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ON FEVERS

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ON FEVERS

THEIR HISTORY, ETIOLOGY, DIAGNOSIS, PROGNOSIS, AND TREATMENT

BY

ALEXANDER COLLIE, M.D. (ABERD.)

MEMBER OF THE ROYAL COLLEGE OF PHYSICIANS OF LONDON;
MEDICAL SUPERINTENDENT OF THE EASTERN HOSPITALS;
SECRETARY OF THE EPIDEMIOLOGICAL SOCIETY FOR GERMANY AND RUSSIA

WITH COLOURED PLATES

LONDON
H. K. LEWIS, 136, GOWER STREET
1887

London:
H. K. Lewis, 136, Gower Street.

PREFACE.

THE observations contained in this volume—Relapsing Fever, Rötheln, and Influenza excepted—are for the most part founded upon over 21,000 cases which the writer has personally treated from commencement to termination. Cases which he has only seen—for instance, over 2,000 of Small Pox admitted into the Eastern Hospitals in 1884—are not included.

A. C.

EASTERN HOSPITALS.
Nov. 1886.

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ENTERIC FEVER.

PLATE I.

Represents the condition of the intestine about the end of the third week. The ulceration is distinct, but not severe. This shows that there is no relation between extent of ulceration and death.

T.A. Phillips pinxit

ENTERIC BOWEL. DEATH DURING THIRD WEEK.

London, Published by H.K. Lewis, 136, Gower Street.

Vincent Brooks

ENTERIC FEVER.

PLATE II.

Represents the condition of the bowel about the end of the first week. The glands of Peyer are enlarged, and there is no ulceration; but this may be seen just commencing on the patch next the valve. Death at this stage is very rare. Of 4,000 cases the writer has only met with two of this kind.

T. Godart print.

ENTERIC BOWEL - DEATH ABOUT THE END OF THE FIRST WEEK.

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HÆMORRHAGIC SMALL-POX.

PLATE III.

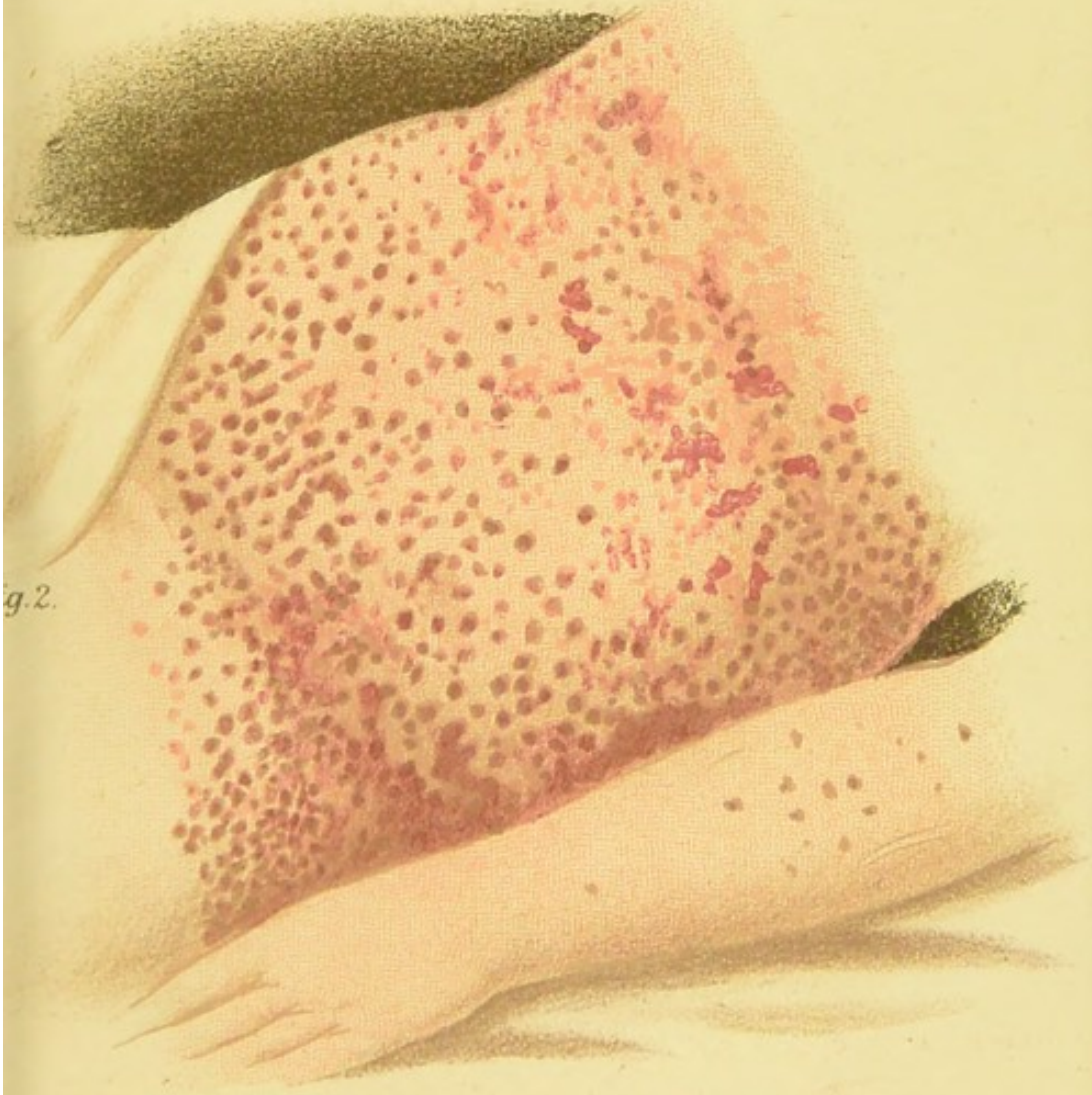
Fig. 1.—This shows a very frequent appearance of the eye. In the case represented the conjunctiva is completely filled with blood; but in some cases this effusion is limited.

Fig. 2.—This shows the purpuric character of the eruption as it sometimes appears. It is commonly mistaken for the eruption of typhus or for purpura hæmorrhagica. It has no likeness whatever to the rash of typhus; but it is very like purpura hæmorrhagica.

Fig. 1.

THE EYE IN HÆMORRHAGIC SMALL POX.

g. 2.



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THE ERUPTION IN VARIOLA NIGRA.

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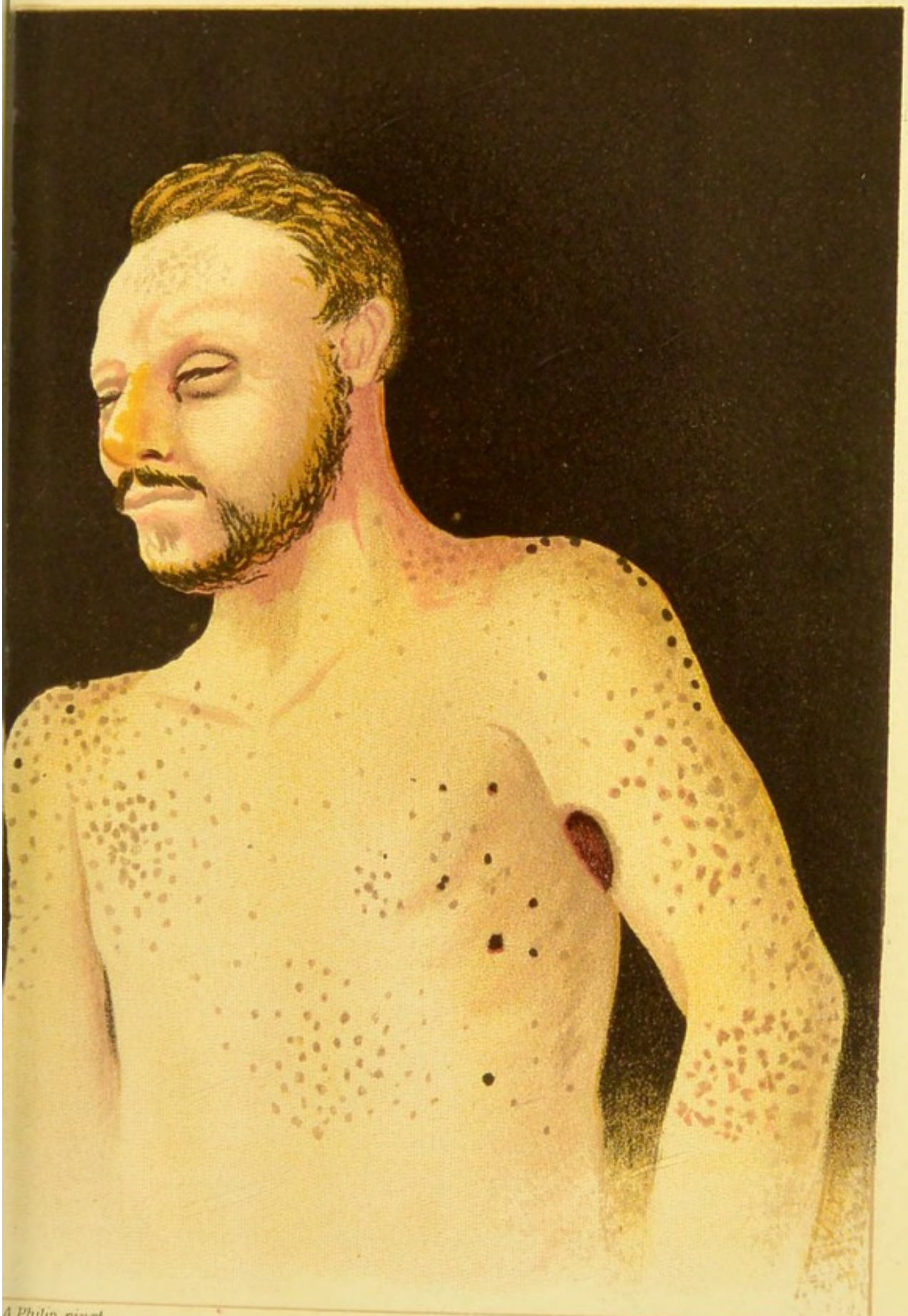
HÆMORRHAGIC SMALL-POX.

PLATE IV.

Represents the appearance of the skin in the most marked of the hæmorrhagic forms of small-pox, the variola nigra, or black small-pox. The eyelids will be seen quite black; there are dark lines on the forehead, dark spots on the chest, and a large bruise-like patch on the arm. In this case the eyelids are not swollen; but in some cases this is a prominent feature, and then the patient looks as if he had been fighting. There was not a single papule in this case, and the remainder of his body was similar to the part shown in the plate. On the foot there was a large bruise-like patch, like the one shown on the arm.



A. Philip pinxt.

Vincent Brooks, Day & Son, Lith.

THE ERUPTION IN VARIOLA NIGRA.

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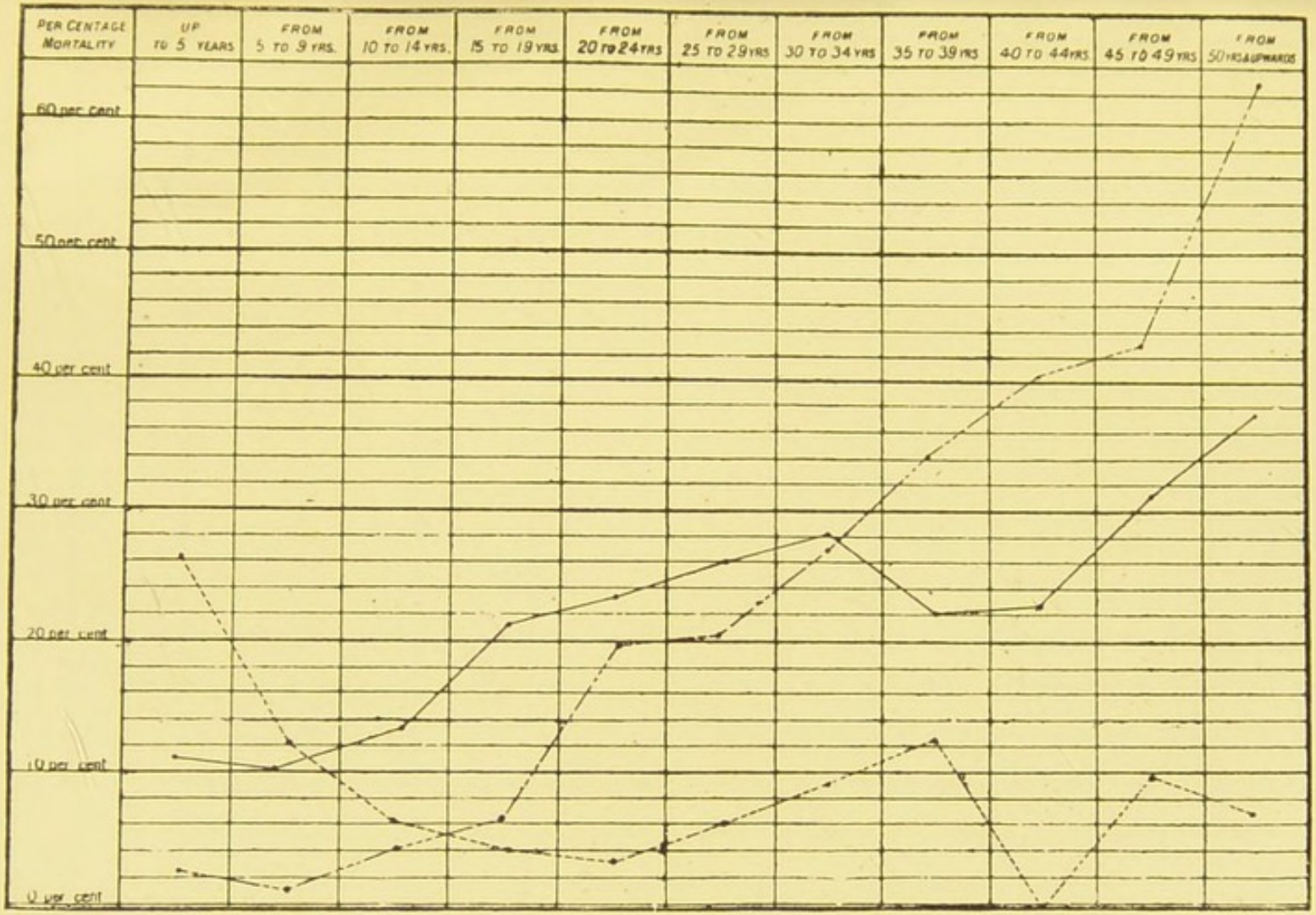
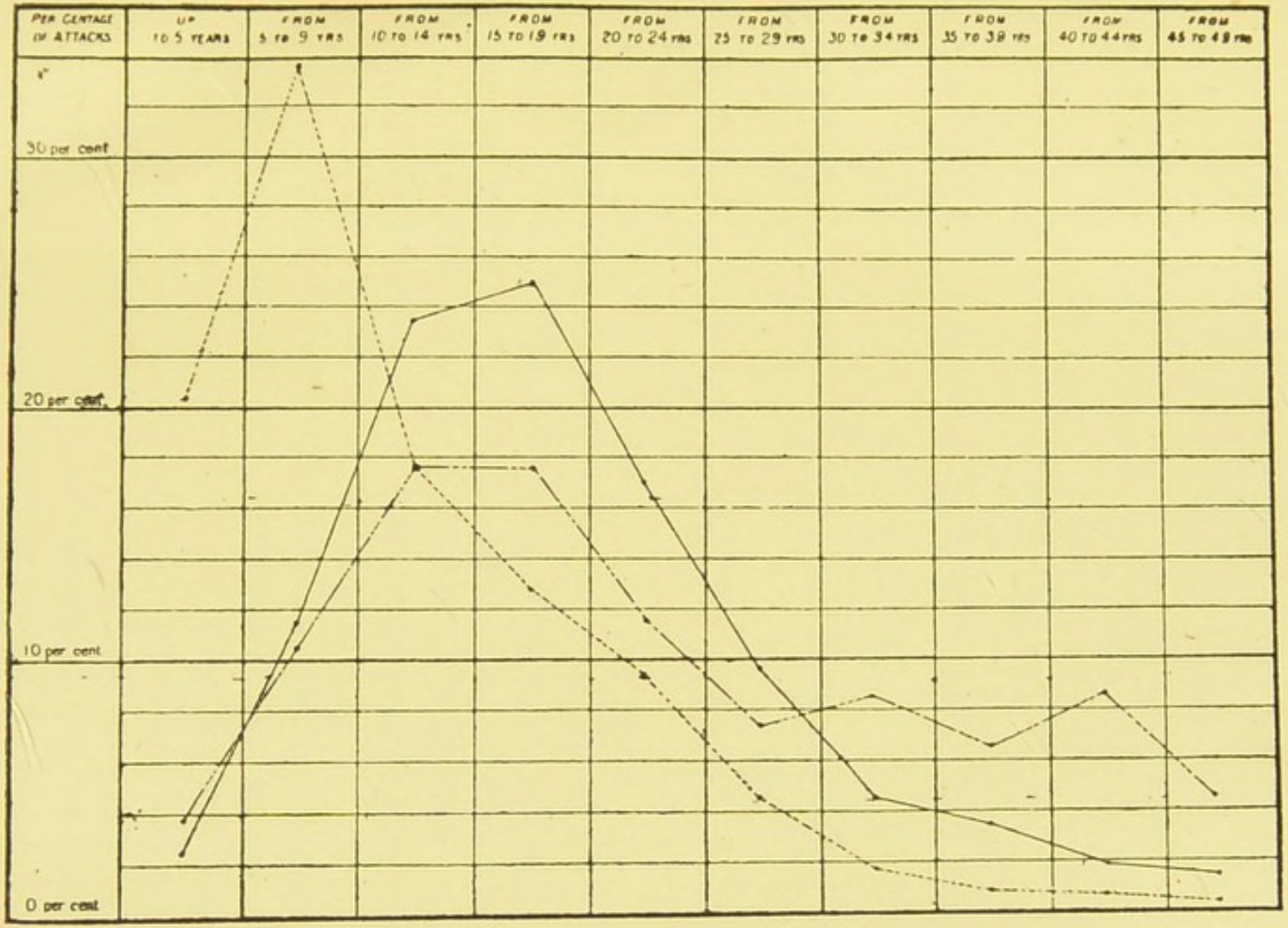
Fever at the different Quinquennial periods.



Scarlatina - - - - - - - - - - - - *Typhus* ——— - - - - - - - - - - *Enteric Fever* ———

NOTE.—The calculations are based on the cases admitted into the London, Stockwell, and Homerton Fever Hospitals during the years 1871—80. 9,830 cases of Scarlatina, 1,923 of Typhus, and 3,523 of Enteric Fever.

Fever at the different Quinquennial periods.



Scarlatina ---------- *Typhus* —— - - —— - - *Enteric Fever*——————

NOTE.– The calculations are based on the cases admitted into the London, Stockwell, and Homerton Fever Hospitals during the years 1871—80. 9,830 cases of Scarlatina, 1,923 of Typhus, and 3,523 of Enteric Fever.

FEVERS.

CHAPTER I.

NATURE AND PATHOLOGY OF FEVER.

Definition. A more or less continued elevation of temperature.

Synonyms. Pyrexia (Gr.); Fièvre (Fr.); Fieber (Ger.)

Varieties. Fever is said to be *continued* when it runs a more or less prolonged course without intermission; *remittent* when it fluctuates daily, now rising, now falling, but never until the disease cease becoming quite normal; *intermittent* when the temperature becomes quite normal and remains so for longer or shorter periods; *ephemeral* when its duration does not extend beyond twenty-four hours; *symptomatic* or *inflammatory* when it is dependent upon some known local lesion; *idiopathic* when there is no known local lesion to account for it, and when it is provisionally regarded as a disease *per se*; *ataxic* when its course is very irregular, conforming to no known type; *adynamic* or *asthenic* when it is characterised by great prostration; *malignant* when there is rapid destruction of tissue (without marked symptoms of fever, such as delirium and high tempera-

ture) followed by speedy death; *hectic* is employed to denote a form of fever, remittent in character, which occurs chiefly in wasting diseases, particularly those characterised by suppuration, although it is not confined to these. It is very common in pulmonary phthisis, is paroxysmal in character, and it is usually accompanied by a circumscribed pink flush on the cheeks which contrasts strongly with the pale face, bright eye, and clear mind. The paroxysm ends in profuse perspiration, most marked about the head and chest (*Roberts*). Fever may be said to be *low* when the temperature fluctuates about 102°; *moderate* when it does not exceed 103°; *high* when it ranges about 104°, and when it exceeds 105° it may be said to be *very high* or *hyperpyrexial.*

Pathology. The normal temperature of the body, taken in the axilla, varies from about 97·5 to about 99·5. It is about one degree higher in the mouth, rectum and vagina, than in the armpit. As in disease, so in health, it has its diurnal variations, the maximum temperature corresponding, for the most part, to the hours from noon to midnight; and the minimum, probably, to the hours from midnight to noon in the case of those who sleep during the night. This variation in health rarely exceeds one degree Fahrenheit. It is slightly raised after meals and severe exercise. It is not much influenced by climate or external temperature, except when the latter produces disease, as in sunstroke. It depends, in health, mainly upon the oxidation of the food, and the maintenance of a ratio of repair to waste. In fever it depends mainly on oxidation of the tissues, and this arises under a great variety of circumstances. There is hardly any dis-

turbance in the health of which it does not, at one time or another, form a more or less prominent part. It is a characteristic feature of all acute diseases of any severity; it is present at some time or other in the course of most chronic diseases. It is so marked a phenomenon of the acute infectious diseases that these have been specially designated "fevers," a term to which they have no more claim than pneumonia or meningitis; it is a most important factor in wounds, in diseases due to poisons, and in surgical operations and injuries, in particular those of the brain and spinal cord. It is, in fact, not a disease at all, any more than pain is, but a symptom, and in process of time it will probably disappear as our pathological knowledge increases. Formerly we spoke of brain-fever, now we speak of meningitis.

In connection with one or another of the conditions mentioned, a person loses appetite. He takes little or no food, but much drink. At the same time the processes of life appear to go on at a greater pace than in health. The temperature is elevated, the pulse and respirations are quickened, the insensible transpiration from the skin is increased, the amount of carbonic acid in expiration is augmented, and although the quantity of the urine is diminished, the amount of solid matter, chiefly urea, is larger than in health. This waste is, for the most part, due to destructive oxidation of the tissues, and this is sometimes so rapid that a patient is emaciated markedly in a few days. If, whilst this excessive waste is going on, the process of elimination go on along with it, and a fair amount of nourishment be taken, the febrile process proceeds generally to a favourable termination; but in a certain proportion of cases little nourishment is taken, and the work of

elimination is interfered with. The consequence is that the waste is not repaired, and the lungs and kidneys, either from old standing disease or from morbid conditions set up during the fever, become unequal to the removal of the waste products, which consequently accumulate, and the patient dies from coma, asphyxia, or syncope.

The precise order of the phenomena of fever is involved in some obscurity. "The hypothesis has "been advanced that there is a centre in the brain "which regulates the production of heat, and that "when this is excluded from performing its functions, "the development of heat is augmented. For such "a view, however, there is no adequate foundation" (*Roberts*).

There may be said to be three views: (*a*) that the phenomena of fever are the result of direct injury to the nervous system, vaso-motor paralysis, by means of which its regulative influence on temperature is more or less destroyed; that in consequence thereof destructive oxidation of all the tissues goes on, with evolution of heat as the natural result;—(*b*) that these phenomena are the result of tissue change in some part of the body or in the blood; that in consequence of this change the whole of the tissues and the blood are infected, with evolution of heat as a result;—and (*c*) that the phenomena are the result of the multiplication of small organisms. There is probably some truth in all these views. To discuss them fully would require a volume, but the germ theory deserves some special notice. It asserts that the phenomena of fever and the infectious diseases are the result of the introduction into the system of minute organisms such as rod-like bodies measuring about $\frac{1}{10000}$ of an inch in

length, commonly called Bacteria (*Bastian*), and minute spherical or ovoid bodies, measuring about $\frac{1}{25000}$ of an inch in diameter, commonly called micrococci (*Greenfield*). Just as some chemists hold that all putrefactive and fermentative change is the result of the action of some kind of organism, so some physicians hold that the acute infectious diseases have their special organism. That bacteriæ, bacilli, and micrococci are found in decomposing fluids, abscesses, and such like, and in various diseases, such as pyæmia and other forms of blood poisoning, there can be no doubt. There can further be no doubt that in some diseases special forms of these have been made out. Thus in relapsing fever there is the spirillum of Obermeyer ; in splenic fever there is the bacteridium of Davaine, the bacillus anthracis of Cohn (*Greenfield*), and particulate forms have been found in vaccine lymph, the micrococcus vacciniæ of Burdon Sanderson. The question at issue is not the existence of these organisms, but their significance. Are they cause or effect ?

"Concerning the question of the precise relation of "organisms to the processes of putrefaction and fer- "mentation, opposite opinions are at present held. "Believers in Pasteur's germ theory maintain that "they are invariably the initiators of these chemical "processes ; whilst those who reject this theory, as "being too exclusive, contend that putrefaction and "fermentation may be initiated in the absence of "bacteria and their germs. Those holding the former "view believe that bacteria are only capable of "being derived from pre-existing organisms of like "kinds ; whilst those who reject it contend that particles "of living matter which develop into bacteria may be "generated from the organic compounds dissolved in

"fermentable fluids, and that such particles of living "matter are, in fact, just as much products of the fer- "mentative process and of the fluid in which it occurs, "as are the gases simultaneously generated therefrom. "According to this view these lowest living units "bridge the gap hitherto held to exist between living "and so-called dead matter, and afford an illustration "of the natural independent origin of chemical com- "pounds so complex and endowed with such attributes "as to win for them the name of 'vital' compounds.

"Pasteur's 'vital theory' of fermentation is one of "great importance both to chemists and biologists; "and it also forces itself upon the attention of medical "men, as the parent of another doctrine which has of "late assumed great prominence in relation to the "science of medicine—the doctrine, namely, that lower "organisms allied to those met with in putrefying and "fermenting media are causally related to certain "morbid processes with which they either do or are "said to co-exist. Bacteria and their allies are as "uniformly co-existent with a few general diseases and "certain local morbid processes as they are with putre- "factions and fermentations, so that the same general "question as to the precise significance of this co-exist- "ence again presses for solution. Are the organic forms "associated with such morbid processes, the sole causes "or inciters of these processes, or are they consequent "(*i.e.* concomitant products) of pathological processes "which have been initiated in their absence? The "former view is warmly supported by many who "regard bacteria and allied organic forms as the "contagious elements of such communicable diseases; "and many of these same pathologists, resting upon "analogy, wish to extend their theory, so as to make it

"applicable to many other communicable diseases with "which organic forms have not as yet been shown to "be correlative. (*Bastian.*)

"Micrococci, like other bacteria, play a certain part "in putrefactive and fermentative processes, in which "they are constantly present; and probably they are "also in some way concerned in certain of the processes "of disease in animal and vegetable organisms. "Although the exact part which bacteria play must be "allowed to be doubtful, there can hardly be a question "of their importance in relation to some of these "processes. In face of the various opinions now "entertained on the subject, it can only be stated here "that some believe them to be the active agents of "these processes, and as a consequence that the "bacterium which produces each process, whether "fermentative or morbific, is specific in its nature; "whilst others believe that these processes arise "independently, that the bacteria are merely con- "comitants, and that the varieties in mode of growth "and in outward form are merely the results of the "various conditions under which they grow.

"But there is much evidence, both from the study "of processes of fermentation, and of the diseases of "vegetables and animals, to show that the various "forms of micrococci, as of other bacteria, are more or "less specific, or at least have acquired specific proper- "ties and powers." (*Greenfield.*)

The importance of these organisms in reference to the pathology of fever is very great. That the phenomenon of that state is due to increased tissue change, to destructive oxidation of the tissues, is admitted. The explanation so far as it goes is true; "but it goes a very short "way, and leaves untouched the questions which itself

"suggests, and whose solution must form the founda-
"tion of any thoroughly satisfactory theory as to the
"mode of production of the symptoms of fever,—Why
"is there increased consumption of tissue? and why
"should the nervous system exercise other than its
"usual and normal action? It is a characteristic of
"the principal maladies in which idiopathic fever
"occurs, that they are communicable from the sick to
"the healthy—they are contagious or infectious, or
"both. In all such diseases the existence of a specific
"materies morbi introduced from without is an assump-
"tion necessary to the explanation of the phenomena
"which they present, and especially of those which
"entitle them to be regarded as contagious. This
"foreign body introduced from without (conveniently
"called the contagium) must be the cause of the fever;
"before its introduction there is no fever; its reception
"into a susceptible system is followed by the pheno-
"mena of that condition." (*Maclagan.*)

It is to be observed, however, that the germ theory has never been demonstrated. No doubt the atmosphere is full of solid particles of matter; but solid particles are not germs, and it is moreover difficult to see how, if all that the panspermists and the sanitarians say be correct, there is anybody actually alive now. It will be clear that before any theories can be formed of the pathology of the febrile state, a clearer knowledge of the exact conditions which regulate and maintain the temperature in health must be acquired. It is not maintained that the normal temperature is due to a germ and its multiplication, but mainly to the action of the nervous system in controlling the pace at which the processes of life move, and it may be conceived readily that anything which weakened or

destroyed this controlling force, say a cold or a poison, would leave these processes to proceed at a greater pace, with the evolution of heat as the natural resultant of the pace at which the processes of life were moving. That there is some such thing as a sudden paralysis of some portion of the nervous system in the acute infectious diseases might be inferred from actual observation. The onset, in many cases, is so sudden as to render it improbable that the cause would be a multiplying germ. In typhus, for example, persons are often struck down at once, without a moment's warning, and in the most perfect health. Suddenly, as if by a stroke of lightning, the subject shivers more or less violently, his teeth chatter, and if he be a child he may have a convulsion. This is sometimes the case in sunstroke. Now this is not like the action of a germ, but like that of a paralysing influence acting at once on the nervous centres; a view which finds support from a consideration of the morbid anatomy of typhus. In that fever there are, as a rule, no changes of structure. There is nothing found in the body after death which enables us to say that the disease was typhus. All that is met with usually is congestion of various organs, particularly the lungs; which appears to the writer more explicable on the hypothesis of a paralysis of the nervous centres. This view derives support from a consideration of what takes place in the malignant fevers. Thus Hecker, writing of "the black death" in the fourteenth century, says :—"Many were attacked as if struck by lightning, and died upon the spot."

The case of Boccaccio's pigs points in the same direction.* During the small pox epidemic of 1876, when

* *Vide* p. 147.

the Homerton Fever Hospital was occupied by small pox, a boy recovering from enteric fever was found one evening to be in his usual health. About one the following morning he woke, sat up in bed, complained of some sickness, vomited a little blood (just as some did in the great epidemics), and fell back dead. These facts point to some cause acting suddenly on the vital forces of the body, after the fashion of a strong poison, not to a cause acting like a gradually multiplying germ. In the case of confluent small pox the results are very like the effects of a multiplying germ. A very small quantity of small pox virus may be introduced into the body, and it is multiplied enormously, and so far as confluent small pox is concerned, the germ theory may be the true explanation; but it does not explain "pure hæmorrhagic small pox," for here there is no reproduction of anything. There is no pimple, no vesicle, no pustule, no specific anatomical change at all. Nothing beyond internal congestions and petechiæ on the skin and the internal organs, and unusual fluidity of the blood. These facts, it is submitted, point to some other cause than a multiplying germ. The present state of knowledge does not, in the opinion of the present writer, permit of dogmatism on either side. The germ theory, like the atomo-mechanical in physics, and the atomic in chemistry, may be a good working hypothesis, but it cannot yet be regarded as a complete explanation of the acute infectious diseases.

This question is closely bound up with the question of spontaneous generation. Up to the seventeenth century it was believed that small animals might arise spontaneously from decaying substances; and at one time it was believed that eels were generated spon-

taneously in the mud of the Nile. That maggots were not produced from decaying meat, but from the eggs of flies deposited there, was proved by Redi; and, since his time, the doctrine *omne vivum ex vivo* has until quite recently dominated the scientific world. Now, because organisms of one degree always arise from another organism of the same kind, it does not follow that organisms of quite another degree may not arise from some combinations of matter wanting in what is usually regarded as the characters of living. Living organisms, so far as we know anything of them, are nothing more than combinations more or less complex of material elements, and the earlier steps of the ladder of life may conceivably have been the result of the combination of material elements not in the ordinary sense of the term living. Indeed if the nebular hypothesis be true, this at one time must have been so.

"The beautiful researches of Professor Tyndall have "indeed proved that the atmosphere is everywhere "filled with solid particles, in the absence of which it "would not be luminous; and it is fair to suppose "that among these particles there are always to be "found some which are the germs of monads and "bacteria. Still this can hardly be taken for granted; "and Dr. Bastian is right in reminding us that it is "reasoning in a circle to assume the presence of germs "that cannot be detected, merely because there is no "other way of accounting for the presence of monads "and bacteria in accordance with the doctrine of "Redi.

"For in all discussions concerning spontaneous "generation it should be borne in mind that the "doctrine *omne vivum ex vivo* is itself on trial for its "life, and cannot be summoned to the witness-box.

"The very point to be ascertained is whether this "doctrine, which is admitted to hold good in the case "of all save the lowest forms of life, holds good also of "these. The doctrine rests entirely upon induction; "and while, in many cases, it is legitimate to infer "a universal proposition from a limited induction of "instances, it is not legitimate to do so in the present "case. For the fact that innumerable highly specialised "types of animal and vegetable life are kept up solely "by generation *ex vivo*, can in nowise prove that other "living things, which are nearly or quite destitute of "specialisation, may not have their ranks recruited by "a fresh evolution from not-living materials.

"Along with the absence of specialised structure, it "may turn out that there is an absence of other "characteristics once supposed to be common to all "living things.

"This will be more clearly understood as we pro- "ceed to consider the change which the last half- "century has wrought in the theories of life with "which Redi's doctrine has hitherto been implicated. "The hypothesis of a 'vital principle' is now as com- "pletely discarded as the hypothesis of phlogiston in "chemistry, or as the Ptolemaic theory in astronomy; "no biologist with a reputation to lose would for a "moment think of defending it. The great discoveries "concerning the sources of terrestrial energy have made "it henceforth impossible for us to regard the dynamic "phenomena manifested by living bodies otherwise "than as resulting from the manifold compounding "of the molecular forces with which their ultimate "chemical constituents are endowed.

"Henceforth the difference between a living and a "not-living body is seen to be a difference of degree,

"not of kind,—a difference dependent solely on the "far greater molecular complexity of the former.

"As water has properties that belong not to the "gases which compose it, so protoplasm has properties "that do not belong to the inferior compounds of which "it is made up. The crystal of quartz has a shape "which is the resultant of the mutual attractions and "repulsions of its molecules; and the dog has a shape "which is ultimately to be explained in the same way, "save that in this case the process has been im-"measurably more complex and indirect. Such, in "brief, is the theory by which the vitalistic doctrine of "Stahl has been replaced. Instead of a difference in "kind between life and not-life, we get only a difference "of degree; so that it again becomes credible that, "under favouring circumstances, not-life may become "life." ("*Cosmic Philosophy*," *Fiske.*)

In any case, it may be easily seen that when, as the result of disease, the elements of which the body is built up fall to pieces, a variety of particles would be found which might be called anything according to the fancy of the individual. When a building falls to pieces, the bricks of which it was made up will be found; but although the house was built with the bricks it was not built by them.

Symptoms. These vary widely. A precise account of them, "distinguishing, as would be required, between "phenomena proper to fever, and phenomena due to "the condition or lesion on which the fever depended, "would be lengthy, and so crowded with qualifications "and exceptions as to be vague and unsatisfactory. "The attempt, indeed, would have a more radical "defect. Either some variety of fever must be taken

"as a type to which other forms are referred, which "is vicious in principle; or all the phenomena of all "febrile conditions must be enumerated and classified, "which would confound the accidental with the essen- "tial, and would result in a heterogeneous collection "of facts without due relation among themselves." (*Broadbent.*)

There are, however, certain common features. Fever commences usually with some sense of weariness. The patient is indisposed to exert himself; he is easily tired and glad of an opportunity to rest, his body aches more or less, and he suffers from a general feeling of lassitude. Following upon this comes a feeling of chilliness, and he likes to sit by the fire, although his temperature may be several degrees above normal. Presently his skin becomes hot, his pulse quick, and his respiration accelerated. His head aches; he complains much of thirst; his tongue is furred, and his nights are disturbed. This condition may last but a few hours or may be prolonged several weeks. It may terminate by *lysis*, a gradual return to health; by *crisis*, a sudden fall of temperature and rapid resumption of health; or in *death* (*a*) from coma; (*b*) from asphyxia; (*c*) from syncope; or (*d*) from a combination of these.

Treatment. This must, whenever possible, have regard to the *kind* of fever; but in practice cases arise in which the fever itself is apparently the only disease, and it sometimes calls for treatment. Generally the patient should keep his bed; he should be fed by means of milk, eggs unboiled, beef tea, chicken broth, mutton broth, and bread crumb; he should be allowed as much cold water, lemonade, soda water, and seltzer, iced or not according to circumstances, as he pleases.

It will be advisable sometimes to give a laxative, and occasionally a purgative ; but having regard to the possibility that the fever may be enteric, a warm water enema should be given in the first instance, to be followed if needed by a dose of castor oil. In fevers other than enteric, a purgative may be required, and the compound jalap powder is one of the best. If it be desired to reduce the temperature, the bath, more or less cold, according to all the circumstances, is the best (*vide* general treatment, and treatment of enteric fever) ; but it is not, in the writer's opinion, necessary to give the bath, as a matter of routine, whenever hyperpyrexia is present, because a certain number of patients bear hyperpyrexial temperatures without apparent inconvenience, much less injury. It should, however, be borne constantly in mind that children do not bear cold baths well, and that, as a rule, they are not suited for elderly persons. When given to children the temperature should range about 80° F., and the duration should not exceed five minutes. Generally the bath is contraindicated in the later stages of fever; in measles, typhus fever, relapsing fever, hæmorrhagic small pox, influenza, erysipelas, diphtheria, malignant fever, and cerebro-spinal meningitis in all stages, and when the fever is complicated with pneumonia, pleurisy, bronchitis, pericarditis, disease of the heart, convulsions, meningitis, peritonitis, hæmorrhage, or disease of the kidneys. When the cold bath is inapplicable, cold sponging may be substituted, or quinine in doses of ten to forty grains according to all the circumstances.

CHAPTER II.

ON THE TREATMENT GENERALLY OF ACUTE INFECTIOUS DISEASE.

The first thing to be done is to *isolate* the patient, and this should be effected before the exact nature of the disease be ascertained. To wait until this be made out, clearly, permits of the infection of the friends and relatives of the sick person. No one can tell at once the meaning of a rigor, a slight sore throat, or a rise of the temperature. Therefore, until it be quite clear that symptoms, however slight, do not depend upon an infectious disease, the sick person should be immediately isolated. In the case of measles, it is doubtful if the utmost care in this respect will avert the spread of it to the household; and in the case of scarlet fever, it is questionable if the same care will be more successful. But in the case of small pox, typhus, and diphtheria, it is probable that early isolation will succeed in sparing the household. In the case of children, the subjects of sore throat and what are called "little colds," it is important that they should not be allowed to go to school, because these slight ailments are often one or other of the infectious diseases in a slight form; and if it be not proved that all of these diseases are infectious in the very early stage, it is certain that measles is, probable that scarlet fever is; and with respect to the others, it is the safest practice to regard them as infectious from the very beginning; not that we

know they are, but because we do not know that they are not. When it becomes clear that any one is the subject of acute infectious disease, he should be placed in a *large room*, which should be ventilated by an open window and open fire-place, and the window should be open, as a rule, by night as well as by day. In very wet, particularly very foggy weather, such as is sometimes found in London, it may be necessary to keep the window shut by day and by night, and to ventilate the sick room mediately through another room, in which there should be a good fire. Whilst, however, the room should be well ventilated, care should be taken that the patient be not exposed to draughts. He should be provided with a sensible *nurse*, who should be neither too young nor too old. She should be competent to take temperatures and to make a record of the patient's condition daily. Generally she should note the quantities and the kinds of food taken, the amount of sleep, the presence or absence of restlessness or delirium, and the kind of delirium, whether violent or the reverse. She should note any marked difficulty in breathing; in particular any blood passed from the mouth, with the urine, or by the bowels, and such other points as the physician may direct. She should be absolutely free of "fuss," and scrupulously clean. She should in particular be scrupulously careful of the cleanliness of her hands; and for this purpose she might, in the performance of some of her functions, wear gutta-percha gloves. The glasses and other utensils with which she administers food and drink should be absolutely free of a speck of dirt, and with this view they should be kept in cold water. She should not, in the interest of the patient, if from no other point of view, be required to do duty for more

than twelve consecutive hours daily, and of this she should be allowed two hours for meals and recreation. No doubt this is expensive, but if a patient is to be nursed carefully, this should be at the expense of his friends, not of his nurse, and it will be well for the economically disposed to remember that overwork in the sick room as elsewhere may be disastrous. The *temperature of the room* should vary with the stage of the illness. In the earlier period of the disease it should, as a rule, measles, influenza, and diphtheria excepted, be about 50° F., or even less than this; but as a patient passes from the acute into the convalescent stage, the temperature should be about 60° F., or even higher. The *light*, as a rule, should be subdued, but as far as possible alternations of day and night should be maintained, although the patient's day and night may not quite coincide with the English civil or any other day. The *furniture* need not generally be interfered with, but the bed should be of such form that the patient may be readily got at from all sides; and there should be two in the room, so that he may be changed from the one to the other night and morning, it being, of course, borne in mind that in certain cases patients are too ill to be so moved. The *bedding*, as a general rule, may be the bedding of health; but the patient should be examined daily, particularly about the sacrum, the hips, and the shoulder blades; and if there be emaciation, the parts should be washed with a spirit lotion, and an air or water bed should be provided, or an air or water cushion, according to circumstances. The coverings should be light, and the sheets should be changed daily. In special cases, as where there is much diarrhœa or perspiration, or much salivation, it may

be necessary to do this oftener. In the early stages, as a rule, he should wear linen; generally he should not wear flannels, unless he be sweating freely, and his linen should be changed as frequently as may in the particular case be considered necessary. As he passes, however, from the acute stage into the convalescent, he should be provided with a fine flannel vest, which should reach to his hips. He should be washed and dressed daily, particular care being taken in the case of women with long and abundant hair to see that it be clean; and the simplest way of cleaning a patient is, if in other respects it be suitable, to give a bath at least once daily. Where this is not suitable, he should be carefully sponged all over. The utmost *quiet* should be observed in the sick room and its neighbourhood. The opening and shutting of the doors and windows, the pulling up of blinds, and the making up of fires should be effected noiselessly. The hinges of the door of the sick room should be oiled so that they may not creak, and coal in paper bags should be near the fire, so that it may be made up quietly. The patient's condition should not be discussed in the sick room, and whatever has to be said should be said audibly, and not in a whisper. He should *be fed* on milk, beef tea, veal, mutton, or chicken broth, without vegetables, unboiled eggs, and bread finely mixed with his beef tea; and of these he should have as much as he cares to take. As a rule he should be fed at regular intervals of from three to four hours; and whilst it is of the utmost importance that he should have enough, care should be taken that he do not have too much. It should be borne well in mind that food is only useful in so far as it is digested, and that pints of milk and eggs in the stomach or

bowels undigested are about as useful there as a cannon ball. Definite rules cannot be laid down, because cases vary indefinitely, and so must quantities; but if a patient take two to three pints of milk, a pint of beef tea, a few ounces of bread, and one or two eggs in the twenty-four hours, more should not be forced upon him, although more should not be withheld if he indicate a desire for it, care being taken by examination of his discharges to see that he be digesting it. Some patients will take with advantage large quantities of milk, four, five, six, and seven pints in the twenty-four hours. If, however, the patient be exceptionally ill and he manifest a strong objection to take food, it will be necessary to press food on him persistently, and if he persist in refusal he must be fed forcibly. This unpleasant necessity may, however, be avoided by offering small quantities every few minutes, particularly in the form of wine. It is in conditions of this kind that *alcohol* is most useful. Patients who will not take milk, with whom milk disagrees, even when given in soda, seltzer, or lime water (and here it may be as well to point out that "curds" in the discharges is not always evidence of too much food, but evidence of the fact that the particular kind of food disagrees, which it would do in almost any quantity, more or less), who will not take beef tea, or in whom beef tea produces diarrhœa, who will not take chicken broth or anything else, frequently children, will often greedily take some form of alcohol. In such cases the administration of this saves life when otherwise it would be lost. The form of the alcohol may vary with the circumstances of the case; but care should be taken that whatever its form it be good of its kind, not the alcohol of any shop that may

be handy. The best forms, in the writer's opinion, are old port, high-class burgundies, and champagnes; but when these cannot be had old Scotch whisky diluted with soda, seltzer, or lemonade, and, for some English palates, brandy. There are some cases, however, in which nothing will take the place of high-class *champagne*. But whilst alcohol is sometimes a useful and sometimes an indispensable article in the treatment of acute disease, it is not required in all cases. On the contrary, the majority do well without it—*i.e.*, the majority of all cases, not the majority of severe cases, which are the cases here held in view. The indications for its administration are generally disinclination or inability to take ordinary food, much restlessness and sleeplessness and weakness generally, however manifested. It is particularly useful in convalescence, when the patient feels his weakness, and, above all, in convalescence from enteric fever, when the craving for food is strong, and cannot be safely gratified; and in convalescence from small-pox and typhus, if alcohol be not "absolutely necessary," whatever that tautological phrase may mean, since nothing is absolutely necessary, it benefits the patients and considerably promotes their recovery. The quantity to be given in any particular case must vary widely. The age, sex, personal habits and history of the patient must be considered; his general condition as to strength or weakness, his appetite, his sleep, or want of sleep, the condition of his mind, and his idiosyncrasy as to alcohol. The nature of the disease will also have to be considered, its severity, its period, and its complications. There is no such thing as so much alcohol for a person or so much for a disease. The writer has found the following to be useful quantities:—For an adult,

half a bottle of port, or one bottle of champagne, or one of burgundy, or six ounces of whisky or of brandy, or ten ounces of gin, daily. Very exceptional quantities have been, one and a half bottles of champagne, or one bottle of port, or twelve ounces of brandy, daily. It should, when given, be in one form at a time, except that a nightcap of whisky may be given to procure sleep, where wine is being given in addition. Here it is very important to observe that children require and do well on what to those who are not familiar with the infectious diseases as they affect destitute children would seem an excessive quantity of wine. Thus children of from two to eight years of age will take as much as six to eight ounces of wine daily, with obvious advantage. The present writer is satisfied that life has been saved in the case of children with scarlet-fever, which, without alcohol, would have been lost. In order, however, that the taking of food and drink may be facilitated, there is one point which the writer thinks of the first importance. The patient's *mouth* should be kept scrupulously clean. During the course of these diseases the patients mostly breathe through the mouth; dirt from the atmosphere is thus introduced into the mouth; mucus collects and dries upon the tongue and teeth, some blood oozes out of the tongue and from the gums, and altogether this cavity comes to be very unclean, greatly interferes with the patient's comfort, and adds to his disinclination to take food. The mouth should, therefore, be kept perfectly clean by means of a soft tooth brush and tepid water. The teeth should be cleaned inside and outside, care being taken not to injure the gums, which are usually tender and bleed easily. The tongue should, at the same time, be well cleaned and the mouth rinsed out

with water, and it may be necessary to do this several times daily. The *bowels* should be kept open, and if there be constipation it should, in the early stages, be removed by means of a laxative and an enema to ensure that there be no obstacle to the action of the laxative in the descending colon or rectum. In the later stages the bowels should be regulated by enemas, particularly in the case of enteric fever, when anything like a purge might be injurious. Where irritating discharges are being passed, a large cool water enema is often productive of much comfort by removing irritating matter from the rectum. These enemata are most conveniently given by means of the Eguisier, with which the quantity of the water and the force of the injection may be easily regulated. The bed-pan should, as a rule, be used from the first, otherwise it may be found difficult, if not impossible, to use it at the last, and where it gives rise to discomfort the discharges should be passed into a draw-sheet. The food should be kept outside the sick-room if possible, and if this be not possible, out of the patient's sight, so that he may not be disgusted with the continual sight of food.

Of *medicines* it may be said, generally, that he has no need; indeed in severe cases, the class of cases with which we are dealing, they are not only useless but positively injurious. What it is important to do is to feed the patient, and this it will often be found difficult enough to do without the addition of unnecessary drugs; for in some cases, to the extent that the patient is worried with physic, to that extent will he be disinclined to swallow food, if he do not, by reason of the taste of the drug or the medicine glass in which it is offered, fancy that he is being poisoned and refuse everything.

Next in importance to food and drink is sleep, which is often difficult to obtain, and if it cannot be obtained in fair amount the patient will sink. It is important, therefore, that the production of *sleep* should be aimed at from the very first. With this object it may be remarked, in the first place, that generally the patient should be allowed to sleep when he is asleep, and when he is inclined. He should not, as a rule, be woke up for food, but should be fed immediately on waking. Generally it is easier to feed him than to procure sleep for him, and, therefore, his sleep should not be disturbed. There is, however, an apathetic condition very like sleep, and which is not infrequently taken for sleep, and from this condition the patient should always be woke up for food. From a real sleep the writer doubts if it be ever wise to rouse a patient, but he should be fed immediately he does wake, especially in the early morning hours, about two, three, and four. To procure sleep then the utmost quiet should be observed, the room should be darkened if it be daytime, and the light of the fire hidden by a screen. This will sometimes suffice to procure sleep without anything else. If this do not succeed the patient's head may be bathed in warm water. If this fail a warm bath may be given, especially in the case of young children and elderly persons ; but in the case of young adults who are not very bad, and who preserve their strength fairly, a cold bath of about ten minutes' duration, at a temperature of 60° F., may be administered ; but the cold bath *should not in the writer's opinion be given in typhus*, in influenza, relapsing fever, diphtheria, erysipelas, malignant fever, meningitis, hæmorrhagic small pox or measles ; nor in cases where there is hæmorrhage from the bowels,

peritonitis, cardiac weakness, pneumonia, nephritis, or strong dislike of it on the part of the patient. Generally it may be said that the cold bath may be given with advantage only to young adults, the subjects of scarlet fever or enteric, whose cases are uncomplicated, and in the earlier stage of the disease; in the case of children and of elderly persons the bath cold is, as a rule, inapplicable. For these the warm bath is, in the writer's opinion, preferable. In the case of *hyperpyrexia*, however persistent, from 105° F. and upwards, whether in young or old, a bath more or less cold, regard being had to all the circumstances of the case, should not be omitted except when the hyperpyrexia comes on quickly at the end of the disease, and is the expression of rapidly approaching death. If the bath be inapplicable or not available, opium or some form of alcohol may be administered; but when there is much congestion of the lungs, or bronchitis, or pneumonia, or the case be one of typhus or measles, the writer prefers alcohol to opium. To relieve the *discomfort* produced by the heat, a bath more or less cold, according to all the circumstances of the case, may be given, or cold sponging may be employed. *Thirst* is best allayed by cold water and ice, the ice being placed in the mouth in small pieces; but lemonade is very much liked by patients, and may be allowed in place of water. *Delirium* occurs in a certain proportion of cases, and it requires careful management, but if the line indicated in the following observations be taken, it will not often give trouble. Generally the patient should not be argued with, and very rarely contradicted. "*Suavitas sermonum atque morum*" will in cases of this kind be found invaluable. If, for instance, the patient wish to leave

his bed, and to walk about his room, he should be allowed to do so. If he desire to put on his clothes and sit by the fire, he should be allowed to do so. To the restless patient this is apparently a great relief. In small pox in particular, patients will wander about a ward, sit by the fire, or at a table, and take their food and drinks apparently much pleased with themselves, although one may be more or less troubled about this and another about that. In the restlessness of ordinary health one finds relief in more or less of movement. So to a much greater extent in the burning unrest of fever. If this treatment be adopted, the patient will usually go quietly to bed again, but if he prefer to sit by the fire, he should be allowed to do so. He is sure in no long time to desire his bed. If he attempt to injure himself he must of course be forcibly prevented if need be, but the best way of preventing personal injury is never to give the opportunity for it. For this purpose knives and other instruments, medicines, and disinfectants with which he might injure himself should be kept out of his reach. His wishes should be gratified as far as possible. Thus if he form a strong dislike to his nurse she should be changed. It should be clearly understood that he is not wanting in reason. On the contrary he *reasons* correctly; but the *medium* by which his *intelligence* is informed of his relations to the external world is out of joint, and, therefore, he is in the position of a man who receives false news. The presentations made to his intelligence through the gateways of knowledge are all awry, but his reasoning upon them is perfectly logical,—*nam neque decipitur ratio, nec decipit unquam.* His perception of these presentations is very keen. To him they are unusually

clear and vivid. Hence the difficulty of dealing with him by those who recognise in him a kind of lunatic who may be or should be reasoned out of his senses. In dealing with him, therefore, his premises must be accepted as the basis of negotiation, and then the treatment is a matter, usually, of comparative ease. Take an instance or two as examples :—A small pox patient was the subject of a delusion that some one had left him a large sum of money, and that it was necessary that he should go to Doctors Commons to receive it. He accordingly demanded his immediate discharge from the hospital. It was replied to him, "Yes, this is very important, but you are very ill and "could hardly walk there ; moreover you are the "subject of an infectious disease, and if you arrive "at Doctors Commons no one would see you. If, "however, you will give the necessary authority the "doctor will go to Doctors Commons and arrange "matters for you, and you will receive the money "when you recover." He was quite satisfied and gave no further trouble, but many months after his discharge from the hospital he returned to ask if he might have the money which the doctor promised to receive at Doctors Commons. A young physician suffering from typhus fancied that a child had been murdered by one of the nurses of his hospital, and that the body had been laid upon the door-step. In consequence of this delusion, in the middle of the night he requested his nurse to call the assistant in order that an inquiry might be made. She, thinking rightly enough that it was all nonsense, made various excuses. These made the patient more persistent, and further led to his believing that she was an accomplice in the crime. She was accordingly ordered to knock at the assistant's

bedroom door, so that he, the patient, might hear her. The assistant had accordingly to be called. The story of the murdered baby was related with much detail, the narrator concluding with an expression of great regret that lying on his back as he was he could do nothing. It was at once admitted to him that a great crime had been committed, but it was pointed out that at three in the morning nothing could be done, but that as soon as it was daylight the police would be communicated with and an inquiry held. He was quite satisfied, but long after his recovery he used to say, "But wasn't that true?" If these delirious patients be dealt with in some such way as this they very rarely give trouble, but they should never be left for a moment, and the nurse should be a trustworthy person, who should be cautioned never to close her eyes *even when the patient appears to be quite quiet.* The house-surgeon of a hospital was supposed to be recovering from typhus about the end of the first week. Some time during the night his nurse fell asleep. He rose, walked out of the hospital, and was found in the morning drowned in the neighbouring river. One cold wet morning, about 2 a.m., a policeman rang the bell of —— hospital, and informed the nurse who answered that he had found one of the patients on the highway. It appeared that the patient, who had shown no signs of delirium, and who in fact was not delirious, had, during the absence of the nurse in another ward, quietly left her bed, passed through a ward full of patients, along a corridor, through the hospital grounds, and over a high wall, into the public highway. There she was seen and followed by some men, whereupon she ran, but presently fell. Then a policeman appeared, and he

took her to the workhouse. There the hospital mark was discovered upon her chemise, and the policeman accordingly called at the hospital to inform the authorities what he had found. So quietly had the escape been managed that the nurse had no suspicion that she was minus a patient until the policeman informed her that the patient was in the workhouse. She was in charge of three wards, and of course could not be in three places at one and the same time, and as this particular patient had not shown any signs of restlessness, much less of delirium, no special care of her was thought necessary. The house-surgeon went to the workhouse, where he found his patient surrounded by a score or two of the inmates, who had roped her to a bed as if she had been a wild beast instead of a home-sick girl. The ropes were promptly undone and the patient removed to the hospital. She died shortly after of pneumonia. The directors of the institution wished to nurse it economically. This was one of the results. If this were a story book these instances might be added to, but the writer hopes that those which he has given may impress upon all who are responsible for the care of the subjects of acute disease the importance of never leaving them a moment alone.

Bed sores should always be looked for, especially in the longer cases, and when there is any redness present or much emaciation the skin should be washed with spirit lotion, and a water-bed supplied. By careful nursing they may be often prevented, and almost invariably mitigated, but the most careful nursing will not always prevent them. *Abscesses* should be opened as soon as possible. *Noma*, which appears in little girls, occasionally in the labia majora,

should be cauterised by pure nitric acid, care being taken to prevent the acid affecting the healthy tissues.

Convulsions are most frequent in scarlet fever and typhus. During the convulsions the patient should be placed so as not to injure himself. On recovering, the bowels should be well opened and a warm bath given. When they occur in typhus towards the end of the disease they are invariably fatal, and remedies are useless; but in scarlet fever they are not usually fatal, so that when the patient comes out of them he should be bathed and purged.

Infants. When it is necessary to feed by bottle, the milk should be from one and the same cow, and there should be two bottles, so that the one may be thoroughly cleaned after it has been used. No more milk and water should be placed in the bottle than the child is likely to take at one time, and if it do not empty the bottle, the remainder should be thrown away.

These are the outlines of the treatment as applicable to all the acute infectious diseases, but in carrying them out the following observations should be borne in mind:—

"Et sane mihi nonnunquam subiit cogitare, nos in "morbis depellendis haud satis 'lente festinare,' tardius "vero nobis esse procedendum, et plus naturæ sæpe- "numero committendum, quam mos hodie obtinuit. "Errat enim qui naturam artis adminiculo ubique "indigere existimat." (*Sydenham.*)

CHAPTER III.

SCARLET FEVER.

Definition. An acute infectious disease characterised by an inflammation of the fauces and an eruption on the skin.

Synonyms. Scarlatine (Fr.); Scharlachfieber (Ger.); Scarlatina (Eng.).

History. That scarlet fever existed among the ancient Greeks appears to be clear from the following case :—

"A woman who resided with Ariston had a bad sore "throat. Her illness began somewhat obscurely about "the tongue, which was dry and red, whilst, at the "same time, the voice was lost. On the first day she "had chills, followed by fever. On the third she had "a rigor and high fever. On both sides of the neck "and chest there was a hard red swelling. The breath- "ing was short and interrupted, and the extremities "were cold and livid. She was unable to swallow, the "drinks being returned by the nose. The bowels were "bound, and she passed no water. On the fourth "day she became worse, and on the fifth she died." (*Hippocrates.*) There is, moreover, an aphorism which describes one of the most characteristic incidents of the disease. "If in a person suffering from fever the neck "be twisted round, and he be not able to swallow, and "there be no swelling of the neck, this is a fatal sign."

(Sec. vii., Aph. 58.) Had Hippocrates been able to recognise that this symptom was evidence of post-pharyngeal abscess, he might have opened it and saved his patient. From this time to the sixteenth century it was confounded with measles, erysipelas, and other eruptive diseases; but in the year 1550 it is briefly alluded to by Ingrassia of Palermo (*Haeser*), and in the following century, in the year 1627, it is graphically described by Sennert. Generally about this time the disease appeared to have been known as rossania, rossalia, rubeolæ, morbilli ignei (the red measles, or rötheln, roteln of the moderns), (*Haeser*). It is described very imperfectly by Sydenham, who had evidently only seen its milder forms; but he appears to have been the first physician who clearly recognised it as quite distinct. His contemporary Morton did not quite clearly separate it from measles.

Etiology. Scarlet fever arises from infection. It may be inoculated by fluid from the vesicles (*Bristowe*), but it is doubtful if this may be effected by means of the desquamated scales (*Squire*). It may be communicated by infected clothing, and there are some interesting stories of the lengths of time such clothing may preserve its injurious quality. One attack usually protects from another, but second and even third attacks are recorded (*Richardson*). This however is very rare. Individual susceptibility is an important factor; some persons, such as hospital servants, being exposed to it for years with impunity, whereas others take it from a single exposure. It exists sporadically at all seasons of the year, is at its minimum in spring and summer, and at its maximum in autumn and winter. It occurs generally throughout

the world (*Bristowe*), but it does not take root in India (*Fayrer*). It is most common among children under five, after which age it rapidly declines; and of those under five the majority of cases occur from three to four (*Richardson*). "It is certain that "women at the time of parturition are specially liable "to take it, receiving it then in some cases apparently "direct from the fingers of the accoucheur" (*Bristowe*). Surgical operations (*Paget*) and injuries such as burns are said to predispose to it; but of the majority of such cases which have come under the writer's observation he has not been satisfied that they were cases of scarlet fever. There was however this much in favour of the diagnosis; the patients, although placed in scarlet fever wards, did not contract the disease, and there is no doubt whatever of the correctness of Sir James Paget's cases. It should be added that if the operation predisposed to the disease, as conceivably it might do, so far as the writer's experience goes it almost invariably predisposed to a mild form of it. Relapses are said to occur (*Richardson*), but they are exceedingly rare. The incubation period varies from some hours to some days. It may be as short as three hours (*Squire*). Probably it rarely extends beyond a week. The following case in which it was only eleven hours came under the writer's own observation :—

"On the evening of Tuesday, June 3rd, 1884, about "10 p.m., I saw in the wards a case with a doubtful "rash, which had been sent in as a case of small "pox.

"Next morning at 9 a.m. I could not touch breakfast. "I went into the wards, but after an hour or two had "to leave them, as any exertion caused a feeling "of nausea.

"In the afternoon I saw patients off by the "ambulances, but felt feverish and uncomfortable.

"My head felt dull and stupid, and my throat "began to get sore. I spent a bad night. Next "day (Thursday) my throat was worse, mouth dry, "tongue red.

"I felt inclined to do nothing but sit in front of the "fire. I had no appetite. Urine was scanty and high "coloured; bowels opened freely after pills taken the "night before. My sleep at night was bad, and I was "rather light-headed.

"On Friday my throat was worse. I felt very weak; "slept a good part of the day; took warm bath in the "evening and noticed skin was red, but paid no "particular attention to this, as there had been no "sickness. Sleep as before.

"On Saturday, on waking, I noticed a rash on the "back of the hands.

"The feeling of tightness in the hands and feet had "disappeared. Throat better, and felt better generally. "Head, which had caused most discomfort throughout, "felt better. Rash well out in afternoon. I was then "sent to bed" (*Assistant Medical Officer, Eastern Hospital*).

There appears to be some causal relation between scarlet fever and disease affecting the cow. An epidemic of the former occurred in London in 1885 in the districts of South Marylebone, St. Pancras, Hampstead, and Hendon. This epidemic was traced to the use of milk supplied by a dairy farmer at Hendon (*Power*). It was shown that at this farm were certain diseased cows, whose milk was probably contaminated by the matter of sores on their teats in the process of milking (*Klein*). It was further shown

that this disease was communicated from cow to cow by inoculation; that inoculation from cultures produced similar effects, and that the *post-mortem* appearances in the inoculation from cow to cow and in those from culture bore a strong resemblance to the *post-mortem* appearance of scarlet fever. It was noted amongst other resemblances that "Peyer's glands are "much swollen and inflamed"; that the changes in the kidney "completely coincide with those in acute "scarlatinal nephritis in man; great congestion of the "cortex, leading in some parts to hæmorrhage into the "parenchyma; glomerulo-nephritis with exudation of "albuminous fluid and blood into the cavities of the "malpighian corpuscles; granular or opaque swelling "of the epithelium of the uriniferous (convoluted) "tubules with degeneration into granular débris of "many of the epithelial cells; miliary foci of aggrega-"tions of round cells around small blood vessels; con-"gestion of the medulla" (*Klein*).

Anatomical Characters. Scarlet fever produces changes in the tonsils, the fauces, the skin, the glands of the neck, the kidneys, the mesenteric glands, Peyer's patches, and the mucous and serous membranes; but for the most part these are not characteristic. The "angina is indistinguishable *per se* from ordinary "simple erythematous sore throat, or from the pellicular "angina (pharyngeal herpes), which forms so large "a proportion of the sore throats popularly styled "diphtheritic" (*Gee*). Pneumonia, lobar and lobular, pleurisy, pericarditis, myocarditis, endocarditis, peritonitis, and rheumatism present nothing peculiar. In nephritis, rhinitis, conjunctivitis, corneitis, otorrhœa, and eruptions about the nose and about the ear, there is

nothing characteristic. When renal disease arises, "yet there is no difference in the appearance of the "kidney itself, whether the cause be scarlatina or "simple exposure to cold" (*Wilks and Moxon*). The eruption is indistinguishable from the initial eruptions which sometimes appear in small pox, and from the red rashes which are seen in the hæmorrhagic forms of that disease. There are, however, two anatomical conditions which, when they occur, are characteristic of scarlet fever. These are the desquamation and the indurated swelling of the neck. The former, it is true, is met with in measles and in other diseases, but in these it is usually slightly marked and powdery; whereas in scarlet fever it is thrown off in large patches, which often form casts of the fingers and toes. There is nothing like this in any other disease, and this condition would of itself be sufficient to justify the diagnosis of the scarlet fever. Swellings of the neck arise from many causes, but the swelling of the whole neck, glands, and connective tissue, which occurs in some cases of scarlatina, is characteristic of that disease, although it is a condition which is not infrequently taken for diphtheria. The latter disease, however, occasionally complicates this form of scarlet fever, when it may be seen in patches about the nostrils, the mouth, and lips, and after death in the fauces, the larynx, the trachea, and the bronchi.

Symptoms. These may be described under the following heads: (*a*) Scarlatina Latens;. (*b*) Scarlatina Simplex; (*c*) Scarlatina Ulcerosa; and (*d*) Scarlatina Maligna.

Scarlatina Latens. This is a form of the disease in which the symptoms are so mild that neither the

patient, his friends, nor the physician under whose observation he may accidentally come recognise its existence. It is occasionally recognised (*a*) by the occurrence of well-marked forms in a family where one member had previously suffered from what was supposed to be a slight cold or a simple sore throat; (*b*) by the appearance of general desquamation; and (*c*) by the occurrence of general dropsy. The writer believes that there is a considerable number of such cases. Several such he has met with, and he thinks that they may explain the origin of otherwise obscure epidemics.

Scarlatina Simplex. This the most common form of the disease usually commences with a sense of discomfort in the fauces. There is usually more or less difficulty of swallowing, and pain at the angles of the lower jaw, which are soon followed by nausea and vomiting. At the same time there is more or less fever, which may be high (without special significance, especially in children), 105° F. or more, headache, pains in the limbs, shivering and weakness. Some time about the second day, in some cases earlier, in others later, a red eruption appears on the skin. It is seen:—

"First on the chest, and simultaneously, or very "soon afterwards, on the forearms, lower part of "the abdomen, and upper part of the thighs. It be- "comes general in the course of four-and-twenty hours, "more or less, and attains its full development on the "third or fourth day.

"It consists, in the first instance, of very minute "rosy papules, due for the most part (as those of so- "called goose's skin) to the conical elevation of the "cutis around the points of emergence of the hairs;

"hence they are closely and pretty uniformly arranged, "but discrete and separated from one another by "healthy skin.

"But they soon increase in size and intensity of "redness, and presently, blending with one another "by their congested margins, give to the surface a "uniformly scarlet hue." (*Bristowe.*)

When it is fully out, it is most marked on the neck, chest, abdomen, and forearms. It may be of all degrees of intensity, from a light red flush to a dark crimson. It is indeed sometimes so light that it is not recognised, and at other times so dark that it cannot be missed. Throughout this general redness, very minute papules may be seen, and minute vesicles which contain a straw-coloured fluid. The face, hands, and feet are sometimes swollen, and the latter feel stiff and tight. The tongue is usually covered with a dirty-white fur on the centre and sides, but at the tip and edges it is red, and the papillæ are elevated. There is usually some thirst, more or less restlessness, sleeplessness, and loss of appetite. If the fauces be examined they will be found red and swollen, the tonsils sometimes to such a degree that they meet. There is hardly any ulceration in such cases; but occasionally individual follicles burst and discharge their contents, which coagulating form grayish-white specks dotted over the tonsil. Sometimes the contents are carried away, and then little cavities may be seen in the tonsil, and occasionally several of the follicles burst in a line and discharge their contents, when the tonsil looks as if it had been cut clean through with a knife. During the few days following the commencement of the disease the symptoms go on increasing in severity, until about the fourth, fifth, or sixth day, when the

temperature falls, the faucial symptoms diminish in intensity, the tongue cleans and desquamates, leaving the mucous membrane exposed and the papillæ very distinct (strawberry tongue). The patient feels distinctly better generally, begins to swallow with comfort, to have a moderate amount of sleep, and in a day or two he is practically well. Along with these changes the eruption fades, first from the face and neck, then from the chest, forearms, and abdomen, and lastly from the legs and feet. As it fades the desquamation begins. This is first seen about the roots of the hair, along the eyelids, on the outer and inner angles of the eye, the wings of the nose, the ears, the mouth, the chin, the neck, and so on downwards to the feet, where it is seen last. On the face the desquamation is fine and powdery; on the neck, chest, and abdomen it is scaly, and from the feet and hands it comes off in large patches, which occasionally take the form of the fingers and toes. The duration of the period of desquamation varies greatly. In some cases it is complete by the end of the fourth week; in others by the end of the eighth, and occasionally it extends to the fifth or even the sixth month. In the majority of cases scarlet fever is of this kind. By the end of the week the patient is practically well, and has no further trouble. In a certain comparatively small number, however, the disease, although of this form, does not end with the week. Sometimes during the third week from the commencement of the disease the patient sickens, loses his appetite, and suffers more or less from fever. Sometimes he is suddenly convulsed. Very soon after he becomes more or less swollen. This indicates that the disease has attacked the kidneys. And here it is important, having regard

to the treatment of a patient who has apparently recovered, and who truly in the majority of cases has recovered, to remember that the nephritis has no relation to primary severity of case. On the contrary, severity of case, as indicated by the faucial and other symptoms, is sometimes so slight that it is not recognised, until the effect of the disease upon the kidney draws attention to it. In the majority of cases it need not give rise to alarm, because with ordinary care it usually ends in recovery even when the dropsy is general and severe. It is usually more or less general, but the intensity varies from slight puffiness of the eyelids and slight pitting of the extremities, up to profuse abdominal, pleural, and pericardial effusion. Occasionally there is œdema of the lungs, and then the patient dies. The urine is diminished in quantity, and occasionally it is suppressed. It is of a dark colour ("smoky," as the phrase is), red or black, more or less bloody in fact, and of high specific gravity; and on the application of heat or some other test more or less albumen is found. This is the general condition of the urine, but it varies widely. In some cases nothing is found but a little albumen; in others there is a great deal, with much blood and hyaline and epithelial casts. The duration of the kidney affection varies from a few weeks to a few months. In the majority of cases recovery does at last take place, but in a few the kidneys become disorganised and the patient dies. This possible effect of the disease on the kidneys should always be borne in mind in mild cases, because it is in these not infrequently that kidney affection follows.

Scarlatina Ulcerosa. In a certain number of cases

the disease does not end by resolution of the faucial inflammation, but proceeds to ulceration. The illness is then prolonged beyond the first week, the prolongation depending upon the extent and severity of the ulceration. This may affect portions of one or both tonsils, or the whole of both tonsils ; and in such cases the duration of the disease may be two, three, or more weeks. It is in this class of cases that various complications arise. There is usually more or less swelling of the glands of the neck, and sometimes the disease affects the nostrils, the ears and the eyes, giving rise to muco-purulent discharges from these organs. Sometimes along with the glandular inflammation there is an inflammation of the connective tissue of the neck, the result being that the neck becomes more or less indurated. This varies in extent ; but it may extend from both ears throughout the neck, as far as the sternum downwards, and outwards as far as the external ends of the clavicles. The characteristic of this is its slowness to suppurate, and when it does it is in small isolated areas. It does not form an abscess and point. The suppuration sinks deeply between the muscles, and dissects them out very distinctly. Occasionally the carotid artery is laid bare, and sometimes there is sloughing.

Scarlatina Maligna. This is characterised by great prostration, sunken eyes, extreme feebleness of pulse, coldness of the extremities, irregular, dark livid eruption, extreme restlessness, and speedy death.

Course, Termination, Complications, and Sequelæ. The course of scarlet fever in the great majority of cases is favourable, and the termination recovery ; but in children under five, especially those

of the destitute poor, it is often fatal. Of complications, the most common are laryngitis, diphtheria, lobular pneumonia, and rheumatism, which come on usually towards the end of, or immediately after, the primary fever. The laryngitis and the diphtheria are usually fatal. The rheumatism is generally mild, confined for the most part to the smaller joints; but occasionally, if very rarely, it is severe, and is accompanied by pericarditis and endocarditis, which result in permanent heart disease. Noma is an occasional occurrence. It is most common on the cheeks. It begins on the inner surface as a dark patch, which gradually extends outwards and sidewards, until occasionally the whole cheek is involved; but this is very rare. Occasionally, owing to sloughing, an artery is ruptured, and the patient dies of hæmorrhage. Jaundice is a rare complication. Once the writer has met with scarlet fever in a pregnant woman. Of *sequelæ*, omitting the kidney affection and desquamation, which have been described under *Scarlatina Simplex*, the most common is enlargement of the glands of the neck, which may end in resolution or in the formation of an abscess. Occasionally an abscess forms behind the pharynx, and in the mastoid process. Conjunctivitis and keratitis are occasional sequelæ. Occasionally, but very rarely, there is destruction of the internal ear, disease of the temporal bone, and abscess of the brain occurring long after. Very rarely acute mania is met with. Hooping cough is not infrequent, and the writer has met with acute tuberculosis, with peritonitis and with suppurative myocarditis.

Diagnosis. Scarlatina commences with a sense of discomfort in the fauces, with some difficulty in

swallowing, and usually more or less pain at the angles of the lower jaw. These symptoms are followed, sometimes in a few hours, rarely in more than forty-eight, by the rash which has been described. The presence of this rash distinguishes it from quinsy. Diphtheria is characterised by the presence of greyish-white patches fringed by a rosy red border of the mucous membrane, and usually an absence of pain. Measles begins in the larynx with a short dry cough, followed by running from the nose and eyes, and an eruption about the fourth day. This is most marked on the face, particularly on the cheeks, where it is frequently in the form of a large confluent patch, which to the touch is smooth and distinctly raised. The measly eruption, moreover, is crescentic, except where it is confluent on the face. The initial eruptions of small pox are indistinguishable sometimes from scarlet fever eruptions, and when small pox is about this should be borne in mind. If there be marked faucial affection, the disease is probably scarlet fever. If, on the other hand, there be much pain in the back, the diagnosis should be guarded until the third day of the disease be passed, when the presence or absence of papules will make the diagnosis clear. If blue-black spots be found in the scarlet eruption, or there be hæmorrhage into the conjunctivæ, in particular if it form a ring round the pupil, or there be hæmorrhage from the mucous surfaces, the case is one of hæmorrhagic small pox. Erythematous rashes arise from various causes, and may sometimes give rise to a little difficulty in forming a diagnosis. They are met with sometimes in enteric fever, and fine desquamation has occasionally, if rarely, followed such. The history of the case and the continuance of the fever after the rash had disappeared, with the other symptoms

of enteric, would exclude scarlet fever; and generally if it be remembered that scarlet fever is something more than a red rash, there may be no difficulty in the diagnosis.

Prognosis. Scarlet fever varies much in respect of intensity at different periods, and therefore it is very important in prognosis to take into consideration the epidemic constitution. In the time of Sydenham—or, more correctly, in Sydenham's practice—it was so mild that he termed it "hoc morbi nomen vix enim altius assurgit;" and Bretonneau states that from 1799 to 1822 he could not remember to have seen a scarlet fever death. In 1824, however, the disease became epidemic in Tours and its neighbourhood, the mortality was great, and then Bretonneau found out that scarlet fever might be as fatal as typhus, cholera, or the plague (*Trousseau*). In Ireland it was very fatal from 1800 to 1804, but from thence to 1831 it was very mild (*Graves*). The epidemic constitution then, whether of the village, the district, or the city, should always be taken into consideration in prognosis. Next in importance is the severity of the individual case. If the disease be of the form which has been designated *Scarlatina Simplex*, the prognosis is usually favourable, but the possibility of the disease affecting the kidney, or producing swellings in the neck, should not be forgotten, whilst, at the same time, it should be remembered that with care such cases usually do well. If there be great swelling of the glands of the neck, and, in particular, if, there be combined with this much cellulitis, the prognosis is unfavourable. Malignant scarlet fever is invariably fatal, but malignancy should not be hastily assumed. Diphtheria or laryngitis is usually fatal. Convulsions

during or preceding the affection of the kidneys are not necessarily fatal, even if repeated for several days. Age is a most important factor in the prognosis of scarlatina. It is most fatal under five. From this age it declines until from 20 to 24 (*see* Charts) it reaches its lowest point, then rises somewhat up to forty, again to decline. Of 820 fatal cases treated by the writer, 460 were under five; 269 between five and ten; 72 between ten and fifteen; and 19 between fifteen and twenty. The social position of the patient and his sanitary surroundings should not be left out of account, because whilst the disease is exceptionally severe amongst the destitute poor, amongst the well-to-do it is usually so mild that physicians in good practice pass years without seeing a death from it. The tables given on pages 46-48 show the deaths and the mortalities at the quinquennial periods of the cases admitted into the London, Stockwell, and Homerton fever hospitals during the ten years 1871-80.

Treatment. In very mild cases it will be sufficient to confine the patient to his room until the desquamation has quite ceased. In others it will be necessary to exercise more care. During the acute stage, the patient should be fed on beef tea, chicken broth, milk, eggs, and bread. He should have a tepid bath at least once daily, his mouth and fauces should be kept scrupulously clean by means of tepid water, and if there be a discharge from his nose, or his ears, these should be syringed as often as may be necessary with tepid water, to which a little of a suitable disinfectant has been added, and if there be a discharge from the conjunctiva the eyes should be bathed as often as may be necessary with cold water. If the fever be high, or the patient

LONDON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	24	5	4	16	82	76	41	38	85	84	455	9	3	2	4	16	20	11	16	25	25	131	28·79
From 5 to 9 years	43	9	10	43	120	126	75	91	152	146	815	12	...	...	4	17	16	13	13	14	12	101	12·39
,, 10 ,, 14 ,,	43	6	3	39	94	61	70	66	67	94	543	2	1	...	2	4	3	3	6	6	2	29	5·34
,, 15 ,, 19 ,,	75	11	12	41	85	96	60	63	81	91	615	8	...	...	2	3	2	4	...	2	6	27	4·39
,, 20 ,, 24 ,,	50	21	11	37	95	96	64	58	61	104	597	3	1	...	2	3	5	...	3	1	2	20	3·35
,, 24 ,, 29 ,,	24	13	2	20	32	43	40	26	31	40	271	1	1	...	...	4	2	...	2	1	1	12	4·42
,, 30 ,, 34 ,,	3	1	3	6	8	11	12	7	21	17	89	...	...	1	...	...	2	..	...	1	1	5	5·61
,, 35 ,, 39 ,,	2	...	...	2	6	8	5	6	3	4	36	...	...	...	...	1	...	...	...	2	1	4	11·11
,, 40 ,, 44 ,,	2	1	...	1	4	3	6	1	4	3	25	...	...	...	...	...	...	...	...	...	...	...	...
,, 45 ,, 49 ,,	...	...	...	2	1	...	2	...	...	1	6	...	...	...	...	...	...	...	...	...	...	...	...
50 years and upwards	2	...	...	...	...	...	...	1	1	1	5	1	...	...	...	...	...	...	...	...	...	1	20·00
Age not stated...	...	1	...	...	...	...	...	...	...	...	1	...	...	...	..	...	...	...	...	...	...	...	...
	268	68	45	207	527	520	375	357	506	585	3,458	36	6	3	14	48	50	81	40	52	50	330	9·54

STOCKWELL FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	2	5	67	117	93	61	...	205	211	764	...	...	1	12	33	19	15	...	55	51	186	24·34
From 5 to 9 years	...	3	9	107	243	162	123	...	314	338	1,299	...	...	1	11	32	29	15	...	41	43	172	13·24
,, 10 ,, 14 ,,	...	5	6	54	111	66	56	...	140	137	575	...	...	...	2	6	6	2	...	13	10	39	6·78
,, 15 ,, 19 ,,	...	6	14	28	80	41	44	...	73	56	342	...	...	...	...	6	4	1	...	1	4	16	4·67
,, 20 ,, 24 ,,	...	1	6	18	37	29	20	...	34	44	189	...	...	...	...	2	...	...	...	3	3	8	4·23
,, 25 ,, 29 ,,	....	...	3	8	14	15	13	...	25	14	92	...	...	...	...	3	1	1	...	1	2	8	8·69
,, 30 ,, 34 ,,	...	...	1	3	13	8	9	...	9	10	53	...	...	...	...	1	...	2	...	...	2	5	9·43
,, 35 ,, 39 ,,	...	...	2	1	6	1	1	...	9	3	23	...	...	...	...	...	1	...	...	2	...	3	13·04
,, 40 ,, 44 ,,	...	...	...	...	1	...	1	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
,, 45 ,, 49 ,,	...	...	...	...	...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	1	..	1	50·00
50 years and upwards	...	...	...	...	2	...	1	...	2	...	5	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated...	...	...	...	...	...	...	...	335	...	...	335	...	...	...	...	...	...	...	48	...	...	48	...
	...	17	46	286	624	415	329	335	813	816	3,681	...	...	2	25	83	60	36	48	117	115	486	13·20

HOMERTON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	7	10	84	115	56	49	43	189	217	770	...	4	2	21	35	16	10	22	48	43	201	26·10
From 5 to 9 years	...	20	12	173	207	94	51	74	273	323	1227	...	2	1	22	23	5	3	12	34	32	134	10·92
„ 10 „ 14 „	...	22	11	70	99	49	27	21	114	125	538	...	1	...	7	6	4	4	7	9	6	44	8·17
„ 15 „ 19 „	...	13	6	31	47	38	10	19	42	48	254	...	1	1	...	2	3	...	1	2	1	11	4·33
„ 20 „ 24 „	...	7	5	21	24	9	6	11	16	32	131	...	1	...	3	1	...	...	...	...	1	6	4·58
„ 25 „ 29 „	...	4	1	8	6	3	1	3	8	16	50	...	...	...	1	...	2	...	1	...	1	5	10·00
„ 30 „ 34 „	...	5	...	6	2	3	4	1	5	5	31	...	2	...	2	1	...	1	...	...	...	6	19·35
„ 35 „ 39 „	...	1	...	1	3	...	...	...	6	2	13	...	...	...	1	...	...	...	...	1	...	2	15·38
„ 40 „ 44 „	...	...	...	...	3	...	1	...	2	1	7	...	...	...	...	...	...	...	...	...	...	...	...
„ 45 „ 49 „	...	...	...	...	...	...	1	1	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...
50 years and upwards	...	...	...	1	...	2	...	...	1	...	4	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated...	...	13	...	1	3	2	...	...	...	...	19	...	...	...	...	...	...	...	...	...	...	...	...
	...	92	45	396	509	256	150	173	656	769	3046	...	11	4	57	68	30	18	43	94	84	409	13·43

restless or sleepless, he should have a cool or a cold bath, due regard being had to all the circumstances of the case, bearing well in mind that to a child whose temperature may be 106° Fahrenheit, a bath at a temperature of 70° Fahrenheit will be cold. If the glands of his neck be swollen they should be protected by cotton wool. When the temperature falls he should have a flannel gown and the temperature of his room should be raised to 60° Fahrenheit. His body should, at the same time, be anointed with vaseline, so that the scales may not be blown about; and he should have a warm bath daily. His diet may be changed to fish or chicken, but he should not be allowed meat until the end of the fourth week, when all danger of kidney affection will probably have passed. If diphtheria arise and spread to the larynx tracheotomy should be performed as soon as there is distinct difficulty of breathing, and this should be done even in cases which are hopeless, because of the great relief which is given to great distress. If laryngitis arise the neck should be wrapped in cotton wool, the atmosphere should be moistened, the temperature of the room raised to 70° Fahrenheit, and tracheotomy should be performed when there is distinct difficulty of breathing. Abscesses should be opened when fluctuation can be detected, and in the case of abscess in the mastoid process before this. If difficulty of swallowing arise during convalescence post-pharyngeal abscess should be thought of, and an opening made by the neck or the mouth, as may be most convenient. If dropsy arise, the patient should, if he have been up, be placed in bed, have a suitable purge such as compound jalap powder as often as may be necessary, a warm bath daily, and a milk diet with some bread. During this period the possible occur-

rence of œdema glottidis should be borne in mind, and tracheotomy performed when marked difficulty of breathing arises. Convulsions, which sometimes attend kidney affections, should be treated by suitable purging, and the warm bath. Of the treatment of rheumatism, pericarditis, endocarditis, myocarditis, pleurisy, peritonitis, and other complications which may arise, there is nothing special to be said. It is the same as when these affections arise independently of scarlet fever. The patient should not leave his room before the end of the fourth week, and he should not mix with persons susceptible to his disease until his desquamation be complete, although it cannot be dogmatically asserted that the dead cuticle is infectious.

CHAPTER IV.

ENTERIC FEVER.

Definition. An acute infectious disease, characterised by inflammation of the agminated and solitary glands of the ileum.

Synonyms. Fièvre Typhoïde (Fr.); Abdominal typhus, Ileo-typhus, Darmtyphus (Ger.); Enteric Fever, Typhoid Fever (Eng.).

History. There is some evidence that enteric fever existed in the time of Hippocrates, and a case given in the third book of the Epidemics is probably an instance; but from this time up to the seventeenth century it appears to have been confounded with other diseases. In this century, however, there are descriptions of a fever by Spigelius, Baglini, and Lanius, which was probably enteric, and Sydenham recognised a fever distinct from the "febris pestilens," which was also probably enteric. Various English authors in the eighteenth century distinguish "slow," "low," and "nervous fevers" as distinct from the "febris petechiales," and these, or some of them, were probably enteric. It was not, however, until the year 1813 that the disease was distinctly recognised. In this year it was described by Messrs. Petit and Serres under the name of "Fièvre entero-mesenterique." They pointed out that "the "lesions were limited to the lower portion of the ileum, "and that thus the disease differed from ordinary

"enteritis"; but it was Bretonneau of Tours who first showed that the disease was always localised in the solitary and agminated glands of the ileum (*Murchison*). From this time the disease was known in France as "fièvre typhoïde," but French writers continued to regard it as a modification of typhus. In 1836, Dr. H. C. Lombard, of Geneva, was "the first to state that "there were two distinct and separate fevers in Great "Britain," one of them identical with typhus and the other with enteric. About the same time "Gerhard "and Pinnock, of Philadelphia, were arriving at the "same conclusions, from observations of an epidemic "of typhus which prevailed in that city in the spring "and summer of 1836." In the year 1840 the disease was described by Dr. A. P. Stewart. "He "pointed out more accurately than any previous "observer the differences of the eruptions; and he "remarked that the characters of the two diseases, "when taken collectively, were so marked as to defy "misconception, and to enable the observer to form, "with the utmost precision, the diagnosis of the nature "of the disease and the lesions to be revealed by "dissection."

Finally, between 1849 and 1851 "Jenner confirmed "and amplified the distinctions between the symptoms "of the two diseases previously drawn by Gerhard, "Stewart, and others, and did much to facilitate their "diagnosis." (*Murchison*).

Etiology. Enteric fever is a specific disease due to a specific cause. It is met with in almost every part of the world. It occurs at any period of the year, but prevails most in the autumn months. It affects both sexes about equally, and all ages; but it is essen-

tially a disease of early life, the majority of the attacks occurring between the ages of ten and twenty-five. Its cause has given rise to much discussion. It has been maintained by Dr. Budd that it is infectious, that is, communicable from person to person by direct personal intercourse. In support of this view, Dr. Budd showed how the disease spread through a household; how the inmates were attacked successively, and how persons sick of it transported it into new localities. The experience of the Homerton Fever Hospital is in entire accordance with this view. Thus, during the eleven years that this Hospital has been open as a fever hospital, thirty of the attendants contracted enteric fever, twenty-eight of whom were nurses of enteric fever patients. On this point the experience of the Homerton Small Pox Hospital is very interesting. From February 1st, 1871, to September 19th, 1879, 6,771 cases of small pox and 171 cases of scarlet fever had been treated there, and during the same time about 487 persons had been employed in attendance upon the sick and otherwise; but during all that time, a period of about nine years, no case of enteric fever had occurred among these 7,000 persons, a large number of whom, being young persons, were of the susceptible age. But on September 29th, 1879, the Homerton Small Pox Hospital was opened for enteric fever, and within six weeks there were two cases among the nurses who nursed it, followed by a third a little later, and by a fourth at the end of three months in the person of a porter who bathed the male enteric patients. On February 7th, 1880, the small pox hospital was closed for enteric fever and reopened for small pox; and from that time to this there has been no enteric fever in the

Homerton Small Pox Hospital. The experience of the Homerton Fever Hospital is essentially the experience of the other fever hospitals. Thus, in the six years 1878-83 eight nurses contracted enteric fever in the London Fever Hospital; and during the same years seven nurses contracted enteric fever in the Homerton Fever Hospital. The Hampstead Hospital was opened for enteric and scarlet fever in October 1882. Very few cases of enteric were admitted until the autumn of 1883, when the wards were full. Then three cases arose, two amongst nurses who were nursing enteric patients, and one in a housemaid who frequented an enteric ward. The experience of the general hospitals is similar to that of the special hospitals, of which the following is a striking example.

"The Committee regret to inform the Governors "that during the latter part of the year seven nurses "were laid up with typhoid fever, one of whom unfor- "tunately died. Although the drains of the hospital "had been carefully inspected so recently as last "spring, the Committee considered it desirable to "have them again thoroughly examined. This was "done on two separate occasions, under the direction "of Mr. Yuill, a member of the Committee, who has "had great experience in such investigations, and Mr. "Harvey, the architect, when powerful tests were "applied to ascertain whether any defects existed; "and the Governors will be glad to hear that nothing "was found in the condition of the drains that could "account for the illness of the nurses. All the nurses "who were laid up with typhoid fever had been en- "gaged in nursing typhoid cases; and this fact would "seem to indicate that the opinion of the medical pro- "fession as to the non-infectiousness or non-conta-

"giousness of typhoid fever may probably, in the "course of time, have to be reconsidered."—(*Annual Report of the Royal Free Hospital*, 1883.)

Dr. Donkin and Dr. Sharkey record, in the *British Medical Journal* of November 6th, 1880, similar experiences in respect of the Children's Hospital at Shadwell, and St. Thomas's, and in the same number Dr. McNeill describes an epidemic of enteric fever which was imported into Colonsay, and spread apparently in no other way than from person to person.

This epidemic is so remarkable that I shall give the account of it in Dr. McNeill's words :—

"The Island of Colonsay lies off the west of Argyll- "shire. It is separated from the neighbouring islands "of Mull, Jura, and Islay by belts of the Atlantic, "twelve to eight miles broad. Small eminences and "intervening hollows, scarcely deserving the name of "hills and valleys, make the surface of the island very "irregular. The soil of the valleys is peat, clay, sand, "and gravel, pure and in combination. The valleys "are generally cultivated. The hills are mostly made "up of hard whin rock, covered with a thin layer of "peaty soil, giving growth to a fine crop of heather. "The population in 1871 was 456. The people are "distributed all over the surface of the island, so that "at any place there are not more than a dozen families, "within several hundred yards of each other. With "the exception of a few fishermen, the people are all "given to agriculture. They generally build their "houses in the valleys, or a little way up the hills. "They never meet in large numbers, except at kirk, "at a wedding, or a funeral. Typhoid fever broke out "in six houses. Three had the disease in the first "house, four in the second, two in the third, one in the

"fourth, five in the fifth, and one in the sixth. With "the exception of one man, all the patients were under "thirty years of age. The distance between the houses "in which the disease broke out, with the exception "of the second and third, was more than two miles. "Between those two there was only a distance of about "one hundred yards of level ground. All the affected "families got their water supply from different wells. "Each family had a sufficient number of cows to pro- "vide their own milk. Their other provisions were got "from various sources. They had no drainage in "common. The subsoil water could not possibly "permeate from the premises of any one of the families "to those of another, as rocky eminences, cultivated "valleys, and lakes, intervened between all the houses, "with the exception of the second and third; these two "got their water supply from two different wells, with "a distance between the wells of about two hundred "yards of level ground. None of the houses had a "sewer in connection with it. The bed-pan was used "for all excretions, and emptied immediately, at a safe "distance from the house.

"During the epidemic, carbolic acid was poured into "the utensil before use, and immediately after use the "contents were poured into a hole dug in the earth, "forty or fifty yards from the house, and covered over "with chloride of lime and earth.

"When I visited the island in April, the first family "were convalescent, and the second family were suffer- "ing from the fever. At first, I thought that the "impure water which the family drank was the cause "of the disease, as the water was renewed by the "drainage of a manure heap. On inquiry, I found that "three other families drank the same well water, and

"they were all in perfect health. I was also told that "the well must have been polluted in the same way for "years, and no one was anything the worse for it. On "further inquiry, I was told that a servant girl went "home to the island from Bridge of Allan, four or five "months before, in a state of ill-health ; and that this "girl was a particular friend of the first member of the "second family that suffered. This was probably the "origin of the whole epidemic, as will be afterwards "shown.

"*First Family.* A member of this family was the "servant girl already alluded to. From the description "which she gave me of her illness, I came to the con- "clusion that she suffered from typhoid fever. As soon "as her employers in Bridge of Allan could get quit "of her, they sent her home to Colonsay. Her clothes "were not washed, and she suffered from diarrhœa after "going home. Her mother and sister washed her "clothes. In a short time, her brother and two sisters "had an attack of fever and diarrhœa. The father and "mother, who escaped, were considerably above forty "years of age. This family lived in a house about "two and a half miles from the second.

"*Second Family.* The first member of the second "family that suffered was a particular friend of the girl "who came home from Bridge of Allan. She went to "see her friend, and remained a night, nursing her "brother and sisters. Between two and three weeks "afterwards, she felt ill, and went through a very "severe attack of typhoid fever. In succession, a "brother and two sisters suffered from the same com- "plaint. This is the family that was ill when I visited "the island in April. The first family was by that "time, as I stated, convalescent.

"*Third Family.* This family lived about one hundred "yards from the second. Some member of this family "used to call on their neighbours daily, to inquire how "they were getting on. In a short time, a daughter "(about twelve) suffered from fever and diarrhœa. "She was not confined to the house longer than a "fortnight. After her recovery, her father (about thirty-"seven) had a very severe attack of typhoid fever.

"*Fourth Family.* As soon as the parents of the last "girl saw fit, they sent her to school. The school-"house was about three miles and a half away. As "the girl was weakly after the fever, her parents "engaged lodgings for her near the school. Her "clothes were washed, but not disinfected, before she "left her parents. She did not suffer from diarrhœa "after leaving her home. She slept with the servant "girl in her new abode. In about a month, the servant "girl became very ill, and suffered from typhoid fever. "This servant girl never visited any of the sick people "before she took ill. She was sent home, a distance "of about six miles, before diarrhœa commenced. No "one in her employer's house suffered after her "departure.

"*Fifth Family.* The servant girl's home was a low, "badly ventilated, two-chambered dwelling-house. "After she went home, the father, mother, and seven "of the family lived in the house. Six of them slept "in one apartment about fourteen feet square, and three "slept in the kitchen. In succession, three sisters and "two brothers suffered from typhoid fever, two of whom "died. A little baby (about one year and a half), the "father (about fifty), and mother (forty-five), escaped.

"*Sixth Family.* When the last family were ill, a "woman came a distance of about six miles and visited

"them. She did not stay in the house longer than ten "minutes. She did not partake of anything in the "house. She noticed a very disagreeable smell from "a recent alvine discharge. She went home, and re- "mained in her usual state of health for three weeks. "At the end of that time she commenced to suffer "from a severe attack of typhoid fever. All who lived "in the house left immediately, except the husband, "and an old woman who acted as nurse. In about "two months she was convalescent. The house was "disinfected, and no one else suffered from the disease. "The nurse was about forty, and the husband consider- "ably above thirty years of age. Both escaped.

"I may mention that the cases occurred in the above "order, and that eleven months elapsed from the time "the servant girl came home from Bridge of Allan till "the last case was convalescent.

"Taken in a straight line, the distance between the "first and the last house is about seven miles. Taken "in a zig-zag way, by which the contagium must have "passed, it is over seventeen miles.

"*Conclusions or Inferences.* 1. The exhalation from "the lungs, skin, urine, or fresh stool, must be infectious, "because the sixteenth case could not have got the "disease in any other way.

"2. There is danger of infection for some time after "the stoppage of the diarrhœa; for the only reasonable "way of accounting for the way in which the servant "girl in the fourth house got the disease is, because "she slept with the girl who suffered from the fever "and diarrhœa a few weeks before. Whether the "breath, the exhalations from the skin, urine, or fæces "contained the contagium, I cannot say.

"3. Persons over thirty are not so susceptible as

"under that age, and over forty they are less susceptible "still, because the father and mother, both above fifty, "escaped in the first house; father and mother, both "above forty, escaped in the second; mother, above "thirty, escaped, but father, above thirty, took the "disease in the third house; husband, above thirty, and "nurse, above forty, escaped in the sixth. All these "had to attend to the sick during their illness.

"4. The period of incubation was twenty or twenty-"one days in the sixteenth case."

The infectious or contagious view has been maintained by the best French authorities, such as Louis, who after discussing the opinions of Leuret, Gendron, and Bretonneau, who all hold that enteric fever is contagious, concludes: "It appears to me henceforth "impossible, after what has preceded, to deny the "contagious character of the typhoid affection even "at Paris, for there can be no doubt of the nature "of the disease observed by M. Bretonneau, M. "Gendron, and those who share their opinions. The "symptoms observed by them during life, and the "lesions found after death, are the same as among "the individuals attacked with the affection of which "we are speaking, 'et comment admettre que la même "maladie soit contagieuse à Tours et à Château-du-"Loir, et ne le soit pas à Paris?'" Trousseau writes to the same effect: "A consideration of the "reports which the Academy receives every year on "the epidemics which prevail in the departments con-"vinces one that 'la contagion de la fièvre typhoïde "est un fait acquis désormais à la science.'"

On the other hand, it has been maintained by Dr. Murchison that it is not in the strict sense of the term contagious, an opinion which he founds upon two facts,

first, that "during nine years 3,555 cases of enteric "fever were treated in the same wards with 5,144 "patients not suffering from any specific fever. Not "one of the latter contracted enteric fever, although it "was not an uncommon practice for them to sit over "the evacuations of enteric patients, and the use of "disinfectants was quite exceptional." Second, that enteric fever rarely affected those who nursed it. Of the truth of the first statement there is no doubt. It is the experience of the other fever hospitals in London, but it does not show that enteric fever is not an infectious disease. It shows that it does not spread any great distance when the ventilation is good, the cubic space abundant, and the general sanitary arrangements good; but that under such circumstances it does not spread far is no evidence that it does not spread at all. By due attention to the conditions just mentioned, typhus, enteric, and scarlet fevers might be treated together with impunity; and when one thinks that the infective matter of the enteric fever patient is for the most part contained in his stools, that these are passed into vessels which are immediately removed from the ward and emptied into the drains, there remains nothing to infect the non-enteric patients in a general ward, and consequently there is nothing surprising in the fact that such patients do not contract enteric fever. The truth of the second, as has been just shown, is not so clear, and the difference in the result is at once explained. The nurses are in close contact with the patients, have to remove their excreta, empty and clean the bed-pans, collect and remove their soiled linen, feed them, clean them, and move them about in bed. Their position, therefore, in relation to the patients is entirely different from

that of the other patients in a general ward, and the difference is shown by the fact that they *do* frequently take the fever; *how* they do so may not be quite so clear. It should, moreover, be remembered that enteric fever is a disease of childhood and youth, and that as a consequence a large number of nurses are protected by a previous attack.

But whilst Dr. Murchison maintained that enteric fever was not contagious in the ordinary or strict sense of the term, he could not explain away the undoubted instances of contagion, and consequently he was compelled to admit that it was in some way communicated from the sick to the healthy—that is, that it was *communicable* and *not-communicable*. The fact appears to be that Dr. Murchison did not accurately interpret his experience. He found at the London Fever Hospital that but a small number of the nurses who nursed enteric fever contracted it, whereas a large number of those who nursed typhus fever contracted typhus, and the contrast apparently led him to conclude that the former was not infectious. He did not sufficiently realise the fact that enteric fever is a disease of infancy and childhood, and that therefore, as in scarlet fever, many nurses would be protected by a previous attack. Unfortunately for susceptible healthy persons the opinion of the profession generally in this country is that enteric fever is not "catching." Great, indeed too much importance, has been assigned to bad drainage in the propagation of enteric fever, and whilst this mode of propagation should always be considered, defective drainage has not that influence in the propagation of enteric fever which has been generally supposed. It was believed at first that in the case of the Homerton nurses drains

were at fault, and these were carefully examined without any obvious defects being discovered. But with the view of removing all possible doubt on this head, the drainage was reconstructed on the most approved principles. The closets and slop sinks were placed in buildings entirely distinct from the wards, from which they were reached by bridges, so that the pollution of the wards by drain air became an impossibility. The soil pipe discharged into an open manhole, and the ventilation of this pipe was obtained by carrying the soil pipe beyond the roof of the building, and all communication with the main drainage was cut off, whilst the drains themselves were flushed twice in the twenty-four hours. Any enteric fever which might henceforth arise in the hospital could not be due to any defect in drains. The new drainage was completed towards the end of the summer of 1884, but notwithstanding three assistant-nurses who were nursing the enteric sick contracted the fever in the autumn, one of whom died.

It is said to be propagated more frequently by the decomposing stool, and some have gone so far as to say that the recent stool is innocuous. What influence decomposition exactly has the writer has no accurate information, but there is very little doubt that the enteric stool is infectious from the first, because at Homerton stools are emptied as soon as they are passed. Nurses at Homerton therefore would not be exposed to decomposing stools unless such were decomposing or decomposed at the time they were passed, which they sometimes are. But although defects in drains and decomposition of the enteric stool have probably been made too much of in the propagation of enteric fever, they should still be regarded as

important factors to be taken into account in any inquiry into the origin of enteric fever. It is conveyed by drinking water (*Buchanan, Thorne Thorne*), and by milk (*Radcliffe, Power, Murphy, Ballard*). It may be conveyed by means of clothing and bedding.

"In 1859 the wife of a butcher residing in the small "village of Warbstowe, situate between Launceston "and Camelford on the Cornish moors, travelled to "Cardiff in Wales, to see her sister, who was ill and "soon after died of 'typhoid fever.' She brought "back her sister's bedding. A fortnight after her "return to Warbstowe, another sister was employed in "hanging out these clothes, and soon after was taken "ill with 'typhoid fever,' which spread from her as from "a centre. The woman who had been to Cardiff never "took the fever herself; there had been no cases in "Warbstowe, previous to her return; neither were "there any cases in the neighbouring villages, either "before or after." (*Murchison.*)

"In December, 1867, two young ladies, living in "country houses about two miles apart, having been "invited to a ball, were measured for new dresses, on "the same day, by the same dressmaker, who went for "this purpose from one of these houses to the other, "staying a considerable time at each. In the course "of a fortnight both sickened for typhoid, and in both "the attack proved to be very severe. They had not "been away from home for several weeks before, and "there was no fever in the immediate neighbourhood. "But at the time when they were measured, the dress-"maker herself had been nursing a child of her own "for several weeks, in a very bad attack of typhoid "fever. For a fortnight or more this woman had "passed a great part of every day with her sick child

"on her lap, and, as there was severe diarrhœa, it is "more than probable that her clothes had become more "or less soiled with the specific excreta." (*Budd.*)

It has been said to arise from diseased meat, and *de novo* from the decomposition of various kinds of filth, but the obvious objection to these statements is that it is an assertion that different causes have the same effects, the specific lesion of the disease being an invariable effect. The proposition moreover from the practical side derives no support. General insanitary conditions and decomposition of filth of all kinds exist along with susceptible subjects in many places, in abundance at all times and in all seasons, with a complete absence of enteric fever. When then, in such circumstances, the disease does arise, it will be clear that some new thing has happened which has determined the new effect, enteric fever. Dr. Budd's observations on the condition of the Thames in the summers of 1858 and 1859 show that there is no necessary connection between "filth," decomposition, and enteric fever. It has been maintained by Pettenkofer and Buhl, that in Munich the disease appears when the well water sinks, and Buhl even asserts that "the magnitude of the outbreak depends upon the "rapidity of the fall, but that when the water again "rises the fever disappears, and this quickly if the "water rises quickly, slowly if the reverse occur" (*Thorne Thorne*). This view has not met with much acceptance, and is noticeable chiefly because it is in entire opposition to what occurred at Terling, where a severe epidemic "did not coincide with the period when "the wells were low, but on the contrary evidently "dated from the time when the water was regaining "a high level" (*Thorne Thorne*).

The disease is constantly present in our large towns, but occasionally it prevails as an epidemic, especially in small towns and villages. It has no necessary connection with poverty and its attendant circumstances. . . . As a rule, one attack confers immunity from another.

Anatomical Characters. The distinctive anatomical feature of enteric fever is an inflammation of the solitary and agminated glands of the ileum. The former are so much swollen as to resemble the papules, vesicles, or pustules of small pox; the latter are distinctly raised above the mucous membrane, have a sharply-defined edge, and a reticulated surface. The extent of the intestine affected varies, but the disease is most marked at the ileo-cæcal valve and the adjoining two feet of intestine, although now and again a higher patch may be more severely affected than a lower one. For the most part the morbid changes are confined to the ileum, but occasionally the solitary glands of the ascending colon are affected. The inflammation may end in resolution, or go on to ulceration, gangrene, or sphacelus. When resolution takes place the patient usually recovers, but occasionally, although very rarely, death occurs in the inflammatory stage without any ulceration, as may be seen in Plate II. If the morbid process continue, the inflammation ends in ulceration, which may be of all degrees of severity, both in respect of depth and extent. In respect of depth the ulceration may be classified as follows: (*a*) ulceration not extending through the mucous membrane; (*b*) extending through the mucous membrane but not affecting the muscular membrane; (*c*) affecting the muscular tissue but not affecting the serous; and (*d*) affecting all four, and so perforating the intestine. In respect of

the extent of bowel affected, this, as shown *post-mortem*, will vary, reckoning from the valve, from eight inches to five feet. In all cases, however, the ulceration is most complete towards the ileo-cæcal valve, from whence upwards it diminishes in intensity, gradually fading into simple congestion, and this into complete health. Of the various degrees of ulceration mentioned all may be found not only in the same case but in the same patch. Thus in one part of the patch the ulceration will be seen to affect only the mucous tissue, leaving the muscular tissue untouched; whilst in another part of the same patch the muscular tissue will have disappeared, leaving the serous membrane exposed. In many instances the muscular fibres will be seen fading into the serous membrane, whilst some of them seem to have disappeared interstically, leaving the serous membrane exposed in narrow spaces between the muscular fibres, which look like fine lines. Occasionally a perforation is met with. This combination of degrees of ulceration is usually best seen some distance from the valve. There the conditions most frequently met with are :—(*a*) complete ulceration of the mucous or muscular membranes affecting the whole patch; or (*b*) sloughing of the patch in the form of large knobby sections, separated by deep fissures which exhibit the serous membrane as a very narrow streak at the bottom of the ulcer. In the midst of great variety these are the most common appearances met with, and they are found most marked in the terminal two feet. Further up the intestine, as the disease diminishes in severity, the ulceration is less complete and more irregular. In one patch there may be a slough in one part and healthy tissue in another part; in a second there may be in one part ulceration of the mucous membrane; in another

part, of the muscular membrane; and in a third part, of the serous membrane; and so on *ad infinitum*.

There is one other form which the disease takes. The whole intestinal tube becomes swollen, congested, soft and spongy, with inflammation of its serous coat, one or more perforations and general peritonitis. In these cases there would appear to be enteritis along with the glandular inflammation. The form of the ulcer when it affects the whole of the patch is the form of the patch, except close to the valve, where sometimes the mucous tissue by the side of the glands is affected. The following is a description of the actual appearances in particular cases :—

Case A.—Three Peyer's patches nearest ileo-cæcal valve present worm-eaten appearance, ulceration mostly follicular, does not extend to muscular layer, and is separated by considerable portions of healthy tissue. In the four or five patches next above, the ulceration has extended here and there to the serous covering. From this point upwards patches appear in the main healthy, here and there an erosion. Solitary glands enlarged, well-raised, well-defined, irregular margin, ulcerated to same extent as preceding. Four feet from the ileo-cæcal valve intestine appears healthy.

Case B.—Complete destruction of glands in neighbourhood of valve. Ulceration irregular; muscular coat in most cases involved; where fibres have disintegrated, the peritoneal covering is seen beneath; ulceration is present to a similar extent in a small patch five feet six inches from valve. Solitary glands in ascending colon here and there ulcerated.

Case C.—Ulceration in this case appears to have affected most of the glands and patches *en masse*, and has extended to the serous membrane. This condition

is seen in the lower two feet of the ileum. Above this point, the ulceration is confined to the submucous tissue.

Case D.—Patches nearest valve extensively, but in the main superficially ulcerated. Muscular coat here and there involved, showing serous membrane beneath. Disease chiefly limited to the last twelve inches of ileum.

Case E.—Irregular sloughing in patches near the valve, extending mainly to muscular coat; here and there fibres have disintegrated, leaving serous covering exposed; solitary glands appear to be chiefly affected. In a patch seventeen inches from the valve, muscular coat more deeply involved than in patches nearer to it. Two feet above valve, intestine is apparently healthy.

Case F.—Ulceration near the valve confined mainly to the submucous tissue; in one point only can it be seen to have extended to the peritoneal coat. Disease confined to lower three feet of ileum.

Case G.—In no patch or gland can ulceration be seen to have extended beyond submucous tissue; is mainly confined to lowest eight inches of ileum; patches present reticulated appearance; the gland follicles appear to have ruptured and discharged their contents.

Case H.—Ulceration in neighbourhood of ileo-cæcal valve has involved muscular coat; in parts shading off into the serous covering. The second patch presents a large perforation, one and a half inches long and half an inch wide. Nineteen inches from valve there is a second perforation less than half the size of preceding. Solitary glands enlarged and ulcerated, and some of the patches within thirty-four inches from valve present sloughs.

Case K.—Ulceration near ileo-cæcal valve affects chiefly submucous tissue, but in parts penetrates to serous coat. Solitary glands in first fourteen inches of ascending colon are ulcerated. Three feet above ileo-cæcal valve intestine is healthy.

Case L.—Individual patches from cæcum upwards have well-defined, raised, irregular, rounded edges; ulcerated surface presents longitudinal ridges and pyramidal elevations, which are separated by deep grooves or furrows. The surface of the patch has the appearance of hillocks and ridges interspersed with valleys. The disease is confined to the lower four feet of the ileum.

The enteric fever ulcer (see Plate I.) is quite distinct from the tubercular ulcer, from which it may be distinguished by the absence of the tubercles. As a rule severity in depth corresponds with severity in extent, but occasionally cases arise in which, although the ulceration generally is moderate, one ulcer proceeds to perforation, and produces general peritonitis. In some of these cases an adhesive inflammation is set up by means of which the perforation is prevented, and in cases with symptoms of peritonitis the recollection of this may give a faint hope in the possibility that a general peritonitis, which would be fatal, may not occur. Perforation usually takes place in the neighbourhood of the valve. The mesenteric glands are more or less swollen. As a rule they end in resolution, but occasionally they suppurate and give rise to general peritonitis. The spleen is enlarged and congested. Along with the changes which are found in the abdomen, in cases of any severity, changes are found in the lungs. These consist of congestions, bronchitis, and occasionally lobar pneu-

monia. Pleurisy as an independent affection the present writer does not remember to have met with, although some adhesive pleurisy as a consequence of pneumonia is not infrequent. In a few cases, in the earlier stage of the disease, the fauces is inflamed and diphtheritic membranes present; in the last stage they occasionally form in the larynx, obstruct that tube, and call for tracheotomy. As a rule the severity of the symptoms clinically corresponds with the extent and severity of the anatomical changes, but to this there are exceptions. In the majority of cases where a patient has recovered from the first attack he proceeds slowly towards complete recovery; but in a small number of cases a relapse occurs. Within from ten to fourteen days of recovery from the primary illness there is a relapse of all the symptoms. In the majority of such cases the symptoms are mild, and the result recovery; but occasionally, though very rarely, the patient dies. In long-continued cases degeneration of the voluntary muscles is found, of the muscular fibres of the heart and the cells of the liver and kidneys; and judging from the long period which elapses before some patients recover the use of their limbs, there is reason to believe that occasionally there is some kind of degeneration of the spinal cord.

Symptoms. These vary widely. No single case is exactly alike, and here, as elsewhere in disease, divisions into classes are artificial. For the purpose of description, however, enteric fever may be divided as follows:—(*a*) Mild enteric fever; (*b*) ordinary enteric fever; (*c*) severe enteric fever; (*d*) enteric fever with stupor; and (*e*) malignant enteric fever.

Mild Enteric Fever. This form of the disease may run its course in from seven to fourteen days. Its characteristic feature is its mildness, the absence of distinctive symptoms, a daily temperature range of about 102°, and a pulse varying from 84 to 108. The general symptoms are slight weakness, restlessness and want of sleep, thirst, and loss of appetite. Usually there is no eruption, and no disturbance of the bowels. The disease in this form is sometimes so slight that the subjects of it do not take to bed during the whole period of illness, from which circumstance it has been designated "ambulant enteric fever." But however mild generally a case of enteric fever may be, the subject of it should invariably be confined to his room, if not to his bed, until recovery be complete, because in a certain proportion of cases the ulceration proceeds as far as the serous membrane, and in such cases it will be obvious that movement might determine a perforation which otherwise would not have occurred. From neglect of this precaution, some may be said to have walked into their graves.

Enteric Fever. The disease, as a rule, begins insidiously. The patient cannot exactly say when he ceased to be quite well. He will say, probably, that he has not been quite well for some time. For how long he cannot be quite sure. He may say that he has not been well for two or three weeks, but that last week he was compelled to take to his bed. On asking him how the illness commenced, it will be found, usually, that the first symptoms consisted in a vague feeling of weakness, of headache more or less severe, of pains in the back and abdomen, chills, loss of appetite, restlessness, sleeplessness, and a general in-

disposition for any kind of exercise. These symptoms go on increasing for some days, when about the end of the first week the patient probably takes to bed. His appearance is now characteristic. His mind is usually quite clear, his face pale, with an occasional circumscribed flush on the cheeks, the eye is bright, the sclerotic pearly, and the pupil dilated. The tongue is moist, covered with a light white fur, and red at the tip and edges. The abdomen is somewhat tumid, somewhat sensitive to pressure, and usually the motions are loose, but diarrhœa is rare. The temperature is more or less raised, and most frequently it will be found about 103° Fahr. This is remittent, but the degrees and the periods of remission vary widely. Generally it is stated that there is a morning remission and an evening exacerbation, but whilst this is a common expression, no one has yet defined what is exactly meant by morning and evening. The truth is, that whilst in a certain number of cases there is a remission in the earlier part of the English civil day, and an exacerbation in the later, this remission and exacerbation may take place at any period of the twenty-four hours, and several may occur in the same day. Generally the minimum temperatures occur between midnight and noon, and the maximum between noon and midnight; but to this general statement there are exceptions. In the earlier period of the disease, moreover, the temperature is sometimes normal at some time of the twenty-four hours. A particular instance will best verify this statement. Thus in the case of E. S., at 2 A.M. of the tenth day of the disease the temperature was normal; at 4 P.M. of the same day it was 104° Fahr.; at 8 P.M. it was 100·5°; and at midnight over 104°. On the thirteenth day of the disease the temperature

from 10 A.M. to 2 P.M. was about 104°, whereas in the evening hours from five to nine (between which hours it is usual to make evening observations) it was below normal, but at 10 P.M. it was 104°. On the fourteenth day at 10 A.M. the temperature was 104°; at noon it was normal; and one hour after it was again 104°. It will be obvious how erroneous would be conclusions from the temperature observations of some morning or evening hour. That the disease has its remissions and exacerbations of temperature is true, but these do not correspond to the evening and the morning of the English civil day. The temperature to be of real value should, in severe cases, be taken every two or three hours, unless the patient be asleep; for the most important point is not the actual height reached, but its duration. The condition of the patient, moreover, should always be taken into consideration. It will be found sometimes that the patient is better than his temperature, at other times that he is worse. In other words, that patients with high temperatures are doing well, whilst others with low temperatures are doing badly. In a word, the value of the thermometer is relative, not absolute. It teaches nothing *in itself*. The temperatures, moreover, to be of relative value must as far as possible be the temperature of the whole day of twenty-four hours, not those of one or two morning and evening hours—hours which vary with the habits of the physician. But to return.

The pulse and respirations are more or less quickened, and occasionally towards the end of the case a few râles may be detected in the lower back. From the seventh to the twelfth day, in a certain proportion of cases, an eruption appears on the skin. This consists usually of minute slightly-elevated papules and flat

spots. They appear most frequently on the chest, abdomen, and back in successive crops, so that in a well-marked case the eruption is mixed, bright spots co-existing with faintly violet spots. Sometimes they are widely separated from one another. Thus one may be found on the abdomen, another on the crest of the ilium, and a third on the nipple. At other times they are grouped together in twos or threes. They are of a bright red colour, fade more or less on pressure, and in from two to three or four days disappear, leaving behind a slight yellowish stain. They may be seen on almost any part of the body, but they are most common and most abundant on the trunk. Along with these red spots are occasionally seen flat streaky spots of a bluish colour, but rarely true petechiæ. The eruption is occasionally preceded by an erythematous injection of the skin, which is sometimes so intense as to simulate scarlet fever. Generally the eruption is slight; occasionally it is abundant, covering the face, the trunk, and the extremities; but its variety or abundance has no relation whatever to the mildness or the severity of the case. The mind is usually clear throughout, but there is more or less restlessness and sleeplessness, and occasionally a little wandering. Some time in the course of the third week the temperature falls, the tongue begins to clean, and in about a week the temperature is normal throughout the day, and the patient convalescent. In the majority of cases there are no complications and no sequelæ. The patient proceeds slowly towards complete recovery; but in a certain small number, in from ten to fourteen days from the termination of the first illness,—in other words, from the time the temperature became normal,—there is a relapse. This usually is a repetition in miniature of

the original illness. Its duration rarely exceeds ten days, and it almost invariably ends in recovery.

Whilst this is the ordinary course of the disease when of this form, there are a few cases in which the ulceration, although as a whole mild, is at some one point deep. Perforation then occasionally occurs, peritonitis is set up, and the patient, who had not given any cause for uneasiness, suddenly sinks. The symptoms are pain, tenderness in the abdomen, with vomiting, and a feeble pulse. These, however, are not always marked; but the "pinched" face, the dorsal position, the drawn-up legs, and gradually diminishing vitality, clearly indicate the fate which the "*Vis medicatrix naturæ*" is providing for the victim.

Severe Enteric Fever. In this form of the disease the symptoms are more pronounced. It may begin in the usual insidious way, but very soon it manifests itself by marked weakness, high fever, great restlessness, sleeplessness, and dorsal decubitus. The pulse becomes rapid and the temperature ranges about 104°, and sometimes it reaches 105°, but it rarely maintains this height. The face is flushed, the eye bright and the pupils dilated, but the mind is clear. The tongue is coated, the abdomen swollen and tender, and the motions loose. During the second week these symptoms become more severe, and in addition the disease affects the lungs, producing congestion there, and more or less inflammation of the bronchi. The condition of the patient is now one of great gravity. The mind, although at times confused, continues for the most part clear, the eye bright and the pupils dilated, but the lips and teeth become covered with sordes, and the tongue is dry, brown, and transversely fissured. There

is great restlessness, continued sleeplessness, high fever, 104° or more, difficulty of swallowing, great prostration, marked diminution of cardiac impulse, excessive thirst, swollen and tender abdomen, looseness of bowels, and in a few cases hæmorrhage. The eruption, however, is not in proportion. In this condition the patient may remain for some days, after which the disease terminates in one or other of the following ways:—(*a*) The temperature falls, the general condition improves, and the patient proceeds slowly towards recovery. (*b*) The symptoms become more severe. The patient's muscles twitch. He picks at the bedclothes and the air, moves his arms and hands vaguely in front of him as if he were weaving something in the air or drawing something towards him (*carphology floccitatio*); there is muttering delirium, and he dies from exhaustion. (*c*) Inflammation of the lungs arises, and he dies of asphyxia. (*a*) Hæmorrhage comes on, and he dies from loss of blood. Or (*e*) perforation occurs, peritonitis is set up, and he dies of collapse. When recovery takes place the fever disappears slowly, and convalescence is protracted. In such cases there is usually no relapse.

Enteric Fever with Stupor. This is a form of disease which resembles typhus. It is characterised by stupor, a temperature ranging about 102°, a feeble pulse, great prostration, and early death. *Post-mortem* examination shows ulceration of Peyer's patches, but usually it is not extensive.

Malignant Enteric Fever. This form of the disease is very rare. The writer has only met with two cases in four thousand. The symptoms are not characteristic, and the disease cannot be diagnosed.

Death occurs within the first week. Peyer's patches are much swollen, but there is no ulceration.

Course, Termination, Complications, and Sequelæ. In the majority of cases the course is favourable and the termination recovery. Of complications the most formidable is peritonitis. This occurs usually some time during the third or fourth week. It is most common in severe cases, but appears occasionally in those which are mild. Its onset is sometimes sudden, characterised by severe pain, and death in from one to two days, or even a few hours. In other cases the onset is insidious, marked by slight pain, some sickness and vomiting, and death after some days, apparently from exhaustion. Its most common cause is perforation of the intestine, but this is not invariable. Hæmorrhage from the bowel occurs in a small proportion of cases. Occasionally this takes place in the early part of the fever, within the first fourteen days, when, usually, it is of no clinical importance; but when it appears towards the end of the fever, and repeatedly in large quantities, it is usually fatal. Bronchitis is almost invariably present to some extent in well-marked cases, and in a small proportion of the severe there is pneumonia. It affects for the most part the whole or the greater part of one lung, and is almost always fatal. It appears sometimes without symptoms, and unless searched for by physical examination, is liable to be overlooked. Relapse occurs in a small proportion of cases. This begins usually in from ten to fourteen days after the disappearance of the fever, and lasts from a few days to one or at the most two weeks. It is rarely fatal. Second and third relapses have

been mentioned, but they are very rare. Diphtheritic patches appear occasionally on some part of the fauces in the early period of the disease; in the later period they affect the larynx, when they require tracheotomy. Parotitis is an occasional complication, but in the writer's experience a rare one. Periostitis is also an occasional complication. Bed-sores are more common in this fever than in the others, probably owing to its longer duration. Abscesses are very rare. Of sequelæ the most common is prolonged debility, and an occasional occurrence is a swelling of one of the lower extremities. Some mental weakness is not unusual in severe cases, and aphasia and paralysis of the lower extremities are occasional results.

Diagnosis. This is often surrounded by much difficulty. The mistakes which may be made are numerous and varied. The following are some of the cases which have been sent to the Homerton Fever Hospital certified to be enteric fever:—Acute miliary tuberculosis, tuberculosis, phthisis, acute phthisis, colica pictonum, pneumonia, pericarditis, endocarditis, peritonitis, ovarian abscess with peritonitis, tubercular ulceration of intestine, common clap, advanced pregnancy, insanity, Menière's disease, Addison's disease, ulceration of the vermiform appendix with peritonitis, small pox, typhus fever, dyspepsia, diarrhœa, cancer of the sigmoid flexure of the rectum, cancer of the pylorus, pyæmia, debility, and nothing at all. The vague and indefinite nature of the symptoms should arouse suspicion of enteric fever. Indeed the symptoms are sometimes so indefinite that it is not recognised, and thus has arisen the notion that a

large number of persons are insusceptible of enteric fever. One difficulty in diagnosis is the impossibility of making out a history, the patient as a rule, to which there are few exceptions, being unable to assign a precise beginning to his illness. This of itself should arouse suspicion, and if in a person who has been in previous good health there be an undefined feeling of weakness, with loss of appetite, some thirst, and a temperature two or three degrees above normal during some time of the twenty-four hours, and there be no local inflammation to account for this, enteric fever should be suspected; and if this condition should continue, the diagnosis of enteric fever may be made. In scarlet fever, however mild, there will be some discomfort in the throat, some difficulty in swallowing, some vomiting, some eruption of the skin, or the history of such. If these be absent, fine desquamation may be seen about the eyelids, the sides of the nose, the chin, or the neck; briefly, there will be some kind of localisation. In typhus fever the onset is usually sudden, and characterised by a distinct rigor. Moreover, in typhus the aspect of the patient is dull and stupid, and the eye is injected; whereas in enteric the aspect is bright, the eye clear, and the pupil dilated. In diphtheria there will be some uneasiness in the throat, and slight difficulty in swallowing, associated with unaccountable mental depression and the presence of diphtheritic membrane. It must, however, be carefully borne in mind that some sore throat, associated with patches of membrane indistinguishable from diphtheria, is occasionally present in enteric fever. In small pox there is usually distinct pain in the back, or very severe headache, or both, followed by an eruption on the third day. In rheumatism the joints

are affected. In pneumonia there is pain in the side, cough, difficulty of breathing, and the physical signs of that disease. And here it may be remarked that careful examination of the chest would prevent the majority of mistakes which are made. In meningitis the symptoms are from the first definite, and essentially nervous. The headache is severe, the patient rolls his head about and screams with the pain. There are contracted or irregular pupils, intolerance of light and sound, and sometimes squinting. To this succeeds drowsiness, slow irregular pulse and dilated pupils, the precursors of certain death. In peritonitis there is acute pain, increased on the slightest pressure, and although in a case where the peritonitis was advanced, the abdomen distended, and the pain had ceased, it might be difficult to diagnose from enteric fever, the history of an illness which *commenced* with acute pain in some part of the abdomen would point to peritonitis or some local inflammation, not to enteric fever. It should of course be borne in mind that the patient may suffer from enteric fever and peritonitis, but in this case the peritonitis comes at the *end* of an illness. Enteritis in its catarrhal form is characterised primarily by "great looseness," associated with "griping pains," tormina, dolores colici. The motions are offensive, watery, and contain undigested food material. There is no such thing in enteric fever, which, it can hardly be too frequently repeated, is not usually characterised by great looseness, especially at its commencement.

Phlegmonous enteritis is characterised by vomiting, local pain, tenderness on pressure, and gripes. Now in the milder cases of enteric fever there is nothing of this definiteness, nothing of this localisation. The fever is

continued without assignable cause, and characterised by daily remissions, usually called morning remissions, which they sometimes but not always are. In ordinary cases there can hardly be much difficulty, bearing in mind that whilst enteric fever may be suspected, guessed at, or prophesied during the first week of the illness, it can rarely be diagnosed before from the ninth to the tenth day, and there are some cases of which it can only be said that the probability that the disease was enteric fever was greater than the probability that it was anything else. On the other hand, in well marked cases there can be no difficulty. The continued fever marked by daily remissions; the bright expression of face, clear eye and dilated pupil; the red at tip and edges, moist with light white fur at sides, dry transverse fissures in centre tongue, and the distended abdomen with scattered rose-spots, form a combination of appearances which could hardly be mistaken. There are three diseases which give great difficulty in diagnosis: tubercular ulceration of the intestine, acute miliary tuberculosis, and acute tubercular peritonitis. The first difficulty may be overcome by remembering that enteric fever rarely affects phthisical or tubercular people, and that tubercular ulceration of the intestine is nearly always associated with tubercle in the lungs, and that given a patient with phthisis and appearances like enteric fever, the probability is that the cause of the enteric symptoms is tubercular ulceration. The present writer has never met with enteric fever in a phthisical subject. In the case of the other two he knows of no means by which a diagnosis may be made with certainty, although there is no doubt much room for an exercise of the gift of prophecy.

Prognosis. In the majority of cases this is favourable. As a rule, it is more favourable in the case of children than in adults. The mortality may vary from 5 to 40 per cent. Speaking generally, if the daily temperature-range be from 102° to 103·8°, or not much above the latter, or if above, for no long time; if the general condition of the patient correspond with his temperature, and no complications exist, the prognosis is favourable; but if there be great depression, great somnolence, extensive pneumonia, or free hæmorrhage from the bowel, the prognosis, notwithstanding low temperature, is unfavourable. If the daily temperature-range be about 104° to 105°, and the general condition of the patient correspond, the prognosis is unfavourable; but if the patient bear this temperature well, sleep fairly, take nourishment well, and there be an absence of complications, the prognosis, notwithstanding the high temperature, is favourable. Briefly, the thermometer is not an absolute but a relative guide in prognosis. Original strength and previous good health give no help in prognosis, the strong and the healthy frequently falling victims, whilst the weak and debilitated frequently recover. An abundant eruption is no indication of severity of case, as it is in typhus. On the contrary, an abundant eruption not infrequently coincides with mildness of case.

Peritonitis. This incident is almost invariably fatal, although cases have recovered after symptoms of peritonitis.

Pneumonia. This is of grave import, especially if it be severe, as it generally is, but it is not necessarily fatal.

Laryngitis. This occurs in a small proportion of

cases, and in some of them, if tracheotomy be not performed, the case will be fatal.

Hæmorrhage. Epistaxis usually is of no clinical significance, and hæmorrhage from the bowel in the earlier part of the fever, say the first ten days, is rarely injurious, if indeed it be not beneficial; but occurring towards the end of the fever, if it be in large quantity and frequently repeated, it is of very grave import; but considerable and repeated hæmorrhage is recovered from.

Relapses. These are almost invariably mild, and the prognosis favourable.

Mild Cases. These, of course, are almost invariably of favourable omen; but it should not be forgotten that occasionally in mild cases one ulcer penetrates the intestine, the contents of the canal are passed into the peritoneum, and peritonitis is set up, with the usual result—which is death. The tables on pp. 85, 86, 87, being the cases admitted into the London Fever Hospital, the Homerton Fever Hospital, and the Stockwell Fever Hospital during the ten years 1871-80, amounting to 3,523, give the mortalities at the various quinquennial periods up to sixty years of age.

Epidemic Constitution. This should always be taken into account as an important factor in prognosis. At some periods the mortality is very high; at others very low.

Treatment. This is of so much importance in enteric fever, that, at the risk of some repetition, it will be considered more in detail. The chief points are: (*a*) feeding, (*b*) sleep, (*c*) diarrhœa, (*d*) hæmorrhage, (*e*) peritonitis, (*f*) pneumonia, (*g*) bed-sores, (*h*) laryngitis, (*i*) periostitis, (*j*) parotitis, (*k*) swelled

LONDON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	6	...	...	3	...	...	...	3	4	2	18	...	...	...	1	...	...	...	...	...	...	1	5·55
From 5 to 9 years	37	...	5	4	4	4	7	3	9	5	78	2	...	1	1	1	...	...	1	...	...	6	7·69
,, 10 ,, 14 ,,	62	5	11	11	8	18	14	22	12	4	167	4	...	...	...	...	1	1	1	1	...	8	4·79
,, 15 ,, 19 ,,	89	12	9	20	18	21	22	20	9	16	236	17	3	2	3	2	3	7	5	3	1	46	19·49
,, 20 ,, 24 ,,	52	14	14	19	18	16	17	15	20	17	202	11	4	5	4	4	1	3	2	2	5	41	20·29
,, 25 ,, 29 ,,	29	7	13	13	7	12	13	9	10	7	120	12	...	4	2	1	2	3	3	3	3	33	27·5
,, 30 ,, 34 ,,	15	1	3	2	4	7	9	4	3	3	51	3	...	...	2	1	2	5	...	...	2	15	29·41
,, 35 ,, 39 ,,	8	2	2	3	3	5	4	2	1	1	31	2	...	...	...	1	2	...	...	1	2	8	25·80
,, 40 ,, 44 ,,	3	...	1	...	3	2	1	6	1	1	18	...	...	...	...	1	1	...	1	...	...	3	16·66
,, 45 ,, 49 ,,	6	2	1	1	1	1	1	4	...	3	20	2	...	...	...	...	...	...	1	...	...	3	15·00
,, 50 ,, 54 ,,	...	...	1	...	2	2	2	1	...	1	9	...	...	1	...	1	...	...	...	...	1	3	33·33
,, 55 ,, 59 ,,	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
,, 60 ,, 64 ,,	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
,, 65 ,, 69 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
,, 70 ,, 74 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
,, 75 ,, 79 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated...	...	1	...	1	...	...	...	...	...	...	2	...	1	...	...	...	...	...	...	...	...	1	100·00
	308	44	61	77	68	88	90	89	69	60	954	53	8	13	13	12	12	19	14	10	14	168	17·61

HOMERTON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	5	3	4	5	3	2	5	5	4	36	...	...	...	1	5	...	...	1	...	...	7	19·44
From 5 to 9 years	...	23	35	24	24	18	17	18	18	14	191	...	3	2	...	4	...	2	5	4	...	20	10·47
„ 10 „ 14 „	...	45	73	62	50	44	38	37	43	30	422	...	8	6	6	7	8	5	9	4	5	58	13·74
„ 15 „ 19 „	...	46	57	68	32	39	32	34	35	28	371	...	11	9	5	7	10	3	13	5	2	65	17·52
„ 20 „ 24 „	...	33	25	38	25	31	27	20	20	23	242	...	10	6	8	4	8	3	10	1	5	55	23·14
„ 25 „ 29 „	...	17	20	18	10	18	14	8	12	17	134	...	3	4	4	4	4	...	8	2	2	31	23·13
„ 30 „ 34 „	...	6	9	16	7	5	6	8	6	2	65	...	2	1	2	4	...	...	3	...	...	12	18·46
„ 35 „ 39 „	...	5	8	9	2	2	3	8	4	4	45	...	1	...	2	2	1	1	1	...	1	9	20·00
„ 40 „ 44 „	...	2	2	6	6	1	1	7	2	6	33	...	...	1	2	2	...	...	2	5	...	8	24·24
„ 45 „ 49 „	...	1	1	8	...	1	2	4	1	...	18	...	...	...	4	...	...	1	3	1	...	9	50·00
„ 50 „ 54 „	...	...	...	2	2	...	...	...	...	2	6	...	...	...	2	...	...	...	...	...	2	4	66·66
„ 55 „ 59 „	...	...	...	1	1	...	...	...	...	1	3	...	...	...	...	1	...	...	...	...	...	1	33·33
„ 60 „ 64 „	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
„ 65 „ 69 „	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
„ 70 „ 74 „	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
„ 75 „ 79 „	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...
Age not stated...	...	45	...	1	1	1	...	...	...	...	48	...	8	...	...	...	1	...	...	...	...	9	18·75
	...	183	233	258	165	163	142	149	146	131	1,615	...	46	29	36	40	32	15	55	18	17	288	17·83

STOCKWELL FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	2	2	3	1	2	7	...	2	1	18	...	...	...	...	...	...	...	...	...	...	...	...
From 5 to 9 years	...	3	18	26	12	20	33	...	8	7	127	...	...	1	1	2	2	6	...	1	1	14	11·02
,, 10 ,, 14 ,,	...	11	29	46	33	27	64	...	29	8	247	...	2	2	9	4	3	12	...	9	1	42	17·00
,, 15 ,, 19 ,,	...	28	37	42	50	40	42	...	28	4	271	...	7	8	8	12	8	17	...	10	...	70	25·83
,, 20 ,, 24 ,,	...	12	15	27	17	15	42	...	19	7	154	...	2	4	5	7	7	11	...	5	3	44	28·57
,, 25 ,, 29 ,,	...	7	14	15	10	8	22	...	10	4	90	...	2	3	1	5	3	9	...	2	1	26	28·88
,, 30 ,, 34 ,,	...	1	7	8	5	6	10	...	2	1	40	...	...	2	1	3	2	7	...	2	...	17	42·50
,, 35 ,, 39 ,,	...	3	4	6	5	4	6	..	5	1	34	...	...	1	1	2	1	2	...	1	...	8	23·52
,, 40 ,, 44 ,,	...	2	3	1	...	1	2	...	1	...	10	...	1	1	...	...	...	...	...	1	...	3	30·00
,, 45 ,, 49 ,,	...	...	3	3	...	1	1	...	2	...	10	...	...	2	1	...	...	...	...	...	...	3	30·00
,, 50 ,, 54 ,,	...	...	...	...	1	...	1	...	...	...	2	...	...	...	...	1	...	...	...	...	...	1	50·00
,, 55 ,, 59 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
,, 60 ,, 64 ,,	...	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	1	100·00
,, 65 ,, 69 ,,	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
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leg, and (*l*) relapse. The food during the fever should consist chiefly of milk, of which the patient should have as much as he cares to take. As a rule two to three pints of milk, one or two pints of beef tea, two eggs, and eight ounces of bread crumb may be regarded as a fair amount of nourishment in an ordinary case; but some patients will take much more, particularly of milk, sometimes as much as four, five, and six pints in the twenty-four hours; and if they can digest this quantity, it should not be refused them. Generally so long as the quality of the food be of the right kind, quantity, if it be digested, should be left to the patient. Whilst, however, for the majority of cases milk is the best and safest food, there are some patients with whom it does not agree, even when mixed with soda or seltzer water, and for these veal, mutton, or chicken broth should be substituted. Ice and water should be allowed without further limit than the desire of the patient, but care should be taken that the drink do not take the place of food. This should be given frequently, yet not so frequently as to annoy the patient, for it should be remembered that he requires rest as well as food. Taking a fairly severe case, about three hours would be a fair interval, but as a rule he should not be roused from sleep to be fed. It is important, however, in this respect to bear in mind that a patient is not always asleep when he appears to be. There is an apathetic condition somewhat like sleep, which may sometimes be taken for sleep, which it is not, a condition due to exhaustion, and from which the patient should invariably be roused to be fed. And it is of the utmost importance to observe in respect of these cases that the whole difficulty of saving them consists in the great difficulty of administering food. The patient,

from exhaustion, is so indifferent that he does not care to take the trouble, if indeed he can, to swallow. He has reached the "centre of indifference," and unless continuous forcible feeding be adopted he is certain to sink. Along with forcible feeding may be combined injections by the rectum. These may consist of milk, brandy, and port wine. It is in conditions of this kind that alcohol administered in teaspoonfuls every few minutes may save life. In the majority of cases it is unnecessary if not injurious, but in cases of this kind, and in cases where patients refuse or cannot take any other kind of nourishment, it is indispensable. It is equally indispensable when the patient has been in the habit of taking alcohol as part of his ordinary dietary. As a rule the alcohol is best given in the form of burgundy and champagne. The quantity in any particular case will obviously vary with a variety of circumstances, but half a bottle of port, a bottle of champagne or of burgundy, eight ounces of whisky or brandy daily, would in certain cases not be excessive, and in others more might be given with advantage. When, however, the patient has not been in the habit of taking alcohol in health, and is taking, say, two or three pints of milk, a pint of chicken broth or beef tea, and one or two eggs, alcohol is unnecessary. It comes, however, to be of great service when the fever has left the patient. In typhus, small pox, and scarlatina (with exceptions in the latter), the patient may have a mutton chop, potatoes, and beer immediately the fever has left him. It is quite otherwise with enteric fever. Here the sensitive condition of the barely healed intestine and the possibility of a relapse make an immediate return to solid food dangerous, whilst the craving of the patient for

solid food is strong, and his disgust for slops intense. In these conditions a glass of wine and a biscuit is very grateful, and should be given according to the age and other circumstances, bearing in mind that children recovering from such diseases do well on a good allowance of wine ; a child of six, for instance, taking with advantage six ounces of port daily. When the danger of relapse has been passed and the patient has begun to take solid food, wine and spirits in the case of those who have not been accustomed to them in health should be dispensed with, and bitter beer supplied instead.

At what time the diet of sickness should be dispensed with cannot generally be determined exactly. Each case requires to be considered in itself, but generally in a well marked case solid food should not be allowed until the patient has been free of fever for from ten to fourteen days. It should consist in the first instance of fish, such as oysters, soles, cod, plaice, brill, red mullet, turbot, or trout, but not salmon. Potatoes should be given sparingly, and should always be mashed. For drink, burgundy and champagne are the best. The beef tea, veal, mutton, or chicken broth may be continued, and in respect of quantity the patient, as a rule, may have as much as he pleases. So long as the food is of the right quality the patient may be allowed to decide as to the quantity, and the quantity which some patients will consume appears enormous to the healthy individual, who forgets that the sick person is recovering from an exhausting disease. The fish should, of course, be varied from day to day, and it may be replaced by a sweetbread or a spring chicken. On a diet of this kind the patient should be kept for about a fortnight in cases of any severity, and

in some probably longer. During the whole of this time the temperature should be taken several times a day, say at 6 a.m., at noon, at 4 p.m., and at 8 p.m.; and if it should be found above 100°, and this be not due to some trifling incident such as the taking of food or the excitement due to a visitor, the milk diet should be resorted to. But whilst the patient should have as much to eat as he pleases, he should not eat a great deal at a time, and he should not be a long time without eating. It is important in particular that he should be fed some time between 10 p.m. and 8 a.m. Circumstances and idiosyncrasies in this respect have to be considered, but as a rough guide the intervals rather than the times being observed: 10 p.m., 3 a.m. (assuming that the patient be awake at that time), 8 a.m., noon, and 5 p.m. might be regarded as a good division of the twenty-four hours, and the most important time of all is probably between 3 a.m. and 8 a.m. Towards the end of this period of fourteen days, chicken, the claw of a crab or a lobster, may be substituted for the fish, and the patient may be allowed to sit up for half an hour, wrapped in blankets or in a dressing gown. For the first week he should not be allowed to sit up for more than half an hour twice daily, and the times of rising should correspond with times of eating. Nothing whatever is gained, however well the patient may feel,—for in these cases feelings are "dangerous guides,"—by rising too soon. On the contrary, much is lost, the patient gains strength more slowly, and convalescence is protracted. About this time, which may be taken roughly to be the end of the ninth week of the disease, the patient may rise daily, and return to his ordinary diet. Convalescence may be said to be established, and in suitable weather he

may be allowed such exercise as his position permits of, and gradually return to his ordinary habits. This in severe cases often takes a long time, and no one who has suffered from a severe attack of enteric fever should, if he can avoid it, return to full duty until from two to three months after convalescence has been established.

Sleep. To procure sleep is of the utmost importance in this fever, partly by reason of its long duration. For this purpose all the precautions already insisted upon should be observed. This however will not always succeed, and when they do not, recourse may be had to opium, alcohol, or the bath. Of these means the most generally accessible are the two former, but in suitable cases, wherever practicable, the writer prefers some form of bath. Thus if the temperature be not high, say about 102°, a warm bath of about fifteen to twenty minutes' duration may be given; but if the temperature be about 103° or upwards a cool, or even cold, bath may be given, from 70°, gradually falling in about ten minutes to 60°, in the case of young adults; in the case of older and younger subjects the temperature should range from about 90° to 70°, and the duration should not, as a rule, last more than about five minutes. In recent years the treatment of enteric fever by means of the cold bath has given rise to much discussion. It is to be observed, in the first place, that there is nothing new in it. Cold water in the treatment of disease is found amongst the most ancient nations, but historically Asclepiades, a physician who practised at Rome about the end of the second century, was amongst the first who brought into general use cold, warm, and hot baths. In his time the cold water cure became the fashion, and

the cold springs of Cutiliæ in the Sabine mountains had a great reputation. From this time until the beginning of the eighteenth century there is no mention of the cold bath in the treatment of disease; but in 1702 it was recommended by Floyer, and in 1729 by Hoffmann. From this time up to 1801 it was recommended by Sigismund, Hahn, Zimmermann, and others, when a new impetus was given to it by Currie, who employed it in almost everything in the early part of the present century. Currie, however, had no followers, and the practice died with him. Within the last few years it has been resuscitated in Germany, and Brand, Liebermeister, Jürgensen, Ziemssen, and others, have asserted that it greatly reduces the mortality of enteric fever, and more recent statistics even assert that the mortality has been abolished. In these statistics it appears to be assumed that, given cases of enteric fever, the employment of the cold bath, and a low mortality, the conclusion follows necessarily that the low mortality was the result of the cold baths. It is assumed that enteric fever is an unit of equal value, at all ages, at all times, and in all places; and it is forgotten that the disease has a natural history, and that, of any given number of cases fairly chosen, the great majority recover irrespectively of treatment. It is a matter of minor importance what may have been the mortality in a given number of cases, but of the first importance what may have been the nature of the cases upon which the mortality is calculated. This is the great difficulty of medical statistics—probably of all statistics—the unequal value of the units of which the statistics are made up.

The laws of physics are inductions of particulars which are similar and true. Tests of the most varied

kind, involving minute and accurate measurements, prove them. But, in medicine, there is much to be desired, both in establishing data and in drawing conclusions from them. The phenomena dealt with are so complex and variable, that it is rarely possible to arrive at the data necessary for a satisfactory induction. Hence a great deal of what is regarded as gospel in medicine has no foundation beyond impressions, depending, to a great extent, on the mind impressed, and statistics composed of units of such different values as to be hardly comparable. Even in astronomy, the personal equation has to be allowed for. In medicine it is nearly everything.

Existing data, moreover, do not sustain the claims which have been made for it. Thus of 163 cases at Basle, in the year 1873, the mortality was 10·4 per cent.; whilst in the same year, of 275 cases at Glasgow, the mortality was 9·4 per cent.; and, of 305 cases at Homerton, it was 9·5 per cent. So also at Basle, in 1874, there were 200 cases, with a mortality of 10·5 per cent.; at Homerton, 372 cases, with a mortality of 9·6 per cent.; and at Glasgow, 343 cases, with a mortality of 7 per cent. It is unlikely that the cases of a small country town like Basle, with forty to fifty thousand inhabitants, were more severe than those occurring among the pauper population of Glasgow, with its five hundred thousand inhabitants, and the pauper population of the east end of London, with upwards of one million. And, in this point of view, it is important to observe that it is in the small country towns of the continent that the "antipyretic treatment" has been said to be successful, such as Halle, Jena, Heidelberg, Prague, Zurich, etc. It does not succeed in Vienna, London, or Glasgow.

Moreover, the supporters of the cold-bath treatment appear to have based it upon an assumption for which there is no evidence. This is the assumption that the all-important factor is the heat.

The question ceases to be a complex question of biology, and becomes one of pure physics. Clinical experience contradicts this view. All the mischief does not arise from the heat. In addition to the heat, there is the individual who is affected by it; and, in this respect, individuals vary. One patient is restless and sleepless, with a dry tongue, and a temperature ranging between 102° and 103°; whereas, another, with a higher temperature, is so slightly affected that, but for the thermometer, one would hardly know that he was ill.

The cold bath has been employed in the treatment of this fever at Homerton since 1872. In the case of adults if the patient had not slept for two or three days, even if the temperature fell short of 103°, he was wrapped in a flannel dressing-gown, and placed in a bath of 70° Fahr. (children and elderly persons at a higher temperature, according to age), gradually reduced to 60° in from ten to fifteen minutes, at the end of which time he was removed to bed, wrapped in a blanket. In nearly all the cases we thought it prudent to give some wine to the patient in the bath, from noting that its effect was to weaken the pulse, which fell but a few beats in frequency, and became thready, compressible, wavered, and sometimes almost disappeared. It required resolution to proceed with the bath in such circumstances, circumstances pointing to impending collapse, a result which occurred in two cases. The general effect of the bath was to lower the temperature two or three degrees at once; and

for about three-quarters of an hour after the bath it continued to fall, about which time the maximum fall had been reached. It then began to rise, reaching its former height in periods varying from one to several hours. In a large number of cases, sleep followed, varying from half an hour to two or three hours.

"The general conclusion formed of the value of the "bath was that, in the milder cases, and in some of the "severe cases in the early period of the disease, the "bath, given once or twice daily, was a useful way of "relieving the discomfort produced by the heat, of "allaying restlessness and producing sleep; that, "beyond temporary relief of symptoms, it had no effect "on the course of the disease or on the general mortality; "and lastly, that, in the severe cases, the remedy was "inadmissible, owing to its depressing effect on the body "generally, to the exhaustion which its administration "entailed, but, above all, to its definite and marked "effect upon the circulation, which it invariably greatly "weakened. In other words, that the bath was useful "in relieving symptoms in those cases whose natural "termination is recovery; inapplicable, by reason chiefly "of cardiac weakness, in those cases whose tendency is "towards death; that is, in the cases in which specific "treatment is needed. The depressing effect of the "bath has been noticed by Liebermeister, who con-"siders a very high degree of cardiac weakness an "important contra-indication. What exactly may con-"stitute such a condition will be differently estimated "by different persons; but it may be inferred reason-"ably, that one who has been the subject of a fever "whose definite and specific effect is to produce, and "that rapidly, some kind of muscular degeneration and "death by asthenia; one who has, let us say, passed

"ten days without sleep, and with little or no food, is "a person whose condition generally is one of weak- "ness, and whose heart in particular is weak in a very "high degree. What might be inferred, a look at the "patient shows at once. He lies prostrate, unable to "turn on his side or help himself to a drink, the "impulse of his heart gone, the first sound inaudible, "and the pulse quick and feeble; in short, in a condi- "tion of exhaustion. Such a person, I submit, is one "in whom there is a very high degree of cardiac weak- "ness. To put the case briefly, those severe cases in "which there is a probability of a fatal result from "bodily weakness and severity of disease are not cases "in which the cold bath treatment is admissible.

"It is true that cases such as I have described form "but a small proportion of the whole number of cases "of enteric fever; but it is also true that they are the "only cases in which specific treatment of any sort is "required.

"The majority of cases recover of themselves; and, "as regards their treatment, probably the less of it the "better. These cases are cases whose temperatures "fluctuate daily between 103° and 104°, rarely remain- "ing any long time at the latter point; and to give "them specific treatment is useless, for they recover "of themselves, and are best left alone. The re- "mainder, which die, are cases in which the prominent "feature is cardiac weakness, cases whose tempera- "tures fluctuate between 104°, 105°, and upwards; "or cases with very low temperatures and extreme "depression of the nervous system, due to some "peculiar effect of the disease.

"These are the cases for which treatment is needed; "but I imagine it would occur to no one to give such

"cases—cases which cannot even be 'changed' without "suffering from exhaustion—a cold bath every two "hours. Liebermeister expressly says that 'a very "high degree of heart-weakness is an important contra-"indication'; and, further, that many patients do not "bear a very frequent use of the bath. Hence, taking "together the cases in which the cold bath treatment is "inadmissible from cardiac weakness, and the cases "which do not bear it, we exclude from its operation "all the cases in which it is desirable that active treat-"ment should be used. The cold bath treatment, on "the showing of its own supporters, then, falls to the "ground.

"The treatment which we have been considering "attracted attention by reason of the very favourable "results which were said to be obtained by it. In some "cases, the mortality was said to have been reduced "to 3 or 4 per cent.; and, more recently, to nothing. "Admitting that relapsing fever, the normal mortality "of which is about 3 or 4 per cent., that the 'typhus' "of young people, whose normal mortality is very low; "that all febriculæ, in which the mortality is nothing, "were excluded; and, finally, that the enteric was "enteric as we know it in London—points on which, by "reason of the loose way in which the term 'typhus' "in Germany is applied to diseases perfectly distinct, "I entertain grave doubts—I should still prefer, judging "from my experience, to believe that nature of cases, "not treatment, determined the favourable results "referred to.

"Whilst, however, I do not believe in the systematic "and routine employment of the cold bath in enteric "or any other fever, I do not say that it is of no use "at all. On the contrary, as a means of cleanliness

"and comfort, it will be useful in the milder cases; it "will sometimes relieve restlessness, and occasionally "promote sleep; and I would not deny that, judiciously "given, it might occasionally determine the change to "recovery. In a word, largely varied to suit individual "cases, it is an useful help in the treatment of enteric "fever; but to say this is one thing, and to say that it "has abolished death is quite another." (*Collie*, Belfast Address).

Diarrhœa. There is a widely-spread opinion that this is an almost invariable incident in the course of enteric fever. This is an error. Diarrhœa, by which is here meant six to eight considerable motions in the twenty-four hours, exists in but a small number of cases of enteric fever. Indeed, as a single symptom, severe looseness points from, not to, enteric, and in a large number of cases there is constipation. In a few, however, there is diarrhœa, and this may be so severe, or of such a character, as to require treatment. If the bowels be open several times daily (twenty-four hours), and the motions consist of true fæcal and undigested food matter, it should not be interfered with. It cannot be other than injurious to a patient to paralyse his bowels so that fæces may putrify and decompose in his inside. Speaking generally, then, diarrhœa, so long as it is of this kind, should not be interfered with, but, on the contrary, tepid enemata should be given by means of the "Eguisier," a much more suitable instrument than the commonly used Higginson. This will remove any hardened fæces which may be in the rectum, favour the descent of solid fæces which may be in the colon, and in so far as the diarrhœa may be dependent upon causes of this kind, remove it by removing its source. Under treatment of this kind, *tympanitis* has been very

rare in the writer's experience, and it may be said generally that its treatment consists in keeping the bowels open. There are, however, cases in which diarrhœa should be interfered with. These are cases in which the motions consist mainly of water, and the patient is being weakened. In such cases it should, if possible, be checked. This may be done by enemata of starch and laudanum and the administration of chalk and opium, or whatever else may appear to be suitable in the particular case. In a certain number of cases constipation prevails, and it sometimes calls for treatment. If, peritonitis and recent severe looseness being excepted, the bowels have not been open for four, five, or six days, a pint of tepid water should be passed into the rectum by means of the Eguisier. If this fail, one or two teaspoonfuls of castor oil should be given by the mouth.

Hæmorrhage. This takes place in a small number of cases. It occurs for the most part from the nostrils and the bowel. In the former case it rarely calls for interference, and is frequently caused by the patient picking the nostrils, to prevent which it may be necessary to muffle the hands. If the hæmorrhage from the bowels be within the first fourteen days, it is usually harmless, if not beneficial; and in the later stages if it be in small quantity, say a few ounces, it need not alarm; but if it occur to the extent of a pint it is of grave import, and if this be repeated a few times the patient should be considered to be in extreme danger. Much might be said upon the treatment of this sometimes dangerous occurrence. If the writer were writing a treatise instead of recording his experience, something would have to be said about lead, ergot, the subcutaneous injection of ergotine, of tannic

acid, and the astringents generally given by the mouth and as enemata, of the application of ice to the abdomen, etc. On this subject two questions may be asked: In what way can astringents introduced within the rectum affect a bleeding ulcer in the ileum? how can cold applications to the abdomen affect torn vessels in the same place except to increase the pressure of blood in them, and, consequently, the hæmorrhage from them? The subject is a difficult one. It may be said generally, as Gull says, that it is "best to trust to the hæmorrhage to cure itself." As a matter of fact it must be left to cure itself. If it be in small quantity it will do no harm and require no treatment; but if it be in large quantity, and frequently repeated, the patient will almost, not however always, certainly die. Generally the treatment should consist in careful feeding, in the avoidance of alcohol, and in the administration of opium to the extent that the patient be kept fully under its influence. When, however, the pulse is feeble, and there are symptoms of impending collapse, alcohol should be administered.

Peritonitis. This consists in the administration of opium and the application of laudanum fomentations to the abdomen.

Pneumonia. This occurs in a small number of cases towards the end of the disease. The patient should be placed in a flannel vest to procure equalisation of temperature, and carefully nourished.

Bed Sores. These may be avoided usually by careful nursing, but in some cases this will not succeed. For cases of a certain degree of severity a water bed should be provided at once, the back, particularly the sacrum, should be examined daily, kept quite dry, and if any redness appear spirit lotion should be applied.

When they occur they should be treated as ordinary wounds.

Periostitis. This is an occasional incident occurring usually during convalescence. The part should be elevated and protected by cotton wool. Opium may be necessary to relieve pain; but if there be severe pain and much febrile disturbance an incision down to the bone must be made to prevent suppuration.

Parotitis. This is an occasional incident which comes on towards the end of the fever. It is usually single, but sometimes double. The part should be protected by cotton wool, and opened when fluctuation can be detected.

Laryngitis. In a small number of cases inflammation of the larynx occurs, and this is sometimes so severe as to block the passage and call for tracheotomy. The patient's room should be moistened with steam, the temperature should be maintained at 70° F., and his neck wrapped in cotton wool. When the difficulty of breathing is marked, and the patient is distressed from this cause, tracheotomy should be performed. To wait until the patient is blue in the face, as some advise, is practically to wait until he be dead.

Swelled Leg. In a few cases this occurs in one or the other leg, mostly the right. The patient, if up, should be confined to his bed, the leg elevated and wrapped in cotton wool until the swelling disappear.

Relapse. When this occurs the patient should revert to his sick diet, and remain upon that until the relapse come to an end; and the same care should be exercised in the resumption of his ordinary habits as in recovery from a primary attack.

CHAPTER V.

TYPHUS FEVER.

Definition. An acute infectious disease, characterised by an eruption on the skin of ill-defined brownish-red spots.

Synonyms. Typhus (Fr.); Fleckfieber, Typhus Exanthematicus (Ger.); Typhus (Eng.); Petechial Fever (general term).

History. The history of typhus is very obscure. There is no evidence that it was recognised by the ancients, although it existed probably in ancient times. Murchison is of opinion that the fifteenth case in the third book of the Epidemics was typhus, but this at least is not quite certain. Murchison thinks further that the great plague of Athens was typhus, but this also is not quite certain. In the graphic description of that plague by Thucydides there is not a symptom pointing to typhus, whilst there is some resemblance to small pox and erysipelas. The obscurity which covers the history of typhus is due in a great measure to its name. Typhus, from the Greek τῦφος, means some degree of mental confusion, a condition common to many diseases. It is met with in diseases of the heart, lungs, kidneys, and brain, and these diseases consequently have been frequently mistaken for typhus. Indeed, there is hardly an acute disease for which typhus has not been mistaken. It was not until the

year 1846 that, owing to the papers of Jenner, the profession clearly recognised typhus as a distinct disease, and even since that time it has been confounded with the hæmorrhagic forms of small pox, with glanders, and with "freckles." The first historical description of it appears in the fifteenth century by Fracastorius, who describes it as follows :—

"Circa quartum vel septimum diem in brachiis, dorso "et pectore maculæ rubentes, sæpe et puniceæ, erum- "pebant, puncturis pulicum similes, sæpe majores, "imitatæ lenticulas, unde et nomen inditum est."

"The other symptoms were great prostration, feeble "pulse, thirst, sordes on the tongue, injected conjunc- "tivæ, blunting of the mental faculties, and, after the "fourth or seventh day, mental aberration and low "muttering delirium; in some wakefulness, in others "somnolence, and in others both of these conditions in "succession. The disease lasted from seven to four- "teen days, and occasionally longer. Retention of "urine, and a deficient or livid eruption were regarded "as bad symptoms." (*Murchison.*)

Typhus appeared in various parts of Europe in the sixteenth century, in Italy, France, Hungary, and Holland. It appeared again in France and England in the seventeenth century, and in the eighteenth it was observed in Ireland, from which time until now it has rarely been altogether absent from Great Britain and Ireland. The last great epidemic was that which prevailed among the French troops in the Crimea. "During "the first six months of 1856 it was computed that out "of a force of 120,000 French 12,000 were attacked "with typhus, of whom one-half died" (*Murchison*). The last epidemic which appeared in Great Britain was the London epidemic of the years 1866-69, since which

time sporadic cases have been met with, but there has been no epidemic.

Etiology. Typhus fever is essentially a disease of temperate climates. It has been met with in France, Germany, Belgium, Holland, Denmark, Italy, and Spain, the United States of America and Canada ; but it has not yet been met with in Australia, New Zealand, Africa, or the tropical parts of America (*Murchison*) ; and it is doubtful if it have been met with in India. It is more common in Great Britain and Ireland than anywhere else, particularly among the poorer classes of the larger towns. It is almost invariably associated with overcrowding, and consequently is most common in the towns where density of population is greatest.

"The town of England which habitually has most "typhus, and in which the most serious epidemics "occur, is Liverpool. Here the huddling together of "houses, with insufficient space around them, is carried "to a greater degree than in any other town in the "kingdom. In Liverpool, a large number of the "houses are built back to back, in unventilated courts, "and the population is so dense that, in some districts, "each person gets only eight square yards of super-"ficial space. In these parts it is that fever specially "flourishes, and in epidemic periods passes by none "but those who are protected by previous attack. "Glasgow is another instance of a town in which the "packing together of houses reaches an extreme extent, "and in which typhus correspondingly prevails ; its "distribution following so exactly the degree of density "of population in different parts of the town as to "leave no doubt of the connection between the disease "and this condition.

"Overcrowding of the interior of houses by too "many occupants, with deficient ventilation of rooms, "may be illustrated as a cause of typhus by the ex- "periences of the common lodging-houses of English "towns. Before the regulation of these by law in "1851, dwellings of this class were in a state of most "miserable filth and overcrowding. In London and "Liverpool, especially, there is evidence that they were "peculiarly infested with typhus, far more cases of this "fever occurring in them than among an equal popula- "tion residing in poor tenements of another class.

"Since 1851, the number of fever cases in common "lodging-houses has been accurately ascertained, under "the same Act of Parliament that has diminished "their overcrowding and improved their cleanliness; "and it is found that in some thousands of such houses "in London, hardly any typhus exists in non-epidemic "times, and that in epidemic times they suffer now "much less than other houses inhabited by the "poor.

"In Liverpool, it was upon the overcrowded lodging- "houses that the chief force of the epidemic of 1874 "fell; the cases of typhus that occurred in them being "numbered by thousands. During the year 1863, "when the fever again became epidemic, in a thousand "regulated lodging-houses of Liverpool, only twenty- "four cases occurred, a quite inappreciable fraction "of the whole number of fever cases in the town." (*Buchanan.*)

It is often associated with destitution, and this has been regarded by some as its cause; but it is probable that the real factor is the overcrowding which attends the destitution, not the destitution itself, a view which derives support from the appearance of typhus in

Greenock at a time of exceptional prosperity among the working classes, which was, however, attended by overcrowding (*Buchanan*). It is doubtful, however, if the overcrowding generate the disease, for the plain reason that more or less overcrowding is constant among the poor of our large towns, whereas typhus is only occasional. Moreover, other diseases are associated with overcrowding, such, for instance, as small pox and enteric fever, and no one has yet alleged that these diseases are due to overcrowding. It affects both sexes about equally, and it occurs at all ages.

"Upon the authority of death registers and hospital "statistics, the statement is constantly made that "typhus attacks adults more than children; but the "evidence furnished by these data is quite untrust- "worthy as showing the relative proclivity of different "ages to an attack. Typhus, as it appears on the "death registers, is indeed incomparably more frequent "among adults than children; but that is because "children rarely die of it, not because they are rarely "attacked. And in hospital records a much greater "proportion of adults than of children are seen to be "admitted; but this is because of obvious domestic "reasons, because of the slightness of the fever in "children, and often because of the rules of the insti- "tution. When inquiry as to age is made to include "every case of attack, children and adults are found to "be quite equally susceptible; the actual incidence may "even be observed to be strongly upon the young, "partly because of their greater numbers, and partly "because adults are frequently protected by previous "attack." (*Buchanan.*)

It appears at any season of the year, but it is more common in the colder than in the warmer months. It

spreads by contagion, but continued exposure is usually necessary in order that the contagion may take effect. For hospital nurses in a ward containing about twenty cases, the exposure required is from six weeks to three months, but to this there are exceptions. One attack confers immunity from a second, but there are said to be exceptions to this.

Anatomical Characters. There is nothing characteristic of typhus but the eruption. This is perfectly distinctive to the practised eye, but very difficult to describe correctly. It consists of three parts : (*a*) rose-coloured spots which disappear on pressure, (*b*) dark red maculæ which are modified by pressure, and (*c*) petechiæ upon which pressure produces no effect, and which persist after death. It is seen usually first in the sub-clavicular regions, along the lower border of the pectoralis major, on the wrists, the back of the hands and the epigastrium, from which parts it gradually covers the body in from one to three days. It is not usually found on the face and neck, but to this there are exceptions. At the very beginning the eruption consists of red spots which disappear on pressure, and if the attack be mild the eruption may consist chiefly of such throughout the whole course of the disease ; but in the severer cases, in addition to the red spots there are dark red maculæ, not unlike "freckles" in form, connected together by faintly visible streaks which partially disappear on pressure, to which are added later on distinct petechiæ upon which pressure makes no impression. When the eruption is well out, it remains out until it disappear altogether, which it usually does towards, or soon after, the crisis of the fever. It differs from enteric in that

it does not come out in successive crops, although at the very beginning spots may be seen to come out and disappear on various parts of the body until the general eruption appear. The blood is more liquid than natural, and coagulates imperfectly. The heart is soft, flabby, and friable, and there is more or less fatty, waxy, or granular degeneration of the muscles. The liver, the spleen, the kidneys, and the mucous membranes are more or less congested, but there are no specific changes in these organs. In the nervous system there are few changes beyond congestion. In former times meningitis was said to be a common occurrence in typhus, but that was at a time (not yet wholly passed by) when most changes characterised by delirium were mistaken for typhus.

"The only decided lesion to be seen is in the "cervical sympathetic, the ganglia of which are some- "what enlarged by a granular amorphous deposit. "This, which extends more or less to all the cervical "ganglia, is best seen in cases dying during the second "week; when death occurs later, it is much less notice- "able, or may be wanting altogether. From this it "may be assumed that the condition passes away with "the fading of the characteristic symptoms of the "disease. Sometimes the deposit is limited to the "ganglia of one side, and in this case it may be "connected with a symptom occasionally observable— "a difference between the temperature of the two "axillæ. If this lesion be regarded as an essential "feature of the disease, it would certainly afford an "explanation of the localisation of the symptoms, of "the disturbed function of the brain, and of the "weak action of the heart; but even admitting this, "there is still wanting an explanation of the nature of

"the infection, and of the reason why its force should "be spent on these organs alone." (*Beveridge.*)

Symptoms. These may be described under three forms: (*a*) Typhus Simplex; (*b*) Typhus Gravior, and (*c*) Typhus Gravissimus.

Typhus Simplex. The disease as a rule commences suddenly with headache and cold shivers, to which are soon added pains in the limbs and back. At the same time there is a feeling of lassitude and dulness, somewhat akin to that of a severe cold. Usually the patient continues at his work until about the fourth or the fifth day, when increasing muscular weakness compels him to take to bed. About this time the eruption appears, and the physiognomy is pathognomonic. The face is dusky red, the eyes suffused and injected, the expression drowsy, and the senses more or less blunted; notwithstanding which the patient is quite conscious when he is roused, for he answers intelligently when sharply questioned. The temperature ranges about 103°, falling to 102°, and rising rarely and for no long time to 104° in the twenty-four hours, the lower temperatures occurring in the morning hours from midnight to midday, and the higher from midday to midnight. The pulse varies from about 100° to 120°. The patient, as a rule, sleeps fairly and takes his nourishment well, but his sleep is broken by dreams, and when awake he is restless and his mind wanders, but he is rarely delirious. The tongue is moist and coated with a thick fur, and the bowels are usually constipated. About the tenth day there is a marked improvement in all the symptoms, the expression becomes clear and intelligent, the tongue cleans, the rash disappears, and the fever declines.

The patient is now ready for a chop, and is practically convalescent.

Typhus Gravior. This form of the disease lasts about fourteen days. It is characterised by high fever, great restlessness, sleeplessness, delirium, usually of the low muttering form, but occasionally violent. The face is dusky, the eyes injected, the pupils contracted, the mind dull, the senses blunted, and the whole expression stupid and sleepy; but there are exceptions to this. Occasionally the mind is clear, the senses acute, the expression intelligent, and the patient anxious about his fate. The tongue, at first moist and covered with a thick fur, becomes during the second week dry and brown, and the lips and teeth covered with sordes. The bowels are usually constipated, and occasionally there is retention of urine. There is usually more or less indisposition to take food, and sometimes vomiting. The eruption is abundant, dark in colour, and towards the middle of the second week it becomes more or less petechial. As the disease reaches its height, the action of the heart becomes rapid and feeble, the first sound is diminished in force, and occasionally it is altogether inaudible. At the same time the breathing is more or less quickened, and there is more or less cough. In favourable cases there is a marked improvement about the fourteenth day; the restlessness diminishes, the wandering disappears, the patient begins to doze at times, then to sleep at times, then to sleep fairly well, and finally to sleep most of the night. At the same time his temperature falls, his appetite returns, and by about the seventeenth day he is convalescent. In unfavourable cases, about the middle of the second week the restlessness and sleeplessness become ex-

treme, the wandering more or less continuous, and the indisposition to take food or drink complete. The patient lies on his back, sinks down in his bed, and passes his motions involuntarily; there is constant twitching of his muscles (subsultus tendinum), carphology (picking of the bed-clothes), sometimes convulsions, coma vigil, and death about the tenth or twelfth day. The carphology is a very remarkable phenomenon, although not peculiar to typhus. The patient lying on his back with his mouth half closed, moves his hands and arms tremulously in front of him, then tremulously draws them towards him and picks at the bed-clothes. Sometimes he moves them towards his head and picks at his hair or his ears or nothing. These movements are more or less continuous, the patient apparently attempting to catch something which moves about and in front of him. Coma vigil is the immediate precursor of death, or rather it is the very act of death. The patient lies on his back, his face is pale and motionless, his eyelids widely open, his eyes fixed, and his pupils dilated. He appears to be wide awake, but death has commenced, and he is absolutely unconscious.

Typhus Gravissimus. This form of the disease is characterised by extreme prostration, great stupor, an abundant eruption, generally an absence of delirium, and death by coma about the eighth day.

Course, Termination, Complications, and Sequelæ. The course of typhus in persons under twenty years of age is, in the great majority of cases, towards recovery, the mortality up to this age being about 6 per cent., but from this time it steadily rises with the age. (See Chart.) The complications are

chiefly pulmonary. Congestion is so constant that it should be regarded rather as part of the disease; but occasionally true pneumonia occurs, and more rarely pleurisy. Parotitis is an occasional complication, and so also is laryngitis and diphtheria, but the latter are extremely rare. Peritonitis is extremely rare. There are only three recorded cases, one by Jenner, one by Murchison, and one by myself. Bed-sores are sometimes troublesome, especially where patients have been carelessly fed and nursed. Acute nephritis is an occasional occurrence, when the patients for the most part die of convulsions. Noma is an occasional complication in children, and in adults facial palsy. Hæmorrhages from the mucous membranes are said to be common in badly-fed subjects, but especially when typhus is complicated with scurvy, as it was in the Crimean war (*Murchison*). Of sequelæ there are usually none. When the typhus patient recovers he proceeds to his usual, or even a better, state of health rapidly and uninterruptedly, but in some cases more or less deafness remains, and in a very few gangrene of the extremities occurs.

Diagnosis. In the diagnosis of typhus it should be remembered that it is an epidemic disease as a rule; epidemic in the town, the street, the village, or the house; not isolated, as enteric so frequently is. The disease with which typhus, in the writer's experience, is most frequently confounded, is acute pneumonia. A careful examination of the chest, together with a careful inquiry into the history, would make this mistake impossible. It is true that pneumonia occasionally complicates typhus, but it is at the end of the fever, not at the beginning. Advanced kidney disease is the

next most frequent error, an error which a careful inquiry into the history of the case would also make impossible, because typhus is an acute disease, with a definite history, whereas kidney disease, such as could be taken for typhus, would be of old standing, with an indefinite history. The error in these cases is in part due to carelessness, in particular to the omission of an examination of the chest, and partly to the notion that "stupor" is a peculiarly typhus feature. This is an entire mistake. The word τῦφος may be applied to many diseases towards their end, and is only applicable to a certain proportion of the severer cases of typhus as the present writer has seen it. The chief element in the diagnosis of typhus is the eruption, which is like nothing else, and which, when present, is unmistakable. It must be seen, however, in a variety of cases, to be known. It cannot be described so as to give an accurate idea of it. It is important, however, to observe that the typhus eruption is not a petechial eruption (*vide* Anatomical Characters), although petechiæ occur in the severer cases; that in the milder cases the spots will disappear on pressure all through the attack, and in the severer forms in the earlier stages, and that a diagnosis can hardly be made from the eruption until about the seventh day. Typhus is not infrequently confounded with hæmorrhagic small pox. No one who has seen the respective eruptions could make the mistake, and it is unfortunate that it is impossible to convey any distinct and accurate notion of these eruptions by description, but careful inquiry into the history will evade the difficulty. In hæmorrhagic small pox the petechial eruption will be present, on the third day, or at the latest on the fourth day, in profusion. This excludes typhus. Moreover, in hæmorrhagic

small pox there are blue-black spots, hæmorrhage from one or more of the mucous membranes, and blood-clots in the conjunctivæ. In typhus there is nothing of the kind. Hæmorrhage from the mucous membrane is almost unknown, and although the conjunctivæ are injected there is no effusion of blood there. Enteric fever may, in some cases, give rise to real difficulty. There are cases of this disease in which the patient appears to be affected more after the manner of a poison. He is apathetic and somnolent from an early period. In these cases the eye and the skin should be carefully examined, bearing in mind that petechiæ occasionally appear in enteric fever. In typhus the eye is usually injected, in enteric it is usually clear; and if in the particular case the eye be clear it is in favour of enteric. But in cases of this kind most reliance should be placed on the eruption. Now, in enteric, the eruption, even when abundant, consists of distinctly isolated spots, which have a faint yet distinctly raised character; in typhus they are flat, not distinctly isolated spots, connected by faint lines,—very indistinct, it is true, but still there. In typhus, moreover, the spots and faint tracings are on a dusky, congested-like skin, and shade gradually into it; in enteric the spots are upon a pale skin, and are as bright at their circumference as at their centre. Meningitis may occasionally give rise to difficulty. In both there is violent headache, a contracted pupil, and delirium, but in meningitis about the seventh day the pupil will be dilating, the pulse becoming slow, and coma supervening; whereas in typhus the eruption distinctive of the fever will be well out. Measles should not, as a rule, give rise to any difficulty, although the typhus rash has sometimes a distinctly measly character. In the first

place, the eruption of measles is distinctly raised, crescentic in form, and most abundant on the face. Moreover, in measles the rash is at its height on the fourth day on the face, and by the sixth will almost have disappeared.

Prognosis. Generally, the prognosis is favourable if the patient take his nourishment well and have a fair amount of sleep, along with a light-coloured eruption. If, on the other hand, the restlessness and sleeplessness be great, the eruption of a dark colour, and there be great unwillingness to take or great difficulty in giving food, the prognosis is unfavourable. The most important factor in the prognosis is the age. If the patient be young, in the great majority of cases he recovers; if he be old, in the majority of cases he dies. Under twenty, 90 per cent. will recover; but from this time onward there is a marked and continuous rise in the mortality (*vide* Chart). The following tables, being the cases admitted into the London, Stockwell, and Homerton Fever Hospitals during the ten years 1871-80, show the mortality at the various quinquennial periods.

The existence of great congestion of the lungs always makes the prognosis grave, and pneumonia if extensive almost invariably means death. Involuntary motions, carphology, or convulsions, if these symptoms be marked, are the almost invariable precursors of death. In the majority of cases, death takes place from the tenth to the fourteenth days, so that if the patient has passed the latter day he is usually safe. The epidemic constitution, whether favourable or unfavourable, should always be considered.

LONDON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	9	...	...	...	...	...	...	...	...	...	9	...	...	...	...	..	...	...	...	...	...	...	...
From 5 to 9 years	30	...	...	...	...	...	...	...	...	...	30	...	...	...	...	...	...	...	...	...	...	...	...
,, 10 ,, 14 ,,	56	...	...	...	...	...	...	...	...	...	56	1	...	...	...	...	...	...	...	...	...	1	1·78
,, 15 ,, 19 ,,	70	...	...	...	...	...	...	...	...	...	70	5	...	...	...	...	...	...	...	...	...	5	7·14
,, 20 ,, 24 ,,	47	...	...	...	...	...	...	...	...	...	47	4	...	...	...	...	...	...	...	...	...	4	8·51
,, 25 ,, 29 ,,	42	...	...	...	...	...	...	...	...	...	42	6	...	...	...	...	...	...	...	1	...	6	14·28
,, 30 ,, 34 ,,	38	...	...	...	...	...	...	...	...	...	38	7	...	...	...	...	...	...	...	...	...	7	18·42
,, 35 ,, 39 ,,	39	...	...	...	...	...	...	...	...	...	39	9	...	...	...	...	...	...	...	...	...	9	23·07
,, 40 ,, 44 ,,	33	...	...	...	...	...	...	...	...	...	33	14	...	...	...	...	...	...	...	...	...	14	42·42
,, 45 ,, 49 ,,	14	...	...	...	...	...	...	...	...	...	14	4	...	...	...	...	...	...	...	...	...	4	28·57
,, 50 ,, 54 ,,	13	...	...	...	...	...	...	...	...	...	13	6	...	...	...	...	...	...	...	...	...	6	46·15
,, 55 ,, 59 ,,	9	...	...	...	...	...	...	...	...	...	9	4	...	...	...	...	...	...	...	...	...	4	44·44
,, 60 ,, 64 ,,	7	...	...	...	...	...	...	...	...	...	7	5	...	...	...	...	...	...	...	...	...	5	71·42
,, 65 ,, 69 ,,	3	...	...	...	...	...	...	...	...	...	3	2	...	...	...	...	...	...	...	...	...	2	66·66
,, 70 ,, 74 ,,	1	...	...	...	...	...	...	...	...	...	1	1	...	...	...	...	...	...	...	...	...	1	100·00
Age not stated...	...	8	10	21	9	23	8	5	7	3	94	...	...	4	5	3	7	4	1	0	2	26	27·65
	411	8	10	21	9	23	8	5	7	3	505	68	0	4	5	3	7	4	1	1	2	94	18·61

STOCKWELL FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	3	10	12	...	1	5	...	6	...	37	...	...	...	1	...	...	1	...	...	...	2	5·40
From 5 to 9 years	...	13	25	51	...	3	19	...	3	2	116	...	...	...	1	...	...	...	...	...	...	1	0·86
,, 10 ,, 14 ,,	...	12	45	61	3	2	25	...	7	...	155	...	...	3	2	2	...	2	...	...	...	9	5·80
,, 15 ,, 19 ,,	...	9	27	51	8	3	27	...	9	1	135	...	...	2	4	...	...	2	...	1	...	9	6·66
,, 20 ,, 24 ,,	...	5	23	31	4	2	18	...	3	1	87	...	1	6	9	2	...	8	...	1	...	27	31·03
,, 25 ,, 29 ,,	...	1	12	12	1	3	5	...	3	...	37	...	...	1	2	...	2	2	...	3	...	10	27·02
,, 30 ,, 34 ,,	...	3	24	14	1	1	7	...	2	1	53	...	...	7	2	1	...	1	...	...	1	12	22·64
,, 35 ,, 39 ,,	...	3	15	13	1	...	10	...	2	...	44	...	1	8	4	...	...	4	...	...	...	17	38·63
,, 40 ,, 44 ,,	...	7	13	21	1	1	11	...	3	...	57	...	3	7	13	1	1	7	...	3	...	35	61·05
,, 45 ,, 49 ,,	...	3	15	18	2	...	4	...	1	...	43	...	2	8	9	1	...	3	...	...	...	23	53·48
,, 50 ,, 54 ,,	...	3	7	3	...	...	4	...	...	...	17	...	2	5	1	...	...	3	...	...	...	11	64·70
,, 55 ,, 59 ,,	...	1	2	2	...	...	2	...	...	...	7	...	1	2	1	...	...	1	...	...	...	5	71·42
,, 60 ,, 64 ,,	...	1	4	7	...	...	...	...	...	...	12	...	1	3	5	...	...	...	...	...	...	9	75·00
,, 65 ,, 69 ,,	...	...	4	...	...	...	...	...	...	...	4	...	...	4	...	...	...	...	...	...	...	4	100·00
,, 70 ,, 74 ,,	...	...	...	1	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	1	100·00
Age not stated...	...	...	...	...	...	...	...	156	...	...	156	...	...	...	...	...	...	...	41	...	...	41	...
	...	64	226	297	21	16	137	156	39	5	961	...	11	56	55	7	3	34	41	8	1	216	22·47

HOMERTON FEVER HOSPITAL.

Age of Patients.	Number of Cases.											Number of Deaths.											Mortality per cent.
	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	Total.	
Under 5 years ...	...	3	2	12	2	3	1	1	...	...	24	...	...	...	...	...	...	...	...	...	...	...	...
From 5 to 9 years	...	5	7	24	2	10	5	...	1	...	54	...	...	...	...	...	...	...	...	...	...	...	...
„ 10 „ 14 „	...	14	32	38	3	16	6	1	2	1	113	...	...	...	2	...	...	...	...	...	...	2	1·76
„ 15 „ 19 „	...	11	40	39	2	10	4	1	2	...	109	...	...	5	3	...	1	...	...	1	...	10	9·17
„ 20 „ 24 „	...	9	18	28	12	14	4	...	...	1	86	...	4	3	3	...	1	...	...	...	..	11	12·79
„ 25 „ 29 „	...	7	9	23	2	10	4	2	...	3	60	...	2	2	4	...	2	...	2	...	...	12	20·00
„ 30 „ 34 „	...	8	7	19	6	16	7	1	1	...	66	...	2	4	8	3	3	2	...	...	...	22	33·33
„ 35 „ 39 „	...	7	13	10	1	9	3	1	1	...	45	...	2	3	5	...	2	...	...	1	...	13	28·88
„ 40 „ 44 „	...	6	15	20	5	18	2	...	1	...	67	...	4	6	10	...	5	...	...	...	...	25	37·31
„ 45 „ 49 „	...	2	9	11	5	4	1	...	1	...	33	...	...	...	5	3	1	...	...	1	...	10	30·30
„ 50 „ 54 „	...	5	4	2	3	7	...	4	...	...	25	...	3	...	...	2	6	...	3	...	...	14	56·00
„ 55 „ 59 „	...	1	...	7	...	3	1	1	...	...	13	...	1	...	7	...	3	1	...	...	...	12	92·30
„ 60 „ 64 „	...	3	...	1	1	3	...	...	...	...	8	...	3	...	1	1	1	...	...	...	...	6	75·00
„ 65 „ 69 „	...	1	...	2	...	...	...	...	...	...	2	...	...	...	2	...	...	...	...	...	...	2	100·00
„ 70 „ 74 „	...	1	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	1	100·00
Age not stated...	...	3	...	2	...	...	...	...	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...
	...	86	156	238	44	123	38	12	9	5	711	...	21	23	51	9	25	3	5	3	...	140	19·69

Treatment. This is essentially the treatment of fever generally. There are, however, one or two points which require special mention. The patient should be fed as in fever, but whenever his temperature falls he may have a mutton chop and a pint of beer, and return, as a rule, at once to his ordinary or any diet he may fancy. The *cold bath* is inadmissible in this fever, but in many cases good effects are produced by warm and tepid baths. There is no objection, however, to cold sponging of the forehead, face, and hands. *Opium, and sedatives* generally, the present writer does not recommend in the treatment of this fever. When it is necessary to procure sleep he prefers the warm bath, or whisky and warm water, or both combined. The *patient* should be carefully watched, even when not delirious, because he is occasionally the subject of delusions, and cunningly watches for the absence of his nurse, in order to run away. In a case of any severity, therefore, he should never be left alone, in case he be found wandering about the street by the policeman, or drowned in the nearest watercourse. *Retention of urine* is an occasional occurrence even in cases which are not very severe. The bladder, therefore, should be examined at least once daily, to ascertain if the urine be freely passed, and much care should be exercised in accepting the nurse's statement that it is passed freely, because, now and then, when the bladder is full it runs over, and a little urine passed in this way, making a "great show," gives rise to the notion that it is being passed freely. *Laryngitis* is an occasional incident, and whenever there is distinct difficulty in breathing tracheotomy should be performed. Parotitis is an occasional occurrence towards the end of the fever. An incision should always be

made when there is fluctuation, but even when there is no fluctuation, the swelling, if tense and painful, should have a few incisions made into it in order to relieve the patient. Gangrene of the extremities is an occasional occurrence, and may call for amputation of the parts.

CHAPTER VI.

RELAPSING FEVER.

Definition. An acute infectious disease, characterised by a tendency to relapse.

Synonyms. Fièvre à rechute (Fr.); Hungerpest, Rückfallstyphus und biliöses Typhoid (Ger.); Famine Fever (Ireland); Relapsing Fever (Eng.).

History. Hippocrates, in the "Third Constitution" of the first book of the "Epidemics," describes, under the head of "ardent fevers" (*καῦσοι*), certain diseases, thought by some to be relapsing fever, which prevailed in his day in the island of Thasos. A cursory reading of the "Third Constitution" would have shown that Hippocrates included in one general description not only different fevers, but diseases other than fever, such as paraplegia and dysentery. In this general description, however, Hippocrates briefly but accurately describes relapsing fever. Thus, in paragraph twenty of the "Third Constitution" he says: "*οἶσι δὲ ἔκρινεν "ἑβδομαίοισι· διέλειπεν ἑπτά· ἐκ δὲ τῆς ὑποστροφῆς "ἔκρινε τρίτῃ·*" From the time of Hippocrates there is no mention of relapsing fever until the eighteenth century, when Strother and Lind speak of a fever in which relapses were frequent, but there is no evidence to show that this fever was not enteric. The earliest distinct account of it in modern times is that which

occurs in "Rutty's Chronological History of the Diseases of Dublin." Speaking of the year 1739, he says: "The latter part of July and the months of "August, September, and October were infested with "a fever which was very frequent during this period, "not unlike that of the autumn of the preceding year. "It was attended with an intense pain in the head. "It terminated sometimes in four, for the most part "in five or six days, sometimes in nine, and com- "monly in a critical sweat: it was far from being "mortal." "The crisis was very imperfect, for they "were subject to relapses, sometimes to the third "time" (*Murchison*). It appeared in Ireland in the beginning of the present century. "Certain it is," say Dr. Barker and Dr. Cheyne, "that the fever "of 1800 and 1801 very generally terminated on the "fifth or seventh day by perspiration; that the disease "was then very liable to recur; that the poor were "the chief sufferers by it" (*Begbie*). It continued to appear sporadically in Ireland until the end of the year 1816, when it became epidemic among the starving labourers of Cork, from whence, in the spring of 1817, it spread to several other parts of Ireland, and in September to Dublin. In 1818 about 3,000 cases were treated in the hospitals and dispensaries of London. In the autumn of the same year Edinburgh was attacked, and at the same time there were 2,715 cases in Glasgow, and 2,400 in Aberdeen. In the autumn of 1819 it declined, and in winter it entirely disappeared. Ireland, however, was the place where it raged. Of the six millions who then inhabited the island, according to one account 737,000 were attacked, of whom 40,000 died; according to another 800,000, and according to a third a million and a half (*Haeser*).

In 1826 it appeared chiefly in Ireland along with typhus, and in 1842-3 it prevailed in Scotland and in England, although to a less extent in the latter. After the epidemic of 1843 sporadic cases were observed in Ireland and Great Britain until the end of 1846, when it again became epidemic in England, Scotland, and Ireland, continuing during the years 1847-48; but in this epidemic a large proportion of the cases were typhus. It appeared also in these years in certain parts of Germany, particularly in Upper Silesia. It appeared in London and Glasgow in 1851, and in Ireland in 1853, "but in 1855 relapsing fever dis-"appeared, and for more than fourteen years not a case "of it was observed in any hospital of Great Britain, "while in Ireland it seems also to have been unknown" (*Murchison*). It appeared at St. Petersburg in 1865, in Siberia in 1867, in Breslau and Berlin in 1868, in Breslau in 1869, in London in 1868-69-70. Towards the end of 1872 the disease again appeared in Breslau and Berlin, where it prevailed far into the spring of 1873 (*Lebert*). In December 1872 eight cases appeared in London, in the neighbourhood of Blackfriars Road (*Mackellar*). In 1876, consequent upon immigration from the famine-stricken districts of the Deccan, it appeared in Bombay, where it prevailed during the years 1877-78 and '79 (*Vandyke Carter*).

Etiology. Relapsing fever is characterised by the presence in the blood of thin thread-like spiral organisms discovered by Obermeyer in 1872. It is essentially a disease of northern Europe, but epidemics of it are more common in Great Britain and Ireland than elsewhere. It is much more common in the latter country however, and those countries in which the

social conditions are similar, as in the following examples. "The province of Upper Silesia is a "dependency of Prussia. It is inhabited however, "not by Saxons, but by a race of Poles who have "been severed from their nation for seven hundred "years, and yet have preserved their language, their "religion, and their unwillingness to labour, although "they have lost the inventive genius, and the "chivalrous spirit of their parent stock. Separated "thus from Prussia by differences of blood, of religion, "and of language, the utmost efforts of that en- "lightened country have failed to teach them Saxon "industry, or to give them Saxon comfort. The "schoolmasters who have been sent among them "have learned Polish, but have not taught German; "the Protestant teachers have only excited in them "a more fanatic zeal for their Catholic priests; the "profound literature of Germany awakened in them "no response; and amidst the dash and tumult of "modern progress, they remain silent and unmoved "in their antique isolation. Like the Irish, the "potato is their staple article of food, to which "they add buttermilk and sauer-kraut. Their "dwellings are the prototypes of the Irish cabins, "and in the smallest and dirtiest of huts persons "of all ages and sexes are crowded together. The "relations between landlord and tenant appear to be "on as false a footing as those which exist in Ireland, "only that here a still more oppressive state of "servitude may be found. The aristocracy also, as "in Ireland, adopt a system of absenteeism, and spend "in Berlin or Vienna the small portion of wealth "which the labour of their miserable dependants "creates." (*Murchison.*)

There is, therefore, no necessary connection between the Irish race and relapsing fever. It is the conditions under which many of them live. Thus in the epidemic which prevailed in Glasgow in 1843, the Irish suffered most "because they lived in the worst "places, in the worst conditions both as to dirt and "poverty. There was nothing in the nationality "*per se* to account for their seizure." (*Russell.*)

It has been met with in America, where it was probably introduced by Irish immigrants, but it has not prevailed there as an epidemic. It has been met with in India and in Egypt in an epidemic form, and it prevailed among the British troops in the Crimea in 1855; but "the most extensive epidemics "have arisen in Ireland in times of famine, and "extended thence to England and Scotland" (*Grimshaw*). Generally when the disease arises in England or Scotland it is mainly confined to the Irish residents, or to persons living under similar social conditions; but in 1843 there was an epidemic which was confined to Scotland, and in 1868-70 there was one which was confined to London. In the latter towns the disease affected Englishmen mainly, but in Edinburgh the great proportion were Irishmen. "Sixty-four per cent. "were either actually born in Ireland, or though born "in this country were of Irish extraction, and bred "in all the habits and ways of their Irish parents. "And if we add those who undoubtedly took the "disease directly from these Irish people, either from "lodging with them or by waiting on them when sick, "we raise the percentage of Irish who were attacked to "77." (*Muirhead.*)

It appears rarely except as an epidemic, but to this statement there is certainly one exception, the cases

already referred to, which arose in the neighbourhood of Blackfriars Road, and there are probably many more. Season is said to have little or no influence over it (*Begbie*). It is usually associated with famine, —hence one of its names, famine fever, in the German "hungerpest"; but there is no necessary connection with famine in general and relapsing fever, as the epidemic which prevailed in London in 1868-70 proved. That epidemic was not preceded by famine, and it affected comparatively few Irishmen, only about 8 per cent. (*Murchison*). But although there was no general famine, the sufferers from relapsing fever in that epidemic were individually the victims of starvation.

"With rare exceptions, the patients admitted with "the disease into the fever hospital had been in a "deplorable state of destitution—far greater than that "of the average of typhus patients. Even the nurses "of the hospital were strongly impressed with this "fact. A large proportion of the entire number were "'tramps' who had travelled long distances in search "of work, and many of whom appeared to arrive in "London with the fever upon them. This remark "applied especially to Camberwell, most of the one "hundred and five patients furnished by that parish "having arrived in the parish only a few days before "being brought to the fever hospital. Many of the "patients admitted during September and October had "only just returned from hop-picking in Kent, where "they had been sleeping in barns and under hedges, "and eating unwholesome food; several patients, for "instance, stating that they had eaten nothing for "weeks except turnips and unripe fruit." (London Fever Hospital Report, 1870.)

It has not, however, any necessary connection with want of food, for of forty cases observed by Muirhead in Edinburgh, not one could be said to be emaciated. "In fact they were all wonderfully clothed with fat. "As a rule they were stouter and more well-to-do in "appearance than typhus fever patients usually are. "Many of them lived well, and were in the habit of "eating butcher's meat every day, some only two or "three times weekly, and in no case where I made the "enquiry did I find that they did not partake of it at "least once a week." (*Muirhead.*) But famine leads to the aggregation of individuals from different parts of a country to the large towns, where the victims of famine are huddled together, and the disease, if it exist in some remote hamlet or village, finds congenial conditions for its spread. What the famine does is to supply the conditions for the operation of the cause. Relapsing fever in connection with famine is a particular instance of the general truth that disease of some sort almost invariably attends large aggregations of individuals, a fact which has given rise to the belief that such disease is produced by overcrowding, whereas the probability is that such disease is merely spread by overcrowding and what that involves, uncleanliness and want of ventilation.

It is essentially the fever of the vagrant and the unemployed, and it is very infectious, notwithstanding the fact that Virchow said it was not. The evidence on this point is indeed overwhelming.

"In all the epidemic visitations of relapsing fever, "to which reference has already been made, but more "especially in those of 1817, 1818, and 1819, of "1843-44, and 1847-48, precisely the same facts "which have been held as sufficient to establish the

"contagious nature of such diseases as typhus, "scarlatina, and morbilli, were observed. Physicians "engaged in the daily observation of the epidemic "fever for many months together, unanimously formed "the opinion that the relapsing fever propagated "itself by contagion. Concerning the earliest men- "tioned of these epidemics, we find Dr. Welsh writing "as follows: 'When acting as clerk to Dr. Hamilton "in the Royal Infirmary, in the course of four months "my three colleagues, two of the young men in the "apothecary's shop, two housemaids, and thirteen or "fourteen nurses, caught the disease, and the matron "and one of the dressers died of it. Since I left the "Infirmary, three more of the gentlemen acting as "clerks, one of the young men in the shop and many "more of the nurses, have caught the infection, but the "number I do not know. In this hospital (Queensbury "House), since it was opened on the 23rd of February, "1818, my friends Messrs. Stevenson and Christison, "the matron, two apothecaries in succession, the shop- "boy, washerwoman, and thirty-eight nurses have been "infected; four of the nurses have died. With the "exception of two or three nurses who have been but "a short time in the hospital, I am now the only person "in this house who has not caught the disease, either "here or at the infirmary, within the last eight or ten "months. Several students, whom curiosity led too "near the persons of the patients, might be adduced as "additional evidence. When it begins in a family, we "always expect more than one of them to be affected; "I could mention instances of four, five, six, and "seven being sent to the hospital out of one family; "eight, nine, and ten out of one room; twenty and thirty "out of one stair; and thirty and forty out of one

"close; and this all in the course of a few months.'
"The contagious nature of the epidemic fever of 1843-44
"is thus insisted on by Dr. Wardell: 'Most of the
"medical officers connected with the Edinburgh Royal
"Infirmary and additional fever hospitals were seized
"with it; eight of the resident and clinical clerks in
"quick succession became affected, and, out of that
"number, no less than six were yellow cases, and thus,
"obviously, in danger of their lives. The majority of
"the nurses and domestics took the disease, and of
"the former, at one time, no less than nineteen were
"labouring under it. Some of the dispensing physicians
"and other practitioners took the disorder, as also
"several of the clergy and visitors of the sick, whose
"duties brought them to the bedsides of the patients.
"The few cases occurring amongst the higher classes,
"resident in the new town, were generally to be traced
"to the influence of contagion, the parties affected
"having had either immediate or indirect communica-
"tion with those suffering under the disease.' And no
"less decided is the testimony borne by Dr. Cor-
"mack: 'The disease,' he remarks, 'is contagious.
"Of this we have sufficient evidence in the fact that
"almost all the clerks and others exposed to the con-
"tagion have been seized. Dr. Heude and his successor,
"Mr. Reid, in the new Fever Hospital; Dr. Bennett,
"my successor there; Mr. Cameron and his successor;
"Mr. Balfour, in the adjoining fever house; as well as
"most of the resident and clinical clerks in the Royal
"Infirmary, have gone through severe attacks during
"the past summer and autumn. Hardly any of the
"nurses, laundry-women, or others, coming in contact
"either with the patients or their clothes, have escaped;
"at one time there were eighteen nurses off duty from

"the fever; and of those who have recently been en-
"gaged for the first time, or of those who have hitherto
"escaped, one and another is, from time to time, being
"laid up.' It is in language closely resembling that
"employed in the sentences now quoted that Drs.
"Paterson, W. Robertson, and other physicians have
"expressed their belief in the contagious property of
"the relapsing fever of 1847-48; and the writer,
"whose position as resident medical officer in the Fever
"Hospital while under the care of Dr. Robertson, in
"the spring months of 1847, afforded him the best
"opportunity for studying the nature of the epidemic,
"arrived at the conclusion that the relapsing fever,
"like typhus, is capable of communication from the
"sick to the healthy; that, for this purpose, actual
"contact with the sick is not necessary, the subtle
"poison of this form of continued fever, equally with
"that of typhus, being readily conveyed through the
"air surrounding the latter; and lastly, that by means
"of fomites or clothes, the disease may readily be
"propagated." (*Begbie.*)

The experience of the London Fever Hospital in 1870 was to the same effect:—

"Out of a total of 136 persons employed during the
"year in the wards of the hospital, 34 took fever.
"1 medical officer, the matron, 10 nurses, 1 scrubber,
"took typhus; 1 medical officer, 9 nurses, 1 scrubber,
"took relapsing fever; 1 medical officer, 1 nurse, took
"scarlet fever; 2 nurses took enteric fever; 2 nurses
"took febricula; 3 nurses, 1 scrubber, took small
"pox."

It affects both sexes, and all ages, but the age at which it is most frequent is fifteen to twenty-five, and males are said to suffer more than females. Relapsing

fever has some kind of relation to typhus fever, also a disease prevalent in Ireland and among the Irish and those living under similar social conditions. It usually appears along with more or less of typhus, and it often either precedes or follows typhus epidemics, so that the one is frequently mistaken for the other. "While I "admit the frequent occurrence of relapsing fever in "Ireland, I must be allowed to record here my protest "against the statements recently circulated on very "insufficient data, that relapsing fever constituted the "large majority of the cases of the famine fevers of "Ireland. The contrary of this I believe to be the "case; and having had large and extended experience "in the last great famine visitations of Ireland 1846-"47-48, I can certify that the maculated typhus was the "disease which chiefly prevailed; while the relapsing "fever presented itself only at the close of the great "typhus visitations." (*Lyons.*)

One attack probably protects from a second, but there is some uncertainty on this point, owing probably to the confusion of relapsing fever with typhus. For the same reason the incubation period is uncertain. Muirhead estimates it at from five to ten days.

Anatomical Characters. In relapsing fever there is no characteristic anatomical lesion. In the case of the victims of famine the body is emaciated. The rigor mortis comes unusually early and remains unusually late (*Niemeyer*). The jaundiced tint of skin which sometimes exists during life is often more marked after death, and when there are petechia, purpura, and vibices during life, these, of course, remain after death. The bronchial tubes show signs of inflammation, and pneumonia is more common than in typhus. Hypostatic

congestion is not infrequent, but pleurisy is very rare. The heart is sometimes fat and flabby, and in a state of granular or fatty degeneration, characters which are rarely absent when death is due to collapse (*Murchison*). The blood is of a dark colour, and if the fever have been of long duration it is watery and without a trace of coagulum (*Niemeyer*). The white corpuscles are increased, and certain small bodies termed spirilla, discovered by Obermeyer in 1872, and confirmed by Engel in 1873, have been found there along with large white corpuscles, two to four times the size of the white blood corpuscles (*Niemeyer*). But it is not quite settled whether the spirilla be the cause or the consequence of the fever, and in favour of the latter view is the fact that it is found in the mucus about the teeth in healthy persons (*Cohn*). By some, however, it is regarded as the cause of the disease, but "others look upon its existence there as "a mere epiphenomenon—believing, as the writer is "inclined to do, that it appears as a consequence rather "than as a cause of the morbid processes constituting "the fever" (*Bastian*). The liver and spleen are enlarged, especially the latter, which is sometimes increased from five to six times its normal size (*Niemeyer*). In consistence it is often softened, sometimes is diffluent, and occasionally contains infarcts which may become absorbed or end in suppuration. "The bile "is often dark, thick, and viscid, but in almost all the "jaundiced cases the bile ducts are perfectly pervious, "abundance of bile is found in the duodenum and fæces, "and in some cases the bile is even thinner than "natural" (*Murchison*). The kidneys are sometimes increased to double their normal size, and in rare cases show numerous small hæmorrhages (*Niemeyer*). The

stomach and small intestines are usually healthy, saving a few patches of ecchymosis, especially towards the lower part of the ileum. The large intestines are usually healthy "except in those cases which have "been complicated with diarrhœa or dysentery. In "the slighter forms of this affection irregular patches "of arborescent and punctiform injection are found "scattered irregularly over the surface of the mem- "brane, which in the vicinity of these patches is "healthy in appearance and consistence. In the "more advanced forms, the mucous membrane of "the whole of the large intestine and of the lower "two or three feet of the ileum presents the most "intense vascular injections of a deep red purple or "dingy brown colour. The surface also is covered "with a pale membranous follicle, which here and "there has the appearance of having been separated "in patches. Occasionally a few small ulcers with "thickened edges are found in different parts of the "large intestine, and extensive recent peritonitis is "occasionally met with, usually associated with an "inflamed colon or spleen" (*Murchison*). Lastly, the bones and white tissues of the body are tinged yellow in jaundiced cases.

Symptoms. The disease commences suddenly with headache, backache, pains in the body generally, and fever. In well-marked cases the temperature is high, and in some cases reaches 106°, 107°, or 108°, without danger to life. The pulse varies from 110° to 140°, but it has no constant relation to the temperature, which may be high when the pulse is low. Murchison, for instance, found the temperature at 106° Fahr. when the pulse did not exceed 90°. The tongue is covered

with a moist creamy fur, which, in severe cases, becomes dry and brown in the centre, and in the worst cases black all over (*Grimshaw*). There is occasional nausea, and more rarely vomiting. The bowels are usually bound, but there is sometimes diarrhœa, which is occasionally of a dysenteric character, owing to the dysenteric tendency which exists in times of famine. The thirst is excessive, and usually there is loss of appetite, but occasionally it is voracious (*Murchison*). The abdomen is tender, particularly in the epigastrium, where there is, in addition, a sense of oppression, and the liver and spleen are enlarged (*Grimshaw*). The skin is usually somewhat jaundiced, and there are occasional sweats. In some cases a reddish mottled rash appears on the second or third day, but there is no characteristic eruption. Minute petechiæ, for the most part due to flea bites, are common, and sudamina are so frequent that the disease has been designated miliary fever. There is usually more or less sleeplessness, but towards the end of the first week there is occasionally delirium. The fever is continuous, with daily remissions of from 1° to 2° Fahr. up to about the seventh day, when it suddenly disappears, leaving the patient convalescent. "This convalescence is frequently accompanied or "preceded by a critical evacuation of the bowels, "kidneys, or uterus, or by profuse diaphoresis. It "may be permanent, but more commonly the patient "remains well for a few days or a week and then "suddenly relapses, and passes through all the "symptoms previously described. There may be a "second or a third relapse, and even a fourth has "been recorded." (*Grimshaw.*) The duration of the relapse is variable, but it is rarely more than two

or three days, and is sometimes so slight that it is not observed.

Such are the symptoms of an ordinary case of relapsing fever, but occasionally it is more severe. In a few cases collapse suddenly arises. The face becomes livid, pulse almost imperceptible, the extremities cold, and death occurs "within a few hours after there had "been no evidence of danger." In other cases there is suppression of urine ending in delirium, convulsions, coma, and death at the end of the first or second paroxysm (*Murchison*).

Course, Termination, Complications, and Sequelæ. The course of the disease in the great majority of cases is towards recovery, death, when it occurs, being due usually to some complication. The terminations are various. In some cases it terminates in about a week without relapse (*Grimshaw*), but more frequently after an intermission of about seven days the fever returns and lasts about three days. In a certain number of cases there is a second relapse, and a third, fourth, and fifth have been mentioned; but the evidence upon which this latter statement is founded is not satisfactory. The duration of the first attack and of the first intermission is not fixed; the former varies from five to seven days (*Hippocrates, Grimshaw*), the latter from seven to nine days (*Hippocrates*). The first relapse lasts usually from three to seven days (*Hippocrates*). The complications of relapsing fever are few in number. They consist, for the most part, of hæmorrhages into the skin and from the mucous surfaces, pulmonary affections such as bronchitis and pneumonia, and affections of the organs of digestion due to the starvation, such as diarrhœa and

dysentery. The following are the complications which occurred in 903 cases treated in the London Fever Hospital in the year 1870:—

Jaundice	48 who recovered.
Diarrhœa	16 ,, ,,
Pulmonary	61 of whom 7 died.
Hæmoptysis	2 who recovered.
Epistaxis	27 ,, ,,
Cardiac Disease	3 of whom 2 died.
Hæmaturia	1 who recovered.
Retention of Urine	3 ,, ,,
Menorrhagia	1 ,, ,,
Herpes	47 ,, ,,
Pemphigus	1 ,, ,,
Urticaria	1 ,, ,,
Erysipelas	1 ,, ,,
Parotid Swelling	2 ,, ,,
Ophthalmia	1 ,, ,,
Iritis	1 ,, ,,
Otorrhœa	2 ,, ,,
Rheumatism	5 ,, ,,
Phthisis	1 ,, ,,
Epilepsy	1 ,, ,,
Pregnancy	10, of whom 8 aborted, and 1 died.

There are no sequelæ.

Diagnosis. Fever of from five to seven days' duration, not dependent on some chest affection, followed by a complete intermission of about a week and a return of the fever; is unlike any other acute disease, and consequently is unmistakable; but then fourteen days must elapse before a diagnosis can be made on these grounds, and they are the only grounds upon which an accurate diagnosis can be made. It may be distinguished from scarlet fever by the absence of sore throat and the absence of the eruption on the second day.

The severe pain in the back which occurs in the relapsing fever might lead to its being mistaken for small pox, but the absence of an eruption on the third, or, at the latest, the fourth day, would decide this question. Measles is for the most part a disease of children, and in any case the absence of cough, of pricking of the eyes, and of the eruption on the fourth or fifth day, would be decisive against this disease. In enteric fever the invasion is slow and insidious, in relapsing fever the invasion is sudden; and in the former the tongue is red at the tip and edges, in the latter covered with a white fur (*Grimshaw*). From typhus fever it might be difficult of diagnosis, except in the severer cases, when the dusky countenance, the dull, heavy injected eye, and the characteristic eruption, would set aside relapsing. The absence of specific symptoms pointing to any particular fever, and the sudden cessation of the fever with free perspiration about the seventh day, would point strongly to relapsing fever, whereas its continuance beyond the seventh day would negative relapsing, and point to something else. The occasional occurrence of jaundice gave rise to the notion that relapsing fever was yellow fever, a view held by Graves; but this fever "is limited to tropical and "sub-tropical regions, or to countries having a tropical "climate or a summer of sufficient length and heat" (*Jones*). Moreover, yellow fever is a very fatal disease, the jaundice is a constant symptom, and death is usually preceded by black vomit; whereas, in relapsing fever, the disease is very mild, the jaundice is only occasional, and black vomit before death is so rare that its actual existence has been doubted (*Murchison*). In this country difficulty in diagnosing relapsing fever from the remittent fevers would not arise, but in warm

climates the diagnosis in the early stage would be difficult. The remittent "in general characters are "distinguished by never showing the blood-spirillum, "seldom relapsing, and never at the same intervals, "with similar gradations, as noted in famine fever; "their origin is malarious, their production seasonal "and endemic, no class of an exposed community "being spared, and contagion being unknown; they "are amenable to treatment by antiperiodics" (*Vandyke Carter*). It must, however, be admitted that an early diagnosis on the merits of individual cases is difficult, if not impossible; but, fortunately for diagnosis, the disease is nearly always epidemic, so that there is general evidence to be found in the circumstances of the patients usually sufficient to ensure a correct diagnosis. Thus the presence of unmistakable relapsing fever in the same street or in the same house in which the patient lived, or among the friends he may have visited, would point strongly in any particular case to relapsing fever, and in the case of clergymen, doctors, and nurses, the determination of the nature of the cases they were attending would be all-important.

Prognosis. This is usually very favourable. The mortality, as a rule, is low, sometimes not more than from 1 to 2 per cent., and rarely more than 4. In the epidemic which prevailed in London in 1869-70 the mortality of the cases admitted into the London Fever Hospital was only 1·32 per cent. It is influenced chiefly by the age and the previous condition of the patients. In early life it is hardly ever fatal, but death becomes more frequent as age advances, which the table given on page 140, taken from the

NUMBERS AND RELATIVE MORTALITY AT DIFFERENT AGES.

Age of Patients.	Males.			Females.			Males and Females.		
	No. of Cases.	No. of Deaths.	Mortality per cent.	No. of Cases.	No. of Deaths.	Mortality per cent.	No. of Cases.	No. of Deaths.	Mortality per cent.
Under 5 years	10	...	...	6	...	...	16	...	...
From 5 to 9 years	25	...	...	32	...	...	57	...	...
,, 10 ,, 14 ,, ...	55	...	...	46	...	...	101	0	...
,, 15 ,, 19 ,, ...	121	...	...	55	1	1·81	176	1	·56
,, 20 ,, 24 ,, ...	111	...	...	36	...	...	147	...	...
,, 25 ,, 29 ,, ...	58	...	...	32	...	...	90	...	...
,, 30 ,, 34 ,, ...	46	...	...	35	...	...	81	...	...
,, 35 ,, 39 ,, ...	28	1	3·57	26	1	3·84	54	2	·7
,, 40 ,, 44 ,, ...	37	...	...	21	1	4·76	58	1	1·72
,, 45 ,, 49 ,, ...	31	...	...	13	...	...	44	...	..
,, 50 ,, 54 ,, ...	18	2	11·11	8	1	12·5	26	3	11·54
,, 55 ,, 59 ,, ...	14	2	14·28	6	...	...	20	2	10·
,, 60 ,, 64 ,, ...	14	2	14·28	12	...	...	26	2	7·7
,, 65 ,, 69 ,, ...	3	...	...	3	...	...	6	...	...
,, 70 ,, 74 ,, ...	...	...	...	...	...	...	...	...	...
,, 75 ,, 79 ,, ...	1	...	...	...	...	...	1	...	...
Total	572	7	1·2	331	4	1·2	903	11	1·2

report of the London Fever Hospital for the year 1870, will show.

The circumstances which make the prognosis grave are the occurrence of hæmorrhages, of lung complications, of peritonitis, of severe diarrhœa and dysentery.

Treatment. This is the same as in fever generally. The special point to be remembered is the fact that a large number of the patients have been suffering from starvation, and that whilst it is all-important that they should be fed, this should be done gradually, and they should be kept in bed until they have recovered strength and appetite, in order to avoid the risk of death from syncope.

CHAPTER VII.

SIMPLE CONTINUED FEVER.

Definition. Slight, of short duration, increase of temperature, without assignable cause.

Synonyms. Febricula (Latin); Fèbricule (Fr.); Febricula (Ger.).

Etiology. This, of course, is not known, otherwise it would not be simple continued fever. One of its most common causes is the poison of one or other of the "fevers" producing a mild effect. This fact is not sufficiently recognised, but that certain "febriculæ" are due to this cause the present writer has no doubt. In a certain number of persons the specific fevers are so mild that the subject of them attends to his daily business,—if a child, goes to school all the time,—wholly ignorant of the fact that he is suffering from an infectious disease which he may be communicating to more or less of his fellow-creatures. This is the explanation of many an epidemic and of many an isolated case which cannot be traced, and it is, the writer believes, the explanation of the continuity of existence of these diseases, which, under favourable, only now and then occurring, conditions break out in the form of more or less formidable epidemics. It is further, the writer believes, the explanation of the frequent appearance of infectious disease where numbers of people are congregated together. It was, and probably

is, widely believed that overcrowding produces disease *de novo*. Infectious disease has appeared so frequently along with overcrowding, that the latter has been assumed to generate it. The present writer believes that this is an error. What he thinks the overcrowding does is, in proportion to its extent, to increase the chance of the presence of one or more sick persons and to supply the conditions for the spread. It proves nothing whatever against this view, that infectious disease has appeared in emigrant ships to which no person was admitted without careful medical examination, and where, the ship not having had any communication, it could not have been *introduced*, and therefore must have *arisen*. The current notion about the infectious diseases is that they are nearly always severe, and that, consequently, no one the subject of one or another of them could by any possibility be on a journey or attending to his business. This is not so. A certain number of persons are so mildly affected by them that they do not recognise that they are ill, and go about their ordinary business probably infecting other persons. It is on this account that cases of "febricula" are so common during epidemic periods, and it explains, the writer thinks, the widely-spread opinion that certain persons are insusceptible to infectious disease. It is doubtful if there be any considerable number of persons insusceptible to infectious disease, if, unprotected, they be sufficiently exposed to their causes. But the degree of exposure required varies greatly. Certain persons are no sooner exposed to infectious disease than they contract it at once. Others may be exposed to it continuously for weeks, months, and even years, and then contract it. A certain number will contract an infection at one time

at once on exposure, while at another time they might be exposed with impunity for weeks. There are, however, as has been already said, a certain number of persons who contract the infectious disease so lightly that it escapes observation. It has happened to the present writer to discover scarlet fever in five instances by an accident. The subjects were nurses in scarlet fever wards at Homerton, and they had each passed through an attack of scarlet fever so slight that it neither interfered with the daily performance of their work nor attracted the attention of the medical officer whom they accompanied daily through the ward.

The means by which two of these cases were discovered are, from an etiological point of view, of great interest. The one went to a Christmas party, at which she fainted whilst dancing. She was taken to her room, when some inquiries as to her previous health led to an examination. She was found to be desquamating abundantly, and to have clear symptoms of an attack of scarlet fever.

The other of the two was on the point of emigrating to Australia, and she came to the writer to ask him to sign a medical certificate. A strong healthy girl to all appearance, it seemed ridiculous to think of examining her. Examination, however, showed abundant desquamation on the chest and legs. She gave a history of scarlet fever, which, however, had been so slight that she did not recognise the nature of her illness. One can imagine the surmises which would have been made if this girl had gone in an emigrant ship to Australia, and about a month afterwards, having wrapped somebody's baby in her flannel petticoat, an outbreak of scarlet fever had occurred. Now, had either of these women been asked if they had had scarlet fever their

answer would have been, but for the accidents mentioned, no! although they had nursed it in the Homerton Fever Hospital for months. Other causes of simple continued fever are errors in diet, disturbance of the digestive organs, constipation, fatigue, excitement, and worry.

Anatomical Characters. There are no anatomical characters.

Symptoms. These are usually mild. They consist of slight fever, some thirst, slightly furred tongue, nausea and probably constipation. The pulse is slightly accelerated. There is not infrequently some headache with pain in the limbs, and occasionally some sleeplessness and restlessness. This condition may last from a few hours to a few days.

Diagnosis. This is established by the thermometer, but when it has been, care should be exercised in concluding that the "febricula" is a real one, and not the commencement of one of the specific fevers, and for this purpose time and patience are necessary.

Prognosis. If the case be a true "febricula" this is invariably favourable.

Treatment. This is of the utmost importance, because the "febricula" may be the onset of a severe infectious disease, and, having this in view, whenever "fever" is made out the patient should be treated, until the contrary be proved, as if he were the subject of such. He should be immediately isolated to secure the safety of others, and placed on a sick regimen to

secure as far as possible his own. It is from neglect of these precautions that so much mischief is frequently done. It is only a "cold," only the stomach or the bowels a little out of order. Meantime the whole household is infected. If the bowels be constipated they should be moved by a laxative. It is important to avoid purgatives, because the case may be one of enteric fever. He may have as much water and ice as he pleases, along with milk, beef tea, chicken broth, and bread, until it be quite clear what the meaning of the "febricula" may be, or until it disappear.

CHAPTER VIII.

NOTE ON MALIGNANT INFECTIOUS DISEASE.

Definition. Disease characterised by absence of the usual symptoms, and speedy death.

In the great epidemics which have from time to time prevailed in the world, cases arise in which death occurs after a few hours' illness, without the symptoms which characterise the cases generally. In some such, the death is so rapid that the victims seem to be struck down as if by lightning. For example, in the great plague of the fourteenth century, "viele wurden wie "vom Blitz getroffen und starben auf der Stelle" (*Hecker*). In Florence, where this pestilence raged with great violence, the rags of a poor man who had died of the disease were thrown upon the street, and two pigs coming upon these, sniffed about them, then took them up in their teeth and shook them. Within an hour, after some twisting as if they had taken poison, both fell dead to the earth (*Boccaccio*). Of this there is apparently no doubt, because Boccaccio saw it, and, as he says, would not otherwise have believed it.

"Maravigliosa cosa è ad udire quello che io debbo "dire; il che se dagli occhi di molti e da miei non fosse "stato veduto, appena che io ardissi di crederlo, nonchè "di scriverlo" (*Boccaccio*).

In recent times cases of a similar kind occur. In the small pox epidemic of 1876-77, the Homerton Fever Hospital, with the exception of a pavilion reserved for isolation, was used for the treatment of small pox. A boy, who had been sent to the hospital as a case of small pox, but who was the subject of enteric fever, was placed in the isolation pavilion. Some time after he had recovered from his fever, he woke up one morning about one, complained of some discomfort about the chest, vomited some blood, and in a few minutes died. There were no premonitory symptoms, for the day before he seemed quite well, made no complaint, and some hours before he woke up he had been quietly sleeping. The *post-mortem*, at which Dr. Bristowe was present, showed nothing beyond a few petechiæ on the skin. Cases of this kind are very rare, but cases in which the patient dies within a few days are not uncommon during and between small pox epidemics. In the pure hæmorrhagic cases the patient rarely lives beyond the fifth day, and in malignant scarlet fever he rarely lives beyond the third. When these cases arise during epidemic periods the prevailing epidemic gives the cue to their real nature, but when they occur during non-epidemic times they are usually regarded as cases of blood poisoning or of purpura hæmorrhagica.

The *symptoms* vary, for malignancy is not a fixed quantity, and no accurate description of it is possible. Its most marked characteristic is the more or less complete absence of symptoms distinctive of the disease. As a rule, by malignant is meant "severe," or "very severe." Hence many writers describe malignancy as characterised by wild delirium, high fever, convulsions, great anxiety, and so forth. Such cases exist, but they

are not the cases here referred to. Certain of such recover. The writer's malignant all die. In these delirium is not only not marked, but usually absent. This is a condition which, if one may so say, has to do with the person rather than the disease, and, as a rule, is not proportionate to severity of case. In the malignant—*i.e.*, pure hæmorrhagic—small pox cases, the mind is clear. A patient with this fatal disease may be talking quite rationally and even cheerfully, probably expressing himself as feeling better, within a few minutes of his death. In cases of malignant typhus and enteric, the mental condition is one of indifference tending to drowsiness, from which the patient can be woke up to answer questions clearly. In scarlet fever malignants there is more restlessness, but usually no delirium. The same may be said of the high fever, the convulsions, and the coma. The fever usually is not high, and the convulsions and the coma are usually absent. Generally, the following are the characteristics of malignancy, as the writer has seen it: Great weakness, extremely rapid and feeble pulse, some macular eruption, some increase of temperature, mental clearness and speedy death. Occasionally, great mental anxiety and a high temperature.

The *diagnosis* is exceedingly difficult, and frequently cannot be made unless it be discovered that the patient has been subjected to the influence of one or other of the infectious diseases.

The *prognosis* is death invariably; but in making this prognosis the utmost care should be taken that the distinction between "extremely severe" and "malignant" is made; because whilst malignants, as the present writer defines and describes them, all die, certain extremely severe cases recover. No treatment

is of course of any avail to prevent the inevitable result; but something may be done to relieve suffering. This, for the most part, consists in the administration of some form of alcohol, and in such cases the best is champagne.

CHAPTER IX.

SMALL POX.

Definition. An acute infectious disease characterised by an eruption of papules, which, in the course of about eight days, pass through the stages of vesicle and pustule. Certain anomalous forms are characterised by a more or less complete absence of the eruption, by hæmorrhages into the skin and from the mucous membranes.

Synonyms. Variole (Fr.); Blattern, Menschenpocken (Ger.); Variola (Eng.)

History. The first records of small pox are met with in China, where the disease is said to have been known fifteen hundred years before Christ, and where, as early as the year 1122 B.C., there is a Chinese book on the subject (*Haeser*). It is considered by some to be endemic in Ethiopia, and it is probably from thence that it passed into Europe and formed part of the great plague of the sixth century, described by Procopius, Gregory of Tours, and others. This plague "first "appeared in the neighbourhood of Pelusium, between "the Serbonian bog and the eastern channel of the "Nile. From thence, tracing, as it were, a double "path, it spread to the east, over Syria, Persia, and "the Indies, and penetrated to the west, along the "coast of Africa, and over the continent of Europe. "The fever was often accompanied with lethargy or

"delirium; the bodies of the sick were covered with "black pustules, or carbuncles, the symptoms of im- "mediate death; and in the constitutions too feeble "to produce an eruption, the vomiting of blood was "followed by a mortification of the bowels" (*Gibbon*); which may have been the interpretation which the unskilled observers of the time gave to the black spots which in hæmorrhagic small pox appear on the abdomen, which sometimes becomes entirely black, and thus resembles, if it be not actually, a mortification. Gregory of Tours notices as highly remarkable "the "connection of this pest with special eruptions which "the Western writers call variolas or milinas, corales "pusulas. Mit jenen variolis verbunden" he says the disease raged in France during the years 565-68 (*Sprengel*). According to Procopius the symptoms of the disease were buboes, swellings under the armpits, in the groins, and behind the ears, along with violent delirium. In many there were black spots covering the whole body, and these, for the most part, died in a few hours, as in the black small pox of to-day. Many died from profuse vomiting of blood, significant of certain forms of hæmorrhagic small pox. In Antioch the disease began differently. In some with blood-red eyes and swollen face, in others with quinsy, and in a third class with diarrhœa; from all which it would appear probable that this plague was composed of more than one disease, and that probably one of these was small pox. In Arabia it appeared, in the year 572, along with small pox and measles (*Sprengel*).

It seized all men, without distinction of age, sex, or mode of life. It prevailed at all times of the year and in all climates, so far as these were known at the time. The mortality was appalling; in Constantinople, at one

time, as many as from 4,000 to 10,000 dying daily (*Sprengel*).

This is the first plague in connection with which small pox has been mentioned by the lay historian; but it has been thought by some, amongst whom are Littre and Daremberg, that the great plague of Athens which prevailed about B.C. 425-30 was small pox. The disease arose in Ethiopia, where small pox is said to be endemic. It was highly infectious, the physicians and attendants upon the sick being affected in greater proportion than others. It began in the head first, and then passed over the whole body. The symptoms were redness and inflammation of the eyes, general redness of the body, an eruption of small pimples and pustules, and an absence of wasting, which, having regard to the swollen condition of the body generally in small pox, is not less significant than the eruption of small pimples and pustules. The breath was very foul, and the tongue was covered with blood. The restlessness and thirst were so distressing that the sufferer could not bear the lightest covering, or indeed anything but nakedness, and some oppressed with the ceaseless thirst threw themselves into the cisterns.

Some lost their hands, their feet, or their eyesight, and on recovery there was complete loss of memory, the sufferers neither knowing themselves nor others. Death occurred usually from the seventh to the eighth day (*Thucydides*). There is a strong resemblance to small pox in this description, but it is remarkable that so careful a writer should have omitted to mention the "pitting." One other conclusion appears to be clear from a consideration of the description as a whole, and that is, that there is not a single iota of

evidence pointing to typhus, the disease which it has been generally supposed to be, but there are symptoms pointing to enteric fever and measles.

In the great epidemic which prevailed in Europe during the Crusades, commonly called the Black Death, there were probably several diseases, but there is some evidence that small pox in its most fatal form made part of it. There is the usual number of swellings in the armpits and groins, but there is also distinct mention of black spots, some large and sparse, others small and thick. "E da questo appressò "s'incominciò la qualità della predetta infermità a per- "mutare in macchie nere o livide, le quali nelle braccia "e per le cosce e in ciascuna altra parte del corpo "apparivano a molti, a cui grandi e rade, e a cui "minute e spesse" (*Boccaccio*). However it may be, this much is clear, that the black small pox of to-day is indistinguishable from some descriptions of the Black Death of the Middle Ages.

Leaving now ground somewhat speculative, small pox is noticed in the fragments of the Pandects of Ahron of Alexandria, in the fifth century (*Haeser*). It is distinctly described for the first time along with measles by Rhazes in the ninth. It appeared in England in the thirteenth, and in Germany and Sweden in the fifteenth. It was carried from Europe to America soon after its discovery in the sixteenth, and in Mexico carried off millions (*Curschmann*). "It "was long confounded with the pest, particularly with "other papular and pustular skin eruptions, and it was "for long confounded with measles until Sydenham "definitely separated them" (*Curschmann*).

Etiology. Small pox is a disease which affects all

races of men, every age, and both sexes. No climate is free from its ravages. It is most frequent in Asia, Africa, and the uncivilised parts of America, owing to the neglect of vaccination (*Curschmann*). It affects the black races more severely than the white, both in their own homes and in foreign countries. Very young infants appear to be less susceptible than others, although they are said to be born occasionally with the disease. As a rule, however, the fœtus escapes even if the mother be suffering from small pox at the time, and if the new-born infant be vaccinated within a few hours of its birth it usually escapes even when it is born in a small pox ward. All cases which have come under the writer's observation escaped. It has been stated that children have been born with small pox where the mothers were free of the disease at the time; but Curschmann is of opinion that in such cases the mother had suffered from small pox without an eruption, of which he relates a case which came under his observation. Whatever may have been its original cause, it now arises solely from contagion. Susceptible persons almost invariably contract it on their first exposure, even if the exposure be of short duration. It may be produced by inoculation, and although, as a rule, the disease is less severe when given in this way, it spreads like ordinary small pox, and is sometimes fatal. It is readily communicated from one person to another, and according to the most recent opinion it is communicable through the air to great distances, especially from small pox hospitals (*Power*), an opinion which has received the assent of distinguished medical men. It may also be carried by infected clothing and bedding; but to a great, and hitherto unsuspected, extent it is spread by

persons so slightly affected by the disease that they attend to their daily business throughout the whole course of their attack. Several instances of this kind have come under my observation at the Eastern hospitals. The disease is probably infectious at every stage, and cases so slight that they do not give rise to an eruption are probably capable of infecting others. This view is rendered probable by the fact that in hospital wards children occasionally suffer from fever, headache, and backache, without eruption, after which distinct cases of small pox appear in others. According to Curschmann it may be conveyed in the incubation stage. It may be carried by physicians and nurses who are careless of the cleanliness of their persons and dress. A first attack usually protects from a second, but there are exceptions, of which a distinguished example was Louis XV., who died of it. Some persons are said to be insusceptible of it, of whom Morgagni, Diemerbroeck, and Boerhaave are said to be examples; but having regard to the fact that some persons suffer from the infectious diseases so slightly that they escape observation, this insusceptibility may be doubted. General insanitary conditions appear to have no influence over it, except in so far as these may favour the action of the cause by overcrowding. Efficient vaccination destroys entirely the susceptibility of the individual to small pox. In no case have I met with an efficiently vaccinated small pox nurse, unprotected by a previous attack, who contracted small pox, however much exposed to it.

Anatomical Characters. These will be best described under the following forms: (*a*) Normal

Forms; (*b*) Hæmorrhagic Forms; and (*c*) Modified Forms.

Normal Forms. In these the characteristic feature is the eruption. In some cases this is preceded by an initial rash which accompanies or immediately follows the febrile symptoms. It consists generally of a scarlet or measly efflorescence, which, usually limited to parts, may cover the whole body, when it presents a strong resemblance to scarlet fever or measles. The scarlet rash is most marked and most frequent on the lower abdomen, where it forms a triangle, having for its base a line drawn through the umbilicus and its apex, the symphysis pubis; the upper and inner parts of the thighs, the sides, the axillæ and the inner surface of the arms. It is occasionally accompanied by a few papules. The measly rash is most common on the chest, arms, and legs. These rashes may occur singly or together, and usually they disappear as the eruption proper comes out, but sometimes they more or less persist. On the third day of the illness, occasionally as early as the second, occasionally as late as the fourth, the characteristic eruption appears. It consists, at the very first, of small red spots, which speedily become converted into hard round papules. If the eruption be discrete, these are arranged in twos, threes, and fives; sometimes they form curves, occasionally straight lines, and now and then almost circles. The eruption comes out first on the face, wrists, and hips, and gradually spreads over the body, sometimes leaving the trunk comparatively free. When the papules are well out the process of vesiculation commences, and by about the fifth day distinct vesicles will be formed, which, when perfect, are usually flat, circular, depressed in the centre, occasionally

umbilicated, multilocular, and full of a clear fluid. Sometimes, however, they are globular. Between the fifth and eighth days of the illness the vesicles increase in size, and if the morbid process be not interrupted by death about the eighth day they begin to lose their flat circular form, and become globular, whilst their contents change in colour, becoming yellow, and the skin around them begins to be inflamed; in a word, the vesicles are becoming pustules. Between the eighth and the eleventh days there is more or less general redness, the vesicles become completely pustular, burst, discharge their contents, and form scabs. These remain sometimes a long time adherent to the skin, particularly about the nose and on the scalp. To this general description there are exceptions. On the soles of the feet particularly, on the palms of the hands and under the nails, where the epidermis is very thick, the pocks may be seen as yellow-brown spots, which cannot discharge their contents until the epidermis has come off, and this often takes a long time. When the scabs fall off the face and the body generally there is fine, scaly desquamation, on the disappearance of which the evolution of the eruption may be said to be complete, except on the palms of the hands, under the nails, and on the soles of the feet. Besides the skin, the eruption is found on the mucous membrane of the cheeks, on the tongue towards the tip and edges, on the hard and soft palate, on the tonsils, on the epiglottis in the larynx and trachea, and occasionally in the bronchi as far as the third division. It is also occasionally found in the œsophagus, and on the conjunctiva, but it has not been found in the stomach or intestine. Small petechiæ are frequently found along with the normal eruption, but these

should not be confounded with the larger petechiæ which are met with in the hæmorrhagic forms of small pox. During convalescence abscesses form in various parts of the body. They are frequent in the subcutaneous tissue, on the scalp, and not rarely they are deep-seated, and occasionally give rise to pyæmia. Erysipelas is not infrequent in this stage, and this also occasionally ends in pyæmia. Acute necrosis of the joints occasionally takes place, and there is sometimes exudation of a sanguinolent fluid into the points of the fingers and toes, which renders the skin very tense, and causes considerable pain. Conjunctivitis and corneal ulcer are common. Iritis is rare. Suppurative keratitis is not infrequent in severe cases, and these affections occasionally end in complete destruction of one or both eyes. On the larynx, pharynx, and trachea more or less swelling and mucous exudation is usually found, and occasionally a greyish-white coherent membrane. Pneumonia most frequently lobular; pleurisy and otorrhœa are occasional results. There are no characteristic changes in the viscera, but fatty degeneration of the heart, liver, and kidneys has been met with. The spleen is usually swollen and pulpy. In children Peyer's patches are swollen and congested as in scarlet fever, but the patches nearest the valve are unaffected. The brain and spinal cord are usually healthy, but in two cases extensive hæmorrhage was found on the brain (*Collie*), and effusion of blood has been found in the nerve sheaths (*Curschmann*). In one case the ventricles have been found full of blood. Hæmorrhage has also been found in the cancellous tissue of the bones.

Hæmorrhagic Forms. In these the leading feature is effusion of blood into the skin, into the skin

beneath the vesicles and pustules, and from the mucous membranes. In the purest of the hæmorrhagic forms, the variola nigra, there are no papules, but the skin is covered with rashes of various colours. In some the skin of the whole body is of a deep scarlet hue, resembling a recently boiled lobster, throughout which are scattered purpuric and blue-black spots, which towards death darken in colour and coalesce to such an extent that the body becomes of a dark, livid red, and occasionally quite black. At the same time there is hæmorrhage into the conjunctivæ, which may form a clot around the pupil, as in fig. 1, Plate III.; hæmorrhage from one or all of the mucous membranes, the kidneys, and the uterus. Occasionally hæmorrhage is found in the tears and through the skin. In another class of cases the characteristic feature is large black spots on various parts of the body, spots resembling exactly the bruises produced by violence. In these cases there will be black eyes, conjunctival clotting, hæmorrhage from the kidneys and uterus, and from the mucous membranes. In a third class of cases very rare in the present day, nothing is found beyond vomiting of blood and petechiæ. In these cases internally, small hæmorrhages are found under the serous membranes, on the surface of the heart, lungs, liver, and kidneys, in the interstitial tissue under the mucous lining of the calyces, in the trachea, the stomach, the duodenum, the colon and the rectum; but the writer has not met with them in the jejunum or ileum. They are also found in the subpleural tissue, and extensively behind the kidneys in the retro-peritoneal tissue and along the course of the ureter. The spleen generally is small and firm.

Modified Small Pox. The causes which most clearly

modify small pox are the following; (*a*) Inoculation; (*b*) Previous Small Pox; and (*c*) Vaccination and Re-Vaccination.

Inoculation. This is a penal offence, and is now rarely met with. The result of inoculation generally is to make the disease milder, but otherwise it produces no substantial difference in the anatomical character of the eruption. In the fatal cases it produces no difference. Secondary small pox is rare, but when it occurs it is usually mild. What modifies small pox most in the present day is vaccination and re-vaccination, and the modification produced by this cause is of the most varied kind. Sometimes the disease is so modified that there are no anatomical characters, the morbid process ending with the initial symptoms. More frequently however there is some eruption, the extent and the degree of which depends upon the quantity and the proximity of the vaccination. If the quality of the vaccination be good and the subjects under ten years of age, there may be nothing beyond a few abortive pimples, which speedily desiccate; but if the vaccination be bad or indifferent, the extent and the degree of the eruption will be greater, or may not even be modified; but as the age of ten is passed a certain proportion of well-vaccinated subjects become liable to small pox which can hardly be said to be modified, and a certain number in which it is not modified. Speaking generally, the modification is directly as the number and the quality of the marks and the proximity of the vaccination. The chief modifications are: (*a*) An interruption of the disease at the initial stage; (*b*) at the papular stage; and (*c*) at the vesicular. If the morbid process go beyond this it can hardly be said to

be modified by vaccination, because mild small pox occurs in unvaccinated subjects; in well vaccinated persons after puberty, although rarely, the hæmorrhages into the skin and from the mucous membranes are met with just as in the unvaccinated small pox. After re-vaccination small pox is almost always a trifling affection, but one case of hæmorrhagic small pox has been met with in a successfully re-vaccinated subject. (*MacCombie.*)

Symptoms. These may be described under the following heads:—

(*a*) *Normal Forms:*—

α. Discrete Small Pox;
β. Confluent Pustular Small Pox;
γ. Confluent Vesicular Small Pox.

(*b*) *Hæmorrhagic Forms:*—

α. Variola Hæmorrhagica Pustulosa;
β. Variola Hæmorrhagica Vesiculosa;
γ. Variola Hæmorrhagica Papulosa;
δ. Variola Nigra.

(*c*) *Modified Forms:*—

α. By Inoculation;
β. By Vaccination;
γ. By Small Pox.

(A) Normal Forms. These consist of cases in which the characteristic eruption appears.

α. *Discrete Small Pox.* It begins with headache, pain in the back, pain in the epigastrium, fever, sometimes slight mental confusion, occasionally delirium and a scarlatinoid or measly rash with a few papules. On the third day of the illness, as a rule, the eruption proper comes out, whilst the earlier disappears; but to this there are exceptions. It consists

of red spots, which rapidly become papules. They appear usually on the forehead and face, from which they gradually spread over the body; but this is not invariable, the wrists, and even the hips, being parts on which it frequently first appears. The papules are generally distinct, and continue to appear for about three days, when there is a decided fall of temperature, which often becomes normal. About the fifth day of the illness the papules become vesicles, and about the eighth they begin to become pustules, when the temperature begins to rise. At this time there is usually some sore throat. Towards the eleventh day the vesicles have become completely changed into pustules, the fever has reached its height; the pustules burst, discharge their contents and form scabs, which fall off in from one to two or three weeks. At the same time the temperature falls, and the patient is convalescent. When the scabs fall off there is usually some pitting, but as a rule this is slight.

β. Confluent Pustular Small Pox. This is the most common form of confluent small pox, but it is occasionally confluent in the papular stage, and still more frequently in the vesicular than the papular. It begins like the former, but the fever is high, there is great thirst and extreme restlessness. When the eruption comes out there is a decided mitigation of the symptoms and a fall of the temperature. The eruption appears at the same time, and passes through the same stages as the discrete pox; but about the eighth day, when the vesicles are becoming pustules, they become confluent. At the same time the whole face swells, the lips become protuberant, the nose is much enlarged, and the eyes closed from œdematous swelling of the eyelids; but it

is very rare that there is any eruption on the conjunctivæ. The temperature now rises, there is more or less sore throat, great thirst, distressing itching of the skin, discharge of saliva from the mouth, extreme restlessness and delirium, which is sometimes violent. From the eighth to the eleventh day the febrile symptoms increase, and sometimes laryngitis arises, occasionally producing complete obstruction of the windpipe, and death by asphyxia unless tracheotomy be performed. About the eleventh day the fever reaches its height, the pustules discharge their contents, the temperature falls, scabs are formed, and in two or three days, if no complications arise, and the patient do not die, he will be convalescent. When the scabs fall off, their seat is sometimes raised, but generally depressed.

γ. *Confluent Vesicular Small Pox.* This form of the disease has been described under the term malignant; a name which has been given to some of the hæmorrhagic forms, and consequently has given rise to some confusion. The word malignant has here therefore been dispensed with. The confluent vesicular form is simply the second stage of the preceding, at which stage the vesicles instead of swelling and becoming pustular remain flat, the face assuming a dirty-white, pasty appearance. There is great exhaustion, and the patient dies from the seventh to the ninth day.

(B) Hæmorrhagic Forms. The characteristic feature of these forms of small pox is hæmorrhage into the vesicles, the pustules, the skin beneath, the skin, and hæmorrhage from the mucous membranes. The initial symptoms are similar to those of the normal forms. They may be described under the following heads: (α) *Variola Hæmorrhagica Pustulosa*, (β) *Variola*

Hæmorrhagica Vesiculosa, (γ) *Variola Hæmorrhagica Papulosa*, and (δ) *Variola Nigra*.

α. *Variola Hæmorrhagica Pustulosa.* In this form the disease passes through the usual stages until the pustular stage be reached, when there is hæmorrhage into the skin beneath the vesicles and into the skin, vomiting or expectoration of blood, sometimes accompanied by a horrible stink, hæmaturia or melæna, or possibly all of these. If the hæmorrhage be limited, it is not necessarily a fatal sign, although the patient may die of small pox irrespective of the hæmorrhage; but if it be extensive, in particular if it be largely into the skin, the case will be fatal, vaccination notwithstanding. In these cases there is usually more or less mental confusion or delirium. It is important, however, not to confound this dangerous form of small pox with effusion of sanguinolent fluid into the pocks only.

β. *Variola Hæmorrhagica Vesiculosa.* The characteristic of this form is that it does not proceed to pustulation. There is hæmorrhage into the skin beneath the vesicles, into the skin from the mucous membrane and from the kidneys. It is almost invariably fatal from the sixth to the eighth day.

γ. *Variola Hæmorrhagica Papulosa.* The characteristic feature of this form is hæmorrhage into the skin with a sparse eruption of papules, which may, however, be very numerous. The hæmorrhage into the skin is of the most varied forms. Sometimes it assumes the form of minute extravasations forming distinct purpuric spots, with large inky black spots on a deep scarlatinoid efflorescence which covers the body. In the lower abdomen they are usually more marked than in other parts. Sometimes the extravasations unite and the whole skin becomes one mass of con-

fluent extravasations. There is hæmorrhage into the conjunctivæ and from the mucous membranes. Death takes place usually from the fifth to the sixth, or in rare cases the seventh, day. The mind is usually clear to the last.

Variola Nigra vel *Purpura Hæmorrhagica* (*Black Small Pox*). This is the severest of the hæmorrhagic forms. The hæmorrhage appears as livid and inky (see Plate IV. and Plate III., fig. 2) black spots, which are sometimes small and crowded, sometimes large and widely separated, when they resemble the bruises produced by violence. There is hæmorrhage into the conjunctiva, which sometimes forms a clot round the pupil,—a condition of things which is found in no other acute disease,—from the mucous membranes, the kidneys, and the uterus. The characteristic features of the disease are a complete absence of the normal eruption, a low temperature, and mental clearness up to death, which takes place from the third to the fifth day.

(c) Modified Forms. These consist of cases in which the susceptibility of the individual has been altered by art or by small pox. Of these there are three varieties: small pox from inoculation, small pox after vaccination, and secondary small pox.

Small Pox from Inoculation. "On the second day "of inoculation a pimple rises, which by the fourth has "developed into a vesicle, and by the seventh or eighth "into a pustule, when the patient has rigors, swelling "and pain in the axillary glands, and more or less "fever, followed on the eleventh day by the ordinary "small pox eruption (*Bristowe*), which passes through "the usual stages. The inoculated pustule attains full "development on or about the eleventh day, and by "the fourteenth there will be a crust. The charac-

"teristic of the disease thus induced is its mildness. "It protects from small pox in the same degree as first "attacks of that disease protect from second attacks. "The objections to it are: (1) that small pox so induced "is infectious; and (2) that it is sometimes fatal." (*Quain's Dict. Medicine*, art. "Small Pox.")

Small Pox after Vaccination. Of small pox after vaccination it has to be observed that the modification is directly as the sufficiency and the proximity of the vaccination. A good vaccination up to ten years of age is protection against all but the mildest and most harmless small pox, but as this age is passed the primary vaccination appears to lose its efficiency, and in proportion to the advance of age unmodified small pox appears in primarily well-vaccinated persons. Small pox after vaccination may be classified as follows:—

α Variola sine Eruptione;
β Variola Papulosa;
γ Variola Vesiculosa;
δ Variola Pustulosa;
ε Variola Hæmorrhagica;
ζ Variola after Re-vaccination.

α. *Variola sine Eruptione.* This is the form of modified small pox seen in well-vaccinated children under ten. It is recognised in hospitals by the occurrence in certain vaccinated persons of headache, pain in the back, vomiting, and high fever of short duration, followed after some time in other patients of the same ward by the same symptoms, along with a papular eruption.

β. *Variola Papulosa.* This is the most common form of small pox after good vaccination. It may be of all degrees of severity, from one or two papules to hundreds. It is accompanied with the usual premonitory symptoms,

which are sometimes quite as severe as in unmodified small pox. The papules come out usually on the third day, but towards the fifth dry up and disappear. It is chiefly met with in well-vaccinated young adults.

γ. *Variola Vesiculosa.* With the advance of age the primarily well-vaccinated individual becomes more susceptible to small pox in its less modified forms. In this form the modification is less marked than in the preceding, and the disease passes beyond the papular into the vesicular stage. Some of the vesicles then discharge their contents and form slight scabs, which fall off in the usual way; whilst in others the fluid appears to be absorbed and the vesicles to dry up and fall off by desquamation.

δ. *Variola Pustulosa.* In this form the influence of vaccination is almost, if not quite, lost. In some the pustular stage is just reached when the disease abates. In other cases there is apparently no modification whatever.

ε. *Variola Hæmorrhagica.* The occurrence of this, the severest form of small pox, in primarily well-vaccinated persons is undoubted. It shows clearly that a primary vaccination, however good, is not protection in all cases against severe small pox for the whole of life. Trousseau said that this form of the disease was not fatal in vaccinated persons. If it be of the papular or pure black form it is fatal in whatever circumstances it occurs. It appears in the vaccinated almost invariably after puberty.

ζ. *Variola after Re-vaccination.* It was the general opinion until recently, and possibly is the general opinion still, that small pox almost never occurred after re-vaccination. This was probably true, because re-vaccination was so rarely performed that it was rare to

meet with re-vaccinated persons, and therefore difficult to meet with those who were the subjects of small pox. But now that re-v accination is becoming more common this opinion can no longer be maintained. Small pox after re-vaccination occurs and—very rarely, it is true—is fatal in its severest form. Examples of small pox after re-vaccination will be found in Dr. MacCombie's Report on the South-Eastern Hospital for the year 1878-79, and in my own on the Eastern Hospitals for the year 1877.

Small Pox modified by Small Pox. Small pox occasionally occurs in the same individual a second time, and the second attack is occasionally fatal.

Course, Termination, Complications, Sequelæ. The course and termination of small pox is mainly determined by the efficiency of the vaccination. In well-vaccinated persons under puberty the course is almost invariably favourable, but after this time fatal cases begin to appear in primarily well-vaccinated persons. Discrete small pox almost invariably runs a favourable course, except in unvaccinated infants and the very aged. Semi-confluent small pox in the majority of cases also runs a favourable course, but in young children and the aged it is sometimes fatal. Confluent small pox in the unvaccinated, who almost invariably take the disease in this form, is fatal in about one half of the cases. In the vesicular or pustular hæmorrhagic recovery is very rare, and in the papular and pure hæmorrhagic death is invariable.

Of *complications*, œdema of the glottis, laryngitis, bronchitis, and lobular pneumonia are the most common; but otitis, parotitis, glossitis, ovaritis, orchitis, lobar pneumonia, and pleurisy are sometimes met with.

Pregnancy has been said to be a fatal complication, but this is very doubtful. One thing is certain, and that is that many pregnant women recover. The truth rather appears to be that the small pox is the danger to the pregnancy, not the pregnancy the danger to the small pox. The disease has been said to be complicated with scarlet fever and measles, an opinion probably founded on the fact that scarlatiniform and measly rashes are frequent in small pox; but on this ground one would not infrequentiy meet with cases where one might say that the patient had small pox in the head, scarlet fever on the trunk, and measles on the extremities.

Of *sequelæ* the most common is pitting. Abscesses, superficial and deep, affections of the eye ending sometimes in destruction of one or both, are met with. Gangrene of the extremities, particularly of the tips of the fingers and toes, erysipelas, pyæmia, aphasia, hemiplegia, mania, and dementia are occasionally met with, and in two instances the writer met with extensive hæmorrhage on the surface of the brain.

Diagnosis. There are three difficulties in the way of the diagnosis of small pox. The first, the almost universal practice of vaccination, which greatly modifies the natural disease; the second, the occurrence of scarlatinoid, measly, and hæmorrhagic rashes; and, third, the want of clear notions on the subject of chicken pox. Unmodified small pox, commencing with fever, headache, and, in particular, pain in the lumbar region, followed by an eruption of papules on the forehead and face on the third day, is like nothing else, and, consequently, unmistakable; but even in modified small pox an eruption of distinct papules on

the third day, after premonitory symptoms, is most probably small pox. The great factor in the diagnosis of small pox is the element of time. How long has a given eruption lasted ? is the question to be asked. If, for example, a papular eruption be met with on the face and forehead, and the patient is in the third day of his illness, that eruption is almost certainly the eruption of small pox, and if it become vesicular by the fifth day it is certainly small pox. To take another example, a person with some half-dozen pustules on his face may be the subject of acne or of small pox ; but if on inquiring into the history it be found that the patient has been ill from eight to ten days, and that it has passed through the stages of pimple and vesicle, it is almost certainly small pox ; and if on the eleventh day the pustules burst and form scabs, it is certainly small pox. Chicken pox, if properly understood, should not give rise to any difficulty. In the first place, in this affection there are, as a rule, no premonitory symptoms, the first symptom usually being the eruption. This, if seen at the very beginning, consists of red spots, which, in the course of a few hours, become transparent vesicles, which are globular, without central depression or umbilicus, whereas in small pox they are flat, circular, depressed always in the centre, and sometimes umbilicated. Moreover, in small pox the vesicle follows its papule at an interval of two clear days, whereas in chicken pox the vesicle appears on its red spot almost at once. It is moreover unilocular, and collapses on pricking, whereas the small pox vesicle is multilocular, and, consequently, does not collapse on pricking. It should be borne in mind that isolated small papules which do not form vesicles are most probably due to modified small pox, not to

chicken pox, the characteristic of the latter being not a few small papules with an absence of severe general symptoms, but an eruption of clear vesicles, which may be very abundant, which appear suddenly, and which collapse on pricking. The anomalous forms of small pox need give no difficulty if attention be paid to the element of time. A scarlatinoid rash, followed on the third day by an eruption of papules, is small pox; if such rash be of a dark colour, with purpuric and inky spots, the case is small pox. Speaking generally, hæmorrhagic effusion into the skin, purpuric and black spots, hæmorrhage into the conjunctivæ, and scarlatinoid measly rashes are small pox. The disease has been confounded with measles, but in cases severe enough to simulate measles, on passing the hand over the face the feeling is that of hardness and furrowed roughness, like that produced by passing the hand over a piece of corduroy, whereas in raised confluent measles the sensation is like that produced by passing the hand over a piece of velvet. Moreover, the eruption of measles never forms distinct vesicles, nor, when well out, distinct papules. Certain hæmorrhagic forms might be mistaken for typhus fever, and the diagnosis of certain hæmorrhagic cases of small pox from typhus might conceivably be difficult if one forgot that in hæmorrhagic small pox hæmorrhages are invariable from the mucous membranes, whereas in typhus they are very rare. Glanders may be mistaken for small pox, but in glanders the disease commences in the mucous membrane of the nose and the respiratory passages, and gives rise as its first symptom to a sanious discharge from the nose. In small pox there is no such thing. In acne there are no constitutional symptoms, and no form of small pox eruption would be

wanting in these; even in the modified cases the constitutional symptoms are often severe. In eczema the eruption is the first symptom, and constitutional symptoms only arise "in the case of the extensive diffusion "of the acute disease" (*Bristowe*). In small pox, however mild, the constitutional symptoms appear first, the eruption afterwards. Herpes has been mistaken for small pox, but if attention be paid to the eruption the diagnosis should not be difficult. Herpes is "an "affection characterised by the development of "clustered vesicles, varying between the size of a "small pin's head and that of a split pea, and seated "on an erythematous base. A circumscribed area of "redness, round, oval, or irregular in shape, first "makes its appearance. This soon becomes thickly "studded with papules, which speedily acquire a "vesicular character, and in the course of twenty-four "hours, or less, attain their full dimensions. The vesicles "are close set, and not unfrequently run more or less "together, so as sometimes to form large bullæ." (*Bristowe.*)

Such are the diseases in which there may be some excuse for error. As a matter of actual practice the diagnosis of small pox from other acute diseases is not difficult, for out of 965 cases sent to the Homerton Fever Hospital during the epidemic of 1876-77 only fifty were not small pox. They were as follows:— Measles, 6; nil, 14; orchitis, 1; syphilis, 4; eczema, 1; renal, 1; gonorrhœa, 1; erythema, 3; acne, 5; enteric fever, 5; varicella, 5; disease of hip, 1; typhus fever, 1; pyæmia, 1; herpes, 1.

Prognosis. The most important factor in the prognosis of small pox is the sufficiency of the vaccina-

tion. If this have been of the best quality, and the patient be under puberty, the case will most probably be mild, and the recovery almost certain; but in proportion as puberty is passed, certain primarily well-vaccinated individuals become susceptible of small pox in its severest form. Speaking generally, in discrete small pox, except in very young children or the very aged, the prognosis is favourable; but in unvaccinated infants under one year, it is very unfavourable. In semi-confluent small pox in young adults, the prognosis is favourable in the majority of cases; but in unvaccinated children, and in the aged, it is unfavourable. In unvaccinated confluent small pox the prognosis is always grave whatever be the age, and when towards the eighth day of the illness the vesicles do not swell but remain flat, the prognosis is almost certainly fatal. In the hæmorrhagic forms of the disease the prognosis is always grave. A few cases of the vesicular or pustular hæmorrhagic may recover, but in the other forms death is certain, whatever be the quality of the vaccination,—Trousseau to the contrary notwithstanding. True hæmorrhagic small pox, however, should not be confounded with small petechiæ, and hæmorrhage from one mucous membrane occurring with a well-developed eruption. It should at the same time be observed that the hæmorrhagic forms of small pox are extremely rare in well-vaccinated individuals, and they are almost unknown in re-vaccinated individuals, but one case has been recorded by MacCombie. Laryngitis, if severe enough to give rise to distinct difficulty of breathing, is mostly fatal, even if tracheotomy be performed. A case, however, which occurred in the Eastern Hospitals, lived fourteen days, and finally died of lobular pneumonia.

TABLE I.

Showing the Mortality from Small Pox in relation to Vaccination. Epidemic of 1871.

Degree of Vaccination.	Under 15 years of age.				Above 15 years of age.			
	Total.	Recovered.	Died.	Deaths per cent.	Total.	Recovered.	Died.	Deaths per cent.
Unvaccinated	208	131	77	37·0	122	76	46	37·7
1 or more bad marks	45	42	3	6·5	104	89	15	14·4
1 or more indifferent marks	12	12	...	...	75	66	9	12·0
1 good vaccination mark	61	61	...	...	101	93	8	7·9
2 good vaccination marks...	29	29	...	...	104	99	5	4·8
3 do. do.	35	35	...	...	39	39	...	...
4 do. do.	17	17	...	...	32	32	...	...
5 do. do.	2	2	...	...	1	1	...	...
6 do. do.	2	2	...	...	11	11	...	...

TABLE II.

Showing the influence of different kinds of Vaccination and of Age, in determining the Severity, short of Death.
(*From* 745 *cases of recovery.*) *Epidemic of* 1871.

Degree of Vaccination.	Mild Small Pox.				Severe Small Pox.				Hæmorrhagic or Black Small Pox
	Under 12 years old.	Attacks per cent.	Above 12 years old.	Attacks per cent.	Under 12 years old.	Attacks per cent.	Above 12 years old.	Attacks per cent.	
Not vaccinated	42	56	98	19½	26	100	79	51	
1 or more bad marks ...	12	15	109	22	...	...	35	23	
1 good mark	3	2½	100	20	...	...	14	9	
2 good marks	...	...	104	21	...	...	17	11	No recoveries out of 15 cases, 2 of whom had been vaccinated.
3 do.	10	12½	48	9	...	...	6	4	
4 do.	6	7½	20	4	...	...	...	...	
5 do.	...	...	3	·6	...	...	...	...	
6 do. and more ...	1	1	11	2	...	...	1	·6	
Total	74		493		26		152		
Small Pox cases admitted after revaccination	None		None		None		None		None

TABLE III.

Showing the Mortality from Small Pox in relation to Vaccination. Epidemic of 1876—77.

Degree of Vaccination.	Discrete Small Pox.						Confluent Small Pox.						Malignant Small Pox—Hæmorrhagic or Black.						Comparative Vaccination, 915 Cases.
	Under 16.			Over 16.			Under 16.			Over 16.			Under 16.			Over 16.			
	Total.	Died.	Mortality per cent.	Total.	Died.	Mortality per cent.	Total.	Died.	Mortality per cent.	Total.	Died.	Mortality per cent.	Total.	Died.	Mortality per cent.	Total.	Died.	Mortality per cent.	
Unvaccinated ...	20	...	...	2	...	...	80	49	61·25	19	11	57·9	8	8	...	2	2	...	(1) Unvaccinated, 131 cases. Mortality, 53 per cent.
Said to be Vaccinated	8	...	...	29	...	...	9	5	55·5	38	18	47·37	2	2	...	4	4	...	
No evidence ...	14	2	14·14	8	...	...	35	12	34·3	22	13	59·	4	4	...	8	8	...	
Bad	16	...	...	34	...	...	3	1	33·33	23	5	21·74	...	...	...	3	3	...	(2) Badly vaccinated, 396 cases. Mortality, 26 per cent.
Indifferent... ...	32	...	...	61	...	...	6	...	...	32	11	34·37	2	2	...	3	3	...	
One good	28	...	...	37	...	...	5	1	20·	26	2	7·7	1	1	...	1	1	...	
Two ditto	33	...	...	85	...	...	3	...	...	27	1	3·7	...	...	...	1	1	...	(3) Fairly vaccinated, 388 cases. Mortality, 2·3 per cent.
Three ditto ...	26	...	...	45	...	...	6	...	...	10	...	...	...	...	...	...	...	...	
Four ditto ...	15	...	...	15	...	...	3	1	33·33	3	...	...	...	...	...	1	1	...	
Five ditto	4	...	...	6	...	...	2	...	...	2	...	...	...	...	...	...	...	...	
Six and more do.	1	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	197	2	1	324	...	...	152	69	45·4	202	61	30·0	17	17	...	23	23	...	

N.B.—The case classed as Confluent with four marks, and the case with two, both died of Cerebral Hæmorrhage.

TABLE IV.

Showing the Mortality from Small Pox in relation to Vaccination. Epidemic of 1881.

Vaccination.	Under 15 years of age.				Above 15 years of age.			
	Total.	Recovered.	Died.	Mortality per cent.	Total.	Recovered.	Died.	Mortality per cent.
Unvaccinated	105	62	43	40·9	19	9	10	52·6
Doubtfully Vaccinated	44	35	9	20·4	64	41	23	35·9
1 or more bad marks	81	78	3	3·7	149	137	12	8·0
1 good mark	11	11	...	...	32	31	1	3·1
2 good marks	14	14	...	...	37	36	1	2·7
3 do.	30	30	...	...	48	46	2	4·1
4 do.	31	29	2*	6·5	19	17	2	10·5
5 do.	13	13	...	...	5	5	...	...
6 do.	...	...	...	...	5	5	...	...
Total	329	272	57	17·3	378	327	51	13·4

Total mortality per cent., 15·2.

* Of these, one died of concurrent disease, the other of acute necrosis of femur (sequelæ of Small Pox ?).

TABLE V.

Showing the Mortality from Small Pox in relation to Vaccination in 595 *cases treated in the Homerton Small Pox Hospital, under the care of Dr. Collie, from May to September,* 1881.

Degree of Vaccination.	Under 15 years of age.				Above 15 years of age.			
	Total.	Recovered.	Died.	Deaths per cent.	Total.	Recovered.	Died.	Deaths per cent.
Doubtful	52	38	14	26·9	36	25	11	30·5
Unvaccinated	73	50	23	31·5	33	23	10	30·3
1 or more bad marks	96	93	3	3·1	230	208	22	9·5
1 good mark	4	4	...	...	8	8	...	...
2 good marks	1	1	...	...	10	9	1	10
3 do.	5	5	...	...	13	13	...	...
4 do.	16	16	...	...	5	5	...	...
5 do.	10	10	...	...	2	2	...	...
6 do.	1	1	...	...	...	...	...	...
	258	218	40	15·5	337	293	44	13·0

Total mortality per cent., 14·1.

The preceding tables, pages 175—79, will supply data for the formation of an approximately accurate prognosis.

Treatment. The points special to small pox are few but important. The delirium is usually more violent than in the other fevers, and therefore it is of the utmost importance that in addition to the nurse there should be an attendant. Mechanical restraint should be avoided. The patient should not be left a moment alone, otherwise he may have to be looked for wandering along some street, or drowned in the nearest watercourse; should he persist in leaving his bed and putting on his clothes, in walking about his room, or in sitting over the fire, he should be permitted to do so, for to the fretted and fevered patient moving about is a relief. In maniacal delirium chloroform may be administered. The eyes should be carefully watched, and in some cases it may be necessary to consult an ophthalmic surgeon. Heat of skin should be relieved by cold water sponging, and swelling of the eyelids and other painful parts by the constant application of cold compresses. To relieve itching olive oil may be used, or, what is better, vaseline, which applied as a dressing to the face will facilitate the removal of scabs; and to destroy the disagreeable odour some kind of deodorant, such as sanitas powder, should be sprinkled about and over the patient's face and bed. About the eleventh day laryngitis often supervenes, and for this tracheotomy should be performed when there arises distinct difficulty of breathing. Although in the majority of cases the patient dies, the relief from suffering is so great that the operation should be performed. When crusts begin to form about the nostrils, they

should be removed, and generally the patient should be kept in bed until suppuration under the crusts has ceased, and the skin is healed. Abscesses should be opened when they appear, and a water-bed should be ordered at the same time. Finally, the patient may be considered free of danger when the crusts and scales have disappeared, and not less than six baths have been given, at intervals of two days. Such is the general treatment of confluent small pox; in the discrete, little is needed; in the hæmorrhagic none is of any avail.

CHAPTER X.

CHICKEN POX.

Definition. A specific infectious disease characterised by the appearance, in successive crops, of red spots, which in the course of about a week pass through the stages of pimple, vesicle, and scab.

Synonyms. Varicella; La Varicelle (Fr.); Wasserpocken (Ger.)

History. Chicken pox was for a long time confounded with small pox, measles, and other eruptive diseases, and in recent times it has been regarded by some, in particular by Hebra, as a form of small pox. There is no doubt that it was recognised in the eighteenth century, and in 1767 Heberden, in a paper read before the Royal College of Physicians, enumerates his reasons for regarding it as distinct from small pox (*Gee*). It is apparently certain that it was recognised by Ingrassia in the year 1550. "Besides these two "evils (the small pox and the measles) we have seen "other two. One which the common people name "rossania or rossalia, an affection characterised by a "red rash; the other unnamed, characterised by an "eruption of pustules scattered over the whole body "These shine like crystal, and on pricking a watery "fluid runs out." (*Haeser.*)

Etiology. Chicken pox is the result of a specific contagium which is quite distinct from that of small pox, with which it has been confounded by Hebra and others. It is distinctly infectious, but it is doubtful if it be inoculable. According to Henoch, Steiner succeeded in a few cases, but Henoch himself never. It affects children chiefly, in whom it may appear as early as the first month (*Henoch*); but it is towards the fourth year that it attains its maximum prevalence, after which it declines. It is rarely met with among adults, but these are not wholly exempt. It is endemic in most of our large towns, but occasionally it prevails as an epidemic. It is not protective against small pox, nor is the latter protective against chicken pox; and this is the strongest evidence in favour of the non-identity of the two affections. "Small pox and vaccinia "are often early followed in the same individual, say "within two or three years, by chicken pox, and *vice* "*versâ;* and chicken pox, vaccinia, and small pox have "been known to follow in immediate succession in the "same individual." (Article "Chicken Pox," *Quain's Dict. Medicine.*) One attack confers immunity from a second. Its period of incubation is about thirteen days.

Anatomical Characters. These consist of the eruption which is fully described under the head of symptoms. According to Henoch it is most abundant on parts subject to pressure, has been met with on the conjunctiva, and is occasionally preceded by an initial rash. Chicken pox may co-exist with vaccinia.

Symptoms. "The illness commences without any, "or with but slightly-marked premonitories. There "is usually, however, some feeling of lassitude, and the

"patient goes to bed earlier than usual. Within a few "hours an eruption appears, usually on some part of the "back or chest, but there are many exceptions to this "rule.

"It may commence on the face, neck, chest, abdo- "men, or extremities, or upon several of these parts "at the same time. The eruption consists of small, "faintly papular rose spots, varying in number from "twenty to one or two hundred. These in the course "of eight, twelve, or, at the most, twenty-four hours "from their appearance, change into vesicles, which, at "first small in size and clear as to their contents, be- "come quickly large; globular, or semi-ovoid in form; "translucent, glistening, and opalescent in appear- "ance; and surrounded with a faint areola. Towards "the end of the second day of illness, the vesicles "attain complete development, and about this time a "few may be seen on the sides of the tongue, on the "lips, cheeks, or palate, and sometimes upon the "mucous membrane of the genitals.

"About the third day a few of the vesicles may have a "pustular appearance, and sometimes a few pustules are "seen; but regarding the eruption as a whole, pustulation "forms an incident rather than an essential feature in "its progress. On the fourth day the vesicles begin "to dry up, and by the sixth complete scabs are formed. "These fall off in a few days, leaving in their place "faintly red spots, and sometimes a few pits. A single "crop of the eruption may be said to complete itself in "five or six days; and, as two or three crops appear "on as many successive days, the illness will last rather "more than a week. In the event, however, of there "being four or five crops, it may be prolonged for "another week, but this is unusual.

"With the appearance of the eruption the tempera-
"ture rises two, three, or even more degrees, and this
"rise recurs with each successive crop of spots. The
"pulse is sometimes slightly increased in frequency;
"the tongue is moist, and sometimes covered with a
"light fur. As a rule, however, there is but little
"constitutional disturbance, although it is occasionally
"severe." (Art. "Chicken Pox," *Quain's Dict. Med.*)

Course, Termination, Complications, and Sequelæ. The course of chicken pox is invariably favourable, and the termination recovery. In itself it gives rise to no complications, but sometimes it co-exists with other diseases, and patients may die of these; but it is never fatal in itself. It is true that deaths from chicken pox are recorded by the Registrar General, but they were probably deaths from small pox, or some disease with which chicken pox happened to be associated. It has usually no sequelæ.

Diagnosis. The only disease with which chicken pox should be confounded is mild small pox, and this has been fully discussed under the diagnosis of small pox.

Prognosis. As regards the chicken pox itself, this is always favourable; but it does not follow that the disease with which it may happen to be associated will also always be favourable.

Treatment. There is no special treatment for chicken pox; but in the severe confluent cases it will be advisable that the child should keep his bed, and in the milder cases his room.

CHAPTER XI.

VACCINIA.

Definition. A specific non-infectious disease produced artificially by the inoculation of cow pox matter, human or animal. The operation by which the disease is communicated is called vaccination.

History. It was a popular tradition in the county of Gloucester and other dairy districts, during the eighteenth century, that the cow pox contracted by milkers protected from small pox. Some time during the latter part of the century, probably about 1768, this tradition came to the knowledge of Dr. Jenner. In particular, in a conversation concerning small pox, a peasant said to him, "I cannot take that disease, for I have had cow pox." Jenner communicated his belief in the truth of the popular tradition to John Hunter, who advised him to inquire into the matter. He commenced his investigations about the year 1775, and continued them during the next twenty years, after which, in 1798, he published his "Inquiry into the Causes and Effects of Variolæ Vaccinæ." In this monograph he demonstrated that cow pox communicated from the cow to man protected from small pox, and that the cow pox thus produced in man may be communicated from man to man with a like immunity from small pox. Further observation, extending to all parts of the world, including thousands upon thousands of

individual cases, has confirmed the truth of Jenner's discovery; of which it may be said that no truth in medicine rests upon a more secure foundation, and that if the art of medicine had done nothing else for humanity than discover the protective influence of cow pox over small pox, it would have justified its existence.

Anatomical Characters. Towards the end of the second or the commencement of the third day from inoculation, a small reddish pimple arises. It increases gradually in size until about the sixth day, when it has become a greyish-white, circular, flattened, and in the centre depressed vesicle containing a clear lymphoid fluid. The vesicle remains in this condition for about two days, at the end of which the contents begin to become pustular, and a red ring forms round it, and soon inflammatory induration of the neighbouring tissue arises. During the next two days the pustule increases in size, and the inflammation in and around becomes more extensive and more pronounced. Towards the eleventh day, the pustule, if it have not been previously opened, bursts, discharges its contents, and forms a scab under which will be found, when it falls off, a more or less circular radiated and foveated cicatrix. Briefly, the cow pox pimple passes through the same stages as the small pox pimple.

Symptoms. General symptoms are for the most part wanting in many cases during the whole course of the disease, but in certain cases towards the eighth day there is fever attended by restlessness and sleeplessness, which usually disappears in the course of the following two days. Occasionally about this time an eruption of small pimples arises, mostly confined to the

vaccinated arm, but occasionally showing itself elsewhere.

Course, Complications, Termination, and Sequelæ. In the majority of cases the course of vaccinia is as has been described; but occasionally, if rarely, this is *irregular* or *complicated.*

"The irregularity may be merely in point of time; "the development of the vesicle being retarded one or "two, or several days, or being slightly accelerated, so "as to present, for example, by the eighth day, the "appearances usually seen on the ninth. If the "phenomena are in all other respects regular, these "mere variations in time do not (as far as known) "affect the protective power of the vaccination. On "the other hand there may be irregularity of the "character and course of the vesicle constituting spuri-"ous vaccination, on which no reliance can be placed "for protecting from small pox. Thus papules or "even vesicles may arise, which instead of undergoing "their proper development begin by the fifth or sixth "day to die away, leaving a mere scale or slight scab "by the eighth day.

"More frequently there are vesicles beginning early "after the insertion of the lymph, with itching and "irritation, symptoms almost invariably absent in a "normal primary vaccination, assuming as they rise an "acuminated or conoidal form, instead of the charac-"teristic flat form with central depression; containing "straw-coloured or opaque fluid, instead of clear "lymph; and developing an early, an irregularly-"shaped areola, which is at its height by the fifth or "sixth day, and far on the decline by the day-week.

"In other cases the vesicles rising apparently more

"regularly at first, are found by the eighth day to have "burst; and present either an irregular scabby appear- "ance, or are in the state of open sores. The chief "causes of these irregularities will be discussed "further on.

"*Complicated Course.* In spurious vaccinations, "especially in the kind last described, and even in the "course of a regular vaccination, if the vesicles have "been rubbed or otherwise injured, ulcerated sores "may succeed, requiring in children who are of scrofu- "lous or otherwise unhealthy constitution, some time "to heal. Occasionally, also, in children of such habit "of body, the swelling of the axillary glands, which "has been mentioned as sometimes attendant on the "areola, may result in abscess. But the only compli- "cation which can be regarded as at all formidable is "erysipelas. This disease may, of course, supervene "on vaccination, as it may on any other surgical opera- "tion, when the conditions which ordinarily give rise "to it exist, and especially where there has been "exposure to its contagium. (The lesson which this "teaches us is not that we should not vaccinate, but "that we should guard the place of operation against "the entry of dirt or decomposing matter, alike at "the time and during the course of vaccination. If "erysipelas be from any cause set up during vaccina- "tion, it will occasionally be serious and even fatal, just "as if it followed on another kind of wound.) (*Collie.*) "But there have been cases, happily rare, in which it "has manifestly arisen from the use of improper lymph, "that is from lymph taken from spurious vesicles, or "from regular vesicles at an advanced period of their "course or which has been spoilt in keeping." (*Seaton.*)

Of sequelæ there are usually none beyond slight

induration of the axillary glands, and occasionally sloughing sores.

Diagnosis. This is made out by the history of the case.

Prognosis. This, when the vaccinia has been produced by means of proper lymph, and with due care in respect of the operation and the after treatment, is almost invariably favourable; but with every precaution in these respects, an unfavourable result occasionally happens.

Treatment. This consists in protecting the wounded part by some simple dressing, such as lint and vaseline, and the avoidance of irritation by clothing, exposure, or anything else.

The Protective Value of Vaccinia. This may be estimated from the tables to be found under the head of *Prognosis* in small pox.

These need no comment, but what is perhaps more striking is the remarkable fact that not only are the vaccinated shown to have an immunity from small pox in proportion to the sufficiency of their vaccination, but that the unvaccinated who happen to be exposed contract the disease.

"During the epidemic of 1871 one hundred and ten "persons were engaged in the Homerton Fever Hos- "pital in attendance upon the small pox sick; all "these, with two exceptions, were re-vaccinated, and "all but these exceptions escaped small pox. The ex- "perience of the epidemic of 1876-77 was of the same "kind, all re-vaccinated attendants having escaped, "whilst the only one who had not been vaccinated took

"the disease and died of it. So in the epidemic of "1881, of ninety nurses and other attendants of the "*Atlas* Hospital Ship (small pox), the only person who "contracted small pox was a housemaid who had not "been re-vaccinated." (*Collie.*)

Dangers of Vaccination. Inasmuch as a clean cut with a knife, scratches, or the prick of a pin may lead to inflammation, erysipelas, pyæmia, and death, it will be obvious that the possibility of this as a result of the operation of vaccination, apart from the additional risk arising from the introduction of the vaccine virus, was to be anticipated. The writer believes that it now and then occurs when the lymph is pure, and every precaution is taken in the conduct of the operation and the after-treatment. This should be frankly admitted. The writer has seen on the arms of adults large sloughing sores with inflammation, necessitating the confinement of the subjects of them to bed; and that such should occasionally prove fatal by pyæmia or otherwise is what might be expected. The writer is of opinion that this risk is increased with the number of the vesicles, and that it would be a better system of vaccination which required two vesicles to be repeated every ten years.

It must be admitted further that syphilis has been communicated, and although instances of this kind have been very rare, nevertheless they have occurred, and the utmost care should be taken to avoid them by a scrupulous examination of the subjects used as vaccinifers. There is nothing to show that scrofula and eruptive diseases generally are inoculable; but it is unfortunate that children are vaccinated about the time soon after which lichen, eczema, and such like are

wont to appear, and the tendency to reason *post hoc* is widely spread.

Selection of Lymph. "This may be of two kinds, "bovine or human. The advantages claimed for the "former are immunity from human disease and greater "protection from small pox.

"As the risk of conveying human disease is infini- "tesimal, if the vaccination be done with due care, "much weight need not be attached to this; and, "moreover, if the argument be sound, it applies *à* "*priori* to the bovine lymph as well as to the human, "so that by the adoption of bovine matter we merely "substitute one possible risk for another.

"It is true that the bovine lymph is recommended "on the ground that no disease other than cow pox is "capable of being communicated to man by inoculation "with it; but this statement must for the present "be open to question. In the selection of lymph, "whether bovine or human, the important point is to "select healthy subjects; and it is probably as easy to "select a healthy infant as a healthy calf. Of the "greater protection from small pox, this is not yet "established on a sufficiently wide induction, and "years must yet elapse before it can be. If the bovine "lymph be preferred for general use, it will still be well "to choose humanised lymph in the case of delicate "children, because of the severity of the local effects "when bovine lymph is used.

"The present writer, in the existing state of know- "ledge, prefers humanised lymph, which, as employed "by his colleagues and himself, he has never found "ineffectual; but, whilst of this opinion, he thinks the "propriety of more frequent recourse to the calf, for

"the purpose of renewing our stock, deserves considera-
"tion." (*Collie.*)

The lymph should be taken from primary cases and from characteristic vesicles. "Babies selected for the "purpose should not only be in good health them-"selves, but, as far as can be ascertained, of healthy "parentage.

"Those of dark complexion, not too florid, with a "thick, smooth, clear skin, generally yield the best and "most effective lymph.

"Vesicles from which the lymph may be taken must "be well characterised, uninjured, and free from areola. "Lymph may, with perfect propriety, be taken so soon "as any can be obtained from a vesicle, as at the fifth "or sixth day of its course; but it is then procurable in "very small quantity, and it is usually and most con-"veniently taken on the day-week from the vaccination, "when the vesicle is perfectly formed, but before the "stage of areola has set in.

"Any vesicle which at that date manifests areola "must be discarded. This was Jenner's 'golden "'rule,' and one which ought to be scrupulously "observed. Good vaccine lymph is always perfectly "limpid, and has besides a certain degree of viscidity. "A thin serous, too readily-flowing lymph should never "be used." (*Seaton.*)

Performance of Vaccination. "Small pox being "a disease to which persons are liable from the "moment of birth, and which is peculiarly fatal in "infancy, it is of great importance that vaccination "should be performed in very early life. In large "towns where a weekly supply of lymph from arm "to arm can always be maintained, the vaccination

"of children who are plump and healthy should be "effected within four or six weeks from birth.

"If the child be less robust it may properly be "deferred for three or four weeks more. In small "towns and rural districts the age at which vaccination "can be performed must depend to some extent on the "arrangements for lymph supply in the district; but "these are always such as admit of a child being "vaccinated within a very few months from birth. "It is under ordinary circumstances a preliminary 'condition of the performance of vaccination, that the "child to be vaccinated should be healthy; and a "careful examination to ascertain this is the first duty "of the vaccinator.

"The child should not only be free from any acute "febrile disease, but also from diarrhœa and from "cutaneous diseases, especially those of the vesicular "type. The states of constitution associated with "herpes and eczema singularly interfere with the "proper course of vaccination, and seem to be the "most frequent causes of those spurious results of "vaccination just described. They may both—especially "intertrigo—without care be overlooked; hence exami-"nation of the scalp and of the folds of the skin behind "the ears, in the neck and in the groins, is in-"dispensable. Vaccination should also be postponed "if erysipelas be prevailing in the neighbourhood in "which the child is living, or if it have been recently "exposed to the infection of measles or scarlatina.

"There is, however, a state of things under which "these conditions must be disregarded, namely when "there may be immediate exposure to the infection of "small pox, as when an unvaccinated child is in a "house in which the infection exists, or has come into

"direct contact with an infected person. Under such "circumstances, it cannot be too strongly impressed "that no age is too early for vaccination, and no state "of health, except the presence of acute disease of a "serious character, can be held to contraindicate it. "Life, then, may depend on the promptitude with which "the vaccination is done" (*Seaton*), especially when a child is born in a small pox ward.

Collection of Lymph, and Arm-to-Arm Vaccination. "The collection of lymph from the human "subject for vaccinating is effected by opening the "vesicle by numerous minute punctures on its surface, "the utmost care being used not to draw blood. "Should any accidentally be drawn the vesicle must "be discarded altogether. No lymph must be used "which does not exude spontaneously; there must be "no pressure or squeezing of the vesicle. The lymph "which stands on the surface of the opened vesicle is "taken on the point of the lancet or other instrument "employed, and inserted in the arm of the child to be "vaccinated.

"This may be done in various ways, as by punc- "ture, by scratching, by scarifications, or abrasions, by "tattooing, etc.

"They should be learnt practically under a good "instructor. All of these methods may in careful "and skilled hands be made equally successful. "That however which in the hands of practitioners "generally the writer has found the most successful "has been the plan by scarification or tattooing ·.·.·.· "over surfaces of the extent here depicted. Insertions "to this extent should be made on at least four, and "preferably five separate surfaces. If the vaccination

"be done on both arms the writer recommends three "insertions of this kind in each arm; if it be done "on one arm only, then there should be five on that "arm." (*Seaton.*)

Storage of Lymph: Indirect Vaccination. "Vaccination should, in all cases in which it is prac- "ticable, be done direct from arm to arm. The degree "of success attending the use of conveyed or stored "lymph, in whatever way the conveyance or storage "be effected, does not approach that of lymph thus "directly transferred. Where vaccination from the "arm is impracticable, lymph intended for immediate "use may be conveyed from case to case, in the "liquid form, by means of the vaccine bottle and other "contrivances for the purpose; but it must be a "quite indispensable condition of this proceeding that "the lymph be used within a few hours, six to eight at "the outside, of its being taken.

"For longer keeping it must be stored either in "hermetically-sealed tubes or on points thickly coated "with it, then carefully dried and kept afterwards "constantly protected from damp and heat. When "stored in the latter way, the lymph needs revival "before use by dipping the point for an instant in "water, and laying it on the edge of a book, so that "the lymph may become soft. In the use of stored "lymph the process of vaccination by scarification or "abrasion is always to be preferred." (*Seaton.*)

Re-vaccination. The effects produced by re-vaccination vary indefinitely. They depend chiefly on: (*a*) the quality and quantity of the primary vaccination; (*b*) on the time of life at which it is performed; and (*c*) on the

idiosyncrasy of the individual. The results may be classified as follows : (α) no effect at all ; (β) a more or less modified effect ; and (γ) an unmodified effect, the second vaccination proceeding apparently in the same way as the primary. In the great majority of cases re-vaccination is protective throughout life, but a single re-vaccination when successfully performed is not an absolute protection for all time against attack or even death from small pox.

CHAPTER XII.

MEASLES.

Definition. An acute infectious disease characterised by catarrh of the air passages and a peculiar eruption on the skin.

Synonyms. Rougeole (Fr.); Masern (Ger.); Measles (Eng.)

History. The historical notices of measles are few in number and meagre in extent. In early times, although they were nominally distinct from small pox, they were usually described in connection with it, and probably they were confounded with the hæmorrhagic, abortive, and other anomalous forms of that disease. It may be that it was in this way that Rhazes and others regarded measles as a disease more serious than small pox. They may, however, in conditions of living different from that usually met with in the Europe of to-day, be almost, if not quite, as grave as small pox; a striking example of which was the epidemic which prevailed in Fiji in 1875. To the islands of Fiji "the disease was introduced from Sydney in the "persons of the king's son and an attendant, who were "attacked by it while on the voyage home. Two other "members of the king's suite fell ill the day after they "landed, and owing to a large tribal gathering having "been convened, the disease was rapidly and thoroughly

"disseminated throughout all the parts of the group of "islands. It raged during four months with great "fatality, not less than 40,000 natives dying out of a "population of 150,000, equal to 26 per cent. All "ages and both sexes appeared to suffer without dis- "tinction, but there is no doubt that a very large pro- "portion of the deaths was brought about by the fact "that whole families, villages, and districts were affected "contemporaneously, so that there were no healthy "persons available for collecting food, preparing it, "nursing and attending the sick. This state of things "was further aggravated by the callousness and in- "difference of the sick persons themselves to their own "condition, a feature often observable among semi- "savage nations. A belief had also gained ground "among them, that the disease was purposely intro- "duced by the white man for the extermination of the "native race and the alienation of their lands. In "consequence, they persistently refused all food and "medical comforts or care offered them by European "settlers or officials as so much poison meant only to "accelerate their dissolution. They could not be "induced when parched with fever or when regaining "strength to refrain from leaving their houses and "lying at night on the cold, damp earth, or even bath- "ing in creeks and water-holes. As a consequence of "this, dysentery or pneumonia was the most frequent "immediate cause of death. On the other hand, in "cases where it was possible to enforce discipline and "medical treatment—as, for instance, in the Armed "Native Constabulary Barracks, and among many of the "planters' indentured labourers—the mortality was very "much less, not more than 6 per cent. The epidemic "ran its course in four months, during which time

"very inclement weather prevailed. Since 1875 "measles has become endemic in the Fiji Islands, a "few cases occurring annually amongst the young "children and the immigrant adults from other islands "where it has not been known. Only one death in a "population of 120,000 has occurred in Fiji from 1875 "to 1883, and that an infant." (*Corney.*)

In London, moreover, they are not invariably less severe, for instance, than scarlet fever. Thus of 73 cases admitted into the Homerton Fever Hospital during the years 1874-80, there were seven deaths, a mortality of 9·6 per cent., and although of 457 cases treated in the London Fever Hospital during the years 1871-80 there were only 18 deaths, a mortality just under 4 per cent., yet in the year 1878, of 47 cases there were five deaths, a mortality of 10·6 per cent.; and Sir Thomas Watson mentions an epidemic which prevailed at the Foundling Hospital, in which there were nineteen deaths in 183 cases, a mortality of 10·3 per cent. Measles was for a long time confounded with scarlet fever, which is probably the reason why there is no distinct account of this disease until the sixteenth century. The first known account of measles is by Rhazes in the ninth century; but from this time there is no description of them until the seventeenth, when they are described by Sydenham. Towards the close of the eighteenth century they were met with in France, Germany, Denmark, and Great Britain. In the beginning of the nineteenth they were observed in England and Scotland in the years 1806-7; in Vienna in 1808, and in Wurtemberg in 1814. After the year 1822 they appeared in Italy, throughout Germany, and the Netherlands; but in this century "the most consider- "able epidemics of measles appeared in the years

"1834-37, becoming more marked in the years "1843-49, 1853, and 1858-63. In the first named "period they spread over the whole of the middle and "north of Europe as well as a great part of North "America. In 1846 they appeared in Iceland for the "third time, and in the same year for the first time in "California. They appeared in the Sandwich Islands "for the first time in 1848, and in the year 1853 they "became more general." (*Haeser.*) But of all the epidemics of measles of which there is any record, that which prevailed at Fiji was the greatest and the most fatal.

Etiology. Of the exact cause of measles nothing is known. They are said by some to be due to organisms such as bacteria and micrococci, and these are said to have been found in the blood; but whether these be cause or consequence is not yet settled. They are highly contagious, ranking probably first (influenza excepted) in this respect among the diseases communicable to man by human intercourse without direct inoculation. Their subjects are mostly children, not because of any special susceptibility on their part, but because the disease is so constantly present, and so widely spread, that few children reach puberty without being exposed to their contagium. The contagium is contained in the blood, the tears, and the secretion of the air passages; a conclusion drawn from the fact that in a great number of cases persons inoculated with these have taken the disease (*Niemeyer*). Although essentially endemic, they prevail frequently in the epidemic form. They are more common in towns than in rural and insular districts, but when they once gain admission among populations for long free of them,

they assume the proportions of a gigantic epidemic, as in the epidemic which prevailed in the Faroe and Fiji Islands. The contagium is said to be carried by physicians and others, in their clothes and persons, for miles, exposed to wind and weather without losing its efficacy (*Niemeyer*); but of this some doubt may be entertained. The contagium is developed at a very early period, probably before the eruption appears, so that it is impossible to prevent the spread of the disease, because it infects before it can be recognised. Measles affect individuals once as a rule, but to this there are exceptions. Sir Thomas Watson knew two large families "in which most of the children have "suffered a repetition of the genuine unmitigated "disease." They are said to relapse, and two instances of something like a relapse have come under my own observation. The period of incubation varies. When the disease is conveyed by inoculation, it is said to be seven days; when it is conveyed by human intercourse, it is usually about fourteen.

Anatomical Characters. These consist of redness and congestion of the pharynx, the arch of the palate, the tonsils, and the larynx. In severe cases there is inflammation of those parts, and then the bronchi are more or less affected. This affection of the mucous membrane of the air passages, although not the characteristic feature of the disease, is by far the most important, because on the degree and extent of this the gravity of the disease depends. The characteristic feature of the disease is the eruption on the skin. It comes out on the fourth day of the disease. It appears first on the forehead, and back of the neck, by the roots of the hair, on the bridge of the nose, and

on the chin. It consists at first of small round red spots, which, varying in tint somewhat, are generally of a dusky colour, but sometimes so red, like the redness of the eruption in scarlet fever, that they have been called "red measles," in the German Rötheln. This difference in the tint of the eruption has been considered by some to constitute a distinct disease partaking of the nature of scarlet fever and measles. The tint of all the eruptions in the acute specific diseases varies very much, and if this variation were to be taken as the basis of a new nosology, the number of these would be largely increased. Hæmorrhagic small pox, for instance, would become quite distinct from ordinary small pox; scarlet fever would in some cases become measles, and so on. But to return. With the spots come out very minute pimples, occupying chiefly the bridge of the nose, and the chin. The spots, which are at first very small, soon coalesce. On the face they are slightly raised, smooth as velvet to the touch, and when fully developed they form lines, spirals, half crescents, crescents, and horse-shoes with ragged edges. On the trunk, to which the eruption spreads from the face in a few hours, it retains the same form, but it is not appreciably raised there, and it does not usually become confluent there. Confluence is most frequent and most marked on the face. On the fifth and sixth days the eruption is at its height in mild cases. On the sixth or seventh it disappears from the face, upon which fine branny desquamation may be seen. In another day or so it disappears from the body, upon which slight brown staining remains. In severe cases, of course, these times will be longer. Occasionally a few small vesicles may be seen, and sometimes petechiæ. Accompanying the eruption

there is usually some flow of tears from the eyes, and a discharge of mucus from the nose. The lymphatic glands are enlarged. There are no *post mortem* appearances characteristic of measles.

Mild Measles. This form of the disease is sometimes so mild that it is not observed until the appearance of the eruption which comes out on the fourth day. In other cases the invasion is marked by slight sore throat, a short dry cough, some loss of appetite, and in delicate children some indisposition to exertion. If in such circumstances the temperature be taken, it will be found slightly above normal. In a third class of cases the invasion will be marked by a rigor and high fever, of some hours' duration, followed by apparent perfect health, until the appearance of the eruption. The cough then usually becomes more frequent, and there is more or less sneezing. The expression is somewhat dull, and the complexion dusky, the child looking as if its face wanted washing. The eyelids are red and swollen, the eyes suffused and injected, there is some intolerance of light, and now or later some coryza. The face is slightly swollen, the tongue coated with a thin white fur, there is some thirst and some loss of appetite. During the two or three following days the fever and the eruption are at their height, the temperature varying between 102° and 103°; but at the end of this time the temperature suddenly falls almost to normal, the eruption disappears from the face, upon which there is a fine branny desquamation. In from two to three days the eruption which has covered the body disappears, leaving slight brown staining, and the child is convalescent. Occasionally there is slight epistaxis, some

little pain in one or both ears, and perhaps slight diarrhœa.

Severe Measles. In these cases all the symptoms are more marked from the first. There is high fever, a dry tongue, a rapid and feeble pulse, great restlessness and extreme thirst. The respirations are accelerated, the cough frequent and distressing, the lungs greatly congested, and mucous *râles* may be heard all over the chest. The eruption is abnormal in form, dusky in colour, and sometimes petechial. These symptoms rapidly develop. The tongue becomes black, the lips and teeth covered with sordes; there is great restlessness, marked twitching of the muscles and cold extremities, the immediate percursors of death.

Course, Termination, Complications, and Sequelæ. In the majority of cases which occur in Europe in the present day the course of measles is towards recovery; but in a small proportion of cases, consisting chiefly of weakly and neglected children, the course is towards death. The complications vary with the epidemic and the season of the year; some epidemics being characterised by one kind of complication, others by another, and in winter particularly complications are more frequent than in summer. They occur mostly during convalescence, but convulsions, epistaxis, diarrhœa, and otitis may occur during the period of invasion, and these are spoken of by some authors as complications, whereas, in reality, they are incidents of the disease. The convulsions of this period are not of grave import; the otitis is not usually serious, and the epistaxis and the diarrhœa

are for the most part beneficial. Convalescence in the majority of cases begins about the end of the first week, and by the end of the second it is usually complete. The complications which occur during this period are convulsions, which at this stage are serious (*Trousseau*); laryngitis and bronchitis, usually slight, but which may be severe and may become chronic; pneumonia, sometimes, though rarely, lobar, but chiefly lobular; and pleurisy. The disease may affect the eustachian tube, producing deafness, which may be permanent; inflammation and suppuration of the middle ear, leading—very rarely—to cerebral abscess and pyæmia. From the mucous membrane of the nose the disease may pass along the lacrymal ducts to the eye, producing conjunctivitis, which sometimes, though rarely, leads to purulent ophthalmia, corneitis, ulceration, abscess of the cornea, and complete destruction of the eye. Diarrhœa sometimes comes on during this period, and occasionally there is dysentery; but the most formidable and most frequent of all the complications of measles is broncho-pneumonia. It is this complication which carries off the majority of the children.

"In the first two or three years of life it is almost "always fatal. During an epidemic we observed in "the years 1845-46 at the Necker Hospital, twenty- "two out of the twenty-four children died of broncho- "pneumonia. This will give you some idea of the "serious nature of measles, and although these results "are more frequently met with in hospital than in "private practice, yet during certain epidemics measles "may be as severe in private as in hospital practice; "and any physician who until the appearance of these "was accustomed to look upon measles as a mild "disease will learn under painful circumstances to

"dread them. When thirty years ago I commenced "the practice of medicine my two first cases were cases "of measles; one a child eleven years of age, the "other a domestic servant of twenty-one. Both died "of broncho-pneumonia, which in one was complicated "with pleurisy. From this time I looked upon measles "as a disease which could be serious. Since then, after "passing many years without losing a single case, young "or old, I met with the fatal epidemic at the Necker "Hospital which I have just mentioned. This year "also we have seen in our own private practice, as "well as in the private practice of those of our "brethren who called us in consultation, a very great "number of infants, and even adults, carried off by "broncho-pneumonia." (*Trousseau.*)

Of sequelæ, diphtheria occurs occasionally, and when it does it is usually fatal. Gangrene of the cheeks and of the labia majora occasionally occur in children suffering from exhaustion due to previous disease, or possibly more frequently to previous want of food and the other necessaries of healthy living; but the most common and the most formidable of the sequelæ of measles are some form of tubercle, occasionally acute miliary tuberculosis. In adults phthisis occasionally follows in persons who are constitutionally predisposed to that disease.

Diagnosis. This, in ordinary circumstances, is not difficult. A short dry cough, followed on the fourth day by an eruption on the skin such as has been described, accompanied by sneezing, pricking of the eyes, and elevation of temperature, is like no other acute disease. Unfortunately for facility of diagnosis, the invasion in a large number of cases is so

mild that it is not observed, and the most important factor in diagnosis, the history, cannot be ascertained. The first symptom of illness in such cases may be the eruption on the face, and if this be not marked a diagnosis may be impossible. It will be found usually, however, if careful enquiry be made, that there were some slight symptoms of illness previous to the eruption. It will be found that the child showed somewhat less inclination to play; was more easily tired than usual; had some loss of appetite, and perhaps for two or three days a short dry cough. Or it may be found that there was a feverish attack two or three days before the eruption, which being of short duration was thought nothing of. There are two kinds of small pox which might be confounded with measles,—the commencement of a severe confluent case, and the commencement of a hæmorrhagic or black case. In the former case some distinct papules would probably be found somewhere about the head and face, or if distinct papules did not exist owing to extreme confluence, the sensation on passing the hand over a small pox face is wholly different from the sensation produced by passing the hand over a measly face. In the former the sensation is essentially hard, like the sensation produced by passing the hand over a piece of corduroy; whereas the sensation of the latter is like that produced by passing the hand over a piece of velvet. But cases of small pox of this severity will be few in number in which papules having the usual hard shotty character will be entirely wanting. Moreover, in any case of small pox which could reasonably be mistaken for measles from the appearance of the rash, the symptoms would be more striking than in measles. There would be severe headache, sharp pain in the back, or both, and a high

temperature, which falls on the appearance of the eruption, whereas in measles the temperature continues or even rises on the appearance of the eruption. In hæmorrhagic or black small pox,—and by this is meant cases in which hæmorrhage into the skin forms the essential and characteristic feature of the disease,—the ordinary eruption being wanting,—the varied character of the purpuric maculæ which occur in this form of small pox, might conceivably be mistaken for measles; and if it be true, as some say, that there is a black measles, it is difficult to see how the one is to be diagnosed from the other. Should the question arise whether it were the one or the other, the present writer would decide in favour of small pox, being inclined to the opinion that hæmorrhagic or black measles is really black small pox. In deciding, however, between measles and these forms of small pox, the quantity and quality of the vaccination should be considered, for if this be of the highest class in a child under ten, the case is almost certainly measles. The initial rashes of small pox have sometimes a measly character, but they are absent from the face, where the rash of measles is most marked. They affect chiefly the lower abdominal region; the upper and inner parts of the thighs, the sides of the chest, the arm pits, the sides of the neck, and the arms and legs. One of the most characteristic of these rashes is the "dotty" purpuric rash which occupies the lower abdomen, forming sometimes a triangle, having for base a line drawn across the abdomen through the navel, for apex the symphysis pubis, and for sides lines drawn from the extremities of the abdominal line to the symphysis pubis. From Rötheln the diagnosis is difficult. It is true that the rash in measles is sometimes very bright,

just as the typhus rash sometimes is, and measly-like eruptions are sometimes seen in scarlet fever; but the writer has not seen anything like a hybrid of scarlet fever and measles, or any other two acute specific diseases. In scarlet fever the eruption commences in the shape of minute pimples surrounded by a red blush, but these soon coalesce, and the skin becomes covered with a uniform red rash, in which there are no spaces free of the eruption as in measles. Moreover the scarlet fever rash is not, strictly speaking, on the face, although the face is often flushed. There is, besides, this difference between the two diseases,—in measles the eyelids are red and swollen, in scarlet fever they are usually hollow and pale; in measles by the alæ nasi and on the lips the eruption is well marked, whereas in scarlet fever there is marked paleness in these parts. The scarlet fever skin is a little rough to the touch, and the eruption comes out on the second day from the invasion, or even a few hours from invasion. In measles the skin is smooth to the touch, and the eruption comes out on the fourth day from invasion. Typhus fever does not present much resemblance to measles, beyond the injected eye and the dusky face; but in typhus the eruption is rarely on the face at all, and in our own experience is never there in a marked degree. Its character moreover is wholly different. In measles it appears in the form of ragged crescents, horse shoes, straight and spiral lines. In typhus it forms a kind of network of small round, square ovoid spots on a dusky injection of skin, in which there are no pale interspaces as in measles. It comes out moreover on the fifth day, and is rarely well marked until the seventh. In urticaria the elevated wheals and tubercles are white elevations on a scarlet ground, whereas the

measles elevations are red. There are various medicines which give rise to skin eruptions, such as copaiba, cubebs, turpentine, and bromide of potassium, and various affections of the nervous and digestive systems; but they have no definite order, and they could hardly be mistaken for measles if a careful enquiry were made of the history of the case. Iodide of potassium in particular gives rise to running of the eyes and nose, and sneezing in addition to a rash; but if the characters of the rash of measles and the history of the case be kept clearly in view, an error of this kind would be difficult.

Prognosis. Measles in the Europe of to-day is in the majority of cases a mild disease, but notwithstanding 9,532 children in the first six years of life died of it in London in the years 1861-70. Amongst healthy, well-cared-for children the prognosis is very favourable, but among the infants of the lower poor, and the infants who find their way into the workhouse infirmaries, especially if they be crowded together and undernursed, the prognosis is very unfavourable. It is unfavourable if the child be tubercular, and it is more unfavourable in cold damp weather than in summer, because of the greater liability to pulmonary affections in the former. From the statistics already referred to rather more boys die than girls up to the end of the third year, when rather more girls die than boys; but it must be remembered that there are more girls to die. The majority of the deaths occur between the first and the end of the second year, and of the 9,532 of all ages which occurred in London in the years 1861-70, 8,566 were under four years of age. The mortality per 1000 during the same years was, for boys

6·2, for girls 5·2. Diphtheria and capillary bronchitis occurring in measles under two years of age is almost invariably fatal. The following totals give the statistics upon which the above conclusions are founded.

Deaths from measles in London during the years 1861-70:—

	All ages.	Under 1 year.	1	2	3	4	5
Males...	4848	971	1856	1022	494	252	224
Females	4684	797	1792	977	527	282	235
Total	9532	1768	3648	1999	1021	534	459

Treatment. The points special to the treatment of measles are the following: (*a*) The temperature of the room should be 60° Fahr., and it should be darkened, because there is usually some intolerance of light; (*b*) if the rash be slow in coming out, or there be convulsions, warm baths should be given, but at the same time it will be well to remember the advice of Trousseau when this alarming symptom occurs, "Ne faites "pas de médecine tumultueuse." In children convulsions during the invasion of acute disease are only the equivalent of a rigor in the adult, and in the case of measles at least they are not alarming unless they be continued for one or two days (*Trousseau*); (*c*) if it be necessary to open the bowels by means of a drug this should be a mild one, like castor oil, or, possibly better, a warm water enema with two teaspoonfuls of castor oil in it, because in measles there is a tendency to diarrhœa and dysentery; (*d*) epistaxis should not be interfered with unless it be very severe, because

usually it is beneficial; (*e*) the child should be kept in bed, as a rule, until the temperature has been normal throughout the day for a week; but if he be vigorous, constantly jumping about in bed and throwing off the bedclothes, he should be allowed to leave his bed, care being taken that he be warmly clad, in particular that he have flannel next his skin; but he should not be allowed to leave his room. When he should be allowed to do this is a question which involves the consideration of many factors. It will be necessary to consider (*a*) the constitution of the child, in particular his predisposition to catarrhal and tubercular affections; for it will be obvious that children liable to these affections in health would require greater care in their convalescence from measles than children without such predisposition; (*β*) the severity of the attack as indicated by otitis, laryngitis, diphtheria, pneumonia lobar or lobular, diarrhœa, dysentery, opththalmia, —for it will be self-evident that the presence or absence of these would make an important difference as to the time when the child might return to his ordinary exercises; (*γ*) the condition of the weather, whether wet or dry, warm or cold, would be an important element: thus in warm dry weather a child might be allowed out much sooner than in cold damp weather; (*δ*) the condition of the soil would be an important consideration, for it will be clear that on a high gravel soil a child might be allowed to run about much sooner than on a low marshy one; (*ε*) the epidemic constitution would form a most important factor and a most important guide, for if the epidemic were characterised by any of the affections just mentioned, greater care would have to be exercised in each individual case, and a longer confinement to

the house would be necessary than in an epidemic of a mild character in which such complications were wanting. Lastly, the age of the children would have to be taken into account, because children under five are usually in more danger than children over five. Thus, of 458 cases treated in the London Fever Hospital during the years 1878-1882 there were 17 deaths, 13 of which were under five. As a rule, in the milder cases the children should be kept in bed until about a week after the temperature has been normal throughout the day, and they should be kept in the house for about three weeks longer, so as to gain strength, and to cover the period during which the relapse usually occurs. In cases of a more severe type these times will be longer, and longer still if the measles be complicated in any way. In the case of children of a tubercular constitution, or even with a tubercular history, the very greatest care should be exercised before exposing them to the weather of our changeable climate, and the utmost care should be exercised in providing them with warm clothing. Should the measles affect such children in winter it may be necessary, if the winter be severe, to keep them in the house until the warm weather returns, in which case the ventilation of their living and sleeping rooms should be as perfect as possible. In the great majority of the cases of measles occurring in Europe in the present day, they are so mild that there is a tendency to be careless in their treatment; but it should be remembered that measles are not invariably mild,—witness the epidemic of Fiji in 1871; that in this country severe cases are not infrequent, and that the disease when not severe in itself becomes so sometimes by the complications and the sequelæ which arise

during its course or follow its termination. Thus, diphtheria, bronchitis, pneumonia, phthisis, acute miliary tuberculosis, otitis, inflammation of the middle ear leading to suppuration of the mastoid cells, pyæmia, abscess of the brain, ophthalmia ending—rarely, it is true—in complete loss of sight, diarrhœa and dysentery, are some of the dreadful things which complicate or follow measles, but which, happily, in the great majority of cases, may be prevented by the simple treatment indicated. It is, therefore, after the measles that danger arises in the majority of cases, and it is then, when the temperature has become normal, that it becomes so important to protect the children from cold and damp, and to see that they are warmly clad and generously fed. In malignant or black measles no treatment is of any avail.

CHAPTER XIII.

RÖTHELN.

(Translated from the German of Niemeyer.

CANNSTATT appropriately defines rötheln as a red-spotted exanthem, in comparing which with the general symptoms and with those affecting the mucous membrane, it is doubtful whether the affection should be classified under scarlet fever, measles, urticaria, or erythema, because in many points it resembles one or other of these, whilst in other points it differs from them. The epidemic rötheln which arises from infection, with which we are here alone concerned, are modified forms of scarlet fever, or measles. Under the head of rubeola scarlatina is comprehended a scarlatina in which the exanthem resembles the exanthem of measles, whilst the high fever, the sore throat, and the dropsy which sometimes follows, resembles scarlet fever. Under the head of Rubeola Morbillosa is comprehended a form of measles in which the exanthem by its confluence resembles the exanthem of scarlet fever, whilst the affection of the respiratory mucous membrane leaves no doubt as to the rubeoloid nature of the disease.

Treatment. "No special treatment is needed" (*Bristowe*).

CHAPTER XIV.

CEREBRO-SPINAL FEVER.

Definition. An acute disease characterised by inflammation of the membranes of the brain and spinal cord.

Synonyms. Epidemic Cerebro-Spinal-Meningitis (Eng.); Méningite Cérébro-Spinale (Fr.); Epidemische Meningitis (Ger.)

History. There is no record of this disease until it was recognised at Bayonne in 1837, since which time it has been met with at various periods in most European countries, in the United States, and in Africa. It appeared in Ireland in 1846-50, and in 1865-67; but it has not been met with as an epidemic in England or Scotland (*Radcliffe*).

Etiology. The disease appears to be independent of age and sex, and generally of social and sanitary conditions; but although no definite relation exists between it and "the sanitary state of habitations or of "individuals, in certain outbreaks, as in that on the "Lower Vistula, the prosperous classes suffered to a "much less extent than the poor and miserable, who "were subjected to privation and to much foulness "of person, dwellings, and atmosphere" (*Radcliffe*). In France it was specially virulent on soldiers in garrison, and "in Dublin it was specially severe among

"the recruits of the Royal Irish Constabulary sta-
"tioned in the police barracks in the Phœnix Park"
(*Grimshaw*). There appears to be no doubt that it arises sporadically, and that occasionally it prevails as an epidemic. It is not quite settled if it be infectious, but its occurrence in garrisons as an epidemic points in that direction. It is a disease of the winter months, and it is definitely related to climatic conditions. Our knowledge of it in the eastern hemisphere "is limited to Western and Central Europe and "Algeria, the northern boundary of the district not "passing beyond lat. 61° N., the southern not beyond "lat. 35° N.; the one extreme closely approaching the "arctic, the other the torrid zone. In the western "hemisphere the records of the malady are confined to "the populous districts of the eastern division of the "United States, from lat. 30° N. to lat. 48° N. It is "noteworthy that the northern and southern limits of "distribution in both hemispheres but slightly overlap "the isothermal lines 5° and 20°." (*Radcliffe.*) There has been considerable difference of opinion on the question whether or not the disease be infectious. The present writer would venture to suggest that the difference arises from the fact that different diseases were referred to. To those familiar with acute infectious disease in its severer, and in particular its malignant forms, this view will derive some support from the nomenclature. It has been described "as "typhus-syncopalis; cerebro-spinal typhus; cerebral "typhus; petechial fever; spotted fever" (*Radcliffe*). It will be clear that if the disease "typhus" be associated with cerebro-spinal disease, and the symptoms of the latter should predominate so that the disease should come to be named from these, cerebro-spinal

meningitis or fever of this nature would be infectious, not because of lesions in the brain and cord, but because of the "typhus." It would, of course, be a question in any given case or cases of typhus in which the nervous symptoms common to that disease and other diseases, such as enteric fever, are present, whether there were also present organic lesions of the brain and spinal cord; and it would be important to know in how many instances in which a disease was regarded as really "typhus" in its character, inflammation of the membranes of the brain and spinal cord was verified by *post-mortem* examination. It was at one time the general opinion that the nervous symptoms of typhus were the result of organic changes in the brain and spinal cord; but repeated *post-mortem* examination showed that this opinion was unfounded. It is certain that in the typhus which has appeared in London during the last twenty years, excepting a few cases in which it was an incident having no special relation to the typhus, the brain and spinal cord have, as far as *post-mortem* examination has shown, been found healthy. The same suspicion is strongly aroused by another set of names by which the disease has been designated. It has been described as malignant purpuric fever, malignant purple fever, nervo-purpuric fever, malignant purpuræ, pestilential purpuræ, febris nigra (*Radcliffe*). Now to persons familiar with the hæmorrhagic forms of small pox these names are highly suggestive of some confusion between cerebro-spinal fever and some forms of hæmorrhagic small pox. The suggestion becomes almost a conviction when it is found that the disease has been described as characterised by "purpuric eruptions, "either circumscribed, raised, hard and shotty to the

"feel, or extensive purpuric spots or patches, frequently "accompanied by vesicular eruptions" (*Grimshaw*). This much is certain, that the London infectious disease hospitals are familiar with the affection just described as a form, more or less "pure," of hæmorrhagic small pox. The terms "black sickness" and "febris nigra" are singularly suggestive of "variola nigra." There appears to be no doubt that it has been confounded with scarlet fever. "In some cases it "has been indistinguishable from malignant scarla- "tina, especially where death occurred within twenty- "four hours, and both diseases were epidemic at the "time" (*Grimshaw*). If it be indistinguishable from malignant scarlatina, is it not that disease? Otherwise, how are they differentiated? Whatever the disease may ultimately be proved to be, it appears to be certain that some sort of disease, characterised by nervous symptoms, spreads amongst soldiers in garrison, and is therefore infectious; but the sporadic cerebro-spinal fever, or meningitis, which is met with in the London hospitals is not infectious.

Anatomical Characters. These consist in congestion of the membranes and substance of the brain and spinal cord, and of inflammatory exudation into the subarachnoid tissue. This exudation is sometimes watery, transparent, and flocculent or purulent. Its extent varies; sometimes the exudation covers the base of the brain, and extends all along the cord to the cauda equina; but in the majority of cases the exudation does not extend much beyond the optic commissure in front and the upper portion of the cord behind.

Symptoms. The characteristic symptom of the disease is violent disturbance of the nervous system.

It comes on sometimes more or less gradually, at other times suddenly. There is fever which is not usually high, the temperature varying from 100° Fahr. to 105°. There are usually shiverings or rigors, acute headache, which sometimes causes the patient to scream with the pain. There is much muscular pain generally, but in particular of the posterior muscles of the neck, causing permanent retraction of the head, the most prominent feature of the disease, and flexure of the limbs. The eye is injected, the pupil unequal or contracted, and usually there is squinting. There is extreme irritability, hyperæsthesia of the surface of the body, and intolerance of light and sound. Delirium alternates with drowsiness. The skin is sometimes dry and hot, sometimes cool and covered with profuse perspirations. Various purpuric, papular, vesicular, and petechial eruptions have been described as having been found there associated with hæmorrhage from the mucous surfaces. Of these the writer has indicated his opinion in the etiology. He has not met with them in the cerebro-spinal-meningitis which has come under his own observation. In this condition the patient may remain for a few days to about a week, during which time the patient becomes gradually insensible; his pupils dilate; his limbs relax; his cutaneous sensibility disappears; his urine is retained, and his motions are passed involuntarily. Death is ushered in gradually by coma or suddenly by convulsions.

Course, Termination, Complications, and Sequelæ. The disease runs a rapid course, and almost always terminates in death.

Diagnosis. In the cerebro-spinal fever or meningitis which is met with in London the diagnosis is easy.

The patient is more or less feverish ; he lies usually on his side with his head thrown back and his limbs drawn up. There is nothing like this in any other acute disease, and consequently it is unmistakable.

Prognosis. This is very unfavourable. All the cases which the writer has seen have ended fatally, and there is a concensus of opinion that the mortality is invariably high.

Treatment. When this disease is really made out, treatment of any kind will be of little avail. Bleeding, narcotics, opium, the bromide and the iodide of potassium, sinapisms, blisters, and other remedies have been used without much effect. The patient should be carefully fed and nursed as in fever, and in cases of collapse, warmth and alcohol employed. The writer would not recommend ice to the head and spine; but in cases where there is great pain some form of sedative may be useful. Many physicians rely on opium.

CHAPTER XV.

ERYSIPELAS.

Definition. An acute inflammation of the skin.

Synonyms. Erysipèle (Fr.); Rothlauf (Ger.); St. Anthony's Fire (Eng.).

Varieties. Very many varieties have been described, but for the most part they have been unscientific in character and wanting in practical value. They may be usefully divided as follows: *Traumatic*, when the disease arises from a wound; *Idiopathic*, when it arises without a wound; *Simple Cutaneous*, when it is confined to the skin; *Phlegmonous*, when it extends to the deeper tissues; and *Gangrenous*, when there is mortification of the parts.

History. There is no authentic information on this point. The disease is noticed, under the name of St. Anthony's Fire, in the tenth century, and epidemics of it are said to have occurred in the eleventh, twelfth, thirteenth, and fourteenth centuries. It gave occasion to the foundation of the Order of St. Anthony, which Urban II. ratified in 1093 (*Haeser*); but it is somewhat doubtful if the "holy fire" of those days be quite the same thing as the erysipelas of to-day.

Etiology. Erysipelas usually arises in connection

with some kind of wound or sore, or in connection with irritation from certain skin eruptions, such as small pox. It spreads by infection, probably in reality some form of inoculation, as the history of lying-in and surgical hospitals abundantly shows. It forms one of the varieties of puerperal fever, and is not infrequent in the region of the umbilicus in new-born infants. It affects all ages and both sexes, but it is more common among the intemperate and in those who are the subjects of organic disease of the liver and kidneys. Its spread is facilitated by overcrowding and insanitary conditions generally. It appears sometimes as an epidemic, chiefly in lying-in and surgical hospitals. In the majority of cases it is traumatic, and in such instances it appears first in the locality of the wound. Admitting that there be a true idiopathic form, this is most common on the head and face.

Anatomical Characters. There is redness, fading on pressure, of the skin of the part affected, and inflammatory infiltration of the skin and the subcutaneous connective tissue. This makes the part swollen and hard. Occasionally vesicles form. If the disease be of the simple cutaneous form there will be nothing beyond this; but if the connective tissue be seriously affected, in other words, if the disease become "phlegmonous," pus will be formed. The pus is usually more or less diffuse, but in the head it is sometimes circumscribed, especially when the erysipelas is the result of small pox. The neighbouring lymphatic glands are usually more or less enlarged. In persons of intemperate habits, and in those who are the subjects of organic, in particular, kidney disease and dropsy, mortification may occur. No special changes

are found after death ; but there are congestions of the viscera, the blood is thin and fluid, and it coagulates badly.

Symptoms. The disease commences more or less suddenly with symptoms of fever. Some time after, from a few hours to a few days, a red blush appears on some part of the body, most frequently on the head or face. When it appears on the face, it usually commences, when there is no manifest wound, at the nostrils, the angles of the mouth, or about the margin of the eyelids. It then extends continuously from point to point until the whole of the head and face be affected, in some cases the whole body. So when it arises in a limb, in a hand or foot, in the external auditory meatus, in the scrotum, or from the anus, it spreads continuously. Occasionally this blush appears to arise in the mucous membrane of the mouth and to spread outwards to the skin. In its progress it is irregular. Sometimes it suddenly stops, leaves one part, to reappear in another like a fresh invasion. With the appearance of the blush the temperature rises and the febrile phenomena increase, an increase dependent partly on the locality and partly on the extent of the body affected. Thus the fever is usually more severe and delirium more liable to occur when the head and face is involved, than when some other part, such as a limb or the scrotum is affected. Along with these symptoms the part becomes swollen, in the case of the head and face to such an extent sometimes that the features are completely obliterated as in confluent small pox. It is hard, tense, and glistening, has a sharply defined edge, feels and is felt to be hot, and its cutaneous sensibility is increased. In the majority

of cases, if the disease do not extend from the skin to the deeper structures, if it be free from complications, and the subject be a healthy adult, it comes to an end in a few days and the patient proceeds rapidly towards recovery. Desquamation follows, and occasionally loss of hair. But in some cases the disease affects the deeper tissues, becomes in a word phlegmonous, and pus is formed. The duration of the affection is then prolonged, the febrile phenomena are increased, the temperature becomes very high, 105°, 106°, or even 107°, and there is usually more or less delirium, which is occasionally violent. Sometimes vesicles of various sizes appear on the skin. In these circumstances, complications may arise; some form of blood poisoning may be developed, such as pyæmia; inflammations may come on, such as pneumonia and pleurisy; in the case of injuries about the head the membranes of the brain or cord may become inflamed or general peritonitis may appear. When one or another of these conditions arises the patient usually sinks. Marked muscular tremor comes on, complete insensibility, muttering delirium, involuntary motions, cold clammy perspirations, coma, and death. In the majority of cases, however, always presuming that the subjects have enjoyed previous vigorous health, that they are free of chronic organic disease, and that none of the severer complications arise, erysipelas in its severe forms ends in recovery.

In some cases the disease spreads from the head and face to the fauces, sets up inflammation there, and occasionally threatens life by œdema of the glottis. This symptom should always be looked for in erysipelas of the head and face, in order that tracheotomy may be performed if required.

Course, Termination, Complications, and Sequelæ. In simple cutaneous erysipelas in young and healthy adults, the *course* is towards recovery; but in the very young, the very old, the unhealthy or the intemperate, it sometimes is towards death, either by the severity of the constitutional fever, from some form of blood poisoning, or from the supervention of some complication. Phlegmonous erysipelas, under the circumstances mentioned, frequently ends fatally.

Of *complications* the most common are meningitis from scalp wounds, pyæmia, inflammation of the lungs and pleuræ, peritonitis, and phlebitis.

Of *sequelæ* the most frequent is more or less prolonged debility; but in severe epidemics gangrene of the extremities is mentioned.

Diagnosis. Erysipelas has been mistaken for erythema, scarlet fever, and confluent small pox in the very early stage. From erythema, in its mildest forms, it is frequently impossible to distinguish it, for erysipelas is sometimes so slight that erythema would seem the more correct term. Generally, however, the constitutional disturbance present in erysipelas and absent in erythema make the diagnosis easy. In scarlet fever the eruption, even when well out, is "dotty," and it is rarely present on the face. In erysipelas there is no eruption proper, but a "continuous" redness of the skin over the affected area, and it is more frequent on the face and head than elsewhere. In the early swelling and redness of the head and face in small pox the swelling is *rough* to the feel; in erysipelas it is *smooth*.

Moreover, pain in the back is almost always present in small pox, and in any case the appearance of papulation would remove all doubt.

Prognosis. In simple cutaneous erysipelas, uncomplicated, in healthy adults this is favourable; but when the disease passes into the phlegmonous form and the area affected is large, it becomes very grave. It becomes very serious if the fauces be affected, mainly from the danger of œdema glottidis. Generally the prognosis is grave if the constitutional disturbance be great, particularly if there be marked nervous symptoms, or symptoms indicative of blood poisoning. The prognosis is also grave in the very young, the very old, in persons of intemperate habits, and in those who are the subjects of organic disease, particularly disease of the kidneys.

Treatment. This may be described under the following four heads: (*a*) General; (*b*) Local; (*c*) Specific; (*d*) Operative; and (*e*) Preventive.

General. As a rule the patient should be isolated as in the case of the infectious fevers, and in carrying out the treatment it should be remembered that erysipelas, like the fevers, has its natural history, and that specific treatment will not seriously affect it. In the majority of cases nothing will be required beyond careful nursing and feeding, but in the severer forms of the disease, in the case of elderly persons, in the case of individuals who have been intemperate in their habits or who may be the subjects of organic disease, it will be necessary to attend very carefully to the feeding, and to give alcohol freely. Of the *local* treatment it may be said that in the milder cases, beyond protection of the affected part by cotton wool, none is required; that in the severer none produces any useful effect. Time, feeding, occasionally some alcohol, and protection of the part, with free and deep incisions when necessary, is the treatment which the

writer has found most useful. Local appliances of various kinds, however, have been largely employed. Solutions of sulphate of iron, the saturated solution of silver, lotions of lead, lotions of zinc, mercurial ointment, zinc ointment, collodion, warm water, cold water, and dusting of the parts with flour or starch powder, have all been used; but it is very doubtful if they do any real good. Of *specific* treatment there is none; but the tincture of the perchloride of iron has been extensively employed as a specific, and is regarded by many physicians in that light. In combination with quinine it is useful in convalescence. As regards *operative* treatment it is of the utmost importance to bear in mind that the fauces are liable to be affected in erysipelas, and that œdema of the glottis may arise. When this occurs to such an extent as to render respiration difficult, tracheotomy should be performed. When the disease extends to the connective tissues and abscesses are formed, free and deep incisions should be made. With a view to prevention it should be constantly borne in mind by the physician in practice, that erysipelas is a communicable disease; that the subjects of wounds and sores are particularly liable to it; above all, that parturient women are specially susceptible to it, and consequently that every precaution should be taken by the physician to see that he does not carry it.

CHAPTER XVI.

DIPHTHERIA.

Definition. An acute infectious disease characterised by the formation of greyish-white pellicles on the mucous membranes.

Synonyms. Diphthérie, Diphthérite, Diphtheritis (Fr.); Epidemische Diphtheritis Bösartige Rachenbräune (Ger.); Croup (Eng.)

History. There is no definite reference to diphtheria in the writings of Hippocrates. It is true there is a passage in the book on dentition relating to ulcers which affecting "the pharynx are more severe and "more acute because they bring on very much "difficulty of breathing," but there is not much to be made of this, and moreover it is doubtful if the book on dentition be genuine. There is, however, no doubt that Aretæus, a physician who lived about the commencement of the Christian era, described it under the name of Syriac ulcer; and Aetius, a physician of the fifth century, describes it in similar terms. Cardinal Baronius, in his ecclesiastical annals, makes mention of a disease which prevailed at Rome in the ninth century after an inundation of the Tiber, the characteristic of which was speedy death from suffocation; and the same author of the year 1004 says: "Hoc "eodem anno urbe modo vexata plurimi interierunt;

"catarrhus enim descendens in fauces meatus obstruens "suffocatos miseros homines confestim mori cogebat." Cedrenus, a Greek monk, makes mention of a Cynanche which prevailed at Constantinople in the eleventh century to such a degree that the living were unable to bury the dead. Saving and excepting these meagre references, there is no known description of diphtheria from the time of Ætius until the sixteenth century, when it was well known in Spain by the name of garotillo, a term originally applied to a stick used for strangling criminals. It was epidemic in that country, after "rains and floods, along with small pox," from 1583 to 1618. The disease reached its height in 1613, on which account that year was designated by the Spaniards "anno de los garotillos." It is described by Fontecha, Villa Real, Alaymo, Mercatus, the physician of Philip II., and others. It appeared as an epidemic in Italy about the commencement of the seventeenth century, descriptions of which have been given by Sgambati and Carnevale. It began to be observed at Chiaia in Naples, appearing first in the poor quarter near the sea, from whence it spread into the town. Children were the first victims, but in the course of its progress it also affected adults, and the majority of those attacked died. It was generally known as "the disease in the windpipe." In the years 1618-20, years marked by the occurrence of floods, it spread during the general prevalence of typhoid diseases (typhöser Krankheiten), along with erysipelas and an epizootic diphtheria affecting horned cattle over a great part of lower Italy and the States of the Church. Along with typhoid plagues (typhöser Seuchen) it passed into Portugal, Sicily, and Malta in the year 1620; it returned to Spain in 1630; it entered Malta

again in 1632, and in the year 1634 it prevailed in the country round about Rome (*Haeser*). In the eighteenth century Ghisi described a disease which appeared at Cremona in 1747, which from the description was apparently diphtheria. The patients died of suffocation, and there is "mention of the case of a little "girl who expectorated a tubular false membrane some "moments before dying" (*Bretonneau*). In 1765 the tracheal form of the disease was described by Dr. Home, who thinking that the tracheal symptoms were the commencement of a disease instead of the most usual fatal termination of diphtheria, published what he supposed to be a discovery under the name of croup, and thus gave rise to the distinction between croup and diphtheria which still exists. In 1771 it was described by Samuel Bard from an epidemic which he saw in New York. But it was not until 1826, when Bretonneau published his papers, that it was definitely recognised. This distinguished physician, who met with it in the epidemic form among the soldiers stationed at Tours, was the first who described it completely. He pointed out its various forms, pharyngeal, laryngeal, tracheal, buccal, cutaneous and malignant, and showed the relation of the one to the other. He further established the important fact that the disease was not new, that it was described by Aretæus in the first century, by Ætius in the fifth, by the Spanish physicians in the sixteenth, the Italian in the seventeenth, and by Dr. Francis Home of Edinburgh in the eighteenth. He laments that this author, by his "Treatise on Croup," had suspended the progress of observation, and concludes the introduction to his papers in the following terms: "It is difficult to "conceive how a work which contains only a small

"number of isolated and scattered facts was capable of "obliterating the traces of the ancient traditions, and, "for half a century, of preserving a great amount "of influence over the opinions of practitioners. "Such is, however, the fact. Struck with the most "ordinary mode of termination of Malignant Angina, "Francis Home persuaded himself that he had just "met with an affection which had hitherto escaped the "attention of his predecessors; he thought that he "ought to give it the popular name under which he "found it designated in a Scotch province; the novelty "of his discovery was widely diffused, and the new "denomination so fascinated all persons, that it pre- "vented them from recognising a disease observed from "the most remote antiquity, and which, in our own "days, is accompanied by all the symptoms which it "has uniformly exhibited."

Etiology. Of the exact cause of diphtheria we know nothing. It prevails more or less in all countries, but it has a marked preference for certain places, such as Paris and Florence, where it is endemic and frequently epidemic (*Rose Cormack*). It is said to prefer low-lying moist places, "the neighbourhood of large "bodies of water," and the sea shore. "Towns situated "on the banks of rivers have more than the average "share of it, and it has been observed to be particularly "frequent among the children of washerwomen in such "places, and thus evidently connected with exposure "to moisture. In towns so situated it has been known "to prevail epidemically after an inundation" (*Watson*). These statements, whatever they may be worth, are in agreement with the historical notices already referred to. Thus the epidemic which appeared at Rome in the ninth

century was preceded by an inundation of the Tiber; and the epidemic of Cynanche, noticed by Cedrenus at Constantinople in the eleventh century, was preceded by much rain. In Spain in the sixteenth century, the "Garotillo" was preceded by heavy rain, and in Italy in the seventeenth century, the "male in canna" prevailed in the years 1618-20, years noted for the occurrence of floods (*Haeser*). On the other hand the disease occurs in situations characterised by salubrity and dryness. Thus "in the towns and hamlets in the "department of Loiret, which are remarkable for their "salubrity and for their excellent geographical position, "I saw diphthérite raging with excessive violence, while "some villages of Sologne, situated in the midst of "marshes, remained exempt from the scourge; and on "the other hand some hamlets and towns situated "on the banks of ponds were depopulated by the "epidemic, while others enjoyed a perfect immunity "which was thought to be attributable to the ordinary "salubrity of the place." (*Trousseau.*)

It appears in all seasons, but more frequently in winter and spring than in summer and autumn. It affects all ages and both sexes, but is essentially a disease of infancy and childhood, which diminishes towards puberty, after which it is comparatively infrequent. Of the exact age at which it is most frequent there is no certainty, because in a large number of the cases in which it is confined to the pharynx and tonsils it is not recognised, and no help is to be gained from the Registrar-General because of the wide application of the term diphtheria. The distinction still maintained between this disease and croup would alone invalidate any conclusions as to the exact age at which it is most common.

It cannot be said to be hereditary, but members of some families appear to be specially susceptible of it.

"Diphtheria is not an hereditary disease; but a "special aptitude to receive and develop the poison "evidently pertains to certain individuals and families. "This statement is borne out by the statistical enquiries "of Morelli, Nesti, and others in relation to the recent "epidemics of Florence; but the facts which establish "it beyond a possibility of doubt are the numerous "cases of particular families being desolated by diph- "theria at intervals of years, and when the members "attacked were widely separated. For example, a "child died this year of diphtheria in Paris; a sister "died of the same disease two years ago in Florence; "about the same date an elder brother similarly "perished at the Cape of Good Hope; and the mother "of these children was in childhood nearly carried off "by the same disease. Family histories of this kind "are so numerous, as to lead to the conclusion that "there is often a certain stamp of similarity of consti- "tution pervading a family, in virtue of which its "members are specially disposed to receive and develop "the diphtheritic contagium." (*Rose Cormack.*)

It appears occasionally towards the termination of other acute diseases, particularly scarlet fever and measles.

Of general conditions, deficient food, scanty clothing, exposure to cold and wet, and the unsanitary conditions inseparable from poverty, are said, and probably with much truth, to favour it; but it is not dependent upon these conditions. It affects the rich as well as the poor; the strong and healthy as well as the weak and sickly; but it is doubtful if it affect these to the same extent. "We know, in fact,

"that this disease, besides its epidemic conditions, "rages principally among poor and weak children, "living in unhealthy habitations. Hence may we not "be permitted to hope that the blessings of civilisation, "by multiplying comforts and their attendant circum- "stances, such as the healthiness of dwellings, the "amelioration of the hygiene of food, and the means "of protecting the surface of the body from the in- "fluence of atmospheric vicissitudes, so fertile in pro- "ducing catarrhal affections, etc., will weaken every "day the predisposing and occasional causes of "diphthérite, and will gradually reduce it, like many "other diseases which were formerly malignant and "epidemic, to a state of sporadicity and benignity, over "which our local methods of treatment will most "frequently triumph when the physician is called in "at the commencement of the disease?" (*Empis.*)

It spreads by contagion. Of this there would appear to be no doubt, but it is difficult to say in what way it occurs. The cases of Valleix and Henri Blache, quoted by Trousseau, would leave little doubt on the subject if it were quite clear that they were cases. In the case of the former, a little saliva was thrown into his mouth whilst examining the throat of an infant he was attending for the disease. On the day after a diphtheritic patch was found on one of his tonsils, and there was some fever. "In a few hours both tonsils "and the uvula were covered with false membranes. "Soon after there was an abundant discharge from the "nostrils, and the glands as well as the cellular tissue "of the neck were considerably swollen. This was "attended by delirium, and in forty-eight hours "Valleix died without any affection of the larynx." In the case of Blache, he was sitting up with a child upon

whom Guersant had performed tracheotomy "pour un "cas de croup. At the end of the third night he had "slight pain in the throat, high fever, and false "membranes on the tonsils. In a few hours the "swelling of the neck became enormous (*énorme*). "Delirium set in towards evening, and in seventy-two "hours he died without any affection of the larynx." It is difficult to resist the suggestion that these cases, with enormous swelling of the neck, infiltration of the cellular tissue, enlargement of the glands, and abundant discharge from the nostrils, together with the absence of laryngeal affection, were cases of scarlet fever. The following, also from Trousseau, are more satisfactory. A little girl two months old contracted a diphtheria of which she died. The disease spread in succession to the mother, the nurse, the father, the grandfather and grandmother, and a lady who visited the family in whom it appeared as croup. In another family it began in the husband of one of the servants, who communicated it to his wife. Six days after the child of the master of the house was seized. The disease invaded the windpipe, and the infant died of croup. M. Gillette, the physician who attended the child, also contracted the disease, and died of croup. Empis gives instances in which the disease seemed to spread in the wards of the Hôpital Necker, and similar instances have come under my observation in the Eastern Hospitals. It is, according to some, doubtful if the disease may be communicated by inoculation; although the experiments of Trousseau and M. Michel Peter, which were failures, prove nothing against inoculation, and the experiments of certain German physicians are far from conclusive in favour of it, the following instances of accidental inoculation quoted by

Bretonneau seem fairly conclusive in favour of this mode of origin.

"In the spring of 1843 I was inoculated with "diphtheria from a child who had come from Epinal. "In passing through Paris, he had advice for an abscess, "and he had soon afterwards been sent to Tours, "where he went to the house of an uncle in order to "be treated there for a sore throat, from which he had "been suffering on his arrival in Paris. From all the "characteristic signs, I recognised pharyngeal diph- "theritic angina, which had become croupal. It yielded "to energetic cauterizations with solution of nitrate of "silver, frequently repeated for six days. A nurse who "took care of the child was attacked with pharyngeal "diphtheria, which soon yielded to local treatment. "The child, being intractable, coughed and violently "threw out the sputa. The orifice of my left nostril "once received some of this excretion, but from being "obliged to continue the cauterization I had no time "either to wash or to wipe the part.

"A few days afterwards, there was snuffling on the "left side, and nasal voice, then suddenly painful "pharyngeal angina, sleeplessness at night, extreme "uneasiness, weakness, coldness and pain.

"In the morning, both tonsils and the uvula were "completely enveloped in a white incrustation. Three "times a thimble of false membranes which enveloped "the uvula was detached and reproduced. Deglutition "difficult; sputa abundant and fœtid; stools loaded "with false membranes. Incomplete recovery; pale- "ness; a fortnight later there was pain in the wrists; "confusion of sight; constriction of the throat; "paralysis of the palatine vault, which had become "completely insensible; regurgitation of food by the

"nostrils. Rather later, there was a sensation of ting-
"ling in the great toes, ascending as far as the knees.

"I walked with difficulty and very slowly, and my
"weakness was especially painful when I went upstairs,
"and this state continued without improvement for six
"weeks. The same tingling had reached my hands
"and fingers, and I had completely lost all tactile
"power. On the 10th of August I took sea-baths, and
"at the second bath I was entirely cured of all my
"complaints.

"A short time after the inoculation of the nasal diph-
"theria under which Dr. Herpin nearly sunk, my friend
"Dr. Gendron, of Château-du-Loir, being obliged to
"perform tracheotomy, received on his lips, at the
"moment of opening the air-tube, a shower of tracheal
"exudations thrown out by the efforts of a convulsive
"fit of coughing. Pharyngeal diphtheria was the im-
"mediate consequence of this accident. Originating in
"one tonsil, the special phlegmasia so rapidly reached
"the larynx that I was obliged to have recourse to
"energetic treatment. The cure was rapid and com-
"plete, and none of the symptoms of constitutional
"diphtheria were developed." (*Bretonneau: Semple's translation.*)

Anatomical Characters. If a diphtheritic patient be examined at the commencement of the disease, which sometimes happens in the case of hospital servants, the pillars of the fauces, the border of the soft palate, the uvula, the tonsils and the pharynx will be found somewhat red and congested, with here and there greyish-white specks which may be readily removed. The tonsils may be somewhat swollen, but usually not to any extent. During the progress of the

disease the specks coalesce into distinct patches, which are sometimes surrounded by a claret-coloured border, and become closely adherent to the subjacent mucous tissue. The membrane formed in this way is confined in a large number of cases to the tonsils, the uvula, the border of the soft palate, and the pharynx; in a few it extends into the trachea usually as far as the division, and occasionally it reaches the minute ramifications of the bronchial tubes. In the majority of cases the diphtheritic membrane is confined to the parts mentioned. But it may be found anywhere on parts of the body exposed to contact with the air. Thus it is met with in and about the nostrils, on the conjunctiva, the edge of the lips, the gums, the internal surface of the cheeks, the anus, the vulva, the vagina, the prepuce and the glans penis. It may be found on wounds and bruises, on abraded eruptions of the skin, particularly those forming behind the ears and on the head. It may be found in the folds of the skin in fat children, and it has a strong partiality for blistered surfaces. In a word, it may form upon any part of the skin deprived of its epidermis, or upon any part of mucous membrane exposed to the air. It never forms on healthy skin, and it never becomes organised. In certain severe cases it decomposes, assumes a black gangrenous form, and exhales a foul odour, a condition of things which gave rise to the notion that there was gangrene of the parts. This is said occasionally to occur, but it is very rare. In mild cases, and in severe cases which recover, the membrane disappears by absorption.

The parotid and submaxillary glands are enlarged, and occasionally the deep cervical. The lungs in tracheal cases are more or less congested, and not infrequently emphysematous. Occasionally lobar or

lobular pneumonia, pulmonary apoplexy or collapse, is found. The bronchial tubes usually contain more or less of a muco-purulent fluid, and occasionally the diphtheritic membrane. The spleen is sometimes enlarged, dark in colour, and soft.

Small hæmorrhages in the mucous and serous membranes, in the substance of the lungs, heart, and kidneys are found.

In the extremely rare event of death from general paralysis, fatty degeneration of the muscular tissues will be found, but no recognisable lesion of any part of the nervous system.

Symptoms. These may be classified as follows: (α) General Observations; (β) Pharyngeal, Laryngeal, and Tracheal; (γ) Nasal; (δ) Malignant; and (ϵ) Cutaneous and Buccal.

(α) *General Observations.* Diphtheria, as a rule, commences insidiously. The membrane appears at first usually in some part of the fauces, but it may commence on portions of abraded skin, or upon wounds and sores in persons exposed to the contagium, and it is said occasionally to begin in the larynx, the trachea or the bronchi, or in all these at once. In the majority of these cases, however, it is probable that the pharyngeal stage of the disease had been overlooked, many of the cases in that stage being so mild that they do not give rise to symptoms until the disease becomes croup. At the commencement there is not much fever, except in severe cases, nor are the general symptoms marked until the invasion of the larynx. The characteristic sign of the disease is the formation of a membrane upon healthy mucous tissue. There is no ulceration. Ulceration of the fauces, accompanied by great swelling of the glands

of the neck, infiltration of the connective tissue, suppuration, and a foul discharge from the nostrils, which is said to occur in diphtheria, are characteristic of severe scarlet fever, not of diphtheria. The latter, however, occasionally complicates scarlet fever, and in that case diphtheria is associated with these conditions, but then they are the result of the scarlet fever, not of the diphtheria. The membrane occasionally decomposes, when it assumes a gangrenous appearance and exhales a foul odour; but there is no gangrene of the mucous tissue, which is seen to be healthy when the decomposed membrane is removed. Albumen appears in the urine during some period of the disease, but there is no relation between the quantity of albumen and the severity of the individual case. Erysipelatous rashes are said to be met with. Hæmorrhage is said to occur, and to be a serious symptom, and subcutaneous ecchymosis, as these are met with in small pox (*Trousseau*).

(*β*) *Pharyngeal, Laryngeal, and Tracheal Diphtheria.* In this form the symptoms in many cases are so slight that they do not claim attention. A child may be ailing and looking a little pale, but unless some incident lead to an examination of the fauces, the disease is often not discovered until it reach the larynx and has become croup. If, however, perchance, the fauces be examined, greyish-white pellicles, like small pieces of parchment, will be seen on one or both tonsils, on the border of the soft palate, on the uvula, on the pharynx, on the epiglottis, or possibly on all of these together. From the pharynx the pellicles may spread to the posterior nares, and thence along the nostrils to the alæ nasi, through the eustachian tube to the internal ear, and along the æsophagus to the stomach (*Trousseau*), but its usual course is towards the larynx. These pellicles are

occasionally discoloured by blood, vomited matter, food, drink, or medicine; a condition which has been mistaken for gangrene. It is desirable, therefore, that the fauces should be washed, in order that this error may be avoided. They are more or less firmly adherent to the mucous tissue, from which they may be detached whole. On their removal the subjacent tissue is usually normal, but occasionally it is somewhat raw, and a few drops of blood may ooze out. They sometimes shade off into the mucous tissue, but occasionally they are surrounded by a claret-coloured border, when it is said that they are less likely to spread (*Trousseau*). Sometimes the mucous tissue around them is much swollen, when the membrane is seen to lie in a hollow, a condition which gave rise to the notion that there was ulceration. Accompanying the membrane there is usually some redness of the fauces, some pain and swelling of the tonsils, and some tenderness and swelling of the glands at the angle of the lower jaw; but usually these are not marked, and there is not much difficulty of swallowing. If the disease be confined to the fauces, the constitutional disturbance will not be marked, there will not be any serious interference with the usual habits of the child, and recovery may be expected in from one to two weeks. But when the disease invades the *larynx*, there is a marked increase in the severity of the symptoms. There is a short dry cough, fever, and marked difficulty of breathing. As the disease proceeds the child becomes very restless, the breathing very difficult, the general condition very distressing, and if the trachea be not opened, death occurs usually in about forty-eight hours, sometimes sooner, rarely much later. Towards the end the restlessness is succeeded by drowsiness, and the child dies from a combination of

asphyxia, coma, and syncope. A characteristic of the difficulty in breathing is its intermittence. The child, after coughing up a quantity of muco-purulent matter, with shreds of membrane, occasionally a complete mould of the trachea, appears and for the time is almost well. It will sit up, take its food, even play, and give rise to hopes which are almost sure to be disappointed. This "fallax morbi mitigatio" should never lead the physician to delay tracheotomy in the belief that the improvement is real and may be lasting. For, although Trousseau relates six cases of recovery in this way, the membrane in all severe cases is almost sure to be reformed, causing renewed blood poisoning and increased exhaustion, which lessen the chances of recovery if tracheotomy be finally resolved upon.

(γ) *Nasal Diphtheria.* There is nothing special in this form, except that usually there is a fœtid discharge from the nostrils. From the nose the affection may pass through the lacrymal ducts to the conjunctiva, and by means of the discharge to the lips.

(δ) *Malignant Diphtheria.* This form of the disease is not common, and for long periods it does not exist. Thus from 1822 to 1844 Trousseau did not meet with a case. It sets in insidiously. There is slight sore throat, some pain about the angles of the lower jaw, and slight difficulty of swallowing. On examination of the fauces, small patches of membrane may be seen in the usual spots. There is no marked constitutional disturbance, but occasionally great mental depression, not accounted for by visible symptoms. Without any obvious changes, death may take place in two or three days, or even earlier.

(ε) *Cutaneous and Buccal Diphtheria.* These are forms of the disease which the writer has not seen, and

the following observations are translated and abridged from Trousseau.

Buccal Diphtheria. This was not really well known until the publication of Bretonneau's paper in 1826.

When, in 1818, a legion of soldiers belonging to the department of La Vendée was garrisoned at Tours, many of the men were affected by a peculiar disease of the mouth, which the surgeons named purpura hæmorrhagica. In a very short time nearly the whole of the legion was attacked. At first Bretonneau believed the disease to be scurvy; but regimen had apparently no influence over it, and the constitutions of the men bore no trace of scorbutic diathesis. They were, on the contrary, strong and vigorous in every respect. Moreover, the only symptoms of scurvy was the stomatitis. There was no ecchymosis, no stiffness of the joints, and, excepting the bleeding from the gums, no tendency to hæmorrhage; in a word, none of the symptoms characteristic of scurvy. At the same time Bretonneau observed that several of the soldiers suffering from this affection were attacked by diphtheritic sore throat and died of croup. He observed also, that in some of the soldiers the tonsils were affected first, and from these spread to the pharynx and the respiratory passages. The affection usually begins by the formation of yellowish-white patches, without premonitory symptoms, on the edge of the gums. The tartar deposited on the teeth is increased, and appears in the form of a greyish mud resembling rust, a result of the bleeding from the gums. The edges of these are swollen and painful, and the lightest touch, the simple act even of opening the lips, suffices to make them bleed; at last they are destroyed, and the teeth become loose. As the disease advances the membranes extend, become

livid and blackish, appear deeply sunk and surrounded with a red border, look very like malignant ulcers; but this is only apparent, for when the membranes are removed, it is seen that there is no ulceration. On the removal of the membranes they are rapidly replaced. The lymphatics of the corresponding submaxillary region are swollen and tender, and the swelling involves the surrounding cellular tissue. There is a considerable flow of saliva and of an unhealthy serum, which continues during sleep and soaks and stains the linen. The breath is insupportably fœtid, and this joined to the appearance of the affected parts presents a strong likeness to gangrene, but here, as nearly always in diphtheria, the appearance is deceptive. There is no gangrene, but this may occur; and in this kind of diphtheria it is more common than in the others, but chiefly among hospital patients. In private practice it is rarely met with; indeed, so rare in this kind of practice that Trousseau only met with it once.

The disease is rare among infants, especially those at the breast, but it spares no age. It commences usually on the edge of the gum of a bad tooth, from which it spreads. Its chief characteristic is its tendency to localise itself. Unlike the pharyngeal diphtheria, which tends to spread by degrees, that of the gums may remain stationary for months. It would be a mistake, however, to suppose that it never spreads. Not unfrequently it invades the mucous membrane of the cheeks, the inner surface of the lips, the arch of the palate, and the tonsils. It may also invade the larynx and the trachea, and cause death by croup. It is when it invades the inner surface of the cheeks that it is liable to end in gangrene. After remaining

stationary at the gums for one or even several months, or to the buccal mucous membrane for an indefinite period, a swelling appears on the cheek. The skin becomes red, the surrounding tissue hard, and soon all the symptoms of gangrene of the mouth appear. There can be no doubt since the publication of Bretonneau's paper that buccal diphtheria, pharyngeal diphtheria, and croup are the same disease. This is proved by the propagation of the gum affection to the pharynx and the larynx.

Independently of the possibility of its propagation, its identity is still further demonstrated by its contagious properties, for it not only spreads by contagion in the form of stomatitis, but it communicates ordinary pharyngeal and malignant diphtheria.

In the epidemic which raged at Tours in 1818 there were no cases of membranous sore throat until the arrival of the soldiers, who brought the gum affection with them; and it is remarkable that the first cases which appeared in Tours occurred in the neighbourhood of the principal barrack. It was also found that in families where several members were attacked, one would have stomatitis, another pharyngeal diphtheria, a third croup, and a fourth cutaneous diphtheria.

Cutaneous Diphtheria. This form of the disease was noticed by Chomel in 1759, and by Samuel Bard at New York in 1771. It appears most frequently on the surface of wounds produced by blisters; in the folds formed by the skin in very fat children; on abrasions; on the vesicles of herpes; on excoriations of the breast or scrotum, and upon any kind of cut; in a word, upon any part of skin spontaneously or artificially deprived of its epidermis. It appears among persons suffering from the disease in some other part

of the body, or it may be the first manifestation of the affection in those who have been in contact with persons suffering from it.

When a wound is attacked, the part becomes painful, pours out a colourless fœtid serosity, and presently forms on its surface a greyish membrane of variable thickness. The borders of the wound swell, acquire a violet-red tint, and rise much above the surface. As a rule the disease does not extend, but sometimes, when the epidermis has been removed, the skin is covered immediately with a white membrane like that seen upon blisters. Occasionally erysipelas arises round the excoriated part, and on the erysipelatous surface numerous milky serous vesicles form which are confluent in the neighbourhood of the wound, but diminish towards the healthy skin. When the vesicles run together and burst, a whitish membrane is formed, which, owing to the confluence of the vesicles, becomes continuous with the membrane on the wound, and so by successive crops of vesicles the membrane gradually creeps along. In this way diphtheria, commencing by a slight excoriation of the scalp, or the back of the ear, may invade the skin as far as the loins. The membranes, which are at first thin, become thicker, those forming on the surface of the skin continually raising up those previously formed in such a way as to constitute a series of laminæ, the thickness of which may reach four, five, or six lines. The exudations in contact with the skin preserve their density, but the more external, being steeped in the serum, soften, putrify, change colour, acquire a greyish, sometimes blackish tint, and exhale a frightful odour, so that it is almost impossible to avoid thinking that the skin has become gangrenous; but this is not so. Actual gangrene of the

parts may, however, occur, as it does in the vulvar diphtheria of measles. When the disease extends rapidly, or affects numerous points at the same time, there is marked fever, but usually this is wanting.

A few examples will make these observations clearer:—At La Blettière, a farm situated in the commune of Marcilly-en-Villette, in the department of Loiret, five individuals died of pharyngeal diphtheria. Huré, aged ten, slept in the same bed as those who died. A slight inflammation which he had behind his ears became acute, the skin became covered by false membranes, which extended over the whole of the back, and in a few days the child died exhausted by severe pain and excessive suppuration.

At Les Rois, near Nouan-le-Fuzelier, there had been cases in the majority of the houses of the hamlet, and a little girl lay dead in a room immediately adjoining that of a family named Bouzy. A young man named Cauqui, aged nineteen, slept in the room which Bouzy, his wife, and child occupied. This youth contracted malignant sore throat, when Bouzy, very much frightened, applied a blister on both the arms of his infant in order to draw the humour. The blisters were immediately covered with false membranes, whilst the skin became inflamed all round. The nostrils were obstructed by pellicular exudations, a very fœtid serosity flowed from them, and the disease invaded the pharynx.

At Saint-Loup, in the department of Loir-et-Cher, twenty-one persons were attacked by diphtheria, of whom nineteen died. A man named Blaise and his wife had just lost two of their children. Owing to the local treatment the husband was recovering, and the wife, whose larynx had been invaded by false

membrane, began to occasion less anxiety; but a blister had been applied to her left arm, and this was now in a really frightful state. The surface of the blister was singularly enlarged. It appeared very deep, was covered with a blackish-grey pellicular exudation, and discharged a very fœtid serosity. The whole arm, fore arm, and hand were swollen, and of a shining rose colour. It was impossible to avoid thinking that the surface of the blister was gangrenous, but on pricking it with a pin the sensibility under the false membrane was acute.

On a farm in the department of the Indre an infant had died of tracheal diphtheria. M. Bonsergent, who was called too late to be of any use to the child, applied leeches to the abdomen of the mother, who complained of pain there. The bites inflamed, the skin became erysipelatous, and as soon as the epidermis was detached it was covered with membranes so fœtid that they simulated gangrene.

François Minière, forty-five years of age, a labourer belonging to the Commune of Chaumont-sur-Tharonne, in the department of Loir-et-Cher, had two infants affected with epidemic sore throat; one died, but the other was cured by topical application. Meanwhile the father, who had an excoriation on one of his big toes, felt sharp pain there. The skin became erysipelatous and threw off its epidermis. Some days after the surface was covered by a greyish membrane, which could be readily detached. The glands of the groin and those of the inner part of the leg were considerably swollen.

At Paulmery, near Selles, a girl who contracted diphtheria went home to her parents, who resided at a farm situated a mile from Paulmery. She as well as her two sisters died. The mother, who nursed

them, was seized by diphtheria, which occupied the side of the neck and the whole of the right side of the face. She recovered, but her recovery was slow, and she suffered much.

At Graçay (Indre), an infant at the breast contracted diphtheria, which was epidemic there. Its mother continued to nurse it until it died. Her breast was soon after attacked by specific inflammation, and covered by a membrane, the extension of which was prevented by suitable treatment. At the same time Dr. Bourgeois observed at Ferté-saint-Aubin, in a family of seven persons, an epidemic of diphtheria, which affected the skin in all, the vulva in a little girl, and in a little boy the thigh, where it had been abraded by hanging over a barrow in which his eldest brother wheeled him about.

Course, Termination, Complications, and Sequelæ. In buccal and pharyngeal diphtheria, in a large number of cases the course is towards recovery without complications; but when the disease invades the larynx and trachea, the course in the great majority of cases is towards death, and if it proceed to the bronchi the result is invariably death. Fatal results are most frequent in children under five, and in children under two they are almost invariable, but there are occasional exceptions, of which four are noticed by Trousseau. Adults, however, are not free from fatal attacks, of which Queen Hortense, the Empress Josephine, the Princess Alice, and Washington were examples.

Of complications there are usually none other than those mentioned under the head of anatomical characters, and of sequelæ there is as a rule but one, and

that is paralysis. It was observed by Ghisi Chomel and Samuel Bard in the middle of the last century (*Trousseau*), and yet notwithstanding it was not until 1846 that it was recognised by Bretonneau, and not until 1852 that it was recognised by Trousseau; facts showing that the paralysis is not very frequent. It comes on some time during convalescence; usually within the first month. The part most frequently affected is the soft palate, and it is sometimes limited to this (*Trousseau*). The patient begins to speak with a nasal tone, his drinks are returned through the nose, and he finds some difficulty in swallowing, especially small morsels of food and drinks. If the fauces be examined the soft palate will be seen hanging motionless, and it may be pricked or cauterised without showing the smallest sensibility. This paralysis of the palate has no necessary connection with the diphtheritic membrane, because it occurs in cutaneous diphtheria when the fauces have not been affected. In many cases the paralysis which follows this affection is limited to these parts, but it sometimes spreads, and after the palate it is the lower extremities which most frequently suffer. There may be tingling and coldness in the feet, a want of feeling of the ground, which seems to be made of cotton wool or thick carpet. There may be a feeling of heaviness in moving the limbs, more or less difficulty in walking, particularly in ascending or descending a stair, and standing may be impossible if the eyes be shut. (*Trousseau.*) In rare cases the paraplegia may be complete. The upper extremities are usually next attacked if the paralysis spread. The hands may lose feeling of what they hold; they may feel cold to the touch; the fingers tingle, and when the arms are extended the hands

tremble. (*Trousseau.*) The patient may be unable to pick up small objects. He drops his hat, cannot button his coat, or even carry a spoon to his mouth. The paralysis may affect the organs of sense, and most frequently it is the eye which suffers. There may be dimness of sight, squinting, loss of adjusting power, and consequently myopia or presbyopia, more frequently the latter (*Trousseau*), and even complete amaurosis. The muscles of the trunk and head and neck may be affected. There may be paralysis of the intercostal muscles and consequent difficulty in breathing; of the deep muscles of the back of the neck when the head falls upon the chest; paralysis of the muscles of expression, so that the patient looks like an idiot; paralysis of the muscles of mastication, so that he cannot eat his food; and paralysis of the muscles of articulation, so that he speaks slowly and with difficulty, or even completely loses power of speech. He may be unable to inflate his cheeks, gargle his throat or blow out a candle, and he may be unable to swallow and so die of starvation. There may be paralysis of the diaphragm producing difficulty in breathing; of the muscular coat of the intestine when the motions may be hardly felt, or are passed unconsciously or not at all. The paralysis may affect the bladder, producing retention; or the sphincter, producing incontinence. Particular points of the body may be affected, —the point of the tongue and nose, the upper and lower lips, the point of the chin, the point of the penis, and the scrotum. The sensibility of the skin may be diminished, usually at one or more points, but occasionally this may be increased. Finally there may be loss of virility. The mind is invariably clear. The general characteristics of this paralysis are: (*a*) sensa-

tion and motion are generally affected simultaneously, but impairment of sensation usually predominates (*Bristowe*); (*b*) it is progressive, leaving one part or one organ before it attack another; (*c*) it is erratic, like the paralysis of hysteria; and (*d*) it nearly always ends in recovery. To this, however, there are exceptions. A morsel of food may pass into the air passages and death arise from asphyxia; the difficulty of swallowing may lead to starvation, or the paralysis may affect the lungs and the heart, and death result from syncope or asphyxia; but such cases are so rare that it would be more correct to say that they have been known to occur, than to say that they are sequelæ of diphtheria. In many cases there is no paralysis; in a large number it is limited to the soft palate and the parts concerned in deglutition, and in any case it usually ends in speedy recovery. Severe cases are very rare. Trousseau, in his great and exceptional experience, only met with ten, and it may be that in these the diphtheria may have been the antecedent rather than the cause of the succeeding paralysis. "The paralysed muscles retain their elec-"tric contractility, their bulk and their healthy "texture, but the tendon reflexes occasionally dis-"appear" (*Bristowe*).

Diagnosis. The difficulty in diagnosis arises from the want of clear notions as to what diphtheria is. With some it apparently means any and every speck on the tonsils. It includes, in practice, aphtha, relaxed sore throat, quinsy, ulcerated sore throat, scarlet fever, and enteric fever. It is true that diphtheria complicates the latter two diseases, scarlet fever in particular; but this occurs during the course or towards the termination

of those affections, when a careful consideration of the general symptoms will suffice to show that the diphtheria is but an incident of another disease. If it be clearly understood that diphtheria is characterised by a membrane adherent to some part of the fauces, there will ordinarily be no difficulty in diagnosis, for when this is clearly admitted, the fact to be determined is the existence of the membrane. If it be determined that there is a membrane, the next point to be settled is whether the membrane be aphthous or diphtheritic, a point which may be ascertained by submitting the membrane to microscopic examination, when, if it be aphthous, the characteristic *oidium albicans* will be seen. The general symptoms which attend the disease are usually not well marked. There is rarely much pain or swelling, and usually no great difficulty in swallowing, so much so that the disease is often far advanced before it is discovered. From a common sore throat it may be distinguished, when the fauces is washed, by the absence of a membrane. In quinsy the onset of the disease is sudden. There is sharp pain in the fauces, increased by pressure at the angles of the jaw, the tonsils are much swollen, red, and congested, and there is usually great difficulty in swallowing. If the disease be mild these symptoms gradually subside; if, on the contrary, it go on to suppuration, the pain increases, the tonsils continue to enlarge, swallowing becomes impossible up to the time when the abscess bursts or is opened, when the disease quickly comes to an end. In diphtheria the progress of the affection is, as has already been pointed out, a complete contrast to this. So insidious is it that in many cases it is not discovered until it invade the windpipe and become croup. It is in this way that croup has come to be regarded as an

affection distinct from diphtheria. Because as long as the membrane is limited to the fauces it gives rise to no symptoms, or at least to none which claim attention. In the fauces it is practically harmless. It is when it invades the windpipe that it becomes dangerous, and even there it sometimes escapes observation, until, during sleep, the larynx be blocked by accumulated mucus, which during the day would have been expelled by coughing, and then the patient is suddenly woke up; hence the opinion "that whether the attack be altogether unexpected, or whether it have been preceded "by hoarseness, sore throat, and catarrh, it usually "comes on *in the night*" (*Watson*). In the throat of scarlet fever, vomiting is an early and almost invariable symptom; there is more or less of an eruption, and the fauces resemble quinsy, not diphtheria. There is sharp pain, swelling of the tonsils and difficulty in swallowing, which in a few days end in resolution or in ulceration. And here it may be well to point out that an ulcerated throat is not a diphtheritic throat, although diphtheria may complicate an ulcerated throat, in particular that of scarlet fever. The sore throat which occurs in small pox and measles should give rise to no difficulty, because the general symptoms of these diseases would show that what throat disturbance there was was due to the small pox or the measles. There would, moreover, be no membrane. Diphtheria, however, occurs occasionally in the latter disease towards its termination as a complication. There is some sore throat in enteric fever, and diphtheritic patches occasionally form there of so marked a character that this fever has been taken for diphtheria. Whether cases of this kind should be considered cases of the coexistence of two specific diseases is a problem of

some difficulty. About the fact that such patches occur there is no doubt; the most distinctive which the writer has seen were in a case of enteric fever. The sore throat of syphilis is an ulcerated sore throat, that of diphtheria membranous. It will be necessary, however, not to mistake every exudation on the fauces for a diphtheritic membrane, and in order to avoid this the fauces should be washed, and what appears to be a membrane should be removed by a thin spatula. The apparent membrane, when removed in this way, should be washed in cold water, and if after this it be coherent it is diphtheritic. In respect of all these distinctions, however, it has to be observed that they are to be met with only in fairly marked cases. There are a considerable number in which the disease is so mild as hardly to admit of a diagnosis. There are clever people who make guesses which sometimes turn out to be correct, but this is not diagnosis. The most skilful of physicians cannot make a diagnosis unless the distinctive characters of disease be present, and in a large number of cases these are absent. This is well seen in the practice of a large hospital, where many cases are diagnosed, not from actual symptoms, but from general considerations, such as: (*a*) prevailing epidemic; (*b*) locality where case occurred; (*c*) disease in the family, and among the friends of the family; (*d*) course and termination; all which do no more than establish a greater or less probability of one disease than another. In the Eastern Hospitals some cases are only diagnosed at the termination of the disease, a few only in the *post mortem* room, and even there, on three occasions in thirteen years, it was impossible to say of what disease the patient died.

Prognosis. In order to make an accurate prognosis the first point to be considered is the age of the patient. If this be under two the disease is almost always fatal, although not quite hopeless, because Trousseau has recorded :—About this age (two) prognosis is somewhat more favourable, but still very grave. According to Settegast, of 568 cases treated at Berlin, in the years 1873-76, of whom 481 were children and 87 adults, there died 239, a mortality of 58 per cent., "whilst of "the adults alone the mortality was only 15 per cent.; "and if in the case of adults all cases in which white "patches are found on the tonsils be regarded as diph- "theria, the mortality would be still lower. Krönkin's "statistics are to the same effect. Of 567 cases treated "at Langenbeck's clinic, of whom eight only were "adults, 377 died, a mortality of 66·4 per cent." (*Niemeyer.*) Beyond the age of five the mortality declines onwards towards puberty. After that age, the most important factor is the epidemic constitution. "The medical "constitution of the season, and the character of an "epidemic greatly influence prognosis. In some epi- "demics in which the local manifestation of disease is "limited to the pharynx, recovery takes place in nearly "every case. In an epidemic which prevailed in France "in 1847, the mortality was 91 per cent. In the first "quarter of 1876 the mortality from diphtheria in the "hospitals of Paris was 79·75 per cent., whereas in the "six previous years it averaged only 76·54 per cent." (*Rose Cormack.*) Following age and epidemic constitution comes nature of case, and in this respect it should be remembered that a particular case is not necessarily serious because it happens to come within the meaning of the term diphtheria. A large number of the cases are mild, and being so, are of no serious consequence.

Thus, in pharyngeal diphtheria, the prognosis is nearly always favourable; but before making one the general constitutional symptoms should be noted, for in some cases the local changes by no means indicate the gravity of the disease. These, therefore, should be carefully looked for, and carefully weighed, and should there be great general depression, bodily or mental, without local disturbance to account for it, a grave prognosis should be made. For if great bodily or mental depression be not accounted for by local changes, it is in all probability due to constitutional changes of a graver character. Laryngeal and tracheal diphtheria, left to itself, is nearly always fatal, and in the majority of cases even when the windpipe is opened. Malignant diphtheria is invariably fatal. The prognosis is unfavourable when the disease follows some other acute disease, particularly scarlet fever and measles. It is more unfavourable in cold damp weather, and although general insanitary conditions have not been shown to have any influence in originating or spreading the disease, the hard lot of the very poor has a distinct influence in largely adding to the mortality.

Treatment. Since the time when Bretonneau pointed out the various forms of this disease and assigned to it its proper place, local applications, such as pure hydrochloric acid, sulphate of copper, and nitrate of silver, have been and still are more or less freely used. By Bretonneau, Trousseau, and others, they were considered indispensable, although Trousseau, an enthusiastic believer in treatment, says of them, "On ne peut pas se dissimuler que ce soient là "des moyens très-imparfaits et d'un résultat très-"incertain." For some time, however, they have

been falling into disuse, both in this country and in France. It is being perceived that the patches on the palate and elsewhere are the result of changes in the system which no local application can reach; and it is also being perceived that the irritation produced by caustics may be injurious. Emetics have been largely used, and although it cannot be said they never do any good, it is at least doubtful if they do very much. Their action is purely mechanical and local; they can produce no effect on the unknown something which constitutes the disease; they produce great exhaustion; it is rare that the air passages are really relieved by them, and if the membrane happen occasionally to be removed it is rapidly reformed. They are, moreover, dangerous from another point of view. "The repetition of dose after dose of any emetic is "a dangerous practice in diphtheria. For example, we "may give, without apparent effect, successive doses "to a semi-asphyxiated patient, whose functional life "is dormant; and seeing that we give him no relief "in the way hoped for, we proceed, as our last chance "of saving him, to admit air into the lungs by "tracheotomy. Forthwith the vital powers awake, and "the accumulated doses speedily act with violence— "the patient has been saved by tracheotomy only that "he may die of pharmaceutical poisoning." (*Rose Cormack.*) The same writer says that lactic acid and lime water "exercise a powerful solvent action on the "false membrane; and were it possible to apply them "to it without their coming in contact with and thereby "irritating the contiguous mucous surface, they might "be used with advantage, or at least with impunity. "Dr. Young, of Florence, states as the result of large "experience, that he has seen much benefit result from

"throwing into the throat every hour by means of a "ball spray apparatus a solution of three drachms of "lactic acid in eight ounces of lime water." This may be all very true, but one would like to know the nature of the cases which derived benefit from the treatment, whether they were cases of themselves proceeding to recovery or to death. If the lactic acid and lime water were applied in cases of pharyngeal diphtheria, no doubt there would be a large number of recoveries, but then so there would be if milk and water were applied.

The one certain fact about treatment in this disease in its severer forms is, that hitherto it has been mostly useless. The enthusiastic Trousseau even exclaims: "Let "us now suppose that all the remedies employed have "not prevented the extension of the disease to the "air passages; let it be granted that we have in vain "tried to check it by the means which I have pointed "out to you—'et qui, je dois le dire, sont le plus souvent "impuissants,'" there remains one more remedy—tracheotomy. Niemeyer is to the same effect: "Von "allen den angeführten Mitteln lässt sich behaupten, "dass sie in schweren Fällen den letalen Ausgang "nicht abzuwenden vermögen, während leichtere Fälle "von Diphtheritis ganz von selbst heilen." Although, however, little hope is to be derived from medical treatment, where it is most needed, there are some points to be attended to which may favour any tendency towards recovery which may exist, and relieve the great distress which always attends the croupal form of the disease. (1) It is of the first importance that the patient should be supplied with an abundance of fresh, warm air. It is air above all things that he needs, and therefore it is necessary that much care

and attention be given to this part of the treatment. For this purpose his room should be well ventilated, if possible by opposite windows, which should be always more or less open according to circumstances, so that there may be a continuous cross current, and consequently a continuous supply of fresh air, and the room should be large, so that the patient may not be in the direct current. (2) The temperature of the room should be maintained at about 55° Fahr. (3) The coverings should be light, but whilst great care should be exercised in this respect, equal care should be taken to see that the body be kept warm, and if the light coverings be not sufficient for this purpose, hot water bottles should be placed about the bed, but not in immediate contact with the patient. (4) The food should be of the kind mentioned in our general treatment of fever, but in this disease, especially in children, whilst it is of the greatest importance that food should be taken, it is equally important that force should not be used for this purpose. "Patients—even intelligent "adults—often resolutely refuse food, and feel intense "loathing excited by the mere sight or mention of "any alimentary substance, and the food taken is "generally rejected at once by vomiting; or if retained "it is very sparingly assimilated. To press food upon "children in spite of their loathing of it is generally "injudicious: to press it upon them in spite of their "struggles is sometimes even dangerous, as the ex-"citement and resistance take more strength out of "the already prostrate patient than can be compensated "for by forcibly administered aliments. We ought "to try quietly to get the child to take frequently "small quantities of milk or beef tea, and when we "fail we give enemata of beef tea and brandy." (*Rose*

Cormack.) (5) Under no circumstances are blisters to be applied. In the majority of cases of tracheal diphtheria, medical treatment and the most careful nursing will not save the patient. Usually "Il marche "à grands pas vers la mort," and the question speedily arises, should tracheotomy be performed? In answering this question it is to be remembered that croup, left to itself, although not invariably fatal, is so in the great majority of cases, and that therefore in the particular case the probability is death, and death of the most distressing kind; that the operation is not an exhausting one; that by means of chloroform it may be painless; that it need not interfere with any natural tendency to recover which might exist, but on the contrary might be expected to favour such tendency, because by the free admission of air the exhaustion and blood poisoning would be checked. The operation, therefore, could do no harm, and would in any case do present good by relieving distress. Trousseau operated two hundred times and saved fifty patients —a most encouraging result in so fatal a disease. The writer's success in tracheotomy has hitherto been a minus quantity, but then it should be remembered that his cases were cases of croup following scarlet fever and measles, cases in which a successful result could hardly be expected. But even if the operation invariably failed to save life, it should, when the windpipe has been invaded, always be performed, because of the immediate relief to suffering. Having decided that the windpipe should be opened, the point to be determined is *when* it should be done. On this point the author is in no kind of doubt: whenever there is distinct difficulty of breathing due to obstruction of the laryngo-tracheal tube. In

this country it is usual to open the windpipe as a last resort when the patient, (*a*) poisoned by his disease, (*b*) exhausted by his struggles for air, and (*c*) almost asphyxiated, is "in articulo mortis," and the result is that the patient almost invariably dies. It would be slightly less rational to open the windpipe after death in the hope that by this means he might be restored to life. In deciding as to the need for the operation, the physician must be careful not to be deceived by the intervals of apparent calm breathing which occur. A severe fit of coughing takes place, the windpipe and bronchial tubes are cleared, possibly some membrane is thrown out, an interval of comparative calm succeeds, and the hope arises that there is a pause in the progress of the disease. It should be clearly understood that in the majority of cases this hope is a vain one, because the mucus will go on accumulating and the membrane reforming until death end the process. Whenever, then, there is distinct difficulty of breathing, due to obstruction of the windpipe and not to any affection of the lungs, the operation should be performed. It can hardly, if properly performed, do any harm, even if it be done unnecessarily, and if it do not save the patient it will in any event relieve him of his great distress. In the event of recovery he should be warmly clad, and for some time should not be exposed to cold and damp. There is no special treatment for the paralysis, which, fortunately, in the great majority of cases is slight, for the most part confined to the palate, and which disappears as a matter of course.

CHAPTER XVII.

MUMPS.

Definition. An acute infectious disease characterised by inflammation of the salivary glands.

Synonyms. Parotitis (Gr.); Oreillons (Fr.); Ziegenpeter, Bauernwetzel, Speicheldrüsenentzündung (Ger.); Mumps (Eng.)

History. There is no satisfactory information on this point.

Etiology. Mumps is essentially a disease of infancy and childhood, but adults and persons of advanced age are not exempt. It affects both sexes about equally, is very infectious, occurs but once in the same individual, and although for the most part endemic, occasionally appears in the epidemic form. It is apparently independent of climate and season. Its incubation period is uncertain, but may be said to vary from seven to twenty-one days.

Anatomical Characters. On this point there is no accurate information. Probably there are no specific anatomical characters. Such information as the writer possesses leads him to believe that the inflammation commences in the ducts of the gland, and from thence passes to the connective tissue. It may be more or less limited, or may affect the connective tissue of the

neck, when it bears a strong resemblance to what has been called the "brawny neck" of scarlet fever. Occasionally the inflammation affects the testicles in males, and the mammæ and labiæ in females.

Symptoms. The affection may be mild or severe. In the former case there is nothing beyond some enlargement of the parotid, unaccompanied by prodromata, slight fever, with pain about the angle of the jaw, more or less restlessness and sleeplessness, which disappear in two or three days. In the latter case the disease is ushered in with symptoms of high fever. The skin is hot, the pulse quick, and the temperature high. At the angle of the lower jaw there is sharp pain and tenderness, and on examination a hard tumour is found there. The skin over it is congested and of a bright rose-pink colour. Movement of the jaw is difficult, the patient cannot eat, and he swallows with great difficulty. His head aches, his tongue is furred, thirst is great, and restlessness extreme. Towards the end of the third day or the beginning of the fourth the disease reaches its height, and if it be limited to one parotid the patient will be well by the end of the fifth or the beginning of the sixth day. If, however, it proceed to affect the submaxillary glands, it will extend, probably with diminished virulence, to about the seventh day, and if further it proceed to affect the other parotid it may extend towards the tenth and possibly the twelfth day. The disease usually terminates in resolution, but this is not invariable. Sometimes the connective tissue of the neck is involved, and the whole neck forms one mass of hard tissue closely resembling the "brawny neck" of scarlatina. Occasionally metastasis takes place, and the testicles in males,

the ovaries, the mammæ, and the labia majora in females, are affected.

Course, Termination, Complication, and Sequelæ. The course of the disease is usually favourable, and the termination recovery in from one to two weeks, most frequently in about seven days. As a rule there are no complications, and rarely any sequelæ, but atrophy of the testicle is said to be an occasional result.

Diagnosis. A swelling at the angle of the lower jaw, accompanied or immediately followed by fever, cannot be mistaken. It is true that parotitis occurs as a complication of typhus fever, and more rarely of enteric fever, but in these cases the parotid affection comes on at the end of the fever.

Prognosis. This is almost, if not altogether, invariably favourable, although at the height of the disease the temperature may be over 105° Fahr. and the child look very ill.

Treatment. Generally the patient should be confined to his bed. This is not, however, always necessary, because in many cases the disease is very slight, but he should always be confined to his room. His neck should be protected from changes of temperature by wrapping it in cotton wool, and his bowels should be opened, if necessary, by a laxative; but purgatives, especially with children, should be avoided. Pain should be relieved by the application of warm fomentations, and if it be necessary to procure sleep or to allay restlessness the writer prefers some form of alcohol to

opiates, especially in the case of very young children. He should be fed generally as in fever, but the writer prefers chicken broth to beef tea, especially in the case of very young children. Thirst should be relieved by cold water, iced if necessary. If a tendency to suppuration be observed poultices should be applied, and when fluctuation is distinct an incision should be made. As a rule no bad consequences follow mumps, but occasionally the child is left in feeble health, for which generous feeding, iron wine, the citrate of iron and quinine, and the seaside are the best. In the case of metastasis no special local treatment is required.

CHAPTER XVIII.

INFLUENZA.

Definition. A specific catarrhal affection of the respiratory mucous membrane.

Synonyms. Epidemic catarrh (Eng.); Grippe (Fr.); Schnupfenfieber (Ger.)

History. According to Haeser the first distinct mention of this disease occurred in the year 1387, but he does not say where.

It is described, in an Irish manuscript of the fifteenth century, under the names of *Fuacht* and *Slaodan;* and it is mentioned in the "Annals of the Four Masters" as epidemic in Ireland in the fourteenth century.

A disease, the symptoms of which answer to those of influenza, is also alluded to in our early Gaelic manuscripts under the term "Creatan"—probably from "creat," the chest. It appeared in divers places in the fifteenth century. There were great epidemics of it in the sixteenth, when, in the year 1510, it made its first appearance in Great Britain (*Thomson*), after which it appeared in the years 1581, 1658, 1675, 1688, 1693, 1709, 1729, 1737, 1743, 1758, 1762, 1767, 1775, 1782, 1789, 1803, 1831, 1833, 1837 (*Thomson*), and 1847 (*Peacock*), which was the last.

Etiology. The cause of influenza is a "contagium" (*Bristowe*) which has not yet been isolated and de-

scribed. It has an incubation period, but it is not known of what length. It affects both sexes equally, and all ages. It is highly infectious, spreads rapidly from person to person, and covers wide areas in a very short time. It is the most typical of epidemic diseases (*Bristowe*). It is apparently independent of climate and season, and it is not inoculable (*Bristowe*). It appears to have some relation to diseases of the lower animals. Thus in the epidemic of 1775 horses and dogs were much affected, "those "especially that were well kept." "The horses had "severe coughs, were hot, forbore eating, and were "long in recovering. Not many of them died, but "several dogs." (*Pringle.*) "At Armagh horses had "a disorder similar to the influenza in the spring of "1802, attended with severe hard cough, laborious "difficult respiration, fever and great prostration of "strength." (*Thomson.*)

Anatomical Characters. There are none peculiar to influenza. They consist in congestion of the mucous membranes and in inflammation of the lungs and pleuræ.

Symptoms. The disease commences usually somewhat suddenly, very much like a bad cold with the general symptoms of fever. There is repeated shivering, more or less lassitude, sometimes great prostration; pain in the head, a "sense of weight and pain "of forehead" (*Streeten*); pain in the back and limbs with a stitch in the side, "just under the left ribs, "piercing from them to the back," and "almost unceas- "ing cough" (*Heberden*); a "sense of tightness or "constriction about the throat and chest" (*Streeten,*

epidemic of 1836-37); "nonnunquam etiam pulmonum "quasi constrictio coarctatioque, unde difficulter spirabat "aeger" (*Sydenham*, epidemic of 1675). Sometimes pain in the epigastrium and vomiting are present. The eyes may be suffused or watery, and sometimes there is pain in the eyeballs. There may be a discharge from the nose, at first watery, subsequently purulent, and occasionally there is epistaxis and frequently sneezing. There is usually a sense of rawness in the fauces, larynx, and trachea, and "more or less "soreness beneath the sternum" (*Streeten*). The tongue is usually moist and covered with a white fur. The patient is restless and sleepless, sometimes much depressed and occasionally delirious. The duration of these symptoms varies. Sometimes the disease is so slight that the patients attend to their ordinary work. In very many cases it reaches its height about the third day or even earlier, but in the severer cases, mostly cases in which the pleuræ or the lungs are seriously involved, it may last from two to three weeks. In some cases the digestive and urinary systems are affected. The symptoms then consist in "pain and "tension, with tenderness at the epigastrium and "upper part of the abdomen, loss of appetite, "thirst, nausea and vomiting, a furred state of the "tongue, and a morbid state of the alvine and urinary "secretions.

"The oppression and tenderness of the upper part of "the abdomen is noticed in several of the returns, and "seems to have been often accompanied with nausea "and vomiting. Dr. Barlow remarks, that when the "chest affections were of trifling importance the special "irritation of the epidemic appeared to be seated in "the stomach and bowels." (*Streeten.*)

Course, Termination, Complications, and Sequelæ. The course of influenza in the great majority of cases is rapid and towards recovery. The complications are bronchitis, laryngitis, capillary bronchitis, pleurisy and pneumonia, and the most common sequela is prolonged debility.

"Though this epidemical illness be just over, yet there "seems no reason to apprehend any of those lasting ill "consequences from it which attended the sufferers in "1762, many of whom continued in a languishing state "for several months and then died; and others com- "plained for two or three years that its ill effects still "hung upon them, and that they had not, in all this "time, recovered perfectly from the hurt which it had "done their constitution." (*Heberden*, epidemic of 1767.)

Diagnosis. Fever accompanied by harassing cough, hoarseness, oppression about the chest, and soreness under the sternum, is a combination of phenomena unlike anything else in acute disease.

Prognosis. Simple, uncomplicated influenza in healthy adults runs almost always a favourable course, but "in persons who have before been out of health, "and especially if there be any previous disease of the "lungs or heart, or if the subjects be very young or "elderly, they prove fatal in a large proportion of cases" (*Peacock*). Whilst, however, these individual factors should always be carefully weighed, the "epidemic constitution," some epidemics being more fatal than others, should not be forgotten as a general guide.

Treatment. "In treating influenza, it is important "to adopt the hygienic measures which are generally

"useful in the treatment of infectious febrile affections.
"Medicinal treatment is not generally very efficacious.
"Small doses of nitre alone, or combined with a few
"drops of laudanum, have been highly recommended.
"But probably nothing is better than a few drops of
"ipecacuanha wine combined with a little laudanum
"or ammonia, associated with solution of acetate of
"ammonia, administered every two or three hours. If
"the bowels are confined they may be moved either by
"mild aperients or by enemata. The inhalation of steam
"may relieve the laryngeal and bronchial affection, as
"also may the diffusion of moisture through the atmo-
"sphere of the room. The removal of blood, even by
"leeches, is rarely admissible; still, in cases in which
"the congestion of the lungs is extreme, and death by
"asphyxia impending, they may be justifiably employed.
"Blisters again are of doubtful efficacy. Flannel or
"cotton-wool, bran poultices or hot fomentations to the
"chest, on the other hand, are often beneficial, as also
"are mustard plaisters. But little food will probably
"be taken, or needed, during the earlier days of the
"disease, and such as is swallowed should consist
"mainly or exclusively of milk and the various farinacea,
"suspended or dissolved in milk or water. Thirst
"may be relieved by these means, or by the adminis-
"tration of water, tea, lemonade, soda-water, or other
"such drinks. Owing to the remarkable prostration
"which generally is present, stimulants are for the
"most part soon required. The nature of the stimu-
"lants to be employed must depend on circumstances.
"When the patient begins to amend, tonics are indicated,
"and the diet must be gradually modified, until it
"combines the ordinary proportions of solid and fluid,
"and of animal and vegetable matters, which constitute

"the diet of healthy persons. The presence of compli-
"cations will, necessarily in many cases, make some
"modification of treatment desirable. It need only be
"said, however, in reference to this point, that, as in
"the uncomplicated disease, so here, depletory mea-
"sures are generally attended with risk, and rarely
"called for." (*Bristowe.*)

APPENDIX I.

EASTERN HOSPITALS DIETARY SCALE.

SICK DIET.

Milk, 2 pints | Beef Tea, ½ pint (1 lb. meat to 1 pint water) | Bread, 8 oz

FULL DIET.

Males.		Females.	
Bread	16 oz.	Bread	16 oz.
Meat (cooked, and without bone)	7 oz.	Meat (cooked, and without bone)	6 oz.
Potatoes	12 oz.	Otherwise as for Males.	
Milk	¼ pint.		
Tea	¼ oz.	Extras—Wines, Spirits, etc.	
Sugar	2 oz.		
Butter	1 oz.		

MIDDLE DIET.

Males and Females.

Bread	8 oz.	Milk	2 pints.
Butter	1 oz.	Rice (or Sago or Arrowroot)	2 oz.
Fish (Sole, Cod, Brill, or Mutton with Potatoes or Hash).	8 oz.	Sugar	1 oz.
	3 oz.	1 Egg.	
Potatoes, mashed	4 oz.	Tea (¼ oz. Tea, 2 oz. Sugar)	1 pint.

FULL DIET.

Children of Ten Years and Under.

Breakfast. 7 *a.m.*		Tea. 4 *p.m.*	
Bread	4 oz.	Bread	3 oz.
Milk	1 pint.	Butter	½ oz.
1 Egg.		Milk	½ pint.
Butter	½ oz.		
Dinner. 12 *noon.*		**Supper.** 8 *p.m.*	
Meat (cooked, and without bone)	4 oz.	Pudding of Rice	2 oz.
Potatoes, mashed	4 oz.	Sugar	1 oz.
Milk	½ pint.	1 Egg.	
		Milk	½ pint.

MIDDLE DIET.

Males and Females.

Bread	4 oz.	Bread	4 oz.
Tea	½ pint.	Butter	½ oz.
Sugar	1 oz.	Tea	½ pint.
Milk	1 pint.	Sugar	1 oz.
Butter	½ oz.	Milk	½ pint.
Fish	8 oz.	Pudding of Rice	2 oz.
Potatoes, mashed (or Mutton Hash)	4 oz.	1 Egg.	
		Sugar	1 oz.
		Milk (Sago or Arrowroot)	½ pint.

FULL DIET.

Males.

Bread	8 oz.	Bread	4 oz.
Butter	½ oz.	Tea (or Cocoa, ½ oz.)	½ pint.
Tea (or Cocoa, ½ oz.)	½ pint.	Sugar	1 oz.
Sugar	1 oz.	Butter	½ oz.
Milk, half whole quantity.		Milk, half whole quantity.	
Meat (cooked, and without bone)	7 oz.	Cheese	1 oz.
Potatoes	10 oz.	Bread (or Pudding as in Middle Diet, or Gruel)	4 oz.

Females.

Bread	8 oz.	Bread	4 oz.
Butter	½ oz.	Otherwise as for Males.	
Tea (or Cocoa, ½ oz.)	½ pint.	Pudding as in Middle Diet, or Bread Pudding.	
Sugar	1 oz.		
Milk, half whole quantity.			
Meat (cooked, and without bone)	6 oz.		
Potatoes	10 oz.		

RECIPE FOR BEEF TEA.

Take of lean, fleshy gravy beef, 1 lb.; cut it into pieces about the size of dice, and place them in an earthenware jar. Add one pint of cold water, and one salt-spoonful of salt. Place a close-fitting lid on the jar, and, to prevent any steam escaping, make some paste with flour and water, and apply this along the junction of the lid with the jar. Then place the jar in a large saucepan full of boiling water (*Bain-Marie*), and keep the water boiling about five hours. After this drain the tea through a hair sieve.

APPENDIX II.

FORMULÆ.

THE following prescriptions are selections from the Pharmacopœia of the London Fever Hospital.

(A) Cataplasms.

CATAPLASMA CARBONIS.

Charcoal Poultice.

Take of
- Linseed meal, 4 ounces,
- Wood charcoal, in powder, ½ an ounce,
- Boiling water, 10 fluid ounces.

Mix the linseed meal with half the charcoal, add the mixture gradually to the water, constantly stirring, and sprinkle the remainder of the charcoal on the surface of poultice.

CATAPLASMA LINI.

Linseed Poultice.

Take of
- Linseed meal, 4 ounces,
- Boiling water, 10 fluid ounces.

Add the linseed meal to the water gradually, constantly stirring.

CATAPLASMA SINAPIS.

Mustard Poultice.

Take of
- Linseed meal, 2 ounces,
- Mustard, in powder, 2 ounces,
- Tepid water, 8 fluid ounces.

Mix the linseed meal and mustard, and add the mixture to the water gradually, constantly stirring.

(B) Mixtures.

HAUSTUS ACIDI CUM OPIO.

Acid and Opium Draught.

Take of
- Dilute sulphuric acid, 15 minims,
- Tincture of opium, 5 minims,
- Caraway water, 1 fluid ounce.

Mix.

Haustus Acidi Hydrocyanici.

Hydrocyanic Acid Draught.

Take of
- Dilute hydrocyanic acid, 4 minims,
- Bicarbonate of soda, 10 grains,
- Cinnamon water, 1 fluid ounce.

Mix.

Haustus Acidi Nitrohydrochlorici.

Acid Draught.

Take of
- Dilute hydrochloric acid, 15 minims,
- Dilute nitric acid, 15 minims,
- Spirit of nitrous ether, ½ fluid drachm,
- Syrup, ½ fluid drachm,
- Water to 1 fluid ounce.

Mix.

Haustus Ammoniæ Acetatis Compositus.

Compound Acetate of Ammonia Draught.

Take of
- Solution of acetate of ammonia, 40 minims,
- Carbonate of ammonia, 4 grains,
- Spirit of nitrous ether, 20 minims,
- Water, 7 fluid drachms.

Mix.

Haustus Ammoniæ Acetatis cum Ferro.

Acetate of Ammonia and Steel Draught.

Take of
- Solution of acetate of ammonia, 30 minims,
- Dilute acetic acid, 15 minims,
- Tincture of perchloride of iron, 10 minims,
- Water to 1 fluid ounce.

Mix the solution of acetate of ammonia and the acetic acid with the water, and add the tincture of iron.

Haustus Ammoniæ Carbonatis.

Ammonia Draught.

Take of
- Carbonate of ammonia, 5 grains,
- Water, 1 fluid ounce.

Dissolve the ammonia in the water.

Haustus Ammoniæ Effervescens.

Effervescing Ammonia Draught.

Take of
- Carbonate of ammonia, 15 grains,
- Water, 1 fluid ounce.

Mix.

Take of
- Tartaric acid, 18 grains,
- Water, 4 fluid drachms.

Mix.

The two draughts to be mixed immediately before use.

Haustus Bismuthi.

Bismuth Draught.

Take of
White bismuth, 10 grains,
Carbonate of magnesia, 15 grains,
Mucilage of gum arabic, 2 fluid drachms,
Cinnamon water, 6 fluid drachms.

Mix the mucilage and cinnamon water and add the bismuth and magnesia. Shake the bottle well before use.

Haustus Chlori.

Chlorine Draught.

Take of
Chlorate of potash, ½ a grain,
Hydrochloric acid, 3 minims.

Introduce both into a glass bottle and cork it tightly. After five minutes, add gradually

Water to 7½ fluid drachms.

Agitate well after each addition of water, and then add—

Chlorate of potash, 10 grains,
Spirit of chloroform, 10 minims,
Dilute hydrochloric acid, 15 minims.

Haustus Cretæ cum Catechu.

Chalk and Catechu Draught.

Take of
Tincture of catechu, 1 fluid drachm,
Chalk mixture, 7 fluid drachms.

Mix.

Haustus Diureticus.

Diuretic Draught.

Take of
Acid tartrate of potash, 40 grains,
Tincture of digitalis, 10 minims,
Spirit of nitrous ether, 30 minims,
Water to 1 fluid ounce.

Mix the tincture of digitalis and the nitrous ether with the water, and add the acid tartrate of potash.

Haustus Effervescens.

Effervescing Draught.

Take of
Bicarbonate of soda, 20 grains,
Water, 1 fluid ounce.

Mix.

Take of
Tartaric acid, 18 grains,
Water, 1 fluid ounce.

Mix.

The two draughts to be mixed immediately before use.

Haustus Effervescens cum Acido Hydrocyanico.

Effervescing Hydrocyanic Acid Draught.

The same as the last, with the addition of 4 minims of dilute hydrocyanic acid to the solution of tartaric acid.

Haustus Ferri et Ammoniæ.

Steel and Ammonia Draught.

Take of
Citrate of iron and ammonia, 5 grains,
Water, 1 fluid ounce.

Mix.

Haustus Ferri Acidus.

Acid Steel Draught.

Take of
Tincture of perchloride of iron, 15 minims,
Water, 1 fluid ounce.

Mix.

Haustus Ferri et Quinæ.

Steel and Quinine Draught.

Take of
Sulphate of Quinia, 2 grains,
Tincture of perchloride of iron, 20 minims,
Spirit of chloroform, 15 minims,
Water, 1 fluid ounce.

Mix.

Haustus Opii cum Æthere.

Sedative Draught.

Take of
Tincture of opium, 15 minims,
Ether, 15 minims,
Camphor water to 1 fluid ounce.

Mix.

Haustus Plumbi.

Lead Draught.

Take of
Acetate of lead, 3 grains,
Dilute acetic acid, 5 minims,
Distilled water, 1 fluid ounce.

Mix.

Haustus Plumbi cum Morphia.

Lead and Morphia Draught.

Take of
Acetate of lead, 3 grains,
Acetate of morphia, $\frac{1}{8}$ grain,
Dilute acetic acid, 5 minims,
Peppermint water, 1 fluid ounce.

Mix.

Haustus Potassæ Bicarbonatis.

Alkaline Draught.

Take of
- Bicarbonate of potash, 30 grains,
- Nitrate of potash, 10 grains,
- Water, 1 fluid ounce.

Dissolve the salts in the water.

Haustus Potassæ Chloratis.

Chlorate of Potash Draught.

Take of
- Chlorate of potash, 20 grains,
- Water, 1 fluid ounce.

Dissolve the salt in the water.

Haustus Potassæ Chloratis cum Ferro.

Chlorate of Potash and Steel Draught.

Take of
- Chlorate of potash, 20 grains,
- Tincture of perchloride of iron, 20 minims,
- Water, 1 fluid ounce.

Dissolve the salt in the water, and add the tincture of iron.

Haustus Quiniæ.

Quinine Draught.

Take of
- Sulphate of quinia, 2 grains,
- Dilute sulphuric acid, 10 minims,
- Water, 1 fluid ounce.

Mix.

Haustus Quiniæ cum Opio.

Quinine and Opium Draught.

Take of
- Sulphate of quinia, 1 grain,
- Dilute sulphuric acid, 15 minims,
- Tincture of opium, 5 minims,
- Peppermint water, 1 fluid ounce.

Mix.

Haustus Senegæ Compositus.

Compound Senega Draught.

Take of
- Carbonate of ammonia, 5 grains,
- Spirit of chloroform, 15 minims,
- Tincture of squill, 10 minims,
- Infusion of senega to 1 fluid ounce.

Mix.

Haustus Sennæ Compositus.

Black Draught.

Take of
- Sulphate of magnesia, 120 grains,
- Tincture of senna, 2 fluid drachms,
- Infusion of senna to 1 fluid ounce.

Mix.

HAUSTUS TEREBINTHINÆ.

Turpentine Draught.

Take of — Oil of turpentine, 15 minims,
Ether, 15 minims,
Mucilage of gum arabic, 2 fluid drachms,
Peppermint water to 1 fluid ounce.

Mix, and agitate well before use.

(C) Enemata.

ENEMA OPII.

Opiate Enema.

Take of — Tincture of opium, 15 minims,
Mucilage of starch, 2 fluid ounces.

Mix.

ENEMA PLUMBI CUM OPIO.

Lead and Opium Enema.

Take of the — Lead draught (page 280), 3 fluid ounces,
Tincture of opium, 20 minims.

Mix.

ENEMA SPIRITUS VINI GALLICI.

Brandy Enema.

Take of — Brandy, 1 fluid ounce,
Beef tea, 3 fluid ounces.

Mix.

ENEMA TEREBINTHINÆ.

Turpentine Enema.

Take of — Oil of turpentine, 1 fluid ounce,
Mucilage of starch, 1 pint.

Mix.

(D) Fomentations.

FOTUS PAPAVERIS.

Poppy Fomentation.

Take of — Poppy capsules, three,
Water, 2 pints.

Slice the capsules, boil them in the water for a quarter of an hour, and strain.

FOTUS TEREBINTHINÆ.

Turpentine Fomentation.

Take flannel wrung out of hot water, sprinkle oil of turpentine over it, apply it to the skin, and cover it with oiled silk or gutta-percha sheeting.

(E) Lotions.

Lotio Plumbi cum Opio.

Lead and Opium Lotion.

Take of
- Acetate of lead, 40 grains,
- Opium in powder, 40 grains,
- Warm water, 10 fluid ounces.

Dissolve the acetate of lead in the water, and add the opium.

Lotio Zinci Sulphatis.

Red Lotion.

Take of
- Sulphate of zinc, 10 grains,
- Compound tincture of lavender, 3 fluid drachms,
- Water to 10 fluid ounces.

Dissolve the sulphate of zinc in the water, and add the compound tincture of lavender.

(F) Pills.

Pilula Argenti Nitratis.

Nitrate of Silver Pill.

Take of
- Nitrate of silver, finely powdered, ½ a grain,
- Powder of opium, ¼ of a grain,
- Extract of henbane, 1 grain.

Mix, and beat into a uniform mass.

Pilula Cupri Composita.

Compound Copper Pill.

Take of
- Sulphate of copper, ¼ of a grain,
- Opium in powder, ¼ grain,
- Confection of roses, a sufficiency.

Mix, and beat into a uniform mass.

Pilula Plumbi cum Opio.

Lead and Opium Pill.

The same as in *British Pharmacopœia;* 4 grains to each pill.

Pilula Quiniæ cum Ferro.

Quinine and Iron Pill.

Take of
- Sulphate of quinia, 1 grain,
- Sulphate of iron, 1 grain,
- Extract of conium, 3 grains.

Mix, and beat into a uniform mass.

Pilula Rhei et Hydrargyri.

Rhubarb and Mercurial Pill.

Take of
- Compound rhubarb pill, 4 grains,
- Mercurial pill, 1 grain.

Mix, and beat into a uniform mass.

(G) Powders.

Pulvis Jalapæ et Calomelanos.

Purgative Powder.

Take of
Jalap in powder, 8 grains,
Ginger in powder, 1 grain,
Calomel, 1 grain.

Mix.

Pulvis Zinci Oxydi.

Dusting Powder.

Take of
Oxide of zinc, 1 ounce,
Starch in fine powder, 2 ounces.

Mix.

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October, 1886.

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