct. ℥ss.
Pulv. stramonii fol., ℥j.
Ignite and inhale smoke.
11. Chloral-hydrate, gr. xv-xx.
Every four hours, until paroxysm subsides.

Bed-sores.

1. Application of alcohol to the skin, in threatening bed-sore.
2. Glycerine rubbed into parts exposed to pressure, a good preventive of bed-sores.
3. ℞ Argenti nitrat. gr. v.
Sp. æth. nitrosi, ℥j.
To be painted on skin, in threatening bed-sore.
4. Iodoform dusted over sore.
5. Ung. resinæ or balsam Peruv.
Useful dressing for open bed-sore.

Biliousness.

1. ℞ Res. podophylli, gr. ʒ-ʒ.
Pulv. capsici, gr. ʒ.
Pulv. rhei. gr. ij.
Ext. belladon. gr. ʒ.
ft. pil. sec. art.
℞ Res. podophylli, gr. ʒ.
Ex. coloc. co. gr. ii.
ft. pil. j.
℞ Pil. hydrarg.
Ext. coloc. co. āā gr. ij.
ft. pil. j.
One or two of either of the above pills at bed-time followed by a saline aperient draught in the morning.
2. ℞ Magnes. carb. ʒij.
Pulv. rhei. ʒj.
Vini ipecac. ʒij.
Pulv. aromat. ʒij.
Aq. menth. pip. ad ʒviiij.
ʒj-ʒjss. every morning.
3. Ipecacuanha in small and long continued doses.
4. ℞ Ext. nucis. vom. gr. ʒ.
Ext. coloc. co. gr. iss.
Ext. hyoscyam. gr. iss.
ft. pil. j.
Twice daily. In chronic hepatic sluggishness.

5. ℞ Ammon. chlorid. gr. v-xv.
Sp. chloroformi, ℥x.
Syrupi aurantii, ʒss.
Aquam ad ʒss or j.
Twice or thrice daily. Very useful in hepatic functional derangements.

Boils.

1. Collodion—to be painted over boil at very first appearance.
2. ℞ Ext. belladonnæ, ʒij-iv.
Glycerini, ʒj.
A useful application. Reduces inflammation and allays pain.
3. ℞ Liquor potassæ, ℥xv-xx.
Infusi cinchonæ, ʒj.
Thrice daily in water.
4. A tea-spoonful of German yeast on an empty stomach thrice daily may be tried in obstinate cases.
5. ℞ Calcii sulphid. gr. ʒ-ʒ.
Sacch. albi. q. s. s.
Every 2 or 3 hours. Valuable in chronic cases.
6. Tonics, of which the best are quinine, and mineral acids with bark.

Bright's Disease.

1. Tr. aconite—in doses of ℥j every hour on first appearance of nephritis after scarlet fever.
2. ℞ Potassæ bitart. ʒj.
Vini ipecac.
Tr. digitalis, āā ℥v.
Sp. ætheris nit. ℥v.
Aquam ad ʒj.
Three or four times daily. In post-scarlatinal nephritis.
3. Tr. cannabis indica—in doses of ℥v-x three or four times daily. Said to be useful as diuretic in cases with bloody urine.
4. Pulv. jalapæ co.—the most useful purgative in Bright's disease. The addition of elaterium (gr. ʒ) greatly increases the effect.

5. ℞ Tr. ferri perchlorid.
Tr. nucis vom. āā ℥x.
Sp. æth. nitrosi, ℥ss.
Aquam ad ℥j.
Thrice daily a useful formula.
6. ℞ Potass. bitart. ℥ss.
Tr. digitalis, ℥x.
Sp. æth. nit. ℥xxx.
Decoc. scoparii ad ℥j-ij.
Thrice daily. A useful diuretic.
7. Camphorated vapour baths.
Half an ounce of camphor for each bath.

Bronchitis.**ACUTE.**

1. ℞ Vin. antimon. ℥x-xv.
Liq. ammon. acet. ℥j-ij.
Syrupi tolutani, ℥ss.
Aquam ad ℥j.
Thrice daily. Relaxing expectorant in early stages.
2. ℞ Vin. ipecac. ℥v.
Tr. camph. co. ℥x.
Liq. ammon. acet. ℥xx.
Syrup. et aq. ad ℥j every three or four hours. A useful expectorant for children.
3. ℞ Ammon. carb. gr. ij-v.
Ammon. chlorid. gr. v.
Sp. chloroformi, ℥x.
Syr. tolutani, ℥ss.
Aquam ad ℥j. Thrice daily.
- ℞ Quin. sulphat. gr. j.
Zinci sulph. gr. iij.
Acid. sulph. arom. ℥xv.
Aq. menth. pip. ad ℥j.
Thrice daily. Useful stimulant expectorants in later stages.
4. ℞ Chloral-hydrat. gr. v.
Oxymel scillæ.
Syrupi tolutani āā ℥ss.
Occasionally when cough is troublesome.
5. ℞ Quin. sulph. gr. j.
Acid phosph. dil. ℥xv.
Syrup. tolutani, ℥xx.
Aquam ad ℥j.
Thrice daily. Useful tonic in advanced stage.

6. ℞ Potass. iodid.
Ammon. carb. āā gr. iv.
Vin. colchici, ℥x.
Tr. scillæ.
Tr. hyoscyami, āā ℥xv.
Aq. camph. ad ℥iss.
Thrice daily. In acute gouty bronchitis.

CHRONIC.

1. ℞ Potass. nitrat. gr. iij.
Tr. conii.
Sp. æth. nit.
Oxymel scillæ, āā ℥xxx.
Infusum senegæ ad ℥j.
Thrice daily.
- ℞ Ammon. chlorid. gr. x.
Sp. ætheris co. ℥x.
Ext. glycyrrhizæ, ℥x.
Inf. senegæ ad ℥j.
Thrice daily. Useful stimulating expectorants, especially in bronchitis of the aged.
2. ℞ Picis liquidæ, gr. ij.
Pulv. aromat. q. s. s.
ft. pil. j.
Thrice daily. In paroxysmal cough with fœtid expectoration and bronchial dilatation.
3. ℞ Tr. ferri perchlor. ℥xii.
Ætheris, ℥xv.
Aquam ad ℥j. Thrice daily.
- ℞ Acid. nitro-mur. dil. ℥xii.
Vini ipecac.
Sp. chloroformi āā ℥x.
Infusum gent. ad ℥j.
Thrice daily. Useful tonics in chronic bronchitis.
4. *Inhalations* of compound tinct. of benzoin (℥j) or creasote (℥x-xx) added to boiling water, lessen secretion.
5. *Sulphur*, gr. x. taken in milk thrice daily, useful in abundant and fœtid secretion.

Catarrh.

1. *Tr. aconite*—in ℥j. doses every hour in early stages.
2. ℞ Ammonizæ carb. gr. v.
Liq. morphizæ hydroc. ℥v.
Mist. amygdalæ, ℥j.

Every four hours, from the outset of catarrh. A colocynth pill to be taken on the second night.

3. *Quinine* in a single dose of gr. x. is said to abort a catarrh if taken early.
4. ℞ Morph. sulphatis, gr. j.
Bismuth. subnit. ʒijj.
Pulv. acaciæ, ʒj.
To be used as a snuff at the beginning of a cold.
5. ℞ Camphoræ, ʒv.
Ætheris, q. s. s.
Dissolve in the consistence of cream and add—
Ammoniac carb. ʒiv.
Pulv. opii, ʒj.
Keep tightly corked, gr. iii-x. to be taken in a little water at bed-time when a cold threatens.
6. ℞ Liq. morphicæ hyd. ℥x.
Vin. antimonial, ℥viij.
Aquam ad ʒj,
Repeated twice at intervals of three hours said to check catarrh on first onset.

Chlorosis.

1. ℞ Ferri sulph. exsic. gr. v.
Syrupi simp. q. s. s.
ft. pil. j.
Three or four daily.

Cholera and Choleraic Diarrhœa.

1. *Castor oil* in dose of ʒss. followed in an hour or so by a table-spoonful of brandy with ℥v-x of laudanum.
2. ℞ Pulv. opii, gr. j.
Piperis, gr. ij.
Assafetidæ, gr. iij.
ft. pil. j. sec. art.
To be repeated occasionally as required.
3. ℞ Sp. camphoræ, ℥vj.
Every ten minutes in water till symptoms abate. Useful in summer diarrhœa.

4. *Chloroform* in doses of ℥v-x. every hour said to relieve vomiting and cramps.

- or ℞ Chloroformi, ℥x.
Tr. opii, ℥v-x.
Sp. vini rect. ʒj.
Aquam ad ʒj.
A formula recommended.
5. ℞ Plumbi acetat. gr. xxiv.
Liq. morph. hyd. ʒj.
Acid. acetic dil. ℥xii.
Aq. distillat. ad ʒvj.
ʒss every two hours in water.
 6. ℞ Liq. hydrarg. bichlor. ℥x.
Aquam ad ʒj. Every hour.
- or ℞ Hydrarg. cum creta, gr. ʒ.
Sacchari, q. s. s.
Every hour. Useful in choleraic diarrhœa.

Chorea.

1. *Liq. arsenicalis* in gradually increasing doses, with or without iron.
2. *Sulphate of zinc* in gradually increasing doses, beginning with gr. ij. thrice daily.
3. ℞ Strychniæ sulph. gr. ij.
Aquaæ, ʒj.
Five drops thrice daily for a child of ten years.
4. Chronic cases do best with Cod-liver oil and ferruginous tonics.

Colic.

1. Hot fomentations, and warm baths.
2. ℞ Magnes. carb. ʒiss.
Ammon. carb. ʒss.
Tr. lavand. co. ʒij.
Aq. menth. pip. ad ʒvj.
A table-spoonful occasionally as required. In simple colic.
3. ℞ Sp. ætheris, ℥xx.
Liq. morph. hyd. ℥vj.
Aq. menth. pip. ʒj.
Occasionally as required. In simple colic.
4. ℞ Sodæ sulpho-carbolat. gr. xv.
Tr. belladonnæ,
Sp. chloroformi, āā ℥x.
Aquam ad ʒj.
Thrice daily in simple flatulent colic.

5. ℞ Creasoti, ℥j.
Pulv. aromat. gr. iv.
Mucilaginis, q. s. s.
ft. pil. j.
Three or four daily in simple colic.
6. ℞ Ol. ricini, ℥j.
Tr. opii, ℥xxx.
A useful draught in lead colic.
7. ℞ Extract. opii, gr. ½-j.
Extract. belladon. gr. ʒ.
Ext. hyoscyami, gr. ij.
ft. pil. j.
Every four or six hours as required. In colic with intestinal obstruction.
8. *Enemata* of turpentine or castor oil are useful in colic with simple constipation.

Congestion.**CEREBRAL CONGESTION.**

1. ℞ Potass. bromid. gr. xv.
Ext. ergot. liq. ℥xxx-xxx.
Aquam ad ℥j.
Thrice daily. In sthenic congestion.
2. ℞ Zinci phosphidi, gr. iij.
Ext. nucis vom. gr. x.
ft. pil. 30.
One thrice daily. In asthenic congestion.
3. ℞ Liq. arsenicalis, ℥iij.
Tr. ferri perchlor. ℥v.
Aquam ad ℥j.
Thrice daily. In congestion due to mental strain.
4. Alcohol of service in some cases of *passive* congestion.

HEPATIC CONGESTION.

1. Saline aperients.
2. ℞ Sodæ sulphat. ℥ij.
Succi taraxaci, ℥j.
Aquam ad ℥ij.
A useful morning draught.
3. The mineral waters of Carlsbad, Friedrichshall, or Hunyadi Janos.
4. ℞ Acid. nitro-mur. dil. ℥xv.
Infusi gentian. co. ℥j.
Twice daily.

5. ℞ Acid. nitro-mur. dil. ℥j.
Aquam ad Oj.
Compress to be soaked in this fluid and applied over the liver.

CONGESTION OF LUNG (see PNEUMONIA).**Constipation.**

1. ℞ Ext. aloes aquosi, gr. j.
Ext. nucis vom. gr. ½
Ext. gentian. gr. iij.
ft. pil. j.
A useful dinner pill in chronic constipation.
2. Decoction of aloes is a valuable aperient for females with pelvic troubles.
3. ℞ Ext. belladon. gr. ʒ.
Ext. aloes, gr. j.
Ext. gentian. gr. ij. ft. pil.
Once or twice daily in atonic constipation with dyspepsia.
4. *Croton oil* ℥i-ij. To be given in a little butter and placed on the back of the tongue. A very powerful purgative.
5. *Ipecacuanha* in dose of gr. j, every morning, said to be useful in chronic constipation with slow digestion.
6. ℞ Mist. sennæ co. ℥j-℥iiss.
or ℞ Magnes. sulphat. ℥ij.
Magnes. carb. gr. xx.
Aq. menth. pip. ad ℥iiss.
or ℞ Sodæ sulphatis, ℥j-ij.
Taken in a tumbler of water in the morning.
- or ℞ Sedlitz powder.
Useful saline aperients.
7. ℞ Pil. coloc. co.
Pil. hydrargyri, āā gr. iiss.
ft. pil. j.
or ℞ Pil. coloc. et hyoscyam.
gr. v. B.P.
or ℞ Pil. rhei co.
Pil. hydrargyri, āā gr. iiss.
ft. pil. j.
or ℞ Podophyllin, gr. ʒ-ʒ.
Pulv. ipecac. gr. ʒ.
Ext. gentianæ, gr. iij.
ft. pil. j.

- or ℞ Podophyllin gr. $\frac{1}{4}$ - $\frac{1}{2}$.
Pil. rhei co. gr. ij.
Ext. hyoscyam. gr. ij.
ft. pil. j.

Useful aperient pills.

8. Castor oil, confection of sulphur, confection of senna, manna, and tamarinds are mild laxatives.
9. Pulv. jalapæ co. (gr. xx- \bar{z} j) with or without the addition of gamboge (gr. j-ij), elaterium (gr. $\frac{1}{4}$ - $\frac{1}{2}$) and bitartrate of potash are useful hydragogue aperients.
10. Pulv. scammon. co. (gr. x-xx) with or without the addition of calomel is a valuable aperient for dislodging intestinal worms.
11. Enemata—which may consist of simple soap and water, or contain turpentine or castor oil suspended in thin gruel.

Convulsions.

1. Warm baths.
2. Inhalation of chloroform.
3. ℞ Potass. bromid. gr. iij.
Chloral hyd. gr. j.
Aq. et syrup. ad \bar{z} j.
Every 4 or 6 hours in convulsions of children.
4. Morphia injected subcutaneously will often stop puerperal convulsions.

Croup.

1. Aconite—drop doses of the tincture every half hour useful in early stages; or
℞ Tr. aconiti, \bar{m} ij.
Vin. ipecac. \bar{m} iv.
Sp. æth. nit. \bar{m} x.
Aq. et syr. ad \bar{z} j.
Every 3 hours.
2. ℞ Potass. chlorat. gr. iv.
Ammon. chlorid. gr. ii.
Aq. et syr. ad \bar{z} ij.
Every 20 or 30 minutes in mild cases.

3. ℞ Potass. chlorat. gr. v.
Tr. ferri perchlor. \bar{m} ijj.
Aq. et syrup ad \bar{z} ij.
Every three or four hours.
4. An emetic followed by
℞ Potass. iodid. gr. ij.
Sp. ammon. ar. \bar{M} x.
Syr. et inf. senegæ ad \bar{z} ij.
Every three hours.
5. ℞ Alum \bar{z} j.
or Zinci sulph. gr. j.
or Cupri sulph. gr. j.
Useful emetics. To be given in honey or syrup every 15 minutes, till vomiting.
6. Lime water.
To inhale spray from atomiser.
Useful also to keep tubes clean after tracheotomy.

Diarrhœa.

1. ℞ Olei ricini, \bar{m} xxiv.
Sp. chloroformi, \bar{z} iiss.
Liq. morph. mur. \bar{z} j.
Pulv. acaciæ, \bar{z} iiss.
Aq. et syr. ad \bar{z} iv.
One or two tea-spoonfuls every one or two hours, as required.
Valuable for general use.
2. ℞ Bismuthi subnit. \bar{O} j.
Acid tannic.
Pulv. ipecac. co. $\bar{a}\bar{a}$ gr. iij.
Thrice daily. In dysenteric diarrhœa of adults.
℞ Bismuthi subnit. gr. ij.
Pulv. ipecac. co.
Pulv. cinnam. co. $\bar{a}\bar{a}$ gr. $\frac{1}{4}$.
Every 3 or 4 hours. In dysenteric diarrhœa of children.
3. Liq. arsenicalis in drop doses every 3 or 4 hours useful in lienteric diarrhœa.
4. ℞ Tr. opii.
Tr. capsici $\bar{a}\bar{a}$ \bar{m} j.
Sp. chloroformi, \bar{m} ij.
Aquam ad \bar{z} j.
Occasionally as required. In diarrhœa persisting after expulsion of exciting irritant.
5. ℞ Acid. sulph. arom. \bar{m} xv.
(Tr. opii, \bar{m} v.)
Aq. menth. pip. et syr. ad \bar{z} j.
Every 4 hours. In summer diarrhœa of adults.

- ℞ Acid. sulph. dil. ℥iij.
Syr. rheados, ℥xx.
Aquam ad ℥j.
Every 4 hours. In simple summer diarrhoea of children.
6. ℞ Vini ipecac. ℥j.
Aq. ad ℥j.
In diarrhoea of children with slimy stools and obstinate vomiting.
7. ℞ Plumbi acetat. gr. ij.
Pulv. opii. gr. ʒ-½.
Ext. hyoscyam. gr. iij.
As required. Valuable in obstinate cases.
8. ℞ Liq. hydrarg. perchlor. ℥xii.
Aq. ad ℥j.
Every hour. In dysenteric diarrhoea with slimy bloody stools and tenesmus (children).
or Hydrarg. cum cretâ, gr. ʒ.
Every hour. In watery offensive stools with vomiting (children).
9. *Opium* in various forms in dose according to age. Dover's powder very useful.
10. ℞ Zinci oxidi, gr. ij-iv.
(Tr. opii, ℥ ʒ-½).
Aq. et mucilag. ad ℥j.
Every 4 hours in diarrhoea of children.
11. ℞ Argent. nit. gr. j.
Tr. opii ℥x-xx.
Mucilag. ad ℥iss.
℥j thrice daily.
or ℞ Liq. ferri pernit. ℥xv.
Acid. nitric. dil. ℥xv.
Syrup. zingib. ℥ss.
Aq. anethi ad ℥iss.
℥j every 6 hours.
Useful in chronic diarrhoea of children.

Diphtheria.

1. ℞ Potass. chlorat. gr. iv.
Tr. ferri perchlor. ℥iv.
Aq. et syrup. ad ℥ij.
Every two or three hours.

2. ℞ Acidi sulphurosi, ℥vi.
Glycerini, ℥iv.
Sol. (saturated) potass. chlorat. ad ℥viii.
From ½ to 2 tea-spoonfuls every hour.
3. ℞ Quin. sulph. gr. ʒ.
Tr. ferri perch. ℥iij.
Potass. chlorat. gr. iij.
Aq. et syr. ad ℥j.
Every two or three hours in asthenic cases.
4. Local applications to throat.
℞ Acidi hydrochlor.
Aquæ æq. partes.
For a *single* application only.
℞ Acid. salicylic. ℥ss or
Acid. carbol. ℥ss.
Glycerini, ℥ij.
Aquæ calcis, ℥viii.
As an application or spray.
℞ Tr. ferri perchlor. ℥iss.
Glycerin. et aq. ad ℥ij.
5. Gradually increased doses of strychnia together with galvanism required in diphtheritic paralysis.

Dropsies.

1. Hydragogue purgatives generally.
2. ℞ Elaterii, gr. ʒ.
Pulv. scillæ.
Pulv. digitalis, āā gr. j.
Ext. hyoscyami, gr. iss.
ft. pil. j.
Every other night.
3. ℞ Pulv. scillæ, gr. iss.
Pulv. digitalis, gr. ss.
Pil. hydrarg. gr. ij.
ft. pil. j.
Twice or thrice daily, followed by
℞ Potass. acetat. gr. xx.
Sp. æth. nit. ℥ss.
Decoc. scoparii, ℥iss.
4. ℞ Sodæ sulphat.
Potass. bitart. āā ℥j.
Sp. æth. nit. ʒj.
Aquam ad ℥vi.
℥ss thrice daily in a tumbler of barley water.

5. ℞ Potass. nitrat. gr. iii-v.
Sp. æth. nit. ℥ss.
Infusi digitalis, ℥i-ij.
Aquam ad ℥j.
Thrice daily.
6. Mist. ferri et arsenicalis, ℥j.
thrice daily. In anæmic
dropsy.
7. ℞ Liq. ammoniæ acet. ℥j.
Acid. acetic dil. ℥iiss.
Tr. ferri perch. ℥ij.
Aquam ad ℥viii.
℥j. thrice daily in chronic renal
dropsy.

Dysentery.

1. Pulv. ipecac. gr. xx-xxx. To be
given in as small a quantity
of fluid as possible. To be
repeated in 8 or 10 hours if
necessary. Give gr. x. at bed
time for 2 or 3 nights after.
2. ℞ Olei terebinth.
Tr. opii, āā ℥iij.
Acaciæ pulv.
Sacchari alb. āā ℥iij.
Aq. menth. pip. ℥iij.
One tea-spoonful every four
hours, after the bowel has
been cleared by a dose of
castor oil.
3. ℞ Liq. hydrarg. perch. ℥xij.
Aquam ad ℥j.
Every hour.
4. ℞ Tr. benzoin. co. ℥ss.
Tr. catechu, ℥j.
Tr. opii, ℥x.
Decoc. hæmatoxyli ad ℥j.
Thrice daily. Recommended in
in chronic dysentery.
5. ℞ Liq. ferri pernitrat. ℥xv-xx.
Sp. chloroformi, ℥x.
Aquam ad ℥j.
Thrice daily in chronic dysen-
tery.
6. ℞ Cupri sulphat. gr. x-xx.
Aquæ, Oj.
As an enema in chronic dy-
sentry.

Dyspepsia.

1. *Alkalies* with vegetable bitters
very useful in various forms
of dyspepsia. The addition
of liq. potassæ (℥x) is useful
in some forms of painful di-
gestion.
℞ Sodæ bicarb. gr. xv-xx.
Tr. hyoscyam. ℥xv.
Inf. calumbæ *vel* quassiæ ℥j.
Useful in dyspeptic vertigo.
2. The *mineral acids* with vegeta-
ble bitters useful in various
forms of dyspepsia. In acid
dyspepsia should be taken
before food.
3. ℞ Sodæ sulphitis, ℥j. *vel*
Sodæ sulpho-carbol. ℥j.
Tr. nucis vom. ℥iij.
Aquam ad ℥iv.
℥j thrice daily after food in flatu-
lent dyspepsia.
4. ℞ Ammon. carb. gr. v.
Potass. bicarb. gr. x.
Inf. chirettæ ad ℥j.
For loss of appetite with flatu-
lence.
5. *Liq. arsenicalis* in drop doses
useful in neuralgic gastro-
dynia. Also in morning vomit-
ing of drunkards.
6. *Bismuth* mixtures are useful in
painful digestion. The addi-
tion of Hydrocyanic acid is
often desirable.
7. ℞ Pulv. rhei, ℥j.
Sodæ bicarb. ℥iiss.
Aquæ menth. pip. ℥iv.
℥ss before meals in dyspepsia
with constipation.
8. ℞ Ext. aloes.
Ext. gentian. āā gr. ij.
Ext. belladon.
Ext. nucis vom. āā gr. ʒ.
ft. pil. j.
A useful dinner pill.
9. ℞ Quin. sulph.
Pulv. ipecac. āā gr. j.
Ext. gentian. gr. ij.
ft. pil. j.
An excellent dinner pill in slow
digestion.

10. *Ferruginous tonics* generally are useful in dyspepsia.
11. *Nux vomica* is a valuable tonic in weak digestion.
12. \mathfrak{R} Bismuthi subnit.
Carbonis ligni, āā gr. v.
In extreme flatulence.

Eczema.

ACUTE ECZEMA.

1. *Alkaline baths*—6 oz. of bicarbonate of potash or soda to 30 gallons of water.
2. *Milk and water* or *weak gruel* are useful washes.
3. \mathfrak{R} Zinci oxidi.
Pulv. amyli, æq. partes.
A good absorbent powder. If much burning add *camphor*— \mathfrak{z} ss to 1 oz. of powder.
4. \mathfrak{R} Lotio plumbi acetatis.
5. \mathfrak{R} Liq. plumbi acetat. \mathfrak{z} iss.
Vini opii \mathfrak{z} j.
Ung. zinci *vel* sambuci \mathfrak{z} j. ft. ung.
When the skin is burning and irritable.
6. \mathfrak{R} Calaminæ \mathfrak{z} j.
Liq. plumbi acetat. \mathfrak{m} x.
Acid. hydrocyan. dil. \mathfrak{m} xx.
Glycerini, \mathfrak{m} xx.
Adipis \mathfrak{z} j. ft. ung.
7. \mathfrak{R} Glycerini boracis \mathfrak{z} i.
Aquæ rosæ \mathfrak{z} ii.
 \mathfrak{R} Boracis \mathfrak{z} iss.
Glycerini \mathfrak{z} j.
Adipis \mathfrak{z} j. ft. ung.
8. \mathfrak{R} Potass. cyanidi gr. vi.
Ung. cetacei (cold cream) \mathfrak{z} j ft. ung.
To relieve itching.
9. \mathfrak{R} Camphoræ \mathfrak{z} ss.
Sp. vini rect. q.s.s.
Ung. zinci \mathfrak{z} j. ft. ung.
Soothing ointment.

CHRONIC ECZEMA.

1. *Arsenic*—in chronic eczema with scalliness.

2. \mathfrak{R} Picis liquid. \mathfrak{m} i-ii.
Pulv. aromat. q.s.s.
ft. pil. j.
Thrice daily, in some forms.
3. \mathfrak{R} Hydrarg. ammon. *vel*
Hydrarg. oxid. rubri gr. v.
Ung. simplicis \mathfrak{z} j. ft. ung.
A valuable ointment in subacute and chronic eczema.
4. \mathfrak{R} Lotio acid. carbolic. 1 in 40.
or \mathfrak{R} Acidi carbolici \mathfrak{z} j.
Ung. zinci \mathfrak{z} j. ft. ung.
To relieve itching.
5. \mathfrak{R} Picis liq. *vel* ol. cadini.
Sp. vini rect.
Saponis mollis æq. partes.
Valuable application in some forms of chronic local eczema.
5. \mathfrak{R} Glycerini acid. tannic.
Useful in eczema of the ears and other parts.

Emphysema.

1. \mathfrak{R} Tr. ferri perchlor. \mathfrak{m} x.
Tr. lobeliæ æth. \mathfrak{m} xv.
Aquæ camph. \mathfrak{z} j.
Thrice daily.
2. \mathfrak{R} Tr. lobeliæ æth. \mathfrak{z} ii.
Sp. æth. sulph. \mathfrak{z} iii.
Tr. conii \mathfrak{z} ii.
Mist. amygdalæ ad \mathfrak{z} vi.
A table-spoonful every three hours in the paroxysmal cough of emphysema.
3. \mathfrak{R} Potass. iodid. \mathfrak{z} ii.
Vin. ipecac. \mathfrak{z} iss.
Tr. scillæ \mathfrak{z} j.
Aq. et syr. ad \mathfrak{z} viii.
A table-spoonful thrice daily.
4. Cod-liver oil.
5. \mathfrak{R} Ammon. carb. gr. iv.
Vini ipecac. \mathfrak{m} x.
Sp. chloroformi \mathfrak{m} x.
Inf. gentian. ad \mathfrak{z} j.
Thrice daily in emphysema with bronchitis.

Epilepsy.

1. Bromide of potassium in doses of ten to twenty grains thrice daily.

2. ℞ Potass. iodid. gr. v.
Potass. bromid. gr. x.
Ammon. bromid. gr. x.
Potass. bicarb. gr. x.
Infus. calumbæ ℥j
Twice or thrice daily half an hour before meals. A useful combination.
3. ℞ Potass. bromid. gr. xv.
Liq. atropiæ ℥ii.
Aquam ad ℥ij.
Thrice daily.
4. ℞ Potass. bromid. gr. x.
Chloral hydrate. gr. v.
Aq. et syr. ad ℥j
Thrice daily.
5. ℞ Zinci bromid. ℥j.
Syrupi simp. ℥j.
Ten to twenty drops in water thrice daily.
6. ℞ Zinci oxidi gr. ii-iii.
Ext. glycyrrhizæ q.s.s.
ft. pil. j.
One or two thrice daily.
7. ℞ Zinci valerianat. gr. iij.
Extract. belladon. gr. ʒ.
Extract. glycyrrhizæ q.s.s.
ft. pil. j.
Thrice daily.
8. ℞ Boracis, gr. xv-xx.
Aquam ℥ss.
Thrice daily. In chronic cases.

Fever.

1. ℞ Vin. antimon. ℥xx.
Tr. hyoscyam. ℥xxv.
Liq. ammon. acet. ℥j.
Every 4 or 6 hours.
- or ℞ Potass. nitrate. gr. v.
Vin. antimon. ℥x.
Liq. ammon. acet. ℥ii.
Aq. camphor. ad ℥j.
Every 4 hours.
- or Solutions of citrate, chlorate, bitartrate, or acetate of potash sweetened and flavoured with lemon juice.
Useful salines in mild fever.
2. ℞ Potass. chloratis ℥ij.
Acid. hydrochlor. dil. ℥ij-ij.
Syrupi zingiber. ℥j.
Decoct. hordei Oij.

or ℞ Acid. phosphor. dil. ℥ijj.
Glycerini, ℥j.
Decoct. hordei Oij.

- Useful acid drinks in mild fevers.
3. *Tr. Aconite*—in drop doses every half-hour, or hour, very useful in early stages of fever.
4. *Alcohol*—in later stages of fever, with nervous depression, muttering delirium, and compressible pulse.
5. *Quinine*—in doses of gr. x-xv. repeated twice or thrice at intervals of a few hours. A valuable antipyretic remedy in many fevers, especially typhoid.
6. ℞ Quiniæ sulphat. gr. v.
Tr. digitalis ℥x.
Acid. phosph. dil. ℥xv.
Aquam ad ℥j.
Every 4 or 6 hours.
A useful febrifuge where the skin is moist.
7. ℞ Sodæ salicylat. gr. x-xx. *vel.*
Quiniæ salicylat. gr. i-ij.
Aquæ ℥j.
Every 4 or 6 hours.
Useful febrifuge, especially in rheumatic fever.
8. *Cold baths*, wet sheet packs, and sponging, with tepid or cold water, very useful in reducing temperature.

Gall-stones.**DURING THE PAROXYSM.**

1. *Opium*, or preferably subcutaneous injections of morphia.
2. ℞ Ext. belladonnæ, gr. ʒ.
Ext. gentian. gr. ij.
ft. pil. j.
Every two or three hours.
3. *Inhalation* of chloroform.

DURING THE INTERVAL.

4. ℞ Ammon. muriat. gr. x.
Succi taraxaci, ℥i-ij.
Aquam ad ℥j.

5. ℞ Chloroformi,
Ætheris sulph. āā ʒss.
Olei terebinth, ʒj.
Sacchari albi, ʒij.
Mucilaginis, ʒij.
A teaspoonful thrice daily.

Gastralgia.

1. *Liq. arsenicalis*—in dose of mʒij.
after meals thrice daily.
2. ℞ Bismuthi carb. gr. v.
Sodæ bicarb. gr. v.
Pulv. tragac. co. gr. v.
Acid. hydrocyan. dil. mʒij.
Aquam ad ʒj.
Thrice daily.
3. *Charcoal*—in dose of gr. v-x, in
gastrodynia with much flatu-
lence.
4. *Pepsine*—in dose of gr. v-x, with
meals, in gastrodynia follow-
ing the use of animal food.

Gout.

1. An aperient pill at bed-time
followed by a saline aperient
draught in the morning, nec-
essary at the outset.
Mercury to be avoided if albu-
minuria.
2. ℞ Potass. iodid. gr. ij.
Vini colchici, ʒxv.
Tr. aconite, mʒij.
Infus. rhei ad ʒj.
Thrice daily in acute gout.
3. ℞ Potass. iodid. gr. iii-v.
Vini colchici, ʒxv.
Magnes. sulph. gr. xx-xxx.
Tr. hyoscyami, ʒss.
Aquam menth. pip. ad ʒj.
Thrice daily in acute gout with
constipation.
4. ℞ Hydrarg. subchlor.
Ext. aloes,
Ext. colchici acet.
Pulv. ipecac. āā gr. j.
ft. pil. j.
Thrice daily in gout with hepatic
congestion.

5. The bicarbonate, citrate, or
acetate of potash with or with-
out colchicum, and some vege-
table bitter infusion is often
of service in sub-acute gout.
or ℞ Lithiæ carb. gr. iii-vi.
Aquæ ʒiij.
As a draught, twice a day.
6. ℞ Potass. bromid. gr. xx.
Tr. cannab. ind. ʒxv.
Tr. lupuli ʒj.
Aquam camph. ad ʒj.
A good draught at bed-time for
sleeplessness.
Opium is contra-indicated.
7. ℞ Potass. iodid. ʒj.
Potass. bicarb. ʒj.
Aquæ bullientis Oj.
As local external application to
the inflamed joint. Laudanum
may be added.
8. ℞ Potass. iodid. gr. iv.
Potass. bicarb. gr. xv.
Vini colchici, ʒx.
Inf. cinchonæ, ʒj.
Thrice daily, in chronic gout.
9. *Iron* and *cod-liver oil* are often
of service in chronic atonic
gout.
10. *Mineral waters* of Vichy,
Wiesbaden, and Carlsbad.

Hæmorrhage.

1. *Cold*—as an external applica-
tion, or by sucking ice.
2. ℞ Acid. gallic. gr. xv.
Acid. sulph. arom. ʒxv.
Tr. cinnamon, ʒij.
Aquam ad ʒj.
As a draught, every four or six
hours.
℞ Acid. gallic. gr. xv.
Pulv. ipecac. co. gr. v.
As a powder, every six or eight
hours.
3. ℞ Ext. ergot. liq. ʒss-ʒj.
Aquam ad ʒiss.
As a draught occasionally as re-
quired.
4. ℞ Ferri ammon. sulph. gr. v-x.
Aquam ad ʒj.

- Every six or eight hours. An excellent styptic in hæmatemesis.
5. \mathcal{R} Ol. terebinth. $\text{m}\times\text{-xx}$.
Mist. amygdalæ, $\mathfrak{z}\text{j}$.
Every three or four hours. In hæmaturia smaller doses to be used ($\text{m}\text{iii-v}$.) and with caution.
 6. \mathcal{R} Infus. matico, $\mathfrak{z}\text{iss}$.
Three or four times daily in hæmaturia.
 7. *Tr. hamamelis*— $\text{m}\text{ii-iv}$. in water every two or three hours, serviceable in hæmoptysis and hæmatemesis.

Headaches.**BILIOUS HEADACHES.**

1. \mathcal{R} Quin. sulph. gr. ii.
Pulv. rhei, gr. iii.
Mucilaginis, q.s.s.
ft. pil. j.
To be taken at bed-time.
2. \mathcal{R} Sodæ bicarb. gr. xv.
Tr. nucis vom. mvi .
Inf. gentian. co. $\mathfrak{z}\text{j}$.
Thrice daily.
3. \mathcal{R} Infusi sennæ.
Infusi gentian. co. ãã $\mathfrak{z}\text{ss}$.
Thrice daily.
4. \mathcal{R} Pil. hydrarg.
Pil. rhei co. ãã gr. iv.
Ext. hyoscyam. gr. ii.
ft. pil. ii.
At bed-time.

PLETHORIC HEADACHES.

1. Saline aperients.
2. \mathcal{R} Ferri sulph. gr. ii.
Magnes. sulph. gr. xx.
Acid. sulph. dil. $\text{m}\times\text{ii}$.
Tr. card. co. $\mathfrak{z}\text{j}$.
Aquam ad $\mathfrak{z}\text{j}$.
Thrice daily.
3. \mathcal{R} Tr. ferri perchlor. $\text{m}\times\text{v}$.
Acid. hydrochlor. dil. $\text{m}\times\text{v}$.
Sp. chloroform. $\text{m}\times$.
Aquam ad $\mathfrak{z}\text{j}$.
Thrice daily, especially during climacteric period.

4. \mathcal{R} Tr. veratri virid. mj .
In water every hour. Useful in congestive headaches recurring at menstrual period.

NERVOUS AND SICK HEADACHES.

1. \mathcal{R} Potass. bromid. gr. xx.
Aquæ camph. $\mathfrak{z}\text{j}$.
Twice daily, in nervous headaches with wakefulness.
2. \mathcal{R} Ext. cannab. ind. gr. $\frac{1}{4}$ - $\frac{1}{2}$.
(Camphoræ gr. j.)
Confec. rosæ q.s.s.
ft. pil. j.
At bed-time, or twice daily.
In nervous headaches, with troubled sleep.
3. \mathcal{R} *Tr. nucis vom.*—in dose of mj . every half-hour or hour in headaches from exhaustion.
4. *Strong tea or coffee* in small quantity for nervous exhaustion. Contra-indicated if it causes palpitation.
5. *Guarana*— $\mathfrak{z}\text{ss-j}$. of the powder in typical migraine.
6. \mathcal{R} Zinci oxidi gr. i-ij.
Confec. rosæ q.s.s.
ft. pil. j.
Thrice daily after meals. In nervous headaches.
7. *Phosphorus*—gr. $\frac{1}{30}$ - $\frac{1}{20}$ in the form of a pill, thrice daily. In nervous headaches.

NEURALGIC HEADACHES.

1. \mathcal{R} Quiniæ sulph.
Camphoræ,
Ext. hyoscyami ãã gr. j.
Confect. rosæ q.s.s.
ft. pil. j.
A very useful pill; to be taken thrice daily.
2. \mathcal{R} Croton chloral gr. v-x.
Three or four times daily.
3. \mathcal{R} Liq. arsenicalis, $\text{m}\times\text{v}$.
Tr. ferri perch. $\text{m}\times\text{v}$.
Aquam ad $\mathfrak{z}\text{j}$.
Thrice daily, after meals.

4. ℞ Ung. aconitiæ.
or ℞ Ung. veratriæ.
Useful local applications.

ORGANIC HEADACHES.

1. ℞ Potass. iodid. gr. v.
Tr. cannab. ind. ℞x.
Inf. calumbæ ℞j.
Thrice daily, in syphilitic headache.
2. Bromide of potassium (*vide supra*).
3. ℞ Tr. gelsemini ℞xv-xx.
Aquæ camph. ℞ss.
Every four hours, as required.

Heart-Disease.

1. ℞ Tr. digitalis ℞x.
Sp. æth. nit. ℞ss.
Infusi buchu ℞j.
Thrice daily. In simple cardiac debility.
2. ℞ Tr. digitalis ℞x.
Ferri et am. cit. gr. v.
Ammon. carb. gr. v.
Aquam ad ℞j.
Thrice daily. As a cardiac tonic, with palpitation, anæmia, and debility.
3. ℞ Pulv. digitalis gr. ½-i.
Ferri sulph. excis. gr. ¼.
Pulv. capsici. gr. i.
Ext. aloes gr. ii.
ft. pil. i.
Twice daily. As a cardiac tonic, with flatulent dyspepsia, and constipation.
4. ℞ Potass. iodid. gr. v.
Potass. bicarb. gr. xv.
Infus. buchu. ℞jss.
Thrice daily with a tumblersful of water, in cardiac irregularity, with gouty tendency.
5. ℞ Potass. iodid. gr. v.
Potass. bromid. gr. xv.
Aquæ camphor. ℞j.
- A useful draught at bed-time, in cardiac dyspnoea.
6. ℞ Pulv. digitalis gr. ½-i.
Ext. belladon. gr. ¼
Ferri sulph. excis. gr. ii.
Syrupi simp. q.s.s.
ft. pil. j.
Thrice daily, in cardiac dilatation.
7. *Hydragogue Cathartics*, together with digitalis in some form, are indicated in cardiac dilatation, with dropsy. Elaterium should always be used with caution.
8. ℞ Tr. ferri perchlor. ℞x.
Tr. digitalis ℞x-xv.
Sp. æth. nitrosi ℞xx-xxx.
Aquam ad ℞j.
Thrice daily.
A useful general formula in heart-disease.
9. *Strychnia*, alone or in combination with iron and digitalis, is a useful tonic, especially in fatty degeneration.
10. ℞ Potassii bromid. gr. v.
Tr. belladonnæ *vel*
Tr. digitalis ℞x.
Aquæ camph. ℞j.
Thrice daily, in palpitation.
11. *Morphia*—hypodermically injected is useful in paroxysmal attacks of palpitation with dyspnoea. Should be used cautiously.
12. ℞ Potass. acetatis ℞j.
Tr. ferri acetat. ℞x.
Sp. æth. nitrosi ℞ss.
Tr. digitalis ℞x.
Aquam ad ℞j.
Thrice daily in cardiac dropsy.
13. *Liq. Arsenicalis*—℞iii-v. well diluted, thrice daily, for cardiac pain and distress.
14. ℞. *Liq. ammoniæ fort.* ℞v.
Potass. iodid. gr. ii.
Tr. digitalis ℞v.
Aquam ad ℞ss.
Every 1 or 2 hours.
In threatening death from agulation within the heart.

Hiccup.

1. Sucking *ice*.
2. *Morphin*—hypodermically injected.
3. ℞ Chloral. hydrat.
Potass. bromid.
Potass. bicarb. āā ʒj.
Aq. menth. pip. ad ʒvj.
One table-spoonful every four hours. Useful in some obstinate cases.
4. *Physostigma*—(gr. $\frac{1}{10}$ to $\frac{1}{4}$ of the extract) in some obstinate cases. To be repeated as required.
5. *Pilocarpine* (gr. $\frac{1}{10}$) hypodermically injected, gave relief in a case which resisted all usual remedies.

Hysteria.

1. ℞ Potass. bromid. gr. xv-xx.
Ferri et am. cit. gr. iii.
Sp. ammon. arom. ℥xx.
Aquam ad ʒj.
Thrice daily. In hysteria with anæmia.
2. *Phosphorus*, in dose of gr. $\frac{1}{100}$ — $\frac{1}{30}$ with or without the addition of strychnia or nux vomica is an excellent tonic in hysteria (Cox's formula preferred).
3. ℞ Liq. strychniæ ℥iv. gradually increased.
Tr. card. co. ℥xv.
Aquæ camph. ʒj.
Thrice daily. In hysterical paralysis. Paralysed muscles to be galvanised.
4. ℞ Zinci phosphid. gr. $\frac{1}{4}$ — $\frac{1}{2}$.
Ext. nucis vom. gr. $\frac{1}{4}$.
Pil. aloes cum myrrh. gr. iii.
Twice or thrice daily. In hysteria with constipation.

Jaundice.

1. A mercurial aperient pill at night, followed by a saline aperient draught in the morning, is beneficial in catarrhal jaundice.

2. ℞ Hydrarg. cum creta, gr. $\frac{1}{4}$ — $\frac{1}{2}$.
Sacchari alb. q.s.s.
Thrice daily together with
℞ Acid nitro-mur. dil. ℥v.
Tr. nucis vom. ℥v.
Aquam ad ʒss.
Thrice daily. Useful in catarrhal jaundice.
 3. ℞ Hydrarg. subchlor. gr. $\frac{1}{4}$.
Pulv. opii gr. $\frac{1}{2}$.
Bismuthi subnit. gr. x.
ft. pulv.
Useful in the obstinate vomiting which sometimes accompanies jaundice with hepatic congestion. To be taken every 3 hours.
 4. *Ammon. chlorid.*—in doses of gr. xx. every five or six hours in jaundice.
 5. ℞ Acid. benzoic. gr. iii-xx.
Glycerini q.s.s.
To form one or more pills.
To be taken three or four times daily.
- or ℞ *Ammon. benzoat.* gr. x-xx.
Syrupi aurantii ʒss.
Aq. ad ʒj.
Thrice daily.
Useful formulæ in some forms of congestive jaundice.

Laryngismus Stridulus.

1. *Warm baths*—during paroxysm.
2. *Chloroform* inhalation during paroxysm.
3. ℞ Potass. bromid. gr. iii-x.
Syrupi aurantii ʒss.
Aquam ad ʒij.
Thrice daily.
Children bear the bromide very well.
4. *Cod liver oil* and other tonics are useful in chronic cases.

Laryngitis.

1. *Hot fomentation* to throat externally, with inhalations of steam, in acute forms.

2. ℞ Vin. antimon. ℥xx.
Vin. ipecac. ℥x.
Potass. acetat. gr. xx.
Sp. æth. nitrosi ℥ss.
Potass. nitrat. gr. v.
Aquam ad ℥j.
Every 4 or 6 hours. Useful in acute laryngitis with general febrile disturbance.
3. ℞ Ammon. chlorid. ℥j.
Tr. opii ℥v.
Decocti cinchonæ ℥j.
Twice daily at 11 and 4. In acute laryngitis, and commencing "colds."
4. ℞ Tr. benzoin. co ℥j.
Chloroformi, a few drops.
Added to boiling water. For inhalation. A useful sedative in acute laryngitis.
5. Tannic acid.—in solution of gr. iii-x to one ounce of water. As a spray for inhalation.
6. Local application to the larynx of
Sulphate of Copper.
or Nitrate of Silver.
or Chloride of Zinc.
or Perchloride of Iron.
or Glycerine of Tannin.
7. Inhalation of turpentine, creasote, or carbolic acid, in chronic laryngitis.

Lead Poisoning.

1. Hot fomentations to abdomen in lead colic.
2. Morphia—gr. $\frac{1}{2}$ to $\frac{1}{4}$ hypodermically injected, with or without liq. atropiæ mi-ij. in lead colic.
3. ℞ Potass. iodid. gr. v-x.
Inf. calumbæ ℥j.
Thrice daily in chronic cases.
3. ℞ Sodii chlorid. ℥ss.
Thrice daily dissolved in water has also been recommended in chronic cases.
5. ℞ Ext. coloc. co. gr. ii.
Ext. opii. gr. $\frac{1}{2}$
Ext. belladon. gr. $\frac{1}{8}$.
ft. pil. j.

Every 4 or 6 hours, till the bowels are open and the pain relieved, in chronic lead constipation.

Lithiasis.

1. ℞ Potass. citrat. ℥j.
Ammon carb. gr. ii.
Inf. calumbæ ℥j.
Thrice daily.
3. ℞ Liq. potassæ ℥x-xv.
Tr. hyoscyami ℥ss.
Infusi buchu. ℥iss.
Thrice daily.

Liver—diseases of

1. *Aperients*—Salines are the best, as magnes. sulph., sodæ sulph., sod. pot. tart., and purgative mineral waters. An occasional mercurial pill is sometimes of great benefit. Podophyllin not so generally useful.
2. *Alkalies*—In the form of carbonates, or bicarbonates in combination with vegetable bitters.
3. *Chloride of Ammonium*—in doses of not less than gr. x. thrice daily is of high value. It may be combined with acids or alkalies.
4. *Mineral Acids*—especially the nitro-muriatic in small doses (℥v.) thrice daily; often of great service.

Locomotor Ataxy.

1. ℞ Ext. ergot. liq. ℥ss.
Potass. bromid. gr. xv.
Aq. camph. ad ℥ss.
Every four or six hours. To relieve pains of early stages.
2. ℞ Argenti nitrat. gr. $\frac{1}{2}$ - $\frac{1}{3}$.
Ext. nucis vom. gr. $\frac{1}{2}$.
Confect. rosæ q.s.s.
ft. pil.
Thrice daily.

- ℞ Argenti nitratis
Ext. belladon. āā gr. $\frac{1}{3}$.
Ext. gentian. q.s.s.
ft. pil. j.
- Thrice daily.
3. ℞ Ext. belladon. gr. $\frac{1}{4}$.
Ext. cannab. ind. gr. .
Camphoræ gr. j.
Confect. rosæ q.s.s.
ft. pil. j.
- Occasionally as required. To relieve the pains of early stages.

Measles.

1. *Aconite*—in drop doses of the tincture every hour. Very useful at the onset.
2. ℞ Vin. ipecac. ꝓss.
Tr. camph. co. ꝓiij.
Liq. ammon. acet. ꝓss.
Syrupi, ꝓss.
Aquam ad ꝓij.
A tea-spoonful every two hours. Useful in the catarrhal stage. (Children).
3. ℞ Liq. ammon. acetat. ꝓss.
Sp. ætheris nit. ꝓx-xx.
Aq. camphor. ꝓss.
Every four or six hours. A mild diaphoretic in simple cases.
4. ℞ Potass. citrat. gr. v-x.
Vini ipecac. ꝓv-x.
Tr. camph. co. ꝓv-x.
Aquam ad ꝓii-iv.
A simple cough mixture for early stages.
5. ℞ Potass. chlorat. gr. v.
Acid. hydrochlor. dil. ꝓiij.
Syrupi limonis, ꝓss.
Aquam ad ꝓij.
Every three or four hours. In measles of low type, with brown dry tongue and prostration. (Children).
6. *Bromide of potassium*—useful as a sedative, and to procure sleep in cases with active nervous symptoms, and wakefulness.

7. *Tepid bath* or *tepid wet sheet pack* useful in high fever, and for early delirium. To be followed by general inunction.
8. *Mustard baths*—useful on sudden retrocession of the rash.

Melæna (see Hæmorrhage).**Meningitis.**

1. *Active purge*—desirable at outset of the acute form, e.g.
℞ Hydrarg. subchlor. gr. ij.
Ext. jalapæ, gr. viij.
ft. pil. ij.
2. Head to be shaved, and ice applied, or leeches behind ears in acute cases.
3. ℞ Tr. physostigmatis (U.S. Ph.) ꝓx.
Ext. ergotæ liquid, ꝓxx.
Aquam ad ꝓss.
Every three or four hours. Useful in early stages of acute form (Davis, *Chicago*).
4. ℞ Potass. bromidi, gr. v.
Aq. et syrup. ad ꝓij.
Every three or four hours. Useful in acute meningitis of children; chloral hydrat. gr. ii-ij, may sometimes be added with advantage if much pain.
5. ℞ Ext. ergotæ liquid. ꝓxx.
Sp. ammon. aromat. ꝓxx.
Aquam ad ꝓss.
Every four hours, in early stages of acute form.
6. ℞ Potass. iodid. gr. ij.
Potass. bromid. gr. iv.
Tr. aurantii, ꝓxx.
Aquam ad ꝓss.
Thrice daily in later stages.
7. *Opium* or *morphia*—given internally or as a hypodermic injection. Useful in acute meningitis of adults; especially in epidemic form.

Mercurial Poisoning.

1. ℞ Potass. iodid. gr. v-x.
Tr. belladon. ꝓx.
Infus. calumbæ, ꝓj.
Thrice daily.

2. ℞ Sulphur. præcip. ℥ii-iv.
Potass. chlorat. ℥ii-3j.
Liq. morphiæ hyd. ʒj-iss.
Mist. amygdalæ, ʒviij.
ʒj every three or four hours. To be well shaken. An excellent formula in ptialism.
3. *Atropine*—The hypodermic injection of ʒi-ij. of liq. atropiæ, useful to check flow of saliva.
4. ℞ Potass. chlorat.
Boracis āā ʒiss.
Glycerini, ʒiss.
Aquam ad ʒviij.
A useful mouth wash.

Myalgia.

1. Lin. belladonnæ or lin. opii useful external applications.
2. ℞ Ammon. chlorid. gr. x-xx.
Aquam ad ʒj.
Thrice daily. Highly recommended by Dr. Anstie.
3. ℞ Potass. nitratis. gr. x.
Pulv. ipecac. co. gr. iij.
To be taken as a powder every four hours.

Neuralgia.

1. ℞ Ung. veratriæ.
℞ Ung. aconitæ.
℞ Morphiæ, gr. i-ij.
Oleic acid, ʒj.
℞ Lin. opii.
℞ Lin. belladonnæ.
℞ Lin. aconiti.
Useful local applications in neuralgia.
2. *Hypodermic injections* of morphia or atropia, or of both combined.
3. ℞ Quiniæ sulph. gr. j.
Ext. hyoscyam. gr. j.
Camphoræ, gr. j.
Confect rosæ, q.s.s.
ft. pil. j.
Every four hours.
4. ℞ Liq. arsenicalis, ʒv.
Tr. ferri perchlor. ʒv.
Sp. chloroformi, ʒx.
Aquam ad ʒj.
Thrice daily after meals.

5. ℞ Tr. gelsemini, ʒxv-xx.
Aquam ad ʒss.
Every four hours in toothache.
6. ℞ Croton-chloral, gr. v.
Syrupi aurantii, ʒss.
Aquam ad ʒss
Occasionally as required.
7. *Quinine*—in a single dose of gr. ii-iv. during a paroxysm. In smaller doses combined with iron is a useful tonic in chronic cases.
8. *Phosphorus*—in doses of gr. ʒʒ to ʒʒ every three hours. Useful in many forms of neuralgia.
9. *Faradization* of painful spot.

Otorrhœa.

1. Frequent *syringing* of the ears with tepid water.
2. *Glycerine of tannin*—an excellent application in catarrh of external meatus.
3. ℞ Lotio plumbi acetat. dil.
℞ Lotio zinci sulph. (gr. ij ad ʒj.)
℞ Lotio aluminis (gr. ii-x. ad ʒj.)
Useful lotions for the ear passages.
4. A small *blister behind the ear* is often beneficial in obstinate cases.
5. *Tonics* and *cod-liver oil* often required.

OZŒNA.

1. Frequent irrigation with tepid water or one of the following solutions.
Weak Condyl's fluid.
or Carbolic acid (1 or 2 per cent. solution).
or Alum (ʒj ad aq. Oj).
or Tannin (ʒss-ʒj ad aq. Oj).
2. *Insufflation* with one of the following powders—
℞ Hydrarg. oxidii rubri vel Hydrarg. ammon. i part.
Pulv. sacch. alb. 60 parts.

- or ℞ Acidi tannici, ʒ part.
Sacch. alb. 2 parts.
- or ℞ Camphoræ (pulv.) ʒ part.
Sacchari alb. 15 parts.
3. *Tonics and cod-liver oil* are often required.

Paralysis.

1. *Liq. strychniæ*—in doses of ℥ij. internally, thrice daily, or of ℥j hypodermically, once daily, the quantity being gradually increased—is more generally useful than any other drug.
2. ℞ Potass. iodid. gr. v-x.
Ammon. carb. gr. ij.
Liq. hydrarg. perchlor. ʒj.
Decoct. cinchonæ. ʒj.
Thrice daily. Useful in syphilitic and some chronic forms of paralysis.
3. *Phosphorus*—in dose of gr. ʒss-ʒ in pill, twice or thrice daily recommended in hysterical paralysis.
- or ℞ Zinci phosphid. gr. ʒ.
Ext. nucis vom. gr. ʒ.
Ext. gentian. gr. ii.
ft. pil. i.
A useful pill in similar cases.
- ℞ Potass. bromid. gr. x-xx.
Tr. belladonnæ ℥x.
Aquam camph. ad ʒj.
Thrice daily. In paralysis accompanying acute congestion of nerve-centres
5. *Galvanism or Faradism* of affected muscles useful in various forms of peripheral paralysis. That form of application should be selected to which the muscles best respond. No use where the irritability has quite disappeared.
6. *Counter-irritation* of the spine exceedingly useful in diphtheritic paralysis and other chronic forms.

Parasitic Skin Affections.**SCABIES.**

1. Thorough washing at night with soap and hot water followed by inunction with ung. sulphuris.
2. ℞ Sulphur. sublim. ʒj.
Potass. carb. ʒss.
Adipis benzoat. ʒj.
A stronger ointment.
3. ℞ Sulphur. præcip. ʒss-i.
Adipis benzoat. ʒj.
For irritable sensitive skin, as in infants.
4. ℞ Styrcis liq. ʒj.
Adipis ʒij.
Very useful in scabies.
5. *Tonics and cod liver oil* needed in bad pustular forms, or when there is much eczema; and at first a weak carbolic acid lotion or ointment is preferable in these cases.

PEDICULOSIS.

1. ℞ Ung. hydrarg. ammon.
For all forms of pediculi. The ointment should be diluted if much eczema or pustulation.
2. ℞ Hydrarg. perchlor. gr. ii.
Glycerini, ʒj.
Aquam ad ʒvj ft. lotio.
Useful for pediculi capitis or pubis.
Not advisable if open sores exist, or if skin be broken.
3. ℞ Staphisagræ (pulv.) ʒij.
Olei olivæ ʒij.
Adipis ʒvj. ft. ung.
Best application for pediculi corporis.
4. Nits of pediculi capitis may be best removed by washing first with soap and hot water, and then with spirits of wine, or parafin oil, followed by the use of a fine tooth-comb.

VEGETABLE PARASITES.

1. Blistering with acetum cantharides in early stage of ring-worm.
2. ℞ Hydrargyri ox. rub. gr. iii.
Hydrargyri ammon. gr. x.
Sulphuris sublim. gr. xx.
Ung. simplicis ℥j.
ft. ungu.
- ℞ Acidi carbolici,
Glycerini āā ℥j.
- ℞ Hydrarg. perchlor. gr. ii.
Glycerini ℥ii.
Ung. cetacei ℥j.
ft. ungu.
- ℞ Acid. carbohc, 1 part.
Ung. hyd. nitrat. 1 part.
Mix, and then add
Ung. sulphuris 1-2 parts.
- ℞ Thymol ℥ss.
Chloroformi ℥ij.
Ol. olivæ ℥vi.
- ℞ Hydrarg. oleat. 5-10 percent.
Useful parasiticide applications.
3. ℞ Sodæ hyposulphitis ℥iv.
Glycerini ℥ij.
Aquam ad ℥vi.
ft. lotio.
- In tinea versicolor (chloasma) and other forms.
or Acid. sulphurosi (B.P.)
4. ℞ Ung. hydrarg. nit. ℥iv.
Creasoti ℥iv.
Glycerini ℥ij.
Adipis ℥j.
ft. ungu.
- In tinea sycosis, and other forms.
5. ℞ Iodine ℥ij.
Colourless oil of tar ℥j.
To be applied with a camel's hair brush in tinea tonsurans, and circinata.
6. ℞ Tr. cantharid. ℥ij.
Acid. acet. fort. ℥j.
Glycerin. ℥iv.
Sp. rosmarin. ℥j.
Aq. rosæ ad ℥viij. ft. lot.
- or ℞ Tr. cantharid. ℥j.
Tr. capsici ℥j.
Aq. Rosæ ℥j. ft. lot.
- Useful stimulant lotions in tinea decalvans.

Perspirations, profuse

1. *Liq. Atropiæ*—in dose of $\text{m}i\text{-ij}$. hypodermically injected is the promptest remedy.
- or ℞ Ext. belladonnæ gr. $\frac{1}{2}$.
Ext. gentianæ gr. ii.
To be taken at bed time.
2. ℞ Acid. gallic. gr. ii.
Ext. cannab. ind. gr. $\frac{1}{2}$
Confect. rosæ gr. i.
For a pill to be taken at bed-time.
3. ℞ Zinci oxid. gr. ij.
Ext. conii, gr. iii.
For a pill to be taken at bed time.
4. ℞ Quiniæ sulph. gr. iii.
Zinci sulph. gr. j.
Acid. sulph. dil. $\text{m}x$.
Aq. et syr. aurant. ad ℥iss.
For a draught at bed-time.
5. ℞ Pulv. ipecac. co. gr. v.
As a powder the last thing at night. If made as a pill ext. belladon. gr. $\frac{1}{2}$ may be added with advantage.

Phthisis.

1. ℞ Ammon. chlorid. ℥j.
Syrupi scillæ ℥iii.
Infusi senegæ ℥vj.
℥ss thrice daily. A good stimulating expectorant in acute phthisis
2. ℞ Quiniæ sulph. gr j.
Pulv. digitalis gr. j.
Pulv. opii gr. $\frac{1}{2}$.
ft. pulv.
Every 4 or 6 hours, in acute phthisis. To be accompanied with the application of iced cloths to the abdomen. (Anderson).
3. ℞ Sodæ hypophosphit. gr. vi.
Syrupi ℥ii.
Aquam ad ℥j.
Once or twice daily.
℞ Calcii hypophosphit. gr. vi.
Syrupi ℥ii.
Aquam ad ℥j.
Once or twice daily.

- ℞ Sodæ hypophos.
Calcii hypophos. āā gr. viii.
Infusi cascariillæ ℥j.
Twice a day after meals.
Of no use in acute inflammatory, or very advanced phthisis. These medicines should be kept in a dark place.
4. *Cod-liver oil*—in doses of ℥i-iv. thrice daily. Dr. Foster recommends the addition of ether to the oil (℥iiss ad ℥iv).
5. *Liq. arsenicalis*—in doses of ℥ii-iv every four hours well diluted; sometimes of great service in tubercular phthisis.
6. *Pancreatic emulsion* (Dobell). A table-spoonful from one to two hours after meals in milk.
7. ℞ Picis liquid. gr. ii.
Pulv. glycyrrhizæ co. q.s.s.
One pill three or four times daily for profuse fœtid expectoration.
8. ℞ Syrupi ferri iodid. ℥xx-℥ss.
Thrice daily in water.
9. ℞ Morph. hyd. gr. ʒ.
Acid. hydrocyan. dil. ℥v.
Acid. hydrochlor. dil. ℥v.
Oxymel. scillæ ℥ss.
Aquam ad ℥j.
A teaspoonful occasionally. A useful cough linctus.
10. ℞ Pulv. bismuthi. nit.
Pulv. ipecac. co. āā gr. v.
As a powder three or four times daily as required. For diarrhœa.
11. ℞ Acid. sulph. dil. ℥xv.
Tr. opii ℥v.
Glycerini, ℥j.
Decoct. hæmatoxyli ad ℥j.
Occasionally as required. For diarrhœa.
12. *Counter-irritation*—by iodine painted under clavicles; in chronic form to allay cough, and to check secretion.
For night-sweats see "*profuse perspiration.*"
14. For hæmoptysis see "*hæmorrhage.*"

Pleurisy.

1. *Tr. aconite*—in drop doses every half to one hour in early acute stage.
2. *Applications* of hot fomentations or turpentine stupes in early acute stage.
3. ℞ Potassæ acetat. gr. xv.
Sp. ætheris nitros. ℥ss.
Vini ipecacuanhæ ℥v.
Syrupi tolut. ℥ss.
Aquam ad ℥ss.
Every six hours. Useful in sub-acute pleurisy.
4. *Counter-irritation*—by application of iodine, croton-oil liniment, or flying blisters to affected side.
To encourage absorption of effusion.
5. *Tonics*—especially the syrup of the iodide of iron and cod-liver oil.
In chronic cases.

Pneumonia.

1. *Tr. aconite*—one or two drops every half hour for two hours, then less frequently.
Quinine—in single dose of gr. v-x. together with gr. ʒ-ʒ of morphia, followed every three or four hours by smaller doses without morphia.
Recommended at first onset of acute pneumonia.
2. ℞ Liq. ammon. acet. ℥ii-iv.
Vin. ipecac.
vel Vin. antim. ℥x-xv.
Liq. morphiæ, ℥v-xv.
Aquam ad ℥j.
Every four or six hours.
A useful formula during early acute stages, with much pain and restlessness.
3. ℞ Ammon. carb. gr. v.
Sp. chloroform. ℥xx.
Aq. camphor. ad ℥j.
Every three or four hours. In acute pneumonia of the aged and feeble.

4. Hot fomentations and turpentine stupes to relieve pain of side.
5. ℞ Ammon. carb. gr. ʒi.
Vin. ipecac. mʒj.
Tr. aconite, mʒj.
Aq. et syrup. ad ʒj.
Every three or four hours. Useful in acute pneumonia of young children (early stages).
6. Hot mustard bath, invaluable in many cases of acute pneumonia and bronchitis in children.
7. *Opium*, especially useful in the first indications of delirium with restlessness and tremor. Stimulants are also needed (adults).
8. *Quinine*, in doses of gr. iii-v. every three or four hours. Especially in æsthenic pneumonia of the aged.

Pruritus, Prurigo, and Itching.

1. ℞ Sodæ carbon. ʒj.
Aquæ, Oj. Ft. lotio.
℞ Potass. cyanid. ʒj.
Aquæ, Oj. Ft. lotio.
℞ Acid. hydrocyan. dil. ʒii-iv.
Glycerini ʒj.
Aquam ad Oj. Ft. lotio.
Useful sedative lotions when the skin is not broken.
2. ℞ Glycerine, ʒj.
Solution (saturated) of Boracic acid, Oj.
In various itching affections—varicose eczema, pruritus pudendi, lichen, etc.
3. ℞ Acidi carbolici, ʒj.
Ung. zinci ox. ʒj. Ft. ung.
Useful in eczema (chronic) with much itching. To be diluted in sub-acute forms.
℞ Liq. carbonis detergens, ʒss-i.
Glycerini, ʒj.
Aquam ad ʒx.
Another formula for same purpose.

4. Solutio argent. nit. (gr. v. ad ʒj.)
To be applied frequently.
Ung. hyd. subchlor.
Lotio nigra.
Useful applications in pruritus ani and pudendi.

Psoriasis.

1. *Arsenic*—Liq. arsenicalis in increasing doses thrice daily after meals.
2. ℞ Picis liq., mʒj.
Pulv. aromat. q.s.
ft. pil. i.
Thrice daily. Especially where arsenic is ill borne.
3. *Tonics and Cod-liver oil*—especially in psoriasis of children.
4. ℞ Magnes. sulph. gr. xx.
Magnes. carb. lev. gr. iii.
Vini colchici mʒx.
Aquæ menth. pip. ʒj.
Thrice daily. In gouty psoriasis.
5. ℞ Ol. cadini *vel* picis liq.
Sp. vini rect.
Sapon. mollis æq. partes.
℞ Olei cadini.
Olei morrhuæ æq. partes.
℞ Ung. picis (B.P.)
To be diluted if necessary.
℞ Acidi carbolici ʒj.
Ung. zinci ʒj.
ft. ung.
Useful local applications, when the skin is not too irritable or inflamed.

Purpura.

1. ℞ Quiniaz sulph. gr. ij.
Acid. phosph. dil. mʒx.
Tr. ferri perchlor. mʒx.
Liq. arsenic hydrochlor. mʒij
Syrupi zingib. ʒj.
Aquam ad ʒiss.
Twice or thrice daily.
℞ Ex. ergot. liq. mʒxx.
Tr. ferri perchlor. mʒx.
Sp. chloroformi mʒx.
Aquam ad ʒj.
Thrice daily.

3. ℞ Ferri sulph. exsic. gr. ii.
Quiniæ sulph. gr. j.
Ext. nucis vom. gr. ʒ.
Confect. rosæ q.s.s.
ft. pil. j.
Thrice daily.
4. ℞ Olei terebinth. ℥x-xx.
Mist. amygdalæ ʒj.
Thrice daily.

Rheumatism, acute

1. ℞ Salicin. gr. xx.
Aquæ ʒj.
Every three hours.
2. ℞ Sodæ salicylat. gr. x-xx.
Aquæ ʒj.
Every three or four hours.
3. ℞ Sodæ bicarb. ʒiss.
Potass. acetat. ʒss.
Liq. ammon. acetat ʒiii.
Aquæ ʒiss.
Every 4, 6, or 8 hours in effervescence with acid. citric. ʒss. till the urine is alkaline; then less frequently.
℞ Sodæ bicarb.
Potass. acetat. āā ʒss.
Decoct. cinchonæ ʒiss.
Thrice daily as symptoms subside.
℞ Mist. quiniæ ʒj.
Thrice daily during convalescence.
4. ℞ Ext. opii gr. ii.
Ext. belladon. gr. ʒ.
ft. pil. j.
At bed-time if great restlessness and pain.
5. ℞ Potass. bicarb. gr. xx.
Potass. iodid. gr. v.
Decocti cinchonæ ʒj.
Thrice daily, in chronic cases.
6. *Tonics*—during convalescence.
℞ Ammon. carb. gr. v.
Tr. lavand. co. ʒj.
Infusi cinchonæ ʒj.
Thrice daily. An excellent formula.

Rheumatism, chronic.

1. ℞ Potass. iodid. gr. v-x.
Ammon. carb. gr. ii.
Inf. calumbæ ʒj.
Thrice daily. Especially where pains are worse at night.
2. ℞ Mist. guaiaci ʒj.
Thrice daily.
Especially where pain is relieved by warmth.
3. ℞ Tr. actææ racemos. ʒss-i.
Aquam ad ʒj.
Three or four times daily.
4. ℞ Liq. sodæ arseniat. ℥iii.
Vini colchici ℥x.
Tr. cinchon. co. ʒj.
Aquam ad ʒj.
Thrice daily after meals. In some forms.
5. ℞ Sodæ sulphat.
Sulphuris precip. āā ʒss.
Every morning in a tumblerful of milk and water.
6. ℞ Ammon. chlorid. gr. x-xx.
Infus. gentian. co. ʒj.
Thrice daily. Especially in muscular rheumatism.
7. *Turkish baths.*
8. *Cod-liver oil.*

Rickets.

1. *Cod-liver oil.*—Should be given in small doses (℥xx-ʒss.) at first.
2. Syr. ferri phosph. co. ʒss.-i.
or Syr. ferri iodid. ℥xx-ʒss.
or Vini ferri ʒss-ʒj.
In water thrice daily.
3. ℞ Calcis phosph. gr. iii.
Bismuthi nitrat. gr. iii.
Sacch. albi ʒss.
Twice daily. Especially with tendency to diarrhoea.

Scarlet Fever. (Children).

1. *Tr. Aconiti*—one drop every hour or oftener at outset of fever.

2. ℞ Potass. chlorat. gr. iii.
Acid. hydroch. dil. ℥ii.
Tr. aconiti ℥ii.
Aq. et syrup. ad ℥i.
Every three or four hours in early stages.
3. ℞ Ammon. carb. gr. iii.
Aquæ ℥j.
Every two or three hours in a little milk.
4. *Tepid sponging* and *baths*, followed by inunction. In early delirium, and during desquamative stage.
5. *Quinine*—in doses of gr. ii-iv. Thrice daily. In malignant cases with delirium and restlessness. If not retained give treble dose by rectum.
6. ℞ Potass. chlorat. gr. v.
Tr. ferri perchlor. ℥v.
Glycerini ℥ss.
Aquam ad ℥ss.
Every 3 or 4 hours. In scarlatina anginosa. Stimulants and good food also needed.
7. For *scarlatinal nephritis*:—
Warm baths.
Saline aperients.
℞ Potass. bitart. gr. xv-xx.
Vini ipecac. ℥v.
Sp. æther. nit. ℥xv.
Infusi. digitalis ℥ss-i.
Aquam ad ℥ss (*children above 5 years*).
Three times daily.

Scrofulosis.

1. *Cod-liver oil*.
2. *Iron*—various preparations.
Syrupi ferri phosph.—Syr. ferri iodid.—Vini ferri—or Parrish's chemical food recommended.
3. ℞ Calcii chlorid. (cryst.) gr. x-xx.
Thrice daily in milk after meals.
4. ℞ Calcii phosph. gr. iii.
Thrice daily in milk.

5. ℞ Calcii sulphid. gr. ʒi.
Sacch. alb. q.s.s.
Every two or three hours. In strumous suppurating sores.

Sleeplessness.

1. *Opium*.—Dose to be regulated according to age. Chiefly indicated in sleeplessness from acute disease. Where there is also much excitement the further addition of antimony desirable, thus:—
℞ Tr. opii ℥xv.
Vin. antimon. ℥xxx.
Aquam camph. ad ℥j.
Every four or six hours.
℞ Pulv. opii gr. i.
Pulv. antimonial gr. v.
ft. pulv.
To be taken at bed time.
Opium should not be given for chronic sleeplessness unaccompanied by disease, nor in cases of albuminuria.
2. *Bromide of potassium*.—Dose gr. xv-xxx. or more. Useful in sleeplessness from worry, irritation, and excitement. Often advantageously combined with chloral.
3. *Chloral hydrate*.—Dose gr. xv-xxx. or gr. iii-x. in children. Useful where opium is contra-indicated. Should be avoided or given with caution where the circulation or respiration is embarrassed.
4. *Alcohol* with light nourishment of great service in the sleeplessness of the aged and feeble. Also in certain low and malignant types of fever. To be taken towards bedtime.
5. *Hyoscyamus*.—The tincture (℥v-x.) is a useful sedative for young children. May be combined with pot. brom. and camphor water.

Small-pox.

1. ℞ Acidi salicylici gr. xx.
Sodæ bicarb.
Ammon. carb. āā gr. iv.
Aquæ ℥j.
Every three or four hours. In early stages (adults). Later on add ferri et am. cit. gr. v. to each dose.—A tepid bath each day; after which body to be painted over with:—
℞ Acid, carbolic ℥j.
Glycerine ℥j.
Gelatine ℥j.
Aquæ ℥xxvi.
As soon as pustules fully form, prick and apply gelatine lotion. During exfoliation a warm, slightly alkaline bath daily. (*Prideaux*).
2. *Saline aperients*—useful at the first onset.
3. ℞ Quinæ sulph. gr. i.
Acid. sulph. dil. ℥xii.
Syrupi aurantii ℥ss.
Aquam ad ℥j. Every 4 hours where there is much debility and prostration. Also good food and alcohol.
4. *Opium* or *morphia* in moderate doses, combined with bromide of potash in the early delirium from small-pox in the intemperate.
5. *Warm baths*—of great service.
6. *Steel and quinine*—during convalescence.

Spinal Irritation.

1. *Counter-irritation* to spine is frequently most valuable, especially in mild cases.
2. *Tonics* and *cod-liver oil*.
℞ Zinci phosphid. gr. ʒ.
Ext nucis vom. gr. ʒv.
Ext. gentian. gr. ij.
ft. pil.
Three or four times daily.

- ℞ Zinci oxidi gr. ii.
Confect. rosæ q.s.s.
ft. pil.
Three or four times daily.
℞ Liq. arsenicalis ℥iii.
Tr. ferri perchlor. ℥x.
Aquam ad ℥j.
Thrice daily after meals.
3. *Hot-water bags* to spine.
 4. *Galvanism*—applied to spinal region.

Stomach, ulcer of

1. ℞ Bismuthi carb.
Sodæ bicarb. āā gr. v.
Acid. hydrocyan. dil. ℥iii.
Aq. et mucilag. ad. ℥ss.
Three or four times daily. To relieve pain and vomiting. Liq. morphia may be often added with benefit.
2. ℞ Liq. arsenicalis, ℥i-ii.
Recommended by Ringer to check pain and vomiting. To be taken before food.
3. ℞ Argenti nitrat. gr. ʒ.
Ext. opii gr. ʒ.
Ext. hyoscyam. gr. iss.
ft. pil.
Thrice daily.
4. *Sulphate of Soda*—in aperient doses, or in form of Carlsbad water, to be taken early morning to clear out stomach.
5. *Counter-irritation* to epigastrium in persistent vomiting.
6. *Peptonised* gruel and beef-tea. See *Brit. Med. Jour.* 1880, vol. i., pp. 647, 683.
7. *Nutrient enemata, e.g.*
Strong beef-tea 4-6 oz.
Cream 1 oz.

The addition of one teaspoonful of liq. pancreaticus (Benger) is desirable; and if the rectum be irritable, ℥v-x. of laudanum.

Stomatitis.

1. ℞ Potass. chlorat. gr. x.
Tr. ferri perch. ℥v.
Acid. hydroch. dil. ℥v.
Aquam ad ℥j.

- Three, four, or more times a day (3i-3ii, for children), in all forms of stomatitis.
2. *Glycerine of borax*—a good local application in many forms.
 3. ℞ Sodæ sulphit. ʒj.
Aqua ʒj.
A useful mouth-wash in thrush.
 4. *Glycerine of tannin*—as a local application in ulcerative stomatitis.

Syphilis.

1. *Mercury*—In primary and secondary syphilis. The following are some of the chief forms of administration:—
 - ℞ Hydrarg. cum creta gr. ʒi-ʒj.
 - As a powder with sugar, or a pill with ext. gentian. three times a day.
 - ℞ Pil. hydrarg. subchlor. co. gr.v.
 - Twice or thrice daily.
 - ℞ Ung. hydrargyri ʒj.
 - To be used as an inunction daily.
 - ℞ Hydrarg. subchlor. gr. xv-xxx.
 - Volatilised by heat, and used with vapour bath.
 - N.B. As soon as the gums are in the least affected, smaller doses should be taken. Slight mercurial advisable for at least two years after primary sore, in order to eradicate disease.
2. ℞ Liq. hydrarg. perch. ʒj.
Decocti sarsæ co. *vel*
Decocti cinchonæ ʒj.
Thrice daily in chronic cases.
3. ℞ Potass. iodid. gr.v.
Ammon. carb. gr. ii.
Liq. hydrarg. perch. ʒj.
Inf. gentianæ ʒj.
Thrice daily. A useful formula.
4. ℞ Hydrarg. perch. gr. i.
Glycerinæ boracis ʒj.
To be painted on obstinate secondary ulcers of mouth. Added to half a pint of water may be used as a gargle.

5. ℞ Liq. Donovan. ℥x-xv.
Aquam ad ʒj.
Thrice daily. Especially in scaly skin affections.
6. *Iodide of potassium*—gr. v-x.
Thrice daily combined with bark or other vegetable bitters. Especially in tertiary gum-mata.
7. ℞ Syr. ferri iodid.
Ext. sarsæ liquid. āā ʒss.
Thrice daily in water.
8. General tonics and *cod-liver oil*—preferable at first to specific treatment in long-standing cachectic cases.

Tape-worms.

1. ℞ Ext. filicis liq. ℥xxx-xl.
Syrupi zingiber. ʒij.
Mucilag. tragac. ʒj.
Aquam ad ʒij.
As a draught at early morning.

Throat Affections.

1. *Aconite*—drop doses of tincture every ½ or 1 hour in early stages of relaxed throat or tonsillitis.
 2. ℞ Potass. chlorat. gr. x.
Tr. ferri perchlor. ℥x.
Sp. chlorof. ℥x.
Aquam ad ʒj.
Every four hours. In sore throat.
Useful gargles in inflammatory conditions of throat.—
 - ℞ Aluminis exsic. gr. 80.
Tr. myrrhæ ʒj.
Aquam ad ʒviii.
 - ℞ Aluminis exsic. ʒj.
Tr. capsici ʒiss.
Aquam ad ʒviii.
- In relaxed throat and tonsillitis.
- ℞ Creasoti ℥xx.
Mucilag. tragac. ʒiii.
Aquam ad ʒviii.
(shake well).
- In sloughing, foul ulcers of throat.

3. *Glycerine of tannin*.—As an application to throat, very generally useful.
4. *Extract of Belladonna*—well smeared over outside of throat, and a hot fomentation or poultice applied. In acute tonsillitis, to relieve pain.
5. *Quinine* and other tonics required on cessation of acute symptoms.

Typhoid Fever. (See Fever.)

1. *Bath* of 95° cooled to 75° and continued for 20 min. To be repeated as often as necessary. For high fever. Most useful in early stages.
2. *Sponging the body* with tepid water, ice being applied to head.
In extreme restlessness, delirium, and wakefulness.
3. ℞ Quinine gr. v-viii.
Every 10 minutes till temperature falls, or distinct cinchonism produced. In high fever.
4. ℞ Bismuth. nitrat. gr. v.
Pulv. ipecac. co. gr. v.
Every 4 or 6 hours as required. In excessive diarrhœa.
5. *Enema opii*—in excessive diarrhœa.
6. ℞ Pulv. opii. gr. i.
Cupri sulph. gr. ʒ.
Conf. rosæ q.s.s.
ft. pil.
As required. In excessive diarrhœa.
7. ℞ Tr. opii.
Olei terebinth.
Tr. chloroformi co. āā.
m̄x-xv.
Acidi tannici gr. x.
Mucilag. et aq. ʒj.
Every 4 hours as required. In hæmorrhage.
8. ℞ Ol. terebinth. m̄x.
Liq. potassæ m̄v.
Vitelli unius ovi.
Mist. amygdalæ ʒj.
Every 3 or 4 hours.

Towards end of second week, with dry, brown, cracked tongue, and tympanitis. Also in protracted diarrhœa. Also in hæmorrhage.

9. *Strong black coffee*—2 or 3 table-spoonfuls occasionally. As a stimulant in place of alcohol.
10. ℞ Potass. chlorat. ʒj.
Glycerini ʒii.
Aquam ad ʒiv.
A pleasant mouth-wash.
11. Chloral hydrate, bromide of potash, morphia, and camphor. Useful sedatives for restlessness.

Typhus Fever. (See Fever.)

1. ℞ Liq. opii sed. m̄v.
Antim. tart. gr. ʒ½.
Aq. camphor. ʒss.
Every hour till sleep is induced. When delirium is active and prolonged.
℞ Liq. opii sed. m̄v.
Sp. ætheris m̄xx.
Aq. camphor. ʒj.
Every hour till sleep is induced. When delirium is wandering and pulse feeble.
N.B. Where dyspnœa, lividity, contracted pupil, and cerebral congestion, opium wholly contra-indicated.
 2. *Quinine*—To reduce temperature (see Typhoid).
 3. *Cold baths*—To reduce temperature (see Typhoid).
 4. ℞ Tr. digitalis.
Sp. ætheris.
Tr. belladon. āā m̄x.
Aquæ ʒj.
Every 4 hours. In cardiac feebleness.
- ### Urine, Incontinence.
1. Attend to thread-worms, vesical calculus, adherent or long prepuce, if present. Especially in children.

2. *Belladonna*—ten to fifteen drops of the tinct. thrice daily, with camphor water. In simple incontinence of children.
3. ℞ Potass. cit. gr. x.
Liq. potassæ ꝑv.
Tr. hyoscyam. ꝑv.
Aquam camph. ad ʒii.
Thrice daily in water. For incontinence depending on lithiasis. (Children).
4. *Tr. cantharidis*—one or two drops in certain cases among the aged. Three or four times daily. (Ringer).
5. *Tonics*—especially iron or strychnia.

Urticaria.

1. Aperient, and perhaps emetics, in early stage of acute cases.
2. ℞ Magnes. sulphat. ʒss.
Sodæ bicarb. ʒss.
Tr. zingiberis ꝑx.
Aquæ ʒj.
Thrice daily with acid tartaric gr. xx.
℞ Ferri sulph. gr. i.
Magnes. sulph. gr. xx.
Acid. sulph. dil. ꝑv.
Tr. zingiber. ꝑxv.
Aquam menth. pip. ad ʒj.
Thrice daily.
Useful formulæ in acute or subacute cases.
3. ℞ Bismuthi nitrat. gr. v.
Sodæ bicarb. gr. xx.
Pulv. zingib. gr. ii.
Thrice daily (in water if preferred).
4. *Arsenic*—Useful in some chronic cases. Iron often a good addition.
5. ℞ Acid. carbol. ʒj.
Ung. zinci ʒj.
ft. ungu.
℞ Tr. benzoin. co.
To be painted on the skin.
Useful applications to relieve itching.

Vomiting.

1. ℞ Sodæ bicarb. gr. iii.
Tr. nucis vom. ꝑj.
Sp. chloroform. ꝑi.
Aq. et syrup. ad ʒj.
Three or four times daily. Useful in chronic vomiting in children with gastric catarrh.
2. ℞ Tr. nucis vom. ꝑj.
Every ½ or 1 hour as required.
In chronic vomiting of nervous women with indigestion.
3. ℞ Bismuth. carb. gr. v-x.
Sodæ bicarb. gr. x.
Acid. hydrocyan. dil. ꝑiii.
Mist. amygdalæ ʒj.
Thrice daily in some forms of gastric vomiting. Liq. morph. may be added if much pain, as in cancer of stomach; or sp. ammon. aromat. if too "cold."
4. ℞ Creasoti ꝑi-ii.
Pulv. aromat. gr. ii.
Mucilaginis q.s.s.
ft. pil.
Twice or thrice daily.
5. ℞ Liq. arsenicalis ꝑi.
In water before food, in vomiting of drunkards (Ringer).
6. ℞ Vin. ipecac. ꝑi.
Every ½ or 1 hour in water as required. In almost all cases of reflex vomiting.

Whooping Cough.

1. *Salines* and *expectorants* in catarrhal stage.
2. ℞ Acidi carbol. ꝑi.
Sp. chlorof. ꝑi.
Ess. menth. pip. ꝑj.
Syrupi ʒss.
Mucilaginis ʒss.
Every four or six hours. A very useful formula; may be combined as required with tr. hyoscyam. ꝑv., or vin. ipecac. ꝑii-iv., or acid. hydrocyan. dil. ꝑj-i.
For children from 5 years and upwards.

3. ℞ Potass. bromid. gr. i-v.
Ext. belladon. gr. $\frac{1}{2}$ -i.
Syrupi papaveris ℥xv.
Aquam ad ℥ij.
Every 4 or 6 hours. For a child of 4 years and upwards. Children bear belladonna very well.
4. ℞ Quin. sulph. gr. i-ii.
Acid. sulph. dil. q.s.s.
Tr. aurantii ℥vi.
Syrupum ad ℥j.
Every three hours (Reynolds).
5. ℞ Ext. belladon. gr. i.
Aluminis ℥ss.
Syrupi zingib. ℥j.
Mist. acaciæ ad ℥iij.
A teaspoonful thrice daily.
6. *Counter-irritation* to chest—a valuable adjuvant to any form of treatment, if much bronchial secretion. Turpentine liniment is a convenient preparation.
7. *Tonics and cod-liver oil*—In all chronic cases.

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