**The principles and methods of medical observation and research : for the use of advanced students and junior practitioners / by Thomas Laycock.**

# THE PRINCIPLES AND METHODS

OF

# MEDICAL OBSERVATION AND RESEARCH

FOR THE USE OF

ADVANCED STUDENTS AND JUNIOR PRACTITIONERS.

SECOND EDITION

WITH COPIOUS NOSOLOGIES AND INDEXES OF FEVERS,
AND OF CONSTITUTIONAL, CUTANEOUS, NERVOUS,
AND MENTAL DISEASES.

BY

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EDINBURGH: MACLACHLAN & STEWART.

LONDON: SIMPKIN, MARSHALL, & CO.

1864.

"The difficulties of medical observation and inquiry can be adequately conceived by the medical man alone. Neither those accustomed to legal evidence only, nor such as have pursued physical science in its more simple material forms, can rightly apprehend the vast difference made by the introduction of the principle of life; or yet more, of the states and phenomena of mind, in connection with bodily organisation. WE HAVE HERE a NEW WORLD OF RELATIONS, occult and complex in their nature, to be reasoned upon and resolved, with a principle of change, moreover, ever operating among them, and deviations from nature, under the forms of disease, which render all conclusions liable, in a thousand ways, to error."—SIR HENRY HOLLAND, M.D.

# INTRODUCTORY NOTE TO THE SECOND EDITION.

The object of this book is to guide and assist the zealous medical student on the one honourable and certain but difficult road to professional distinction and success. As a student's book, however, it is an acknowledged departure from long established routine, both as to matter and plan—and this demands an explanation.

If the practitioner who entered the profession thirty or forty years ago compares the past condition of the science and practice of medicine with the present, he must be more or less impressed with the difference. At that date the science of physiology, or more correctly, of biology, upon which the whole of medicine rests, was just beginning to take its present form. Cerebro-mental physiology and pathology did not exist. Few except advanced students and practitioners studied and practised physical diagnosis, and used the microscope in research. Pharmaceutical chemistry had not been long established, and given the alkaloids to therapeutics, and the natural history of disease was little investigated. The poor-law

medical service was unreformed; there was no lunacy board, no general registration, nor vital statistics, nor sanitary inquiries. Within the profession, medical reformers in vain opposed its tripartite division; otherwise its harmony, in Great Britain, at least, was unbroken by sects.

All this has changed. The unity of the profession in science and art is an accomplished fact. A select body of learned physicians no longer exclusively represents it before the public. The natural sciences have been popularized, and sectarian practitioners have separated themselves from the great body equally as to etiquette, doctrine, and practice, appealing to the tribunal of unlearned public opinion, and which it behoves the profession to enlighten, if it would have a just and true judgment. The science of epidemiology has been created; epizootics have given importance to comparative pathology; and the practice of hygiene has been made a department of the public service. So also the care of pauper lunatics in handsome asylums and hospitals, while the poor-law medical service only awaits its time to attain the like position. A single campaign served to develope military and naval hygiene; and naval and military appointments, formerly obtained by patronage, may now be got by honourable competition. Biology has become both a science and a philosophy, and speculative psychology is about to be wholly eliminated from medicine. New remedies and new methods of clinical

research are from time to time discovered, and the observation of the natural history of morbid states is the acknowledged basis of a rational experience, as distinguished from a blind empiricism.

Such being the condition of things, the serious question arises whether the established routine of teaching and training the medical student is sufficient to fit him for modern exigencies? When this duty first devolved upon the author, he considered the matter fully, and concluded that the ordinary routine was wholly insufficient. His first lecture as a teacher contained therefore, in brief, the principles and methods of this book.* They were more fully developed ten years later, in 1856, and constituted the first edition of the work. Seven years' additional experience has only confirmed what he then stated in the preface. While the medical student is amply supplied with manuals of physical diagnosis and the like, there is none which teaches him in a simple form how to attain to a mental culture and discipline suited to his special and immensely wide spheres of knowledge and labour. It is very obvious that he should in some way or other be trained to solve and apply practically the most difficult questions in biology and mental physiology. The subtle and profound inquiries of epidemiology and public hygiene demand a thorough knowledge of the logic of causation, and of the fallacies into which the inquirer is apt to fall. The rise of empirical systems points

* Published in the *London Medical Gazette* for July 1846.

to the need of that higher kind of therapeutics which is founded upon an enlightened observation of the natural order of vital changes; for it is necessary that the practitioner be able not only to discriminate how much is due to nature, how much to external conditions, and how much to art and drugs, but also to guide public opinion as to the true value of popular systems. Nor is it to be forgotten that successful competition for professional distinction, in virtue of discoveries in science and art, is not possible without a knowledge of the higher methods of research in medicine.

How all this mental training, or any part of it, can be accomplished, has had much and serious consideration in various quarters. It is vaguely believed that a study of logic will help greatly; but experience proves that logic, as commonly taught and practised, is not applicable to the new and great world of phenomena comprised within medicine. One of the first and most accomplished logicians of the day, lately deceased, was so manifestly unable to apply the logic of causation to pathology and therapeutics, that he came to conclusions as to disease and remedy wholly opposed to the daily experience of the profession. The study of scholastic logic is, in truth, only a training in the use of language, and is as often used to defend error as to elicit truth; but the business of the physician is the search after knowledge by observation and induction. It is expertness in the use of the inductive logic, therefore, which is to the student the great

essential to success, and which can only be attained, like all other arts, by self-culture, under proper training and guidance.

The author has aimed at these ends; and this explains the peculiar matter and plan of his book. He has taken up some of the more important principles of observation and induction, and in the familiar language of a lecture, and devoid of the technical phrases and methods of systematic writers (which may be learnt best in Mill's system of logic, and other works), so laid them before the student that, if zealous in self-culture, he may discipline his own mind to a successful encounter with the exigencies of his profession. With a view to more special needs, the author has given prominence to fallacies of theory and observation, and laid down a method of investigating a case founded on the principles. In pursuance of his plan he has also developed the clinical observation of constitutional morbid states, partly because a knowledge of them is at the root of all generalisations in therapeutics, and partly to counteract the mischievous tendency to minute physical researches and narrow conclusions into which the student is apt to fall. The natural order of diseased conditions follows necessarily the natural order of healthy states, as developed in the laws of vital periodicity. Since these are stated in few, if any, of our physiological or practical works, and are little understood generally, the author has pointed them out, and the applications of which they are capable. A knowledge of

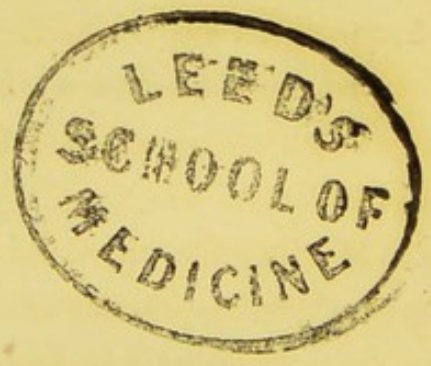
these laws is the foundation of all inductions as to the influence of drugs and treatment on morbid states, as well as to the causes of disease.

The two chief methods of research in medicine, the numerical and the analogical, must necessarily interest the young practitioner who desires to win a reputation. As to the analogical method, it appears capable of any extent of application. In illustration, the author need only refer to his recently published work on the correlations of consciousness and organization, the doctrines of which constitute the basis of his pathology and practice, but more especially in nervous and mental diseases. As much difference of opinion was expressed by critics of this lecture, he has concluded to make no change in it; but as to the others he has adopted whatever criticisms seemed to him to be amendments. Since it is certain that medicine will advance very rapidly, and new forms of disease be discovered, he has added a short lecture on the naming and classification of diseases. New terms indicate and help scientific progress. Nothing, therefore, can be more erroneous and mischievous than the unlettered ignorance which indiscriminately denounces them in medicine.

Having in view the large advances and enlarged sphere of the practice of medicine, the author has added to this edition an entirely new Part, containing the nosologies and indexes of several important groups of diseases, and which are founded on the teachings from his chair.

In all of these, new views, the result of long-continued observation and inquiry, are developed. He would more particularly call attention to the bearing on epidemiology and hygiene of his classification of fevers, to the important class of constitutional diseases, to the etiology of skin-diseases and the new class of "figurate" affections, to the new group of trophical and vasomotor diseases of the nervous system, and to his classification of mental diseases according to a method not hitherto attempted, and based on the author's long-continued researches. Since it has much simplified to his own mind the study, comprehension, and treatment of these obscure and important disorders, he hopes it will help others in like manner.

RUTLAND STREET, EDINBURGH,
*October* 1863.



# CONTENTS.

## PART I.

## PRINCIPLES AND METHODS.

### LECTURE I.

#### GENERAL PRINCIPLES OF OBSERVATION AND INQUIRY.



#### NATURE AND ACQUISITION OF EXPERIENCE IN MEDICINE.

THE COMBINATION OF THEORY WITH EXPERIENCE AND OBSERVATION.



ILLUSTRATIONS OF THE FALLACIOUS USE OF THEORIES.



## LECTURE II.

GENERAL METHOD AND OBJECTS OF CLINICAL STUDY.

## LECTURE III.

### METHODS OF CLINICAL EXAMINATION.

## CLINICAL OBSERVATION OF GENERAL OR CONSTITUTIONAL MORBID STATES.

## LECTURE IV.

### ON PROGNOSIS AND ON THE ORDER OF SUCCESSION OF MORBID PHENOMENA.

## LECTURE V.

### On the Due Estimate of Treatment, and on the Management of the Case.

#### THERAPEUTICAL OBSERVATION.



#### MANAGEMENT OF THE CASE.

## LECTURE VI.

### THE NUMERICAL METHOD OF RESEARCH IN MEDICINE.

## LECTURE VII.

### THE ANALOGICAL, PHILOSOPHICAL, OR PURELY INDUCTIVE METHOD OF RESEARCH.



### PRACTICAL EXAMPLES OF THE CONDUCT OF AN ANALOGICAL INVESTIGATION.

EXAMPLES OF APPLICATIONS OF THE METHOD OF ANALOGICAL RESEARCH TO ANATOMY, PHYSIOLOGY, AND HISTOLOGY.



## LECTURE VIII.

ON THE NAMING AND CLASSIFICATION OF DISEASES.



# PART II.

## CLASSIFICATIONS OF DISEASES.

## THE NAMING AND CLASSIFICATION OF PYRECTIC DISEASES.



## ETIOLOGICAL NOSOLOGY AND INDEX OF FEVERS.



## THE NAMING AND CLASSIFICATION OF CONSTITUTIONAL DISEASES.



## ETIOLOGICAL NOSOLOGY AND INDEX OF CONSTITUTIONAL DISEASES.

## ETIOLOGICAL NOSOLOGY AND INDEX OF DISEASES OF THE NERVOUS SYSTEM.

### 1. General Nosology of the Neuroses.



### 2. Special Nosology of the Neuroses.



## THE NAMING AND CLASSIFICATION OF MENTAL DISEASES AND DEFECTS (VESANIÆ).

NOSOLOGIES AND INDEXES OF MENTAL DISEASES AND DEFECTS.

# PART I.—PRINCIPLES AND METHODS.

## LECTURE I.

### GENERAL PRINCIPLES OF OBSERVATION AND INQUIRY.

Introduction.—We are met to-day that we may study and practise medicine together at the bedside of the sick. These pursuits are of singular importance to us all. To you, clinical study is the culmination of your academic career, and upon the habits you now form, and the doctrines you now imbibe, much of your success and happiness in the practice of your future profession will depend. To me, clinical teaching and practice involve a grave

responsibility; for to guide you rightly in your studies, as well by precept as by example, is to ensure, so far as I am concerned, that your career shall be successful and happy, and therewith human suffering largely alleviated, and the profession of medicine advanced.

I need, therefore, say hardly one word in commendation of clinical teaching. I would merely observe that it is of singular advantage in every way. To the sick poor especially valuable, because it secures to them at small, if any, cost to their feelings, the most careful consideration of their case. To the public not less advantageous, because it is the best means of advancing medical art and of training students into good practitioners. To the student, of vital importance, because it affords him opportunities of meeting disease face to face, not easily obtained otherwise, and thus enables him to secure the great object of all his studies. That object is the acquisition of those qualities, which, included under the terms professional skill and tact, constitute the surest means of professional success. To aid you in attaining this great object will be equally my pleasure and my duty.

First, however, let us understand what is implied

in the phrase professional skill and tact. Skill implies both knowledge and experience; tact, quickness in applying that knowledge at the bedside, and ability to secure as well as direct the most appropriate treatment. With a ready appreciation of the essential points in the case before you, there must be a decisive opinion of what is needed, and prompt action upon the opinion. In a few words, it may be said that the sagacious practitioner determines quickly and clearly what ought to be done, what can be done, and how what can be done may be accomplished. Much of this skill and tact can be acquired in no other way than by familiarity with disease. The judgment and the senses must both have a practical training at the bedside. Without it, indeed, science or learning is of little avail. Just as surgical dexterity can only be attained by practice of the art of surgery, so the medical dexterity known as tact can only be acquired by the practice of the art of medicine.

But these accomplishments have more than a personal value. In your future career you will have to labour as members of the profession at large, and that knowledge which you have received from past generations you ought to improve and increase by

your own researches. This is a duty not only to be done simply, but with professional skill and tact—that is, to be so done that you will extend your own reputation by your success in treatment, while you add to the domains of medical science and art. To this end your researches must be practical, while they are profound; philosophical in their method and aim, while they are laborious and minute. Clinical medicine should teach you how to perform this duty.

Now, it is to be remembered that in the exercise of your profession with these varied objects, you are in hourly contact with your fellow-men, with no other power over them, under ordinary circumstances, than so much influence as their own desires or their personal esteem for you may supply. You have to collect evidence where no oath binds the speaker; to penetrate disguises; to sift conflicting statements; to reconcile improbabilities. Without the power to experiment—that is, to vary at will the circumstances, so as to disentangle the essential from the non-essential, or without even the power to cross-examine, you must come to a conclusion; often with but a moment for deliberation, you must act. And when you have determined what is to be done under the circumstances, still you will usually have no

power to compel to the necessary course of conduct, except through those motives to action which are consonant with the hopes, the fears, the prejudices of your patient. To investigate a case rightly and to secure that the necessary measures be executed promptly and fully, you must be able to judge quickly as to these motives. This judgment can only be founded on a thorough knowledge of human nature, and this knowledge and the use of it, therefore, constitute important elements of professional skill and tact.

How, then, can I assist you in the acquisition of these qualities? By precept and by example only; yourselves must do the rest. I can explain to you what is the nature of the mental processes by which skill and tact are acquired. I can point out to you how to conduct those processes; what methods are to be followed in investigation; what errors to be avoided; what fallacies to be guarded against. I can, in short, give you a brief outline of a system of clinical research, and I can indicate to you in the clinical wards of the Infirmary how this system can be carried out. Here, then, I must deliver my precepts; there you must learn practically how simple and yet how difficult is the art and the study of medicine.

As to the plan I propose to adopt, it is this :— In the first place, and in the present lecture, I will lay before you my views as to the mental processes by which knowledge and tact are acquired. And, inasmuch as the tact to investigate and the tact to discover and treat disease are nearly identical in their nature, I shall consider the matter with reference to both these duties. While pointing out principles, I shall also point out fallacies and sources of error, adding practical illustrations. This will constitute an exposition of general *principles*.

In the next place, I will give an exposition of the *methods* to be followed, founded on the principles previously developed. I shall therefore point out the order and means of investigation ; the leading phenomena to be investigated ; and the rules for attaining satisfactory results—that is, all that it is possible, under the circumstances, to attain, whether in the investigation and treatment of disease, or the advancement of medical science and art.

In addition to skill in detecting, prescribing, and investigating, there is a tact required to secure the due execution of the measures determined upon, and the management of the patient to that end. This will also constitute a subject of inquiry.

## NATURE AND ACQUISITION OF EXPERIENCE IN MEDICINE.

Empirical Diagnosis and Therapeutics.—What is requisite technically for a practitioner of medicine? He may be considered from two points of view. First, as the uninstructed man, guided by an unenlightened experience. Secondly, as the taught man, guided by enlightened experience. The one knows disease and its treatment solely from having often seen similar groups of morbid phenomena or *symptoms* made to disappear by the same agent. Each symptom, or group of symptoms, he designates as *a* disease, giving it a name, and the agent he terms *the* remedy for the disease. All he asks for is a cure for the disease—it may be a headache or a cough—without reference to the abnormal changes in structure and function upon which the abnormal phenomena depend. This is experience simply. From the earliest records of medical art to the present moment, we have abounding illustrations of this method of practice. Take as an example the Hippocratic treatment in a commencing case of Pleuro-pneumonia. "When pain seizes the side, either at the commencement or at a later stage, it will not be improper," it is recorded in the works of Hippocrates,

"to try to dissolve the pain by hot applications. Of hot applications, the most powerful is hot water in a bottle, or bladder, or in a brazen vessel, or in an earthen one; but one must first apply something soft to the side to prevent pain. A soft large sponge squeezed out of hot water, and applied, forms a good application; but it should be covered over, for thus the heat will remain in the longer," etc. For the 2400 years which have elapsed since this was written no more simple, and at the same time equally effectual treatment of pleuritic pain has been discovered or practised, and it may be added, that to this day the *modus operandi* of the means has not been made out. Amongst the Hippocratic writings is the following as to the treatment of peri-pneumonic and pleuritic affections:—"If the fever is acute, if there is pain in one side of the chest, or in both, if the patient suffers during expiration, if he coughs, if the sputa are rusty, or livid, or thin, and frothy, or blood-red, or if they differ in any way from healthy sputa, it is necessary to act as follows:—The pain extending upwards towards the clavicle, or towards the nipple and the arm, the inner vein of the arm of the affected side should be opened. The quantity of blood drawn should be in proportion to the constitution of the body, the season, the age, and the colour;

and if the pain is acute, the bleeding should be pushed boldly to faintness,"—a plan of treatment not unlike the modern. These are illustrations of the simplest form of Empirical therapeutics, or therapeutics dependent upon the teachings of experience only.

Empirical Prognosis.—Medical tact may be shewn in the perception of the cause or causes of a given morbid state, and of the results; in other words, of the antecedents and consequences. This knowledge was comprised by the ancients under the general term *prognosis;* by the moderns that term is limited to a perception of the event or consequences. As an illustration of empirical prognosis I give the following from the aphorisms of Hippocrates:—"In a fever not of the intermittent type, if a lip, an eyebrow, an eye, or the nose be distorted; or if there be loss of sight or of hearing, and the patient be in a weak state—whatever of these symptoms occur death is at hand." Here again is a simple enumeration of phenomena in a given order, without reference to the cause or seat of the disease. The term fever comprising all its past as well as present phenomena; the symptoms specially described are the prognostic phenomena, and death, the result, is predicted as neces-

sarily following those symptoms. To the practitioner instructed in the physiology and pathology of the nervous system, such symptoms indicate a condition as well as a result, viz., a complication involving the base of the brain. Yet there is nothing to shew that the writer of that ancient record of medical experience had such knowledge. We are sure, nevertheless, that with practised perceptive powers he must have possessed a quick insight into the course of disease, although his prognosis be purely empirical.

Empirical Etiology. — Empirical etiology is on a similar footing. It is an instinctive pleasure of man's intellectual nature to look for and discover the causes of what happens to him—"*Felix qui potuit rerum cognoscere causas.*" Take an aphorism from Hippocrates, as to the influence of age in the development of phthisis: "Phthisis," he says, "most commonly occurs between the ages of eighteen and thirty-five years"—a general statement, which the application of the numerical method of investigation (one of the great intellectual means of discovery of modern times), made with the greatest care and on the largest scale, has only confirmed. The same remark applies to the influence of the seasons, as

laid down by Hippocrates. The twenty-third aphorism informs us that the diseases of winter are, "pleurisy, pneumonia, coryza, hoarseness, cough, pains of the chest, pains of the ribs and loins, headache, vertigo, and apoplexy." The large numerical returns to the Registrar-General, with all the advantages of modern science, only demonstrate the truth of this aphorism; yet it is purely empirical.

COMPARATIVE MERITS OF EXPERIENCE.—These statements sufficiently prove the uses and even value of unenlightened simple experience in medical art; but do they prove its excellence? No. Such experience is the most common thing in the world. Every man with opportunities for observing, and a mind for estimating, the relations of the phenomena that come under his daily cognisance, acquires each, in his profession or business, the same kind of tact. The Indian warrior on the trail of his enemy has not more acute tact in observing and concluding, than the detective police officer in quest of his object of pursuit—the forger or murderer. The common seaman or unlettered shepherd will anticipate far more readily than the experienced statesman the coming changes in the weather; but the statesman has equal tact in his vocation.

After a long life spent in the public service, at an age

> When old experience doth attain
> To something like prophetic strain—

he can anticipate the course of events, and foresee the political storm; and, if vigour of mind be left to him, can guide warily and well the helm of government. Such a statesman was the late Sir Robert Peel—the physician of the sick commonwealth.

Now, experience has its principles as well as philosophy; for experience *is* philosophy—the philosophy of common sense; and it is well that you should know that these principles are nothing more than the aphorisms, proverbs, maxims, and wise sayings, current in the world. These are the pith and essence of multitudinous experience, professional, moral, domestic, or national, as well as physiological and pathological. In a word, they constitute empirical knowledge. The proverb, to mention a solitary instance, of "Conceit (or the fancy, imagination) will kill, and conceit will cure," is an embodiment of the philosophy of globulistic and mesmeric therapeutics. The acquisition of a certain amount of medical knowledge, by uninstructed daily experience, is equally illustrated by the proverbial saying, "A man is either a fool or a physician at forty."

What, then, is the requisite conduct for the attainment of this wise experience? Simply long-continued, sedulous, accurate observation of manifest external phenomena; but observation, independently of aids, for that alone is prompt, because practicable under all circumstances, in which the eyes, the ears, and the senses generally can co-operate with the ready exercise of the judgment. In this way the practised eye and ear, trained by long use, and the practised judgment, trained by careful exercise, act together at the bedside with the precision of instinct. All men have not the needed natural qualities; many want the industry; but to those who have both, experience will afford a power of intuition which is sometimes really marvellous in its results.

FALLACIES AS TO THE USES AND VALUE OF MERE OBSERVATION AND EXPERIENCE.—But, after all, unlearned experience is not the best guide, nor empirical knowledge real science; and this is a fallacy against which I must warn you; for it is of common occurrence. Medical practitioners in all ages, noting the great value of simple experience, and seeing how far away from truth and common sense men have been led by theories and hypotheses, have put simple experience forward as something better or more instructive

than the combination of observation with theories—esteeming them as only mischievous elements, and to be avoided at all cost. Now, this notion is, in fact, a theoretical notion; for experience itself teaches us two great principles or maxims as to what is termed theory or hypothesis—namely, first, that theory *cannot* be dispensed with in observation; and secondly, that theory, rightly used, is a necessary element not only in the advancement, but in the practical application of all human knowledge.* Let me illustrate these propositions.

Sydenham has had conferred upon him the title of the English Hippocrates. Undoubtedly, he stands out as one of the greatest men of the modern era of medicine. Now he, of all men of his era, has most strongly inculcated the empirical method of observation and inquiry, to the exclusion of theory or hypothesis. To shew this, I will quote him. "In writing the history of a disease," he says, "every philosophical hypothesis whatsoever that has previously occupied the mind of the author should lie in abeyance. This being done, the clear and natural phenomena of the disease should be noted—these, and these only. They should be noted accurately, and in all their minuteness, in imitation of the ex-

* Compare Mr. J. S. Mill's *System of Logic*, 4th Ed., p. 345.

quisite industry of those painters who represent in their portraits the smallest moles and the faintest spots." In these directions Sydenham is influenced by two hypotheses—first, that just as there are species of plants, there are also *species* of diseases, which have their clear and natural phenomena; and, secondly, that nature, in the production of disease, is "uniform and consistent." He therefore roundly asserts, what is in fact contrary to the experience of us all, "that for the same disease in different persons the symptoms are for the most part the same, and the self-same phenomena that you would observe in the sickness of a Socrates you would observe in the sickness of a simpleton." Now, diseases are really series of events, and not well-defined objects, as plants or animals, and these events vary as infinitely in combination as the natures of the individuals to whom they happen; so that it is a medical proverb or maxim, that in practice "No two cases are alike." Sydenham was hypothetical, then, even in laying down his method; was he less so in carrying it out? Let us look at one of his "Histories," and take up that of vernal intermittents. Strange to say, he adopts a series of hypotheses to explain hypotheses. "Now, during the cold of winter," he says, "the animal spirits become strong and concentrated, from their recess. In the meanwhile,

viscid humours (less viscid, however, than those that the heat of the previous autumn had wrought up even to seething and boiling) have been accumulated by nature during the whole winter in the volume of the blood."

"Against these the animal spirits struggle—they try to fly off; but they get entangled, and netted in, and held back."

"This it is that excites the vernal ebullitions."

"Exactly in this manner do full beer barrels that have lain long in cool cellars, or in sand, begin to work as soon as they are set near a fire, when their liquor becomes ready to fly."

"The blood does the same."

"Similarly affected it tries to clear itself; and it does its work quickly when the volatile spirits second it," etc.

After reading this, it is not surprising to find that Sydenham had a hypothesis also as to diseases in general, namely, that they arise "partly from the particles of the atmosphere, partly from the different fermentations of the humours." Nor is it at all remarkable that he was equally hypothetical in his practice, which in fact he was. It is not necessary to multiply illustrations of this kind. No man was ever great in medicine on the principles laid down by Sydenham, for no man

ever could be; all, therefore, of the greatest thinkers will be found to be theoretical or hypothetical. What is common to them all and really distinguished them all, as it distinguished Sydenham, is this—the combination of accurate, sedulous, minute observation with theories and hypotheses.

## THE COMBINATION OF THEORY WITH EXPERIENCE AND OBSERVATION.

NATURE AND USES OF THEORIES AND HYPOTHESES.—What, then, you will ask, is the nature of hypothesis or theory in medicine, and what the use? I will endeavour to explain to you. Experience shews that in medicine, as in every other branch of human knowledge, thought itself is impossible without hypothesis or theory. We instinctively desire to understand all that we observe to occur. No man can be content with mere perceptions, for these are only the *stimuli* to thought. After observation comes comparison with what we already know, and conclusion or inference from the comparison. This conclusion is a theory, which would be perfectly true if the data were complete and correct; but they are not. Our observations are imperfect, our knowledge is imperfect—our conclusion, therefore, reflects the imperfection of our

observations and of our previous knowledge, and is never true, but always hypothetical or theoretical; varying from the truth, just in proportion as we are ignorant or imperfect observers. Having drawn our conclusion—that is, formed our theory, we may or may not rest satisfied with it. If we wisely doubt, then we desire to verify it by observation or experiment; or if the conclusion be as to something attainable, we endeavour to attain. And this is only another way of testing the theory by experience. To theory, then, in this sense, that is, tested by observation or experiment, or experience, we owe all true progress in knowledge, for empirical knowledge is stationary. If Columbus had not had a geographical theory of dimly-conceived western lands, and the great kingdom of Cathay, he would never have set forth on his voyage of discovery. Without theory, Harvey would not have unfolded the circulation of the blood. Without a theory, the grand laws of the universe would not have been revealed to Newton, and this Newton knew well.

Sir David Brewster, in his Life of Newton (vol. i. chap. 3), gives a history of Newton's discovery of the composition of white light. The student will find in that history an interesting illustration of the uses of theories and hypotheses in research. Newton pro-

pounded successive hypotheses or "suspicions," and experimentally investigated the phenomena of the prism in reference to each, until he arrived at a satisfactory explanation. Every hypothesis, therefore, except the last was necessarily erroneous; but the investigation of each added to his knowledge, and brought him nearer to the truth.

THEORY NECESSARY TO INVESTIGATION.—You must, therefore, by the very constitution of your mental nature theorise as well as observe. You cannot avoid it, try you ever so; to attempt it, is to attempt an impossibility. In every case that you investigate, in every remedy you prescribe, you form one theory at least, if not many; nor can you make any advance in science or art without it. What, then, concerns you, is to know how you may theorise to the best advantage, and what errors you must avoid in the process; to learn, too, how to estimate the theories of others; for since theory is absolutely necessary to thought, all expressions of thought, whether they be evinced in *collective* words, as "irritation," "inflammation," "fever," "tonics," and the like, or in collective theories termed *systems*, are more or less hypothetical, and are therefore more or less fallacious.

Let us look at this matter as it concerns your

own minds in your vocation. When you begin the investigation of a case, that is to say, of the condition of a person in a state of disease, what are the steps that you instinctively take? These. You note some of the phenomena, and associate them in your mind by the process termed association of ideas, with other phenomena, or conclusions as to other phenomena, which you have either yourselves witnessed already, and thought of, or have heard or read of as witnessed by others. You notice a similarity, perhaps, and you come to the conclusion, probably erroneous, certainly theoretical, that the two are identical. This conclusion, if drawn from your individual experience, will lead to another conclusion, founded also upon your individual experience, as to what will be beneficial or injurious to the sufferer—or, in other words, the *treatment* of the patient. If, as will be the case, the conclusion be drawn from a more complex source, viz., the recorded theories and experience of others, then a knowledge of medical science enters into your conclusions.

No true Theory possible without Science. —Now, disease may be simply defined to be a deviation from the normal state, either of structure, or function, or both. To know this deviation in its full extent, that is to say, its origin or causes, its nature, its course,

and its remedy, implies at least a knowledge of healthy function and structure, or the science of physiology; of the agents which cause deviation from the normal state, or etiology; and of the mode in which those agents act, or pathology. All recorded theories and general terms, and all your conclusions, will therefore be applicable and complete only in proportion as they are founded upon this knowledge. Hence, your estimate of theories, as well as your power to comprehend and control disease, will depend upon the amount of your physiological, pathological, and etiological knowledge. In proportion as this is extensive and accurate, will you be successful as practitioners and investigators. Here, knowledge is synonymous with power; and in this respect a junior medical student of the present day is far superior to a Hippocrates or a Sydenham.

THE FALLACIES OF THEORY DETECTED BY EXPERIENCE.—But however great the amount of knowledge of this kind you possess, it will not preserve you from fallacies; on the contrary, you may be the more seduced into them. Knowledge puffeth up; and theories, which are perhaps hardly a shade better than those that have been justly rejected, either take the place of facts in your conclusions, or are retained as

being true, or at least sufficient explanations. Physiology and pathology are full of these false facts; in therapeutics they crowd upon us on every hand. Now, there is a very simple method of trying the value of a theory, and that is to put it to the test of experience. This is the Ithuriel's spear for all those hypothetical conclusions or theoretical views you may be tempted to adopt. It is the great secret of success in all researches; nor is it difficult, for it is what you will have to do every day in the actual treatment of disease. Your diagnosis is confessedly but a probability; your treatment will test its worth.

## ILLUSTRATIONS OF THE FALLACIOUS USE OF THEORIES.

Fallacy of Substituting a Theoretical Word for a Fact.—I will now point out to you, by way of example, some of the principal errors you will have to avoid in your observations and inquiries. The first and greatest of these is the substitution of a theory for a fact—a probability for an actuality. This is so common an error, that you can hardly open any medical essay without meeting with it, and it is a very insidious error. There are two or three principal modes in which it occurs. One is the use of collective words or general terms, as facts, which are

essentially theoretical, as "tonic," "diaphoretic," "fever," "inflammation," and the like. In the search after accuracy, a definition is given, and then it is thought that the word has a definite meaning. This is not so, however. Naturalists have not even defined what a species is, although they have only objective phenomena to deal with, and can place the objects before them. In defining processes and states of living bodies, we must remember that we do not know the entirety of any one process, for we have never observed it—sometimes, indeed, only a small portion of a process; as to the remainder, we draw conclusions only, that is, establish theories or probabilities. Nothing is so difficult to handle in this way as the phenomena of life, because all vital phenomena are continuous, or run into each other. It is this continuity that renders it all but impossible to define a species with absolute strictness, or even what is animal and what vegetable. All words and terms in medicine, then, are sources of fallacy; and this being so, it is not difficult to comprehend how all systems, as they are called in medicine—that is to say, methods of cure dependent upon one or two falsely called principles *must* be erroneous. How absurd the therapeutical dogma of *similia similibus curantur* appears from this point of view. No diseased

individual is exactly like another individual; nor, in the same, is the condition of one day like the condition of another. It is a mere assumption that they are.

An illustration of this kind of error may be drawn from the theoretical use of terms in pathological anatomy, or the anatomy of disease. No method seems so sure as that of dissection for determining the nature of a disease, and pathological anatomy has therefore always attracted earnest and enthusiastic minds to its culture. The phenomena are often visible and tangible, or, if not, then there is the microscope and chemical analysis; and the inference naturally follows, that the method is sufficient for the determination of the nature of disease. Brought to the test of experience, that crucible of all theories, we find that the hoped-for certainty is wanting. Nothing, for example, seemed so settled by histologists as the characteristic forms of cancer-cells; recent discussions and experiments have shewn, however, that there is not that settled agreement on this point amongs microscopic observers, as was alleged, and for this reason, that the nature and forms of the cells arise out of a general *theory* of the cellular structure of cancer-growths. Theories, dietetic or therapeutical, founded upon the varying chemical composition of the urine, appear in succession; each is received for

a time as a satisfactory theory, and is then proved by experience and observation to be erroneous. So, also, with theories of inflammation, and its sequelæ; these would appear surely within the domain of histology and chemistry; but all such attempts to demonstrate the nature of inflammation fail, for a satisfactory definition of what inflammation is, has never yet been advanced. Nor is it probable that attempts of this kind will ever succeed, seeing that the entirety of the group of processes known under that name have never been observed, any more than the entire processes of the living organism. We have, in fact, observed and investigated only a portion, and that a very small portion, of the inflammatory process.

FALLACIES OF GENERAL PRINCIPLES AND OF SYSTEMS FOUNDED THEREON.—All kinds of false systems of medicine manifest therapeutical theories and fallacies. Homœopathy, hydropathy, and mesmerism are the three principal of modern times. Homœopathy has for its basis two dogmas: the one to which it owes its name of *similia similibus curantur* I have already noticed; the other is, that infinitesimally small doses of drugs powerfully influence the vital functions. Let us touch this dogma with our Ithuriel's

spear of experience, and ascertain, in the first instance, whether the infinitesimal dose be administered. The process by which the dose is obtained is theoretically one of minute division and subdivision; but is it really such? What is the proof that the theoretical subdivision into infinitesimally minute fragments or portions takes place? There is no proof; it is simply an assumption founded on another assumption, that the particles so treated are capable of infinitesimal subdivision. But does this assumption correspond with the fact? Various plausible arguments only are brought forward in support of it, chiefly from analogy; but these are of so vague and erroneous a character, that they need hardly be mentioned; as for example, it is alleged, that odorous bodies *must* give off infinitesimally small particles, inasmuch as they manifest no appreciable diminution of weight after many years. But is it not a more reasonable inference, that in the particular instances mentioned, the odour is not at all dependent upon particles given off from the odorous body? Were it otherwise, they would at last shew a sensible, although a very small, diminution in weight. And even if the argument be allowed as to odorous bodies, how can it apply to the inodorous, as chalk, charcoal, bichloride of mercury? When, in addition to the teach-

ings of experience, we have facts as to the atomic constitution of bodies, which imply limits to the divisibility of matter, we may well feel justified in rejecting the whole system of medicinal therapeutics founded upon the infinitesimal hypothesis, because wanting in the primary fact that an infinitesimal dose is administered.

Fallacies of Therapeutical Theories.—But there are amongst the class of unsectarian practitioners, men who, misled by fallacious terms, treat symptoms like the homœopathic sectarian; they err in the same way, but in the other extreme. These assume to be exemplifications of the "practical man." They are unhesitating believers in phrases, in the names of symptoms, and in classes of drugs. For each symptom they have a remedy, and talk of tonics, alteratives, astringents, febrifuges, not being in the least aware, apparently, that every word they use involves a complex and very doubtful theory. They are necessarily theorists in practice of the worst kind, because they do not even suspect that they are theoretical. So far from being practical in their methods of treatment—that is to say, adapting it to the morbid conditions in which the individual is involved as a unity—they only look at special or isolated morbid

states. The result is, the administration for the cure of disease of a frightful farrago of drugs, more dangerous even than the nullities of homœopathy. This error has had a very seriously injurious influence on the profession as a whole, as well as upon medical art.

As an illustration of this error, I will read to you a prescription composed by a graduate of a distinguished English university—one of that class of self-styled practical men who habitually seek to exalt themselves above what they term the theoretical practitioner. "Take of nitric acid, of hydrochloric acid, of medicinal hydrocyanic acid, each half a dram, fluid extract of sarza two ounces and a-half, tincture of hop six drachms, syrup of orange peel four drachms, compound infusion of gentian six ounces, acacia gum mixture one ounce and a-half, camphor mixture four ounces and a-half. One ounce to be taken three times a day." This was prescribed for a man aged forty-five; and we may theorise on his case thus:—He had probably the syphilitic cachexia, for which the sarza and nitric and hydrochloric acids were prescribed; the hop perhaps aimed at nocturnal pains; the hydrocyanic acid and acacia gum at an irritable stomach; the orange peel syrup, camphor, and compound infusion of gentian, at a want of appetite. The object of another farrago I will read

is not so clear. "Take of powdered cinchona ʒij, powdered rhubarb gr. x, compound cinnamon powder ℈i, aromatic spirits of ammonia ʒij, spirit of cinnamon ʒij, white sugar ʒij, spring water to make a ℥xij mixture. Let him take ℥j three times a day, and twelve drops of the syrup of the iodide of iron with each dose." This dose contains fourteen ingredients, one of them, cinnamon, in three different forms. Such are the results of unchecked therapeutical theories.

Fallacies in the Indefinite Use of Theoretical Terms.—But the fallacies that lie hid in terms have another bearing upon practice of some importance. They are not theoretical alone, for they are indefinite also, and are used therefore in several meanings. Take as an example the word dyspepsia. It means painful digestion, or indigestion—a change of function only, but a function which is itself of an obscure character, and carried on by an organ with numerous imperfectly understood pathological relations to other organs of great importance, as the cerebrum, heart, liver, kidneys, uterus. So that this word dyspepsia, intended to imply a special derangement of function, really includes a multitude of diseases of the most opposite character, so that, to be at all explicit, there ought to be a nosology of dyspepsia. How impracti-

cable, then, is it to discuss the treatment of dyspepsia in its usual vague sense. The term pneumonia is another of those indefinitely comprehensive words which the progress of nosology and pathology has rendered still more comprehensive and indefinite. Cullen used it to indicate all acute inflammations within the thorax, of which he had two classes—pleurisy and peripneumonia. These terms for the 2400 years antecedent to the time of Cullen had been used in the same sense, and it is evident applied equally to bronchial as to parenchymatous inflammation of the lung. But in the present day, bronchitis (a term unknown to, or before Cullen), is a distinct species, and the term pneumonia expresses essentially inflammation of the air-cells or aërating tissue. Were it limited even to this anatomical definition, there would be confusion enough, but we find that, like the term dyspepsia, it has been used to indicate a *group* of lung-diseases, of which several differ widely as to their etiology, nature, and termination, demand the most opposite modes of treatment, or require no treatment at all. It is a group which, when reduced to a common expression, may be described as presenting interruption of the respiratory function, with certain auditory phenomena termed physical signs. In one form the rational

symptoms, in another the physical signs, in another the pathologial changes in structure, in another a blood-affection, are, in fact, the characteristics of the pneumonia. I know nothing more puzzling to the student, however necessary to the progress of science they may be, than these shifting and varied, as well as vague uses of collective words.

Fallacious Use of Theories as Truths in Investigation.—But there is another important source of error of a somewhat antagonistic character to the last mentioned, which you should also guard against, and that is, that bias of the judgment which leads to the retention of theories and hypotheses as if they were truths. You will already have fully comprehended that a theory is a means to an end only, namely, the progressive discovery of the order of events. It has been likened to the scaffolding of a building which is in progress, and which is pulled down so soon as the work is completed. Or truth may be compared with a besieged fortress, and theories considered as the trenches opened against it—each parallel being deserted so soon as it has served its purpose—that of enabling the besiegers to open the next. It is just as fundamental an error in science to retain those theories as if they were

truths, as it would be in war to retain trenches, as if they were the captured fortress.

Theories thus used are injurious in two ways—to the successful treatment of disease as well as to the successful cultivation of the art. In fact, all observation, and thought, and action are bent to the favourite theory. It is in this way a practitioner, if he have a favourite pathological theory, finds almost every case to be nervous, or hepatic, or spinal, or renal, or uterine, or else every disease is treated by fixed routine, according to a favourite therapeutical theory; it matters little whether the staple be mercury or mesmerism; bleeding or the water-cure; kinesipathy or purgation by Morrison's pills.

Perhaps no mistake has been more obstructive to scientific discovery than this; that of the circulation of the blood may be mentioned as an example. Aristotle had a theory of flux and reflux of the blood during waking and sleep, which he compared to the flux of the Euripus, and for 2000 years men's minds bent unquestionably to the theory. In 1569 Andrew Cæsalpine, a distinguished anatomist, stated concisely all the anatomical and physiological facts necessary to a knowledge of the circulation. He pointed out the function of the semilunar valves; he shewed that the blood could only enter through the vena cava at the

right ventricle, and pass thence to the lung, whence it came to the left ventricle, and out of which it flowed through the aorta. He had only in fact to seize the idea that the blood *circulated* through the body, and not *oscillated*, and the discovery was made. Unfortunately he had a preconceived theory, that of Aristotle; and he used his facts to explain *it;* and thus he theorisingly passes by the great truth.—"Now," he says, "while awake, the movement of the innate heat is from within outward, and during sleep it is the reverse; hence it follows, that while awake a great quantity of the vital spirit and blood are carried to the arteries, which transmit them to the nerves; and during sleep the same heat returns to the heart, not by the arteries but by the vena cava, which alone communicates with this organ. In this manner the flux and reflux of the blood toward the superior and inferior parts, like the waves of Euripus, manifest themselves during sleep, and when we are awake also. The same species of movement is manifested either by applying a ligature around some part of the body, or by pressure on the veins in any other way." This was written in 1569. It remained for Harvey, nearly half a century later, to demonstrate the true theory of the motion of the blood in 1616, and publish it in 1628. This same tidal theory, which delayed

the discovery of the circulation, also prevented its reception by all those of the older anatomists who implicitly believed in Aristotle. Apart from these, Harvey's discovery experienced a ready and even cordial reception.

Practical medicine presents many similar examples of this fallacy. Thus, at one time it was accepted as a settled truth, that the buffy coat on blood drawn from the arm was not only a proof of inflammation, but of the necessity of drawing blood for the cure of it. Routine practitioners consequently abstracted blood from the body in quantities that seem almost incredible, *e.g.*, one and a half gallons in five days. Again, a discussion has been constantly raised whether tubercular deposit be "inflammatory" or not in its nature—a question asked, on the assumption that the current doctrines of inflammation are settled truths, which they are not. The remedy for this class of fallacies is to disintegrate the general facts expressed by or under the theory; as, for example, in the instance of inflammation, in which, in some cases at least, the process is one of morbid nutrition, as well as of morbid vascular action.

COMPOUND FALLACIES FROM THE WRONG USE OF THEORY IN CAUSATION.—You must not gather from

these special illustrations that these are all the fallacies to which you are exposed in executing the necessary process of theorising; they are only a few. Specially to be guarded against, are what may be termed compound fallacies, that is, mistakes in both observation and theory. I will shortly point out one or two instances of this kind of error.

In *observation* there is a twofold mental process going on; we have, however, only considered one, namely, that which is directed to ascertain the *nature* of the thing observed; but we also seek to know the *cause*. Now, etiology, or the doctrine of causation in disease, is a large and most important department of medical science; and the student should know well what is meant by cause, and how it is discovered. Cause is a term signifying the necessary and constant antecedent to an event. To discover causes is nothing else, therefore, than to find out what is the constant and necessary order of any series of phenomena. Thus, when croton-oil is administered, and excessive purgation succeeds to the administration of the drug, we say that the oil is the cause of the purgation. This conclusion is reached by no other logical process than this, that when the intestinal tube is duly continuous, and the intestinal mucous

membrane in its normal state, the administration of croton oil always is followed by purgation—that is to say, by increased peristaltic action of the tube, and augmented effusion from the mucous membrane. In this example, we have an illustration of empirical observation. But we also theorise as to the mode of action of the drug. We note that croton-oil acts on or "irritates" the skin in a certain way, whenever it is applied to it; we compare the two groups of phenomena, and we infer that the oil acts on the intestinal surface, when applied to it, in the same way as it acts on the skin. This action we also say is the cause of the purgation; but it is, again, the order of the phenomena which determines the inference as to the cause. The process differs from that just described mainly in this, that our knowledge of the relation of croton-oil to the surface of the body is made a constituent element, and we theorise as to the order of phenomena.

FUNDAMENTAL FALLACY IN THE INVESTIGATION OF CAUSE.—Well, then, what are the fallacies to be guarded against in this process of causality? Fundamentally this—Experience shews us that we do not and cannot perceive the complete order of any series

of vital phenomena, not even in apparently the simplest. In the illustration just given of the action of croton-oil we are yet much in the dark as to the next group of causal phenomena antecedent to the increased peristaltic action and effusion. We have theories as to the innervation of the muscular tube from the sympathetic ganglia and spinal cord, and as to the function of the capillaries, the epithelial cells, and the mucous crypts; but the theories are manifestly incomplete, and therefore our knowledge of the entire circle of phenomena is necessarily imperfect. Yet, however imperfect our knowledge may be, we inevitably come to a conclusion as to the order of causation; and the relations that are most on the surface, or nearest to our apprehension, are those which we adopt. This is the source of the "*post hoc-ergo propter-hoc*" logic of common life, and of all the pursuits of mankind, as well as of those purely medical. One or two simple illustrations will suffice to shew this fallacy and its remedy. Until within the last twenty years, it was an uncontroverted doctrine in England that ripe fruit, and especially the plum, was the "cause" of the diarrhœa and cholera prevalent in the towns and villages during the hot months of summer. Even so lately as October 1848, the English General Board of Health set forth this theory in their official

notification to the boards of guardians as to the means to be adopted for the prevention of cholera—in which we have this paragraph. "It will be important also to abstain from fruit of all kinds, though ripe and even cooked, and whether dried or preserved." By way of proof, certain facts are subjoined, as thus—"The three fatal cases [of cholera] that have just occurred to sailors who had been at Hamburgh, and who were brought sick to Hull, turned out, on inquiry, to have followed very shortly after the men had eaten a large quantity of plums, and had drunk freely of sour beer." Note the wording—"Very shortly after"—as illustrative of the mode in which this fallacy arises. The nearest phenomena to the event to be explained are seized upon as "the cause." The becoming sick at Hamburgh, where cholera was raging, is not noticed; this important fact, indeed, is omitted from the statement; nor is there a word as to the medicinal treatment, or as to other articles of diet. Doubtless, in this particular instance the illustration was given to clench the caution against ripe fruit (the sour beer not entering into the theory), but which caution is itself founded on fallacious observation. This is so generally understood now, that I need hardly to tell you, that ripe fruit, moderately taken, is one of the best prophylactics against the summer cholera,

diarrhœa, and dysentery. Nor need I add, that of the large number of the poor attacked, amongst whom diarrhœa is proportionately much more prevalent than among the rich, it is only a very small minority that have the means to purchase ripe fruit in sufficient quantities for daily consumption, or even to purchase it at all. This long prevalent dogma, then, as to the bad effects of ripe fruit on the alimentary or intestinal canal, when tested by experience, is found to be nothing more than a very fallacious inference from a wholly erroneous observation.

FALLACIES OF ANATOMICAL ETIOLOGY.—A fallacy in the determination of causation is very common in researches into the anatomy of disease. Certain abnormal conditions of structure are discovered after death, and it is at once inferred that these are the causes of the symptoms observed during life, or, in other words, constitute the disease. In this way the terms phthisis and consumption, originally used to express a wasting or diminution in bulk of the living tissues, have come to signify a certain kind of abnormal structural change, namely a so-called characteristic *deposit* in living tissues, or tubercle. And inasmuch as it is usually found that the lungs are the seat of this deposit, *pulmonary* phthisis and *tuber-*

*cular* phthisis have become convertible terms. But, in truth, the disease, etiologically, is that on which both the wasting and the deposit depend—that is to say, a morbid condition existing antecedently to any perceptible structural change, and without which neither the true phthisical tabes nor the true tubercular deposit will occur. This fallacy is of constant occurrence in anatomical researches into disease, and by insensibly leading the minds of practitioners rather to the results than the processes of morbid action, has seriously checked the progress of practical medicine.

Use of Fallacious Terms in Epidemiology.—The class of complex fallacies is again admirably illustrated by the current etiology of epidemics. In the usual investigations of this class of causes, we note every one of the errors I have laid before you. It is asked, for example, is cholera an infectious disease? Can cholera be communicated?—in the most perfect good faith, and without the slightest suspicion, that in the use of the collective term itself, there is a fundamental fallacy. Cholera is but a word by which a group of symptoms is indicated; it is not a thing. The questioner meant, therefore, to ask this question—can the *materies morbi*, the cause of the symptoms, be generated in the bodies of the sick,

and communicated to the bodies of the healthy, so that in them a similar disease, or group of symptoms will result? Now it has in fact been assumed, without due inquiry, that the group of symptoms designated by cholera are the only phenomena which resulted from the *materies morbi*; so that during the whole of the first epidemic at least, it was hardly guessed that, etiologically, the immensely greater number of cases of diarrhœa were instances of slight cholera, that is, due to the same cause. I need only add, there was still less suspicion, that in such slight cases the *materies morbi* might be generated and given off equally as in the more intense forms.

This fallacious use of a collective term interferes with the advance of our knowledge in all the more important epidemics, as plague, yellow fever, influenza; the materies morbi of each of which, as experience will show, excites widely different symptoms.

Another illustration of the fallacious substitution of a theory for a fact in causation is afforded in the current theory of the rapid spread of the epidemic poison which excites the group of phenomena termed influenza. It is highly characteristic of a strictly infectious agent, and but for the circumstances that an insi-

dious unperceived theory takes the place of fact in the consideration of the question, would suffice to establish its infectious character. So soon as the mind addresses itself to the question of causation, it instinctively compares the mode of the spread of influenza with its knowledge of the mode of the spread of other epidemical diseases that are known to be infectious, as the exanthemata. But it finds that the identical characteristic of influenza which, to an unbiassed judgment, would most strikingly indicate its infectious character, namely, its rapidity of spread, is wholly different from these. They require many months to infect an entire population; influenza never requires as many weeks. This dissimilarity being noted, and no other facts as to influenza being brought into comparison, the inference is drawn, that the diseases are really dissimilar as to the contagious element, and that the influenza spreads too rapidly to be caused, like them, by an infectious agent. Then, as the mind cannot rest satisfied without a cause being assigned for the rapid spread, the agent nearest the apprehension—namely, the atmosphere—is selected, and so it is concluded that influenza spreads in consequence of some change in or unusual "influence" of the atmosphere. This false theory of epidemic causation is not peculiar

to influenza; it is the most common, as well as the most mischievous of the epidemiological fallacies. Since the days of Sydenham, who in modern times gave it extended currency under the term "*epidemic constitution*," it has obstructed inquiries into the true nature of epidemic diseases, and has been erroneously applied equally to cholera, plague, and yellow-fever, as to influenza.

EXPERIENCE THE TEST OF COMPLEX FALLACIES. Experience is also the test of these complex fallacies. The theory of an epidemical constitution has been tested by it, with the aid of an improved and extended system of meteorological observation, and it has *not* been shown that any single or specific change in the atmosphere is constantly antecedent to influenza or the other epidemics. But we may also test it by inquiring what are the conditions under which recognised infectious diseases are found by experience to spread, as epidemics. Firstly, it is necessary to this, that the bodies of the sick, or their clothing, or air which has passed over them, be brought into proximity with the bodies of the healthy, or their clothing, so that the necessary communication of the poison may take place. This being granted, how

does the communication take place as to small-pox for example, and influenza, respectively? Thus; as to the former, the individuals affected are known to be infectious and are commonly secluded at home; their clothes are disinfected; persons susceptible of the action of the virus avoid them; and so comparatively few persons in a given time are placed under the conditions necessary to infection. As to influenza, it is different. Few believe it to be infectious; the individuals attacked are not secluded for the most part at home, but go about everywhere; nor are their clothes disinfected; so that *many* persons are thus *quickly* brought under the conditions necessary for infection. Another element of spread is the time required for the generation or multiplication of the virus in the sick; for in proportion as this is short will the epidemical diffusion be rapid, and which is short in influenza; another is the number of persons who are liable to be affected. Other essential facts might be mentioned, such as the surface of the body, from which the virus is given off; whether it is gaseous, or held in solution in watery vapour, or in the fluids of the body, etc.*

* In a review of the first edition of this work, Dr. W. B. Carpenter objects to these conclusions as to the infectious nature of influenza, because opposed to generally received opinions, and likely to be

Let me now shortly recapitulate my views. I have shewn, 1. That medicine is necessarily a conjectural art, because in the present state of physi-

"scouted as absurd by the united voice of the profession." The mischievous fallacies of epidemiological inquiry set forth in the text would remain precisely the same whether influenza (which was simply taken as an illustration) be infectious or not. But Dr. Carpenter admits that it must be placed amongst the diseases which spread by infection; only adding, "we believe that influenza is one of the least contagious." The evidence that it is at least as infectious a disease as measles or small-pox is conclusive. The Faroe Isles are far removed from general intercourse with the rest of the world. Now it has been observed that, just as with measles, no epidemic of influenza ever spread through them, except after a ship with persons sick of the disease on board had communicated with one of the ports. Very lately Dr. John Hjaltelin, medical officer of Iceland, has shown that it also spreads by infection there; a fact easily proved, because of the isolated position of the families affected. None are attacked except after communication with infected persons. Numerous similar and equally conclusive proofs have been published by Dr. Bryson of the spread of influenza by infection, and infection alone, throughout the British fleet in 1837. The fact as to the Faroe Isles must have been well known to Dr. Carpenter when he reviewed this work in 1856, for it was he who first made it known in this country, in the review of a work inserted by him as editor in the "Medico-Chirurgical Review" for April 1851. And I may add that at that time he specially called my attention to both the book and the article as containing conclusive proof of the spread of influenza by infection.

The lives of myriads, and the prevention of incalculable misery depend upon the right solution of these questions. And it would be well for humanity if rash medical critics would remember this when engaged in the discussion of them.

ology, pathology, and therapeutics, a positive science, which can alone give rise to positive art, is not attainable. 2. That experience, derived from careful, sedulous, and accurate observation and experiment, is the safest source of practical knowledge, and the best test of all theories. 3. That for the advancement of all knowledge, and its application to practical uses, theories and hypotheses cannot be dispensed with; but that, on the contrary, they are essential even to observation, and to the best use of a matured experience. 4. Consequently, that both theory and observation are necessary to the practitioner—theory, by pointing out what needs to be observed; observation, by correcting and enlarging theory. In subsequent lectures, I shall shew how these principles are the essential elements of all methods of observation and research, whether it be desired to observe a particular case, and determine its nature and treatment, or to investigate groups of phenomena by the numerical and inductive methods. I will only remark further that these doctrines have the stamp of twenty-five centuries upon them. Life, says the "father of medicine" is short; art is long; opportunity fugitive; experience deceptive; judgment difficult.

# LECTURE II.

## GENERAL METHOD AND OBJECTS OF CLINICAL STUDY.

Introduction.—I have already stated that the basis of all medical science and of practical tact is experience. Now experience in any art is not otherwise attainable than by the practice of the art. The foundation of medical experience is observation of disease, and the requisites to successful observation are minuteness and accuracy. The clinical student must therefore make up his mind to be sedulously minute and carefully accurate in investigating the cases under his notice. These two qualities are so important, so absolutely essential to success, that he cannot be too assiduous in the cultivation of them. They must become habitual. At first the difficulty in clinical observation is considerable; almost overwhelming. Everything in the case appears to be chaotic. The line of

demarcation between morbid states drawn in books or in the class-room, appear by no means so sharp at the bedside; signs or symptoms described there as well marked, and which are so to the experienced describer, appear but dimly or obscurely marked to the student, amidst the infinite variety of phenomena which press upon him. There appears to be no interconnection or relation between the symptoms. The mind cannot grasp any leading phenomenon and bring the others into comparison with it, for it knows not which to select as the best; often, indeed, it selects the worst for this purpose, namely, the most general. It is here that the student can be much assisted by the teacher, who, in a few words, or with a graphic touch, can hit off the two or three leading characteristics in the case to be examined. Sometimes a single phrase as "tubercular phthisis," "cardiac dropsy," will suffice to indicate what is to be observed; for the clinical student is supposed to be acquainted with the sciences of pathology and therapeutics, and if not, he certainly ought to be.

The student having thus got a clue as to what he must look for, his examination of the case is much facilitated. His memory, his notes of lectures, or his manual, supply him with the results of the experience of

others in a similar investigation; consequently, instead of having to make his way, like the enterprising traveller, over a wide expanse of untrodden wilds, where no beaten track guides his steps, he can confidently pursue the well-accustomed road of systematic semeiology—enabled, with his map in his hand, to mark each turn and winding. What, then, is requisite for him to do in this case? That he shall mark them carefully, minutely, accurately.

First Step in Clinical Study.—The first step, therefore, in clinical study, is to select a well-marked typical example of some common disease, and observe that with book in hand, even to the most minute phenomena. I say of some common disease, because students are apt to run after uncommon cases as the most interesting. An aneurism of the abdominal aorta will attract their attention much more than a case of chlorosis or phthisis. This is undoubtedly a great mistake. A knowledge of the rare case, when acquired, is almost wholly of speculative value, and may be applied once or twice in a lifetime in practice; the knowledge of the other is of daily use.

I do not think, however, that any case will be

observed with the required industry, minuteness, and accuracy, unless it interests the mind. How, then, can it be made interesting? In this way. Let the student set before him an object to be attained by careful observation. Let him, for example, if well up in his physiology, examine the case with reference to the modes in which aberrations of function take place. Let him take cognisance of the sciential relations of the symptoms to each other. Let him, if he pleases, construct a theory or a hypothesis as to these relations, and seek to verify it, remembering, however, that the theory is of no other use than to stimulate and guide his inquiries. It is not necessary to success to have anything elaborate in the theory or problem to be solved. The simpler, indeed, it is, and the better, as when limited to some simple proposition involving only one or two symptoms. Such an one, for example, as the acid or alkaline reaction of the saliva in the case under observation, under varying circumstances; or the character of the pulse, or of the respiration.

Observation and Deduction Instinctive.—This limitation of the attention to one set of phenomena, is, however, more theoretical than real;

practically it will be found that while apparently it is thus exclusively directed to one set or group, all other *obvious* phenomena have been in fact instinctively noted, and a general picture of the entire group graven on the memory for use and comparison during the remainder of life. This indeed is only an extension to a series of events and objective phenomena, of that fundamental and necessary process of perception by which a written or printed sentence is read, or the simplest experience gained. The constituent elements of the word (the letters), or of the sentence (the words), are never so presented to our consciousness that we note each singly. So it is in the examination of a patient. Experienced tact in diagnosis never analyses; never spells the symptom-letters, or stops at the pathognomonic words, but reads off the case at once, the moment that the whole of the characters become cognisant to the perception. This is the reason why in intuitive diagnosis so few physicians are able to give the grounds of their decision. They are not conscious of the individual elements; no more, in fact, than any man is conscious of the multitudinous points or parts in any merely visual object of which he becomes cognisant, as a book or a chair. It is only the great salient

marking points that strike the eye, as the angles and sides of the book, or the seat, legs, back of the chair. What you need, then, for the acquisition of this intuitive sagacity in the perception of disease, is a familiarity with morbid states, having leading characteristics, so that an opportunity is afforded to the mind of instinctively arranging into the proper words and sentences, or into the evolved outlines, if the metaphor may be permitted, all those minute and separately inappreciable phenomena, which reach the consciousness rather as *results* than as *objects* of thought. Then, when afterwards one or two of these leading characteristics are seen, all the rest, although not seen, are known to be there. Just as a single word may be read easily, although all the vowels be left out.

Now, the more readily to gain this familiarity with the leading or pathognomonic characters of a disease, it is better to investigate two or three cases well than many superficially. It will thus be gained in much less time, and therefore at much less cost, and, above all, it will be much more valuable in its results—that is, you acquire a more sagacious, because more accurate intuition. Those of you who enter to the "Examination Class," will, if you please, have

special cases committed to your observation and investigation, and thus the opportunity will be afforded you of the kind of clinical training which I recommend.

INSTRUMENTAL AIDS TO OBSERVATION.—Observation by the unaided senses and induction by the unaided intellect, were the only means of research of the ancient Greek school of medicine, and of the era anterior to the revival of learning in Europe. Philosophical research of modern times would be nothing without philosophical instruments of research, as well as a philosophical method. You know well, that in the study and advancement of the collateral or auxiliary sciences, it is absolutely necessary to have aids to the senses. What would chemistry be without the thermometer? What physiology without the microscope? What astronomy without the telescope? Instrumental aids constitute one of the great characteristics of the inductive method. Bacon wisely marks this fundamental need of instruments of research as well as of aids to thought, and embodies the truth in his second aphorism, "De Interpretatione Naturæ."

"Nec manus nuda, nec intellectus sibi permissus

multum valet. Instrumentis et auxiliis res perficitur: quibus opus est, non minus ad intellectum quâm ad manum."

I shall consider these aids under the two heads under which they may naturally be classed:—1. The aids to the senses and perceptive powers, or the instruments for clinical observation. 2. The aids to the intellect, or the methods of clinical generalisation and induction. And do not make the mistake to think that this is a useless, because a mere metaphysical division, and therefore of no practical value. More wisely bend your minds to the comprehension of these instructions, however difficult they may be; then, when once mastered, and correct habits of thought and investigation formed, their value will be fully estimated by you. At present I shall direct your attention to the first class only; the other class, namely, the methods of generalisation and induction, I shall reserve for special consideration.

The Clinical Aids to the Senses.—The clinical aids to the senses and to the perceptive powers are, first, Aids to vision, to hearing, to touch. Those of touch belong principally to the surgical department of medicine. Secondly, Aids to per-

ception, principally of number, space, time, or of the qualities of matter.

Of the aids to vision, the microscope is the chiefest. Clinical research would be hardly possible without it. And this is all I need say now of that instrument, for so numerous are its applications, and so important therefore a knowledge of its uses, that two or three lectures would hardly suffice to set them forth. Clinically it is used principally in the examination of morbid products. Lenses may, however, often be substituted for the microscope. Certain cavities of the body cannot be examined without the means of permitting either light to fall or be reflected upon them. These are *specula*. You have therefore specula for the throat, the ear, the eye; for the vagina and uterus, the urethra, the anus.

The aids to the sense of hearing are, the surgical sound, the stethoscope, percussor or hammer, and pleximeter. These belong, in a technical sense, to the art of exploration by auscultation. The pleximeter (wrongly so-named, strictly since it measures nothing) is used in eliminating sound by percussion upon it, placed over the organs or regions of the body. In hospital practice, the hammer and pleximeter are undoubtedly valuable; indeed, if the patients to be

examined are numerous, they cannot be dispensed with. In private practice, and under ordinary circumstances, the fingers of the two hands constitute the best percussor and plexímeter.

The *stethoscope* is an auxiliary to the sense of hearing of comparatively recent application. Perhaps none of these sense-helps have demonstrated more clearly than this the immense value of instruments in the philosophical researches of medicine, and the practical application of the results of these researches to art. It is difficult to conceive how, without it, the precision in etiology and pathology, and consequently in diagnosis and treatment so characteristic of modern medical art, could have been attained. And now, when we see how simple is the principle of its use, namely, the convenient conduction to the ear of sounds made during vital action, it seems extraordinary to us that its value should have remained undiscovered so long. The stethoscope has been made in a great variety of forms. What is requisite is, that the ear shall be well covered with the ear-piece, that all the sounds conducted along the body of the instrument shall reach it; that the opposite end shall fit easily to any surface; and that it be made of good conducting

material; hard wood or gutta-percha is the best. Perhaps the double stethoscope may be ultimately a more useful modification than many others; but the great requisite for the right use of the instrument is a trained ear. To secure this, I propose that those who wish to perfect themselves in the use of the stethoscope, and of the other means of physical diagnosis, shall be formed into small classes for practice in the wards, on the evenings of certain fixed days. This plan will secure the *quiet* so necessary to the practice of the art of auscultation, and which is not easily obtained when many are present, however motionless and silent they may keep.

Instrumental Aids to Perception.—The aids to perception are those which enable you to measure time and space in relation to structure and function, and to ascertain the qualities of living matter, or of its constituents. The aids to the latter consist in the application of chemical research; of the former, in a variety of measures or *meters*. The height and weight of the body are often taken by standards and scales; the callipers and tapes measure portions of the superficies, and, indirectly, the extent of structural or func-

tional disease below. The amount of respiratory power may be measured variously. 1st, By taking the capacity of the thorax, as indicated by the amount of air respired. These are pulmometers, pneumometers, or spirometers. 2d, By determining the amount of expansion or contraction, or extent of antero-posterior movement of the thorax. Various kinds of "chest-measurers" have been invented for this purpose, having for the most part as the primary element the callipers or the measuring-tape. The rapidity of the respiratory action, as well as of the cardiac movements or the pulse, is measured by your watch or chronometer; the force of the heart by the sphygmometer. The aids to a perception of the qualities, conditions, and composition of vital structures or their products are equally numerous. The thermometer, usually placed under the tongue or in the axilla, gives a definite idea of the varying degrees of temperature of the body, or, placed upon the tongue, of the expired air. The urinometer (a barbarous name) measures the specific gravity of the fluids, especially of the urine; the test-papers indicate their acid or alkaline reaction; and various tests for morbid constituents in the blood, urine, and other fluids of the body, accompany the test tubes. Questions of che-

mical composition may, however, be sometimes solved by the use of the microscope.

Danger of unduly Estimating the Value of Aids to Clinical Research.—I have simply and briefly enumerated these various aids to clinical research. I shall not add more now, for to instruct you in the use of each is no part of my present plan. This, indeed, is the less necessary, as excellent manuals of instruction abound. I would rather direct your attention to two errors the student is apt to fall into in the application of them to clinical research, namely, of valuing them too highly, and of pursuing the study of them too exclusively, without continual reference to the great object of his studies, the acquisition of skill and tact in future practice. You may value them too highly, relatively. Consider this point in reference to two of the best of these aids, the microscope and stethoscope. All experienced microscopists agree as to the fallacies to which the use of the microscope inevitably gives rise, unless in hands familiar with its use by long manipulation. And even in such hands, fallacies surely abound; were it otherwise, how can we explain the discordant assertions of the most distinguished microscopists of the day as to the micro-

scopic appearances of morbid structures? The statements made during the successive discussions of the diagnosis and curability of cancer, which were held at the French Academy of Medicine in the autumn of 1854 (*vide* Edinburgh Monthly Journal of Medicine, vols. xix. xx.), sufficiently illustrate the extent of these discrepancies. At one of these (that of Nov. 7, 1854), Velpeau said that a portion of a cancerous tumour had been sent to Lebert for microscopic examination. He, finding no cancer-cells (theoretically so called), in the morbid structure, pronounced it benign. The disease recurred; in the second tumour then formed, the so-called cancer-cells were discovered. Now, as to Lebert's title, beyond most men, to give a confident opinion upon any point of pathological histology, there can be no question; how strongly, therefore, are we warned, by such an occurrence, as to the danger of too exclusive a reliance on microscopic researches. To shew this point more strongly, I subjoin the following quotation from Lebert's "Pathological Researches," published in 1847:—

"Before we began the study of pathology by the microscope, we were engaged during several years in microscopic researches on various questions of Natural History. Yet for all that, a long apprenticeship

was requisite before we could form true and exact opinions on the microscopic constitution of certain morbid products. . . . . Pythagoras required a five years' silence from his disciples before they expressed an opinion upon his doctrines. We would recommend to those physicians who propose to use the microscope in the study of diseased products, to keep silence for at least some years before they publish their researches."

These remarks apply equally to the stethoscope, although in a less extensive way. Every one knows how long a time is required to train the best ear to that detection of delicate degrees of tone which is requisite to the reliable use of the instrument, in the diagnosis of the more obscure forms of structural disease; and how signally the best stethoscopist sometimes fails, even in cases in which unaided but experienced observation triumphs.

The second error is that of pursuing the study of these aids to research too exclusively. Tact consists in the prompt as well as accurate detection of diseased states; it is, therefore, incompatible with a slavish dependence upon these various aids, for the obvious reason, that to use them occupies time. Further, in the daily routine of a busy professional life,

occasions will often arise when their use is impracticable. Delay may be dangerous; the patient may object; the clothing cannot be removed for physical exploration; the fluids cannot be obtained for chemical or microscopic inquiry; or if obtainable, the microscope and chemical apparatus may not be at hand. Ordinary professional life has various aspects. Every man is not equally qualified by natural gifts; there must be a quick eye and a delicate ear. But the eye and ear, however good naturally, and however well trained, may and do fail with age, although the intellect be still clear. Nor are the conveniences of infirmary routine the lot of the practitioner. That may be cast in the country or in the town; in general or in consulting practice; in a newly-settled country, with few appliances, or amidst the accessible conveniences of British civilization. None of you can tell what is before you. You must, therefore, be prepared for any fate. By far the greater number of you will necessarily have to meet the varied exigencies of general practice, and these, for the most part, are incompatible with much instrumental research.

NEED AND MODE OF STUDYING PHYSIOGNOMICAL DIAGNOSIS.—Now, to meet every exigence success-

fully, and to be armed at all points, you must, as far as practicable, be independent of these aids, and yet be able to profit by them so as to determine, with reasonable accuracy, the essential points in the case before you. How is this to be done? I would recommend this procedure. Now that you have an opportunity, study well the physiognomy of disease—that is to say, all those external characteristics in the patient that reach the unaided senses, and which are associated with morbid states, whether they be sounds, or odours, or visible and tangible modifications of form, complexion, expression, and modes of functional activity; taking cognisance of minute modifications as well as of the more obvious, for they are only minute in a popular sense. Technically, a shade of tint of the skin, a quickly passing change in the expression, an almost imperceptible modification in the breathing or mode of speaking, the ring of a cough, a local, and in itself trivial development of a capillary network, a slight twitching of a muscle or a tremor, may be as clearly significant of structural disease, as the most characteristic and undoubted physical signs. While, then, you study physical signs, note and compare the corresponding physiognomical characters. While you catch every symptom pre-

sented to the unaided eye, or ear, or hand, sedulously seek to connect them, as far as you can, with the physical signs you observe by means of aids, and with the pathological changes revealed by the interpretation of those signs. So that ever after, during your subsequent career, when physical exploration may be impossible, the visible and external phenomena may be associated with the hidden and internal changes, and thus a complete view of the morbid state be attained, independently of the mere aids to research.

PHYSICAL AND PHYSIOGNOMICAL DIAGNOSIS SHOULD CORRECT EACH OTHER.—There is another advantage secured by this plan of observation; you can use the one class of characteristics to correct the inferences deduced from the other. Mere experience, based on rational signs alone, is by no means trustworthy, and will too frequently lead you into error. Physical diagnosis, whatever theoretical ideas of certainty may be excited by its inappropriate name, is but another form of experience, and has its fallacies also. Often has this method betrayed the confidence of those who have relied upon it, to the exclusion of the more comprehensive and surer (albeit

less definite) help to be derived from physiognomical diagnosis. Looked at as the exponents of structural or functional changes, the external or physiognomical signs of disease are, in fact, as much physical as those to which that term is exclusively applied. To enable you to understand these better, I will give a short summary of them.

PHYSIOGNOMICAL DIAGNOSIS OF MORBID CONSTITUTIONAL STATES.—There are certain general morbid states, or predispositions to morbid states, which may be determined with sufficient accuracy for therapeutical purposes by certain external characteristics. Practical medicine recognises temperaments, diatheses, cachexiæ, and constitutional conditions, however pathology may ignore them. These give a special character to a multitude of local diseases, so that the general condition being known, the local state is intelligible. Knowledge like this constitutes a kind of intellectual microscope, for it reveals morbid changes in the living body utterly beyond the reach of the optical instrument. To what an extent this diagnosis is practicable in diseases (to mention examples), arising in arthritic, strumous, or syphilitic constitutions, is well known to the practitioner. But

that which is of still greater importance to know, is that the knowledge which we possess of the diagnosis and general treatment of these morbid states is often more accurate than of the diagnosis and treatment of the so-called local diseases. So that even when we fail to diagnose these latter accurately, we can nevertheless still administer suitable remedies; inasmuch as that which suits the cachexia will suit also the local change dependent thereon, although its exact nature may be unknown. Thus it is, that for each of the numerous varieties of local disease in an arthritic or strumous constitution, cod-liver oil or colchicum may be equally applicable as a basis of treatment. The great and manifold uses of this kind of knowledge must be obvious to you; I shall not therefore apologise for pointing out to you at length the external characteristics of these general morbid states.

NECESSITY OF PHYSIOGNOMICAL DIAGNOSIS TO DETERMINE THE MORBID CONDITIONS OF THE BLOOD AND VISCERA.—But in addition to what may be termed these innate or congenital tendencies to disease, there are general morbid states superadded to them, or induced by various causes, which also stamp local diseases with a special character, or give them a

wider meaning. To these belong various conditions of the blood—all the *hæmic* diseases; general morbid states of the nervous system; and diseases of important viscera, as the lungs, heart, liver, kidneys, uterus, ovaria, gastro-intestinal canal. The blood is variously coloured in various diseases, so that these variations in colour manifested through the capillaries of the skin (changes in complexion, as they are termed) become important signs of disease, and may be connected with miscroscopic and chemical researches into the pathology of the blood, and with methods of treatment founded upon those researches. So that the naked eye can thus be fitted with a microscopic perceptive power. The modes of breathing, and the attitudes of the trunk, are exponents of thoracic disease, but so also are changes in the colour of the blood, or in the facial capillaries themselves. The play of the facial muscles in abdominal disease, as well as the expression of the eye and of the countenance in affections of the nervous system, are keys to the diagnosis of groups of diseases, and are as significant and useful in their way as any merely physical signs, while, at the same time, they are of much more comprehensive import. I shall therefore indicate to you as briefly as I can in another lecture the external characteristics of this

kind and their interpretation, just as you learn in manuals of physical diagnosis the characters and interpretation of physical signs.

THE OBSERVATION OF THE ORDER OF SUCCESSION OF PHENOMENA THE FOUNDATION OF ETIOLOGY.—But let me not forget another matter for consideration, and remind you, that when you are inquiring into the pathological condition of a patient, it is only with the greater object of attaining to a knowledge of the *etiology* of the disease. Etiology or the science of the causes of disease, is nothing more than a knowledge of the order of successive development of morbid phenomena. The structural or functional changes upon which the symptoms depend may be revealed to you by physical diagnosis, and by all the admirable aids to the discovery of such changes which modern improvements afford, but you cannot rest satisfied with such knowledge. You must advance another step in the order of causation, and seek to know what is constantly antecedent to or precedes the structural or functional changes discovered. The importance of this knowledge to therapeutics is matter of daily experience, and is embodied in the maxim, remove the cause and the effects will cease. Now by

removing the cause is meant simply, interrupting the order of the morbid phenomena, or breaking a link or links in the chain of causation. To do this with tact and skill implies a quick perception of the results of what are termed causes, that is, of the origin, and progress, and ending of the great series of morbid phenomena with which you as practitioners will have to deal. I shall designate this technical perception *etiological diagnosis.*

Origin and Order of Etiological Phenomena. Let us examine for a moment how these etiological series arise, and go on with a view to classification and inquiry. In the first place, we must note that there are a number of agents, to speak metaphorically, which act from without—changes in the temperature, climate, habitations, clothing; in the articles of food and drink, as regards quality, quantity, or fitness; changes depending on the occupation or mode of life of the individual, that is, whether it be active or sedentary; in the open air or within doors; requiring great exercise of the sensorial or of the muscular system; the exposure to noxious agents, and the like. Practically this kind of knowledge is as essential to treatment as that which may be termed diathetic, and

for the same reason, namely, because prevention or cure often depends mainly upon the withdrawal of the individual from the causes of the disease. How would it be possible to cure a lead-neuralgia, so long as the sufferer, in virtue of his occupation, is being continually exposed to the poison? How cure a disease dependent upon alcoholic poisoning, so long as the patient is drunken?

Now it is an element in practical tact, to be able to eliminate the phenomena according to their causation; to this end a knowledge of the changes induced in the external characteristics, by various general or special causes, is of some importance. Patients are apt to deceive the practitioner. They are ashamed to detail their follies, or to reveal their secret vices, as manustupration, drunkenness, sensuality. But these vices reveal themselves to the practised medical eye. Or it frequently happens that patients are little aware of the value of the facts or statements which regard themselves; for they may have been insensibly, and therefore unknowingly subjected to injurious agencies. It is a valuable tact to detect the operation of these agents by their less obvious results on the organism, or by a consideration of the occupations, amusements, or pursuits of the patient.

Observation of the Natural Order of Vital Phenomena.—Let me pass on to another branch of etiology, namely, to that branch of causation which considers the phenomena that arise in succession *within* the organism, and according to fixed and determinate laws. In health, and therefore not less in disease, one change leads necessarily to another, whether the change be in development or in functional activity. Birth is followed by successive dentitions and by puberty; then mature life, with the reproductive organs vigorous, occupies a certain period, and next comes decline. Each sex has its peculiarities, as well as each age; and mingling with these are the varying influences of the circling hours and seasons. Disease has also its periods; so that it is absolutely necessary to etiological diagnosis, and equally I may add to *prognosis*, to know what is the natural order of events, and be able to apply that knowledge to practical uses. Here medical science presents a large gap or hiatus. We know something of the alternations sleeping and waking; of the menstrual period; of the periodical influence of night and day, and of the seasons. Nor are we altogether ignorant of the morbid changes to which each age and sex are liable at different ages, and the

like. We know, too, the periods of several forms of fever, such as the exanthemata and the intermittents. Little of this knowledge, however, has as yet entered the domain of physiological science, and even as to pathology and prognosis, the general, or at least the accepted knowledge of critical days is hardly more applicable to clinical medicine than in the time of Galen. We had yesterday presented to us in the wards of the Infirmary an illustration of this doctrine of critical days, in a case of pneumonia. A woman attacked with rigors on the 1st instant, has remission of the phenomena on the evening of the 7th, and sleeps; presenting, as a consequence of the change, a marked improvement on the following morning. Now Traube, a recent writer, gives the following aphoristic summary of his clinical observations as to the periodic phenomena of acute diseases. "If in acute diseases the abrupt sinking of temperature, leading to recovery, begins, as it generally does, within the first fortnight, then it is always either on the 3d or 5th, or 7th, or 9th, or 11th day that this occurs." This aphorism is so similar to some left us by Hippocrates, that it might be readily mistaken for one of his. How important, at the bedside, is a knowledge of the natural course of disease may be

easily comprehended. By it you may alike anticipate the exacerbations or the termination of disease. To what fallacies in therapeutics an ignorance of these laws of sequence leads, is now becoming better known. It is this knowledge, also, which teaches us, that if there be any disease for which a multitudinous array of remedies are recommended as having been found successful, we may conclude it is either a disease of the nervous system, amenable to the stimuli of hope and suggestion, such as epilepsy; or else a disease of the blood, as variola or pneumonia, which usually terminates in health as its natural and necessary termination.

Bearing of General Terms on the Observation of Etiological Phenomena.—Seeing the importance of knowing the order in which phenomena occur and recur, I shall give you a few rules so as to facilitate the observation of these periods in disease. But I must first strongly impress upon you that the age, sex, occupation, and habits of the patient, are not to be noted merely as a matter of course; a clear and distinct appreciation of the etiological bearing which the collective phenomena indicated by the word have on the morbid conditions, is of vital

importance to diagnosis and treatment. Under "age" is included a large number of special physiological facts; under "age" and "sex" a number equally special and fertile. Very often your various diagnoses, nosological, etiological, and therapeutical, as well as your prognosis, will mainly turn upon a consideration of the phenomena included in these collective terms. The order of succession of morbid phenomena, that is, of occurrence and recurrence, is illustrated by the doctrines of periodic vital changes and of critical days. These shall have a special notice, for I know of no work in which they are explained in a sufficiently comprehensible, and, at the same time, comprehensive way.

# LECTURE III.

## METHODS OF CLINICAL EXAMINATION.

INTRODUCTION.—It will be useful to recapitulate your objects in clinical observation. You wish to ascertain—

1. The existing morbid condition, the disease: Nosological diagnosis.

2. The pre-existent morbid conditions, latent or actual: Etiological diagnosis.

3. The course and termination of the disease: Prognosis.

4. The method of treatment: Therapeutical diagnosis.

You propose to attain these objects, 1st, By inspection of the patient, so as to read and interpret all the perceptible characteristics of the disease. 2d, By the patient's history of his case elucidated by cross-examination. 3d, By physical exploration of the various viscera, so far as the results already

obtained may require. 4th, By microscopical and chemical investigation of the secretions and morbid products.

First General Inspection of the Patient.—On approaching your patient for the first time, you will rarely be ignorant of the *age*, the *sex*, and the *duration* of the illness, that is, whether acute or chronic; and you will, by looking at the face and person, see at once the characters of the complexion and the expression, the state of nutrition, and the mode of breathing. In other words, you will learn in outline the condition of the blood, of the nervous, respiratory, and circulatory systems, and of the nutrient energy. These data will also enable you, from the first, to limit your inquiries to a class of diseases. If, for example, the patient is a child, it will have a disease of childhood, and not of the parturient state, or of adult life or old age; if the disease be chronic, you exclude all fevers and acute diseases; if the face be wasted, or the complexion cachectic, then you may have a blood-disease to treat; if of a strumous character, it may be a tubercular disease. The tone of voice, the cough (if heard), will direct your attention to the respiratory organs; distortion of a limb to the

nervous system, etc. So that at the first glance of your patient you have already made a decided advance in your diagnosis.

FIRST GENERAL EXAMINATION OF THE PATIENT. After this general but rapid survey, a more minute examination follows. The patient (we will suppose he is a man) will perhaps offer you his hand. You may derive information from this. The grasp may be weak and uncertain, and the limb tremulous. This condition indicates an affection of the motor portion of the nervous system, and you will rapidly glance at the face to see if there be distortion, or listen to his greeting to observe if his speech be hesitating; or you will feel the hand, and ascertain whether it is wasted, or hot, or dry, or wet with perspiration, or fat, or large, or rough, or smooth, and the like. The manner in which the hand is offered will tell you something of the mental character of the man you will have to deal with, while its condition will equally tell you something of his past habits and occupations. There is the rough hand of manual labour; the soft hand of the shopkeeper or merchant; the graceful hand of the gentleman-born; the fat hand of the drunkard. And do not think these hints trifling;

in clinical observation every minute particular is to be noted, and you cannot begin too soon. Begin, then, your observations with the hand as well as face, if the opportunity be afforded; *ex ungue leonem;* it may give you a clue to the whole case.

But this, as well as all other similar means of observation, should not be practised exclusively on the sick. You should accustom yourselves to note all the peculiarities of this kind in persons in health that come within your notice, and the relation of the *notanda* to the characteristics of the individual, of whatever age, sex, condition, habits of life, etc., he may be. Many persons can repress their emotional acts, alter the tone of their voice, and deceive you in various ways; but the phenomena I have just mentioned are rarely selected for deception, so that the information you obtain from them is often more trustworthy than that derived from the expression, or manner, or positive statements of the patient, and may, therefore, prevent you falling into error.

The manner of the patient is often flurried at first, and the pulse quickened from the emotional feelings of the moment. This should always be remembered, and time given for the feelings to sub-

side. In the meanwhile, you will glance rapidly over the features, and as soon as courtesy or convenience will allow, have your patient placed with his face to the light, while your back is turned to it. This arrangement will not only prevent him watching the play of your features (a thing the sick are very apt to do in consultation with their medical adviser), but will enable you to scrutinise his more effectually, without attracting his attention to your proceedings. The better to secure this point, you should, if possible, occupy his mind with some indifferent thing, no matter what. Four or five minutes well used will suffice to put you in possession of all the more obvious external characteristics of the case; indeed, often in active practice, two or three minutes can only be afforded for this purpose.

Close of First General Examination and Formation of First Theory.—You will now have guessed or learnt the age and occupation of your patient; noted his diathesis, or cachexia; his complexion, or the colour of his blood; the form and play of his features; his attitudes and movements; his mode of breathing; the colour of his lips and the like; and you will have formed already a general

opinion or theory as to the disease you have to encounter. The remainder of your examination and inquiry will be directed to the confirmation or rejection of this theory. If further inquiry prove it to be erroneous, you will form another; and if that be rejected, another, until you have satisfied yourself as to the morbid state, or come to the conclusion that you must suspend your judgment until you get additional facts, or try the effects of remedies.

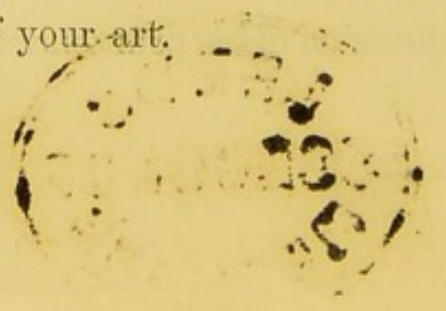
But you have as yet hardly spoken to your patient; all your facts have been objective; you now speak to him, and ask him a few general questions; his own opinion of his case, his occupation, whether married, how long he has been ill, or where he suffers; or else, seeing where he suffers, you state the fact interrogatively. This should be done, however, with caution, and in those cases only in which you can speak *positively*, for a mistake will give an unfavourable impression, and put you in a false position. You have now a more definite idea as to the seat of the disease, and as to its nature, that is, whether it be chronic or acute, and the like.

History Elicited, and Cross-examination thereon, of the Patient.—The next step is to

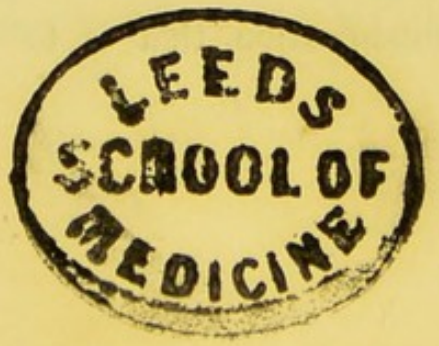
elicit the history of the morbid state. This is easy. Patients in general, if mentally competent, have a great anxiety to detail their ailments from the beginning. All you need do is to listen attentively to the story, only asking a question now and then, when the statement is doubtful or imperfect, or required to clear up a deduction already made. An important preliminary inquiry, and to be carefully made, if the case be one of acute disease, is, whether, previously to the attack, the patient was in good health or not. The result will indicate whether it is a relapse, or an intercurrent attack or not; and consequently, whether there be disease of one or more viscera already pre-existent. These questions should be as few as possible, and therefore pointedly direct. Nothing gratifies patients so much as attentive listening; if they become wearisome and prolix, they can be readily stopped by asking them to shew the tongue; this step being followed by appropriate questions. While the patient is speaking, you need not be idle. You can now study more minutely and carefully the various external characteristics I have already alluded to; you can analyse the tone of his voice; his manner of speaking or of breathing; the corporeal as distinct from the mental expression of his countenance, or lines

of physical suffering, etc.—constantly the while comparing and associating the facts of his history with your acquired knowledge, and with what you have observed and concluded already. The patient having finished his history, you can now proceed to ask him questions. Practically, by this time, you have attained to a tolerably definite opinion of his case. It only remains for you to verify that opinion by eliciting, in cross-examination, any additional facts necessary thereto. In the meanwhile, you can look at the tongue, feel the pulse, examine the state of nutrition of the system, and make such investigations as can be carried on without aids.

Orderly Exploration of the Functional and Structural Changes of the Viscera.—The cross-examination being finished, you next proceed to an orderly exploration of the condition and functions of the viscera directly or indirectly implicated. This is the most important part of the inquiry; for the result of your observations will be the completion of your nosological diagnosis—that is to say, you will determine the classification of the case, positively and finally (if possible), with a view to treatment, or the exercise of your art.



THE METHODS OF INQUIRY AND EXPLORATION EXAMINED.—There has been a good deal of discussion as to the methods to be followed in clinical inquiry, and I will here notice the principal. They are essentially of two kinds, the artificial and the natural. As to the artificial, the methods are two, the synthetical and analytical. The synthetical, called also the genetical and historical, begins the inquiry with the birth of the patient; includes the health of his relatives and ancestors, so as to trace his hereditary diseases; passes in detailed review the affections of his infancy and childhood; inquires into his social position and occupation, his bodily constitution, his usual morbid states, mode of life, personal habits, inclinations, and idiosyncrasies. This constitutes the first part of the *anamnesis* or medical biography of the patient. The second part ascertains the history of the existing affection, the mode of its commencement, its course, and the operation of the remedies already used. The entire anamnesis being concluded, the present condition of the patient, or *status præsens*, is investigated. In this, an inquiry into the structural condition of the viscera and their functions, each in succession, is carried out in a regular and systematic manner.



The synthetical method is the opposite to the analytical; it commences with the inquiry into the *status præsens*, and endeavours to ascertain the predominant changes of structure or function, and the phenomena subordinate thereto. The result of this inquiry is taken as a starting point for conducting the anamnesis, which, instead of commencing with the history *ab ovo*, goes backward from the *status præsens*. It is a retrospective research.

REASONS FOR PREFERRING THE NATURAL METHOD. The natural method is that which I would recommend for your adoption. I call it the natural method, because it is the method adopted instinctively by every man in his inquiries into the unknown. It is based upon simple observation of the phenomena, and comparison of them with one another, and with the knowledge which the practitioner has acquired of similar phenomena, either by instruction or experience. This comparison leads to the results instinctively aimed at, by a continuous succession of corrected theories, that is, corrected by observation and research—the results themselves being a knowledge of the causation or order of the phenomena, and of the means for their modification, that is to say, the treatment.

Of the respective merits of these methods much may be said. The synthetical may be considered the most scientific and the most applicable to pure pathological research. But it has the disadvantage of not being practical, that is, applicable to the requisites of daily professional life. It is comprehensive in its scope; but it sweeps up much that is useless in therapeutics, occupies much time, and implies great labour. The analytical has the same disadvantage as the synthetical in the latter respect; but this in addition, that there is no guide as to what should be observed and looked for in examining the *status præsens*, so that all the phenomena are presented with equal force to the mind; there is no centre of crystallization for the ideas, and without such centre, important phenomena may be left out. The natural method is free from these disadvantages. It equally requires the observations to be minute, careful, extensive, but is free from vagueness, for it is orderly as well with reference to the inter-connection and meaning of phenomena, as anatomical contiguity of parts. It comprises also the etiological and therapeutical diagnosis as well as the nosological—an important requisite for a practical method, when we remember that no two cases are exactly alike.

THE NATURAL CLINICAL METHOD ANALOGOUS TO OTHER APPROVED METHODS OF INVESTIGATION.—I may add, as a further recommendation, that in establishing the nosological diagnosis according to the natural method, you follow very closely the methods used in investigations in other departments of knowledge. It is analogous, for example, to the method of the naturalist. Diseases are practically arranged by nosological writers into natural orders, just as plants and animals are arranged, only taxonomical names are not given to them. The diseases of infancy constitute a natural order; the diseases of the brain, known as mental disorders, form another. In another we class the diseases of women; and again, diseases resulting from violence, or consisting in disruption or destruction of tissues, form the large natural order of surgical diseases. In botany you take some leading characteristic as the first step, and you class your plant with the Exogens, or Endogens, or the cellular plants. In zoology you determine whether the animal be vertebrate or invertebrate—bird or mammal; the limitation to one division excludes all the rest. In diagnosis you do the same. A disease of dentition excludes diseases of the puerperal or parturient state; a disease of a strumous character, as tubercular phthisis, excludes the

class of intermittent or continued fevers. Nor does the process apply less to etiology and therapeutics. Malarious diseases of summer exclude, in etiological diagnosis, the thoracic inflammations of winter; the group of saturnine diseases exclude those arising from mercurial poisoning. It is the naturalness, then, of this method which proves its value. When I come to speak of the two great methods of scientific research applicable to medicine, the numerical and analogical, I shall shew that in these there are the same fundamental principles in operation as in this natural method of clinical inquiry.

Final Conclusion as to Nature, Causes, and Treatment of the Diseased States.—The nosological diagnosis being established, the etiological and therapeutical arise out of it; for diagnosis in this sense is nothing more than determining the similarity of the case under observation to those from which the descriptions in recorded experience are derived. Having made this out, it follows that that experience can be made applicable to the case in hand. To do this, you read it up, noting in what respects, as regards the etiology and symptomatology, the case is closely similar—in what it differs.

Having decided upon your plan of treatment, you have to enter upon another and somewhat different duty—the management and supervision of your patient. I shall, however, defer the consideration of this, as I have still to describe those external characteristics of general morbid conditions, or, in other words, of certain natural orders of diseases, the due estimate of which will ultimately decide your diagnosis, whether it be nosological, etiological, or therapeutical. To this end I will, in the first place, give you a brief outline of the characteristics of the leading diatheses and cachexiæ.

## CLINICAL OBSERVATION OF GENERAL OR CONSTITUTIONAL MORBID STATES.

Definition of the Term Diathesis.—By the term diathesis is meant such an innate hereditary constitution of the body that, in the course of the vital actions, there will arise at various periods of life, under varying circumstances, local or general diseases, having a common resemblance, either as to etiology, symptomatology, or pathological anatomy. This may be shewn in disorder of a general process, of which the nutrient derangement characteristic of the strumous

and arthritic diatheses is an illustration ; or in disease of a special tissue, as in the nervous or the rheumatic diathesis.*

Definition of the Term Cachexia.—A cachexia is a morbid constitutional state of the blood and tissues, and not merely a special predisposition thereto. A cachexia may be either a diathesis developed into disease, or due to the etiological conditions of the individual. The hereditary strumous diathesis, *e. g.*, may be transformed into the strumous cachexia by innutrient food, by an impure atmosphere, or by depressing agents, but the strumous cachexia may be developed *de novo* under the same conditions. There are, therefore, hereditary diatheses, but both hereditary and induced or acquired cachexiæ. And it is probable that diathetic tendencies may also be acquired, although not manifested.

General Characters of a Diathesis.—The hereditary diatheses are the arthritic, strumous, nervous, bilious, and lymphatic. Of these, the two

* For the connection of the diatheses with temperaments, and numerous details on this subject, see my *Lectures on the Physiognomy of Disease*, in Med. Times and Gazette, January to June 1862.

latter are the least prevalent in the United Kingdom, and are by no means so well marked as the others. The lymphatic diathesis is closely allied to the strumous. All these combine variously with each other, and composite diatheses result. Each diathesis is a unity: that is to say, the external configuration and every function are in harmony, so as to constitute a whole. To diagnose a diathesis, we select such general characteristics as are easily observable. Of this kind are—the colour of the blood as seen through the capillaries; the development of the heart and vascular system; the conformation of the bones and muscles; the features; the form of the trunk and of the limbs: the condition of the teeth, hair, and skin; the state of nutrition; the activity of function; the amount of vital energy; and the mental character.

Physiognomy of the Strumous Diathesis.—A defect in vital force, manifested by defective nutrition, imperfect development, and deficient function. *Vascular Characteristics:*—The blood-vessels are thin; heart small; blood-corpuscles comparatively few, as indicated by transparent pallor of the skin. *Face.*—Cheeks over malar bones delicately tinted; conjunctiva pearly white. Skin thin, transparent,

white. Hair fine, silky, thin ; in early infancy immediately after or at birth often dark, closely-lying and abundant over the forehead, arms, and back. Eyelashes long, curved, lying close together ; pupil dilated, hence a soft expression of the eye. Teeth irregular, crowded, projecting, imperfectly enamelled, white, and pearly. Nostrils and upper lip thickened ; mouth large, or, if small, unsymmetrical.

*Bony development.* — Of a retrogressive type, either towards the infantile or a lower ethnic form, both as to cranium and other bones. Head unsymmetrical ; malar bones prominent ; frontal rounded and projecting ; temples hollow ; inferior maxilla projecting ; nasal bones unsymmetrical and sunken.

The *body* stunted : chest narrow and long from lateral compression at the summit ; ribs flattened and receding from the scapulæ, which project ; lateral curvature or other spinal curve ; keel-shaped sternum ; abdomen large and projecting in proportion as the summit of the thorax is contracted. Muscles flabby, soft, imperfectly developed ; heads of bones (or joints) large ; shafts slender ; wrists and ankles thick ; fingers thickened and clubby. Skin irritable, giving off abundant epithelial scales, in the form of furfuraceous stuff. Perspiration copious, acid. Mu-

cous surfaces generally prone to relaxation, irritable, and readily giving off mucous discharges.

*The functions* and vital energy are below par. *Digestion* imperfect; appetite capricious and irregular. *Respiration* feeble, hurried, defective. *Circulation* feeble; pulse quick; extremities cold; animal heat generally defective. *Locomotion* feeble; inaptitude for exercise or out-door amusements; manner listless; apathetic. *Nutrition* imperfect or vitiated, with tendency to fatty and albuminous deposits; puberty delayed; sexual appetite feeble. *Innervation.*—Nervous system irritable, feeble in tone; mind precocious, but mental powers imperfect, or if good, soon exhausted.

Syphilo-Strumous Diathesis.—Mr. Hutchinson has indicated the physiognomical signs characteristic of a syphilitic habit, and which distinguish it from the ordinary strumous diathesis it closely resembles. The hair is thin, harsh, brittle; nose somewhat snubbed; often traces on the cornea of infantile keratitiz and scars of ulcers about the angles of the mouth. The complexion is dull and earthy. The permanent teeth are most characteristic, being yellow, small, and peg-shaped, while the upper central incisors

have a broad vertical notch, with the corners rounded off, unless the notch have been worn away.

THE STRUMOUS CACHEXIA.—The characteristics of the strumous cachexia are those of the diathesis, but exaggerated. Skin more furfuraceous; hair scanty, rough, dry, brittle; nails brittle; teeth discoloured and decayed; alæ nasi inflamed and swollen; lips thickened, rough, and fissured; lower eyelids œdematous; lymphatic glands enlarged and inflamed. Abdomen pendulous; thorax more contracted; limbs wasted; joints more prominent. Respiration hurried; breath acid or fetid; appetite exaggerated or abolished; pulse quick, with feverish heat; muscular debility.

MODIFICATIONS OF THE STRUMOUS CACHEXIA.—Strumous diseases differ according to age, sex, and temperament.

During the period of the first dentition cutaneous superficial inflammations occur, most usually impetigo, eczema, lupus. During that of the second, cutaneous abscesses and ulcers, with caries of the long bones; these are observed especially of the apophyses. Olive-complexioned strumous children are most liable

to cutaneous ulcers, and glandular inflammations and abscesses. During childhood, there are tubercular deposits in the pia mater, and not unfrequently in the mesenteric or superficial glands; and strumous inflammations of the bronchial and intestinal mucous surfaces, as well as of the skin. At or after puberty, scrofulous deposit in the lungs; during middle and old age, in the liver and pancreas—less frequently in the lungs. In the aged, cancerous deposit not unfrequently takes the place of tubercle. In women, the ovaria and uterus are the seat of local disease at the decline of the reproductive power—as are the lungs at the commencement of it.

The strumous diathesis and cachexia abbreviate life. Strumous diseases greatly increase the mortality of childhood, being most prevalent and fatal at younger ages, and are comparatively rare in middle age.

The Atheromatous Diathesis.—Strumous persons of an arthritic habit manifest a tendency to a deficient nutrition of the blood-vessels, termed atheroma, and which often involves allied tissues, as the sclerotic coat of the eye, the connective tissue of the skin, etc. In addition to some of the marks of the

strumous diathesis, there is often a fatty, oily, skin, and a remarkable development of the cutaneous vessels; the cheeks are ruddy, and the vessels varicose; vascular nævi are observed on the trunk in adults; and when atheroma is beginning, an *arcus senilis* sometimes forms. This change, is not, however, pathognomonic of atheroma, and must be taken in connection with corded arteries, and other signs; nor does it always indicate a tendency thereto, as it may be due to wholly local causes.

Men of this diathesis of a quick temper have not uncommonly a line of dilated capillary vessels curving over the left precordial region, which I have named *precordial vascularity*. I have rarely seen it in women or youth. It indicates a predisposition to cerebral, rather than cardiac atheroma.

Physiognomy of the Arthritic Diathesis.—This is seen under two forms, which, from the amount of vital force in each, may be termed sthenic and asthenic; or if distinguished by the predominant temperament, may be known as the sanguine and the bilious. The common dominant predispositions of both are to the undue formation of uric acid, and to congestion, irritation, or inflammation and degene-

rations of the muscular and articular sero-fibrous tissues, of the vascular system, of the serous membranes, and of the periosteum.

PHYSIOGNOMY OF THE SANGUINE ARTHRITIC DIATHESIS.—This is the *sthenic* form of the arthritic diathesis. The external characteristics are, as to the blood and vascular system :—Blood-vessels numerous; heart large and powerful; blood corpuscles numerous; skin over malar bones highly vascular, giving a floridness to the complexion. Skin fair, firm, oleaginous, perspirable; eyes blue; hair thick, not falling easily; teeth massive, well enamelled, regular, even, undecayed in advanced life; malar bones flattened; head symmetrical; nasal bones well formed; nose aquiline or of mixed form; lower jaw massy; lips symmetrical.

*Form.*—Figure for the most part tall; thorax broad at summit; ribs, well curved; abdomen full; muscles firm, large; limbs large, robust; gait erect, well-poised. *Nutrition* active; digestion vigorous; appetite great for animal food and alcoholic stimuli. *Respiration* deliberate, deep; circulation vigorous; animal heat abundant; locomotion active; aptitude for exercise or out-door amusements. *Reproductive* powers active; innervation abun-

dant; the mental powers vigorous and enduring. This diathesis tends to prolong life; it is therefore seen often after forty.

The *predisposition* to disease in the arthritic diathesis may be *general*, and consist in the retention of urea in the blood, or in its too rapid production; or *local*, and consist in inflammation and inflammatory irritation of the products of the serous layer of the embryo, ending in calcification or bony change. When the retention of the urea is associated with a depraved blood-crasis, or with visceral disease, especially of the kidneys, liver, and heart, the arthritic *cachexia* is developed.

Modifications of the Sanguine Arthritic Diathesis by Age and Sex.—The *general* predisposition to disease in this form of the arthritic diathesis manifests itself variously according to *age* and *sex*. It is shewn most purely and distinctly in males, and at an age when nutrition is most active, and visceral disease at a minimum. In male children, by lithiasis; by eruptive diseases, principally *congestive;* and by an abnormal appetite for animal food; in male youths about puberty by epistaxis, hæmoptysis, and functional cardiac disorder. In middle age by gout;

by hepatic and cardiac congestion; by hæmorrhoids; and often by chronic congestion of cheeks and nose.

The sanguine gouty cachexia may be associated with struma, or it may be typical; the typical form is best seen in advanced age.

PHYSIOGNOMY OF THE SANGUINE GOUTY CACHEXIA. The external characteristics of this gouty cachexia are —blood-vessels largely developed over the malar bones, and varicosed; blood darkly tinted or icteric; skin oily, yellow from subcutaneous deposit of fat, or fatty degeneration of the derma; hair thick and white; teeth numerous, discoloured, crusted with tartar; lips bluish; nose reddish, hypertrophied; margin of lucid cornea opaque at junction with sclerotic (the *arcus senilis*); abdomen pendulous; limbs thick; joints nodose; nodosities on the ends of the fingers, lobes of ears, fasciæ of muscles and tendons; respiration hurried, wheezing; pulse intermittent, irregular; stomach flatulent; digestion acid; urine loaded with lithates. Temper irritable; mind sometimes enfeebled.

The *local* diseases of the arthritic cachexia are principally seen in adult males past the age of forty-five. They consist especially in chronic inflammations of the muscular and articular tissues; in calcification

of the basilar and coronary arteries, and of the cardiac valves. These changes give rise to hæmorrhagic apoplexy, angina pectoris, and cardiac hypertrophy and dilatation; and to secondary pulmonary affections, as emphysema, pulmonary apoplexy, and asthma. Irritation of the mucous surfaces is not uncommon in this form of arthritic cachexia, giving rise to nephritis, pharyngeal and laryngeal coughs, diarrhœa, chronic gouty eruptions, knobby fingers, and the like.

Arthritic Predispositions in Woman. — The arthritic diathesis and cachexia, as manifested in woman, have never had the attention they deserve. This omission has arisen from a fundamental mistake in pathology, namely, that they occur but seldom in the sex. They predispose at puberty to hysteria in anomalous forms; to varied neuralgiæ; nephritis; hysteritis; acute cutaneous inflammations; and to vicarious urinary and menstrual discharges.

The arthritic cachexia in the female predisposes to chronic skin diseases, especially desquamative chronic erythema of cheeks and nose; to chronic inflammation of the uterine cervix; and, in the decline of life, to nodose joints and fingers and to rheumatic gout.

PHYSIOGNOMY OF THE OLIVE-COMPLEXIONED ARTHRITIC DIATHESIS.—The olive-complexioned or bilious arthritic diathesis is usually asthenic, and is comparatively of rare occurrence. Its external characteristics are—Blood-vessels few; blood corpuscles an average or below par (oligæmia) no capillary development over the malar bones; complexion tending to olive; hair dark; teeth small; features and limbs small; tendency to *embonpoint;* appetite feeble; circulation feeble; calorific powers defective; hepatic functions imperfect; predisposition to gout at an early age, and in the females of a family as well as in the males; to struma; to tubercular hæmoptysis at puberty; to cataract; atonic gout; to nephria and to chronic purpura at more advanced ages.

ASTHENIC ARTHRITIC DIATHESIS AND CACHEXIÆ. It is more usual to meet with complex rather than the typical forms of the cachexiæ and diathesis just described. The arthritic diathesis and cachexia may appear in an asthenic form, and be characterised specially by a tendency to tubercular deposit, or else by fatty rather than albuminous or calcareous changes in the tissues. The last mentioned may be designated the adipose arthritic cachexia. It is allied in

the quality of feeble nutrient action to the strumous diathesis, with which it is sometimes confounded, sometimes complicated. There are two varieties. The one characterised by fatty accumulation, of which chlorosis gigantea and polysarcia are types; the other by fatty deposit in the interstices of tissues, as in those of the heart, arteries, kidneys (fatty degeneration). In both the external characteristics are those of the arthritic diatheses, and in both the ancestral or family taint must be noted. Probably it is the olive-complexioned which presents, comparatively, the larger number of these asthenic types; in this respect there is an analogy between the olive-complexioned strumous diathesis, and it. As to the adipose cumulative form, the external characteristics are obvious enough, namely, corpulence of limbs, face, and abdomen. This is, perhaps, in strictness, the lymphatic cachexia, which I will notice shortly. In the adipose *depositive* form, there are usually evidences of feeble powers. The figure is slight (especially in the olive-complexioned), the pulse weak, the extremities cold; blood vessels are sparingly scattered over the cheeks, and the few there are, not unfrequently become varicose early in life. One tooth in the lower jaw is often seen to be thrust out of rank (a "buck-tooth").

An arcus senilis, probably fatty deposit, occurs at an early period of life — sometimes before forty — and the specific morbid actions are of a low type and metastatic, giving rise to retrocedent, irregular, misplaced, or nervous gout. This form is closely allied to the next I shall mention as belonging to this group, namely, the arthritic tubercular cachexia. The fatty degeneration which characterises it seems to pass readily into the tubercular or cancerous under circumstances favourable to these changes.

Physiognomy of the Arthritic Tubercular Cachexia.—With the taint of gout in the ancestral or collateral line, there are always present some of the leading characteristics of the arthritic diathesis, namely, regular features, well-set sound teeth, and a pearly white and florid complexion. But the lower jaw is usually contracted, the bones of the face small, the skin delicately thin or transparent; the neck elongated; the thorax narrowed; the heart's action feeble and irregular. This is often considered to be a form of the strumous diathesis or cachexia, but it is much more distinctly allied to the arthritic. The characters of the strumous tubercular patient are in strong contrast with those just mentioned. The pupil

is more dilated; the nose and lips thicker, the teeth more irregular, more discoloured, and more frequently decayed; the skin more furfuraceous, the smaller joints more clubby. The similarity between the arthritic tubercular cachexia and the strumous consists in the hæmoptysis, which, in the former, is so frequently *followed* by tubercular deposit in the lungs. The cause of this pulmonary hæmorrhage in the arthritic is rather a fatty degeneration of the pulmonary blood-vessels, (at least when it is the earliest symptom) than, as in the strumous, a deposit of tubercle. There seems reason to think, too, that when tubercle is actually deposited in this cachexia it is rather of the grey semi-transparent than the yellow variety. It is found in the air-cells, rather than the capillary bronchi, while deposit in the lymphatic glands is a rare occurrence. All these points distinguish the arthritic tubercular from the strumous tubercular cachexia.

The Adipose or Lymphatic Cachexia.—The *adipose* or lymphatic cachexia is a complex form with both a strumous and arthritic element. Its characteristics are, large bones, largely developed heart and vascular system; early deposit of fat under the skin,

in the omentum, the mammæ, the face. With these there is want of osseous symmetry; a feeble muscular power; imperfect digestion; unsound teeth; acid breath, and other strumous signs. The predispositions are to tubercular disease in the early years of life, up to twenty-five; to irregular gout after forty-five. Very often the accumulated fat is suddenly absorbed, leaving the individual thin and lank, or the contrary takes place, and the individual rapidly becomes loaded with fat—both changes recurring in consequence of depressing agencies.

Physiognomy of the Hæmorrhagic Cachexia. The vascular or hæmorrhagic diathesis or cachexia is a modification of the asthenic arthritic forms; but there is also an important abnormal condition of the blood itself, as well as of the blood-vessels. It is the hæmophilia of Schönlein. The external characteristics, if developed in individuals of the Teutonic race, are a fair complexion, usually blue eyes, and an abundant capillary development over the malar bones. If in the dark or olive-complexioned, the eyes are grey; the hair black; the circulation feeble. A marked susceptibility of the males of the family to hæmorrhages from slight causes, at all ages, is a

marked characteristic of this variety of the arthritic cachexia. Besides this hæmorrhagic tendency, there is a predisposition in youth to spasmodic and neuralgic diseases and to phthisis; in middle age to hypochondriasis; in advanced years to nephritic and gouty pains. Very often struma complicates this form.

There is a variety of this type occasionally met with which is complicated with the nervous diathesis, and is specially characterised by excessive sensorial development. For the most part the complexion is highly florid. It predisposes to arterial neuralgia; to arteritis, with plugging of the artery, and gangrene; and to profuse hæmorrhages from the parenchyma of organs—splenic—gastric—anal—hæmorrhoidal or cerebral—according to age.

All these cachexiæ shorten life.

The Rheumatic Diathesis and Cachexia.—Two forms will be observed, the vascular, allied to gout, and the strumous, with external characteristics of struma. In the latter there is no floridness, but pallor of complexion; a predisposition to sero-fibrous, and not to synovial inflammation is observed; to lymph deposits in the vascular system; and to local

diseases dependent on arteritis or on travelling lymph plugging the vessels (*embolismus*).

PHYSIOGNOMY OF THE NERVOUS DIATHESIS AND CACHEXIA.—The external characteristics are, medium stature; small muscular development, spare habit; countenance mobile; eye lively; forehead broad and lofty; muscular movements abrupt, jerking, and energetic; the sensorial sensibility is great. This diathesis often constitutes an important element in the other diatheses and cachexiæ, especially the arthritic and strumous; ingrafting, when present, a predisposition to asthenic and anomalous diseases of the nervous system. The especial diseases to which it predisposes, when thus associated, are insanity, anomalous hysteria, eccentricity, oinomania, epilepsy, eclampsia, chorea.

PHYSIOGNOMY OF THE CANCEROUS CACHEXIA.—This may arise in any diathesis or cachexia, but it appears to be most frequently associated with the strumous about middle age or later. The deposit which characterises it usually occurs in organs which are exempt in the earlier periods of life from tubercular deposit. The characteristics are therefore, as

to the features, those rather of the strumous cachexia than the arthritic. The complexion is muddy, waxy, or semi-transparent; the venous circulation torpid; the expression of countenance gloomy; the temper captious and melancholic; the muscular power enfeebled; the appetite impaired; the body progressively wasted; the nights sleepless. It attacks middle age.

The Hæmic or Blood Cachexiæ.—The induced and not necessarily hereditary cachexiæ are hæmic in especial. They are essentially characterised by change in the red blood corpuscles, either as to number, to colour, or to vital force; or by increase of the white corpuscles. Pallor of the surface is a predominant characteristic; but it must be borne in mind, in the estimate of their relations, that they will vary much, according to the age, temperament, diathesis, or cachexia upon which they are superinduced; and that they may occur in any temperament, diathesis, or cachexia. I can only indicate the leading forms.

i. *True Anæmia from Loss of Blood.*—The characteristics are—Pallor of the lips, prolabia, face, hands; tendency to deposit fat; pulse jerking or thrilling; cardiac impulse slapping, palpitating; blow-

ing murmurs, especially in the veins; feeble capillary circulation, indicated by œdema and transient albuminuria; respiration hurried; muscular power feeble; limbs easily aching; sensorial powers feeble.

ii. *Physiognomy of Scorbutus.*—This cachexia arises from imperfect nutrition and aëration of the blood. Characteristics vary as to the stage and intensity. The first stage, most usually designated chlorosis, and may therefore be distinguished as the *chlorotic.* It is marked by a muddy pallor of the complexion; pale gums; languor; hurried respiration; gastric pain and irritation; fœtor of breath. In the second stage (which from its sequelæ may be distinguished as the *rheumatic*), we note a complexion of a dusky, dirty tint; features slightly swollen; spongy gums, soon bleeding; œdema; pains in the limbs. Third stage (*the hæmorrhagic*), leaden pallor; gums purple or livid, fungoid; vibices and petechiæ; hæmorrhages from the mucous surfaces; albuminuria; spasmodically flexed extremities; knees swollen and painful; "bullock's liver," a fungus growth, from wounds.

iii. Of the *glandular hæmic cachexiæ* I note the following:—

*a.* The *splenic* (anæmia), with death-like pallor,

and enlarged spleen. Variety, the leucocythæmic or leucohæmic of Virchow.

*b.* The *gastro-splenic* or true chlorotic, with gastric neuralgia.

*c.* The *gastro-hepatic* or *melanchlorotic.*—A combination of splenic spanæmia, with scorbutus.

*d.* The *melancholic*, associated with atrophy of the spleen ? characterised by a deeply sallow or dirty complexion ; pallid lips ; œdema of left leg ; neuralgic pains in left side ; suicidal despondency.

*e.* The *melancholic*, with displacement or irritation of colon ?—Anæmic tint ; despondency ; indigestion ; wasting ; constipation or diarrhœa ; pain in region of colon.

*f.* The *supra-renal?* or "bronzed skin" anæmia. Nails white ; prolabia and mucous membrane of mouth, stained with inky patches ; the face, hands, axillæ, and trunk, variously coloured—either uniformly or in patches of a colour varying from pale yellow to bronze ; the hands and feet cold ; pulse feeble ; a feebly-beating heart ; irritable mucous surfaces ; wasting. This has hitherto been observed as an affection of adult life ?

iv. To enumerate the cachexiæ dependent upon morbid states of the viscera, whether structural or functional, would lead me away into general pathology.

I need only refer, therefore, to the renal, the cardiac, the hepatic, and the onanistic, as illustrations of the general cachectic conditions thus originating, and which are in fact chronic morbid states of an intractable character. There are also various cachectic conditions primarily dependent upon certain poisons, the characteristics of which ought to have your special attention. Alcohol and lead-poisoning are the most common forms, but others should not be forgotten, as those arising from iodine, phosphorus, etc.

I have dwelt at some length upon these cachexiæ, as important *notanda* when taking a case, partly because there can be no philosophical diagnosis or therapeutics without a thorough knowledge of them, but mainly because the information regarding them in our systematic works on medicine is scattered through many volumes, and at best is imperfect. What I have detailed to you is confessedly imperfect too, but it is right to say that it is the result of much careful observation and thought on my own part.

# LECTURE IV.

## ON PROGNOSIS AND ON THE ORDER OF SUCCESSION OF MORBID PHENOMENA.

Prognosis.—After you have established your diagnosis and treatment, you will still have to watch the progress of the disease from day to day, and to manage the case. Especially you will be called upon to state your opinion as to the probable duration and results of the illness. This is that part of the medical art termed prognosis. Prognosis may be based upon simple experience. I gave you an illustration of empirical prognosis in my first lecture, drawn from the aphorisms of Hippocrates. As a fundamental principle of this kind, and of equal antiquity, it may be stated, that the more the countenance changes from its ordinary condition, the greater the danger. The *facies Hippocratica* is a change in the physiog-

nomy, the description of which by Hippocrates is so true to nature, that his name is linked with it for so long as medical literature shall exist. It is well worthy your study in the dying. I will quote the description. "The features have their last degree of alteration when the nose is pinched, the eyes sunken, the temples hollow, the ears cold and contracted, and the lobe turned out, the skin of the forehead rough, tense, and dry, and the colour of the whole face yellow, or black, or livid, or leaden." Or take the following description from the same writer of the carphologia or movements of the hands in typhomania, so prognostic of a fatal issue in fevers and cerebral diseases. "I have made these observations upon the movements of the hands. In acute fevers, in peripneumonias, in phrenitis, and in headaches, the hands moved to and fro before the face, seeking in the void, as if gathering bits of straw, picking at the coverings, or detaching objects from the walls of the room, constitute so many signs of a fatal termination." Now this kind of prognosis, being dependent upon observation and experience, can only be acquired by assiduous observation at the bedside of the sick. It is hardly possible to give general rules. You must acquire this tact in the wards; and you

will have opportunities for the acquisition, because so many of the cases admitted are of a serious character, and of necessity terminate fatally.

INSTANCES OF COMMON RULES FOR PROGNOSIS. There are a number of common-sense rules, however, which are deductions from our knowledge, and not the results of our mere experience. Thus we can easily comprehend that in a disease like bronchitis or phthisis, in which there is copious expectoration as an essential part of the affection, a sudden cessation of the process will but be the forerunner of death, inasmuch as we know that the retention and accumulation of the sputa in large quantities in the bronchial tubes will necessarily cause fatal asphyxia. So also we may conclude that a continuous wasting going on unchecked by treatment, in an individual who ought not to waste normally (as in adult life), implies a fatal termination of the disease, whatever it may be, or wherever its seat; for the inevitable tendency of such a state is to terminate in a fatal exhaustion of the vital powers. In like manner, when a disease has resisted suitable remedies at a period when the system was in a favourable state for their due and salutary action, it is not probable

they will be more efficacious when the disease is more advanced; but, on the contrary, we may expect less and less favourable results. Many rules like these are deducible from common-sense views of health and disease.

THE FOUNDATIONS OF SCIENTIFIC PROGNOSIS.—But there is a prognosis which may be termed scientific, inasmuch as it is founded upon certain general laws of occurrence or recurrence, according to which distinct series of vital actions, whether normal or morbid, succeed each other at regular periods, that is, after laws of definite duration. This kind of prognosis is well known, and constantly practised in the eruptive fevers; the more especially in them perhaps, because the eruption or cutaneous inflammation is a phenomenon, or a series of phenomena, easily watched and estimated. It is also of great practical value in the treatment of intermittent fevers of every kind, for in these the paroxysm of the fever is usually marked so clearly from its commencement to its termination, that the most superficial observer can hardly fail to note the law of periodic recurrence. In women, in whom there is a general change in the health co-existent with the monthly

functional activity of the ovaria and uterus, a practical prognosis, founded upon this monthly nisus, has been in use amongst physicians from the earliest ages. Here, again, in the flow of the catemenia there is a well-marked indication of the periodic change, although practitioners are sometimes led into error by their patients, who do not usually note the flow unless it be coloured. If there be few blood-corpuscles, and little flow, it is popularly believed to be suppressed.

THE SIGNIFICATION, AND NOT THE EXTENT OF PHENOMENA, THE IMPORTANT ELEMENT IN PROGNOSIS.—Now it is a mistake to conclude that there is no periodicity or order of sequence in other diseases, and in other series of vital phenomena, because no very manifest or tangible phenomena indicate the operation of the law of regular occurrence. Phenomena are minute in a popular or relative sense only. The sudden fall of the pulse, in a certain stage of pneumonia, is equally as significant of an important change (a change for the better) in the patient, as the due flow of the catamenia regularly, at each monthly period, is significant of an appropriate change in the system of the individual at that

time, and of healthy ovarian action. It is the signification then, and not the extent of phenomena, which renders them important. In this way a sudden and transitory syncope, or a sudden blindness, or a grinding of the teeth, may be much more important in prognosis, than a markedly irregular pulse, a violent palpitation, or a paroxysm of delirium.

In those cases, therefore, in which the phenomena are not extensive, although significantly important, it is an advantage to know when and how to look for them, for thus they will be the more readily detected or observed. I propose to give you this information.

Definition of a Critical Day.—And first, as to the critical days, so called, or the order of recurrence of phenomena in fevers and periodic diseases. I define a critical day as that day on which some change takes place in the phenomena of the disease, significant of two things; first—either of death, amelioration, or recovery on that day; or—of death, amelioration, or recovery on a subsequent day. The change may be from health to disease, as occurs in the onset of fevers; or it may be in the cessation, exacerbation, or development of symptoms in the course of the affection. Such a development as an intense rigor, a hæmorrhage,

a diarrhœa; such an exacerbation, as a rise in the pulse from 100 to 130; such a cessation, as the occurrence of sleep after sleeplessness—of a breathing moisture of the skin after feverish dryness—of disappearance of the albumen in albuminous urine, and the like. But the change may not be marked by any obvious symptom; it may only be in the feelings of the patient; he may feel much better or much worse, and nothing more be noticeable; yet this is also a change; indeed, a very important change. All diseases that have a definite period of duration, as fevers; all paroxysmal diseases, all sudden injuries, as wounds; and many chronic diseases, with intercurrent febrile phenomena, as phthisis, manifest a law of periodicity. Their various exacerbations, remissions, and phases, may be therefore anticipated and provided against; or if remedies be given, the action of the remedies may be considered apart from the action of the law of sequence. Now, the first thing to determine in cases of this kind, is the date of commencement of the series, for the detection of the periods will follow upon this.

Mode of Observing Periodic Changes Generally, and in Fevers.—There can be no difficulty

in the observation of periodic changes in all paroxysmal affections; for the date of the commencement of the paroxysm will be the starting-point of the calculation, unless it is clearly obvious that the paroxysmal phenomena have themselves a relation to some antecedent series, as rigors, sudden headache, or the like. In a case of this kind, each sequence should have a separate notice and calculation, and then the two series should be compared.

The method of counting critical days in fevers, is the following:—Take the day of the first sense of chill, or if that cannot be ascertained, the first day of exacerbation or remission. Then count backward theoretically, and see if the order of succession of any observed phenomena corresponds to the already supposed type, and then observe carefully the symptoms as they subsequently appear. In entering dates in the case-book, place the day of the disease below the day of the month. When a whole family is attacked, note the days in each case very carefully, and in addition ascertain the menstrual or dentitional periods, the date of birth, and the menstrual periods of the mother. Indeed, if possible, these should be ascertained in all cases.

Although as to fevers, the ordinary rule is to date

from the first rigor, and not from the occurrence of a mere premonitory phenomenon, as a diarrhœa; yet premonitory phenomena should also have their place in the case-book, and be referred as accurately as possible to the proper date. Subsequently it may so happen, that they will serve as important links in the series of events.

Critical Days in Chronic Diseases.—In chronic diseases, the law of periodicity is rarely so distinctly marked as in the acute and paroxysmal, for the obvious reason, that the changes which indicate periodic movements in the vital actions are from a state of disease to a state of disease, and not of health. I may add, also, that in chronic diseases, the order is not itself usually so regular. From time to time the type will change; as in an ague, from a quotidian, or every-day type, to a tertian, or every other day, or every fourth-day type, and back again; so that without careful calculation, as well as observation, there may be nothing but confusion apparent.

Observation of Longer Periods.—The preceding remarks apply to critical days in the ordinary sense of the term. But there are periods which recur

at intervals of weeks, or at intervals which are multiples of weeks, such as is the menstrual period; or at intervals which are multiples of a month, as the periods of utero-gestation, of dentition, of recurrent insanity, and other affections of the nervous system.

THE MENSTRUAL PERIOD.—1. This is the typical form of the twenty-eight day or monthly period. In women it should always form an important point of observation; it may be taken, indeed, as a starting-point in the greater proportion of cases. It is usually indicated by the occurrence of the principal and most obvious phenomena, the sanguineous discharge; or, when this is suppressed, it can be calculated retrospectively or prospectively from the last appearance of the discharge. And this is an important principle, for the mere suppression of the more obvious characteristic must not, by any means, be taken to indicate that the entire series of physiological changes in the blood, the nervous system, and the ovaria, are suppressed too. They may, on the contrary, be only the more important, because occurring in deviation from the healthy manifestation.

The monthly period occurs in males as well as

females, and is occasionally indicated even in them by hæmorrhagic discharges, as epistaxis, hæmoptysis, hæmatemesis, hæmaturia, and hæmorrhoidal flux. Most frequently, however, the law is shewn in the monthly return of paroxysmal diseases of the nervous system, of which epilepsy is the most common.

The monthly period is simply a multiple of weeks; it may be therefore shortened or lengthened just as the menstrual period. The most common modifications are into fourteen and twenty-one days, and multiples of them, as six weeks, two months, three months. Utero-gestation and the parturient state will afford you illustrations in women, as well as paroxysmal affections in both sexes. I may add, that all febrile and inflammatory affections of the parturient state are ruled as to their exacerbation and decline by critical days. In making a calculation, the fact should be noted, whether the term of utero-gestation is a normal multiple of weeks, and whether the commencement of labour was a natural or an unnaturally induced process. If the latter, the calculation as to the periods should be made from the last normal catamenial flow.

Dentitional Periods.—During the three dentitional periods, but especially during the first and

second, there is a law of periodicity in operation, not dissimilar from that which regulates the action of the ovaria when puberty is established. This is shewn by the recurrence of convulsions, diarrhœa, and the like, as well as by the eruption of the teeth at multiples of the weekly or monthly period. The careful observation of the operation of this principle will be occasionally found of much value in the diagnosis, prognosis, and treatment of the diseases of infancy and childhood. For practical purposes, each eruption of a tooth may be considered as analogous to a menstrual period, so far as the *general* health is involved; that event may, therefore, be calculated from both, prospectively or retrospectively. During the third dentition (the eruption of the *dentes sapientiæ*), we have the completion of puberty. At this period, the physiological phenomena are very different from those of infancy and childhood, and consequently the pathological phenomena are very different also; but the seat of the principal phenomena, the nervous system, is the same. Hence the occurrence of functional diseases of the nervous system, especially in women, at this age. The more important modifications in the health are due to the action (regular or irregular), of the ovaria and testes, as in hysteria.

THE RELATION OF CRITICAL DAYS TO THE WEEKLY AND MONTHLY PERIODS.—The critical days in fevers are submultiples of the week; they differ, just as the disease may be of a tertian or quartan type. For practical purposes, the 4th, 7th, 11th, 14th, 17th, 20th, are the most important; but of all, the 7th and 14th. They occur in a large number of acute and chronic diseases, but are marked with much more distinctness in some than in others. Thus, the tertian changes in a case of phthisis require aids to observation to detect them; the patient must be weighed daily; the amount and character of the urinary excreta noticed, etc. In an ordinary case of quartan ague, running on for several weeks, the paroxysms require nothing more than simple observation. Occasionally the types will occur alternately at regular periods. As, for example, there may be a quartan type for a definite number of weeks, then a tertian type may come in and continue for a period; or, what is not unusual, there may be definite periods of health alternating with paroxysms at tertian, quartan, or other periods.

THE DISEASES CHARACTERISED BY PERIODIC CHANGES.—The following are the diseases in which you may observe critical or periodic changes:—

Primarily and eminently the malarious, or diseases caused by marsh miasm; that is, fevers of the intermittent class, and all forms of disease in which marsh miasm exercises a predominant influence, as intermittent neuralgiæ, and other similarly periodic affections of the nervous system.

Inflammatory fever, following on mechanical injuries.

The entire group of the exanthemata.

The groups of fevers dependent upon a specific cause, the operation of which is progressive, and occupies time, as exanthematous typhus, whether Irish, petechial, miliary, or pestilential; influenza; relapsing fever; erysipelas; the intercurrent febrile attacks in the leprous and syphilitic cachexiæ; hydrophobia; tetanus.

The excretory fevers, as acute gout, rheumatic fevers.

Inflammations traceable to any of these fever-poisons, as herpes zoster; acute pemphigus; also various forms of pneumonia, pleuritis, bronchitis, nephritis, diarrhœa, hysteritis, inflammatory dyspepsia, and cutaneous inflammations, occurring as intercurrent or secondary diseases.

The critical days are not well marked in the

ochletic and miasmatic or sewer-poison fevers, or in the intermittents that have changed into the continued type; but the day of death, or the occurrence of a favourable or unfavourable change, is often on a critical day. In the various forms of fever in which intercurrent visceral inflammations constitute important complications, or in which there is great devitalization of the blood, the order of the phenomena is apt to be set aside, and death either occurs quickly, or the natural termination is delayed. This explains the conflicting statements of observers as to these points, one of whom (Dr. Latham) makes out that more than one-third of his total number of cases of fever were prolonged beyond the twenty-eighth day; and of these so prolonged, one-third were prolonged above six weeks. In instances of this kind the *sequelæ* of fever are surely confounded with the essential condition itself, which is rarely prolonged beyond the twenty-first day. It is in pestilential fevers (as plague, yellow fever, cholera) that death is too early for the manifestation of the regular periods of the fever. Should the epidemic be mild, then these are seen. Indeed, this circumstance alone renders the etiology of fevers a difficult question for investigation, giving rise to a sub-acute instead of

a per-acute type. In well-known fevers, as the variolous, we know how widely individual cases will differ. Analogy would teach us that this varying action of the poison occurs also in influenza, typhus, yellow fever, and plague; indeed all the pestilential forms.

Observation of Meteorological Influences. I have said nothing of those periodic influences, which, being primarily or secondarily atmospheric in their origin, influence the course of vital phenomena by direct action on the organism. The presence and absence of the sun's rays corresponds to the time of waking and sleeping; and these states again influence in a very important manner the accession, exacerbation or remission of disease. Changes in temperature, both diurnal and annual, occurring in consequence of changes in the sun's place, together with the barometric, electrometric, and hygrometric variations following thereupon; the seasonal sweep of aërial currents, as winds, and even telluric changes, have all their influence; sometimes counteracting all treatment, sometimes developing disease with fatal rapidity, and not unfrequently giving a fatal character to diseases, which, under more favourable meteorological conditions, are

for the most part very mild. Meteorology, in its practical applications, is as important to medical art as to agriculture or navigation; and no practitioner is complete in practical tact without a knowledge of these applications. At present, however, I can only state a few general facts.

Observation of Horary Meteorological Changes.—The hours of the twenty-four in which pathological and physiological changes take place are, in the order of their importance—

*a.* From 4 to 6 A.M., when the consumption of oxygen by the organism is at the *minimum;* the thermometer low; the atmospheric pressure low. Death is most frequent at this period; and attacks of epidemic cholera, diarrhœa, ague, and the like, most likely to occur.

*b.* From 8 to 10 A.M. are favourable hours for the health, and the opposite, therefore, to the early morning hours.

*c.* The night hours are appropriate to sleep; and it is during these that diseases seated in the nervous system, or originating there, are the more frequent. The hour of falling asleep is marked by a state of the sensorial system closely analogous to that of morbid

states; there is a quasi-delirious condition, predisposing to those paroxysmal diseases, which are usually associated with an abnormal circulation of the blood through the brain. It is at this hour that delirium begins in fever and insanity, and that epileptic attacks occur.

*d.* The hour of profound slumber, usually from 1 to 2 A.M., is also characterised by a state predisponent to paroxysmal diseases, but more especially to those in which interrupted excretory function acts on the nervous system; to this group spasmodic asthma, the spasmodic neuralgiæ, and gout, especially belong.

Observation of Seasonal Changes. — The seasons exercise an influence in various ways upon the progress and treatment of disease. It is to be regretted so little information is afforded by systematic or text-books on this point; we want, in fact, a system of medical meteorology. I can at present only request those of you who attended my winter course on the Practice of Medicine, to recal to your remembrance what I then said. I may here state generally that you have compound influences to consider. There is an inner annual revolution in the vital phenomena of animals, especially of the vertebrate

class, which is almost, if not wholly independent of the seasons, and which, like that of sleeping and waking, follows rather the law of successive activity and repose than of meteorological changes. For example, in birds the annual activity of the reproductive organs occurs early in the year, long before the heat is perceptibly vernal, and ceases long before the heat is autumnal. Meteorological changes have, however, an important influence, but their relation to vital action require to be well analysed; and it must be always remembered, that the influence they exercise is most complex. Thus, for example, the heat of summer facilitates the evolution of miasmata in towns in proportion as it reaches the fœcal excreta or the sewage beneath the surface, and thereby develops epidemics and endemics, as cholera, summer diarrhœa, continued or intermittent fevers. But the decomposing matters may be on the surface, or at varying depths from it, and thereby be affected by the heat in varying degrees. The amount of rain-fall may hinder or facilitate decomposition as well by its influences on the matters to be decomposed, as on the atmospheric temperature, while the amount of vapour in the air will facilitate the solution of the gases evolved. Then again, the heat has a direct physiological or

pathological influence on the body generally, and on various viscera in particular, independently of the emanations it causes to be evolved. It is in this way that the problems of seasonal meteorological influences are so singularly complicated. Add to the various changes in the weather which characterise the seasons, all those changes in diet, clothing, habitation, and the like, contingent upon them, and you will easily become aware how large the subject of medical meteorology is, and how numerous the sources of fallacy.

The continually increasing number of meteorological observers throughout the world is a strong proof of the increased attention that is now given to the science. Henceforth medical meteorology must take its place in the cycle of the medical sciences. I know of no data so useful and so complete as those afforded by the Registrar-General of England, in his weekly and quarterly returns, and I have reason to believe that they are sent to every medical practitioner who may desire to possess them, for the purposes of research.

# LECTURE V.

## ON THE DUE ESTIMATE OF TREATMENT, AND ON THE MANAGEMENT OF THE CASE.

### THERAPEUTICAL OBSERVATION.

The due estimate of a plan of treatment, and of the effects of medicinal agents, belongs, I need hardly say, to that part of the subject which treats of causation. You have to investigate the order of a series of events set up by yourself designedly, and therefore with a particular object in view, namely, to induce a certain change, or class of changes, in the system of the patient under treatment. The fallacies, therefore, to which you are liable are identical with those of which I pointed out illustrations in my first lecture, when speaking of etiological research. I shall not enter

more into these at present except to refer to a few of the most common sources of error in the therapeutical management of the case.

Common Sources of Error in Therapeutical Observation.—A very common error in practice is to assume that the remedy has been administered, or the mode of treatment has been carried out, for no other reason than that it has been prescribed. We shall understand this better if we examine a few practical details.

It may so happen that every possible care has been taken at the bed-side, but the drug prescribed is supplied to the sick-room in an impure state. It is well known how largely drugs are adulterated —first by the producers or growers; next, by foreign merchants; next by the importer; next by the drug-grinder, or wholesale druggist; then by the retail dealer or compounder. I do not by any means intend to assert that all growers, foreign merchants, importers, wholesale and retail druggists, and pharmaceutical chemists adulterate their wares, but only this, that some do actually, and all may if they so will. In the United States adulteration of drugs has become (we are told by American writers) an evil of

so great magnitude that the legislature has been appealed to, to protect the consumer.

Or the remedy may not have been given from ignorance, neglect, or carelessness of the compounder. He has either substituted another drug for that prescribed—that not being at hand, and the substitution being made with the belief that the substitute is equally good; or it has been omitted altogether; or so negligently compounded, that its medicinal virtues have been destroyed.

Or the remedy has been duly supplied in all its integrity by the compounder, but the nurse ignorantly or carelessly omits to administer it, may be substituting another remedy of her own, or of another person; or, if the nurse be faithful, the patient thinks it no harm to "cheat the doctor" in this way. Great practical tact may be shewn in detecting and estimating these sources of error. Perhaps it is a good general rule to see and examine at each visit the medicines or appliances sent, and to ascertain, either by direct questioning and cross-questioning, or more indirectly, as circumstances permit, whether the remedy has been administered, or the plan of treatment recommended duly carried out.

But supposing the remedy to have been taken,

we have still other sources of error to guard against. It may have been rejected by vomiting as soon as swallowed, or it may have been eliminated too rapidly to act upon the system by entering into the current of the circulation. I have known calomel given daily in considerable doses, for a lengthened period, without inducing ptyalism, simply because it was eliminated by the kidneys and intestinal canal as fast as it was taken. And just as the virtues of a medicine may have been injured by improper manipulation when compounded, so they may be diminished or abolished after it has been taken—either by improper diet, or by being taken at an improper time, or by the action of other and counteracting medicinal agents.

FALLACY FROM THE INFLUENCE OF SUGGESTION AND EXPECTATION.—Perhaps one of the most common sources of fallacy is the influence of what has been commonly but erroneously termed the imagination. It is now amongst the established truths of mental physiology, that ideas may become realities without the co-operation of the consciousness; and that whether they originate spontaneously or not, a physiological or pathological change suggested to the

mind of an individual may take place really and actually, without the co-operation of any other agent than the suggestion itself. It is in this way that the therapeutic fallacies of mesmerism and homœopathy have arisen. Perhaps nothing is so well calculated to elicit this operation of suggestion, as the method of "proving" a drug adopted by the followers of Hahnemann. The "prover" takes, as he believes, an infinitely minute dose of a supposed medicinal agent, (but, more probably, no portion whatever of it) and then mentally watches, or listens, or feels, as it were, with his attention, for the results that have been suggested to him by theory or otherwise. The anticipated effects will most probably occur; and with a degree of probability proportionate to his mental and corporeal susceptibility.

The expectation of benefit from a medicinal agent often modifies its action favourably. The stimulus to the nervous system of hope and desire, and through the nervous system to all the vital processes, is often very powerful, and always more or less efficient; so that not unfrequently the most incurable diseases seem to derive, and sometimes do derive benefit from remedies taken with hope or expectation of benefit. It is well known to the experienced physician, how often

temporary relief is afforded, in long protracted and incurable cases, by a simple change of remedy. To misunderstand the nature of this stimulus, and esteem it as something immaterial, is a common fallacy. So far from this being true, it is as material as any of the *stimuli* received by the system. Nor is it apparently limited to the nervous system; the blood itself, as to its constituents and vital forces, is probably influenced directly and immediately, as well as the organized tissues and the viscera.

FALLACIES FROM UNDERRATING THE IMPORTANCE OR VALUE OF CONCOMITANT MEANS.—I have already remarked that the importance of causes, symptoms, and the like, is often not duly estimated, because they are theoretically considered to be minute or inert. This fallacy is very common in therapeutics. A thorough ablution of the surface may allay fever more effectually than any drug which is given at the same time, yet the benefit be ascribed to the drug. A draught of cold water may act as a most efficient anodyne; fresh air, simple rest of a limb, or a position of the body instinctively sought, will favour sleep more effectually than any sedative. Thus I have known patients obtain rest by assuming the most natu-

ral attitude of repose, because the position of the earliest instinct, namely, flexure of the trunk and limbs as in the position of the fœtus in utero. It is the position in which various animals sleep, and is that in which the muscles of the trunk are most completely relaxed, as well as of the limbs. It is a good general rule to be ever remembered by the student, that the simple removal of the causes of a morbid state, or the abstraction of the patient from them, will, in a great proportion of functional diseases, suffice for the relief or cure of the patient. Thus a change of habits of life, of diet, or of regimen, in homœopathic treatment, is equally efficacious with or without globulistic medicaments in the class of dyspeptic cases which are dependent upon unnatural habits of life, diet, or regimen. Delirium of drunkards may be treated very successfully on the expectant method, if the alcoholic stimuli be duly abstracted, and quiet, with proper regimen, and common sense simple means of relief, as cold sponging, darkened room, etc., be adopted.

FALLACY OF MISTAKING THE NATURAL TENDENCY TO HEALTH FOR THE RESULT OF MEDICATION OR TREATMENT.—We have already seen that many diseases run a definite course and terminate favourably

after a series of changes, within a given period. There is no commoner fallacy than to mistake these orderly sequences of vital phenomena occurring according to natural laws for the effects of some favourite method of treatment. In the darker ages of physic, many disgusting, inert, and worse than inert, articles of the materia medica, and many cruel modes of treatment, were believed to be most efficacious from this fallacy. We no longer use scarlet cloth for the certain cure of variola, or rely upon drugs for the cure of the exanthemata in general, because we know the order of development of their symptoms, and their natural termination. Our knowledge protects us from foolish mistakes as to these, but it is equally true that our ignorance leads us into foolish mistakes as to other diseases, and we too frequently rely very weakly upon medication, to the exclusion of a more natural method of treatment.

Error of Doubting the Power of Drugs and of Treatment.—This has been always a rarer mistake than the opposite; nevertheless it is an error apt to occupy the minds of men who study pathology and pathological anatomy for the purposes of scientific research rather than with a view to therapeutics.

It is an error, too, of those who take a metaphysical view of the phenomena of life. Such inquirers are apt to dwell exclusively on their favourite researches; they are not practical, in the true sense of the term—that is to say, they do not bend their theories to practical uses, nor test their value at the bed-side of the sick. On the contrary, they often prefer to watch the disease with a view to the establishment of a theory, wholly neglecting therapeutics; or they think more of the structural changes that they may find in the body during life or after death, than of the means whereby they can arrest the morbid processes upon which these changes depend. Perhaps the French pathological school presents the most striking examples of this error. Another class of doubters of this kind consists of men of a sceptical turn of mind, who are apt to doubt everything—except perhaps the soundness of their own judgment in thus doubting.

METHODS OF ESTIMATING THE RESULTS OF A REMEDY OR MODE OF TREATMENT.—There are two modes by which the effect of a remedy or mode of treatment may be ascertained. The one is by the comparison of recorded experience with your own;

the second consists in a series of entire new researches.

As to the first method, it is so usual and common that I need not detail it. The same rules which apply to nosological research apply also to this branch of therapeutical inquiry. Just as you should take some well-marked instance of a commonly occurring disease for careful and diligent observation, so you should take some well-established medicinal agent and method of treatment, and observe well and closely its *modus operandi* in every form of morbid action to which it is applicable; noting its action when variously administered as to quantity or dose, or combination with other means or drugs. There are a number of important remedies which merit this close investigation; I would more particularly mention mercury, lead, opium, ipecacuan, colchicum; the iodides, bromides, and haloid salts generally; the great group of terebinthinates; quinine, salicine, and the allied vegetable principles; the purgative gum resins; the astringent vegetable principles, and the like. I need hardly say that published works on materia medica should be carefully studied, while observations on the effects of the remedies are being carefully made. This is the only mode in which

thorough tact in the handling of medicinal agents can be acquired. In inquiries of this kind it is always necessary to isolate the patient as much as possible from modifying circumstances, and especially to avoid the administration of other drugs, unless they are administered as part of a well-digested plan.

Original researches into the effects of plans of treatment, or the virtues of drugs, must be carried on according to the laws of the inductive philosophy. It is not possible, even in experimenting on the lower animals, so to exclude all modifying conditions in each experiment, that the conditions shall be the same in all. Here the numerical method of research is particularly applicable; but this I shall refer to again. All I need say now is, that the effect which is seen to follow under all conditions, or in the greater number, is to be considered as the effect of the drug. It is thus we know that jalap purges, that mercury salivates, that chloroform abolishes consciousness.

## MANAGEMENT OF THE CASE.

I do not propose, under this head, to enter into the ethical relations of the practitioner and his patient. This would be foreign to my purpose, which is to

shew to you how to manage your patient with skill and tact.

Correction of Incomplete Diagnosis.—It is rarely that you attain to a correct diagnosis in the first instance, and yet it is necessary to prescribe for your patient. In cases of this kind you have to keep two ends in view: the first and principal being the relief of your patient; the second the completion of your diagnosis. Now, as to the first, the practical business is to treat the symptoms so far as you can safely do this. It is above all things necessary to relieve pain and give ease; to arrest the influence of noxious agencies; and to put your patient into the way of relief or cure. Now, to the attainment of these objects, it is only necessary to establish your etiological and therapeutical diagnosis. You may ascertain the causation sufficiently well for practical purposes, and you may see enough of the symptoms to determine what is best to be done, without waiting until you can give the case its nosological position, or until you have determined the pathological changes of structure. In truth, if you do not prescribe until you have done this, you are wholly theoretical; for, as I have shewn, the state

of our knowledge as to pathology is necessarily so imperfect that accuracy as to these points is simply impossible.

Circumstances, however, will often prevent you attaining to the knowledge that is attainable. They will often prevent you making the requisite physical exploration or the needful analysis of the urine or other products of excretion and secretion. Information as to the history of the case may be wholly wanting; you may have to wait the recurrence of a paroxysm, and the like. These circumstances vary almost *ad infinitum*, but still you must act, whatever they may be. Now it is when you have to encounter difficulties like these that the greatest tact is displayed, and it is at these times that you will find the value of not having placed your exclusive reliance upon any one method of diagnostic research. Do what you will, you will often have to prescribe tentatively, that is, to feel your way; palliating symptoms, and correcting your diagnosis at one and the same time.

Nature of Tentative Treatment.—Practical medicine does not permit experiments to be made upon patients—that is to say, such experiments as

may be made upon lower animals. These are instituted for the sole purpose of scientific research; experiments on the living man are made for the sole purpose of best affording him relief. They are not therefore truly experiments, but rather modes of treatment instituted to try whether the patient will be benefited or not, or thereby to ascertain the nature of the disease. In this way, quinine or arsenic may be administered in intermittent and periodic affections of a doubtful character; and colchicum in doubtful gouty disorders. There may be an abdominal tumour, the nature of which is obscure; it may be fœcal accumulation, and enemata or purgatives are prescribed tentatively to test the diagnosis. The patient is suffering from incessant nausea, or vomiting; it may be from an irritant retained in the stomach, so an emetic is given, or the stomach-pump is used. But it may be from exhaustion, and then suitable food is administered.

Estimate of Probabilities.—It will be easily understood, from the remarks just made, that much practical tact may be shewn in the requisite estimate of probabilities. Indeed this, perhaps, is the department of practical medicine in which the most pro-

found sagacity may be shewn. Practical medicine is confessedly a conjectural art; to conjecture wisely is therefore the essence of the art—the whole sum and pith. The numerical method affords us a numerical estimate of the probabilities in a given number of cases, but this is not of much help to the practitioner at the bedside, who has to determine the probabilities in the individual case before him, and which may or may not be more or less similar to the cases estimated numerically. What, in fact, is essential to this sagacity in especial, is essential to form the whole man as a practitioner. He must have the habit of minute and accurate observation, so as to be able quickly to detect all possible circumstances that can throw light upon the case; he must have sound experience, so that he can compare what he now sees with the results of that experience; and he must have knowledge, that he may correct and extend his observations, and correct and simplify his conclusions. Nothing but constant and painstaking exercise of the faculties necessary to these mental processes can give the requisite quickness of perception, comparison, and deduction. But in proportion as these faculties are possessed by the practitioner, as well as in proportion as they are exercised,

will he be sagacious in his estimate of probabilities. Some men are wholly unfit, naturally, for the exercise of the art, simply because they want the requisite faculties of mind; some because they want the requisite industry.

Error of Impatient Expectation of Results of Treatment.—When a practitioner has clearly laid down his plan of treatment, he must carry it out steadily, and patiently await the result. Nothing is so detrimental to success in treatment as an indefinite conception of the end to be attained or of the means to be used. The practitioner so situate is constantly vacillating; being swayed by every change of symptom in the patient, or by every expression of opinion he may hear. He is, therefore, constantly changing his remedies or method of treatment. Thereby he renders the symptomatology more confused by superadding the varied phenomena induced by drugs to those of the original affection, and thus at last his diagnosis is utterly bad. In consultation-cases in which treatment has been long continued, or, if not long continued, has been actively pursued, the first step in the examination is a careful separation of the results of this kind of treatment

from the results of disease. Thus you may be called into a case in which the starvation-system of certain homœopathists has been rigidly carried out. You may be told it is gastric fever ; but in reality the patient is perishing for want of food and drink. In cases of intestinal obstruction, it is not an unfrequent circumstance to find the patient suffering more from the effects of drastic purgatives incautiously taken or wildly administered than from the primary disease. It is a great point in your art to know when to do nothing, and to be able firmly to resist all solicitations to be very actively doing something. A clear conception of the case in all its bearings can only give you this admirable quality. And for this, therefore, you must incessantly labour, never being content until you have exhausted every available source of the knowledge that can help you in your diagnosis.

The Exercise of a Moral Control and Influence over the Patient.—Finally, I would suggest to you the singular importance of so conducting yourself as to be able to control your patient by your moral influence. All your skill and all your pains will be thrown away unless you secure the execution of your plans of treatment. A knowledge of human

nature is essential to the acquisition of this influence. Man, but especially a sick man, is a poor creature, easily swayed by his hopes and fears; often looking wildly on every side for help and succour; now with a superstitious faith in a bold empiricism; now with an envious dread of science. You must not appear too wise nor too elevated above your fellow-man—he will be envious of you and fear you; you must not be too familiar—he will contemn you. It is not within my plan to treat of the moral management of the patient; I will therefore only remark, that a quiet self-confidence will generate confidence; a kind, sedulous attention to the case, even to devotedness, will win your patient's affection by indicating the warm and sympathising interest you take in his sufferings; a calm firmness will secure respect. It is by this threefold influence—the confidence, respect, and affection of your patients, that you will be able to carry out to your utmost wishes the plan of treatment you may think right to adopt.

# LECTURE VI.

## THE NUMERICAL METHOD OF RESEARCH IN MEDICINE.

Introduction.—The summer session is coming to a close, and we shall soon separate—some of you to receive the *honores summi* of the University, others of you to prepare for the attainment of those honours. Amongst the pursuits which will henceforth occupy all of you, there is none of greater importance than the acquisition of medical knowledge by original research. The knowledge acquired even during a lengthened curriculum of study is but small when put in comparison with what you may, indeed ought, to acquire in future years as practitioners, whether as students preparing your theses for graduation, or as junior practitioners seeking and preparing for opportunities to practise your profession, the advancement

of medical science by diligent research and study is not less an object of value than of duty. If successful as students in these pursuits, you gain that mark of approbation from the faculty which constitutes a valuable introduction to your future career; if successful as junior practitioners you lay the foundation for confidence with the public in a solid because merited reputation, with your professional brethren; to all of you, therefore, it must be of interest to know what are the best methods of scientific research in practical medicine, and how those methods can be best put into operation. I have already indicated to you what must be the characteristics of your researches—that they must be profound as well as practical; philosophical in their method and aim as well as laborious and minute. What methods of research secure these characteristics?

Two methods of research are open to you—First, the numerical; secondly, the inductive, or philosophical. I will briefly explain and illustrate the nature and application of these methods; you will then better understand under what circumstances to use the one or the other; for, as I will soon shew you, they have each a special value, according to the nature of the questions to be solved; you will also better compre-

hend the mutual aid they may give to each other in the solution of the same question. And first, as to the numerical method of research.

THE NATURE OF THE NUMERICAL METHOD.—It will be well to inquire, in the first instance, into the nature of what is termed the numerical method.

In my first lecture you will remember I pointed out to you the nature of experience in medical art—its sources, and the principles deduced from it, constituting empirical knowledge. Experience, and the empirical knowledge flowing from it, are alike due to observation of multitudinous facts; but the facts from which the principles are deduced are not specifically stated in detail. They are therefore not estimated numerically, nor formally collated in their various bearings on each other. Now, the numerical method is that by which facts and observations are thus formally estimated and collated, or compared, with a view to more definite and accurate conclusions. Experience tells us that a certain event is generally to be expected to occur under certain circumstances; the numerical method tells us how often it is to be expected. Experience tells us that a certain event will be generally followed by another; the numerical

method shews how often the sequence takes place. Induction from the facts of experience indicates (and, it cannot be denied, fallaciously, in many instances) the causal relations of things; the numerical method examines and collates more precisely the facts and observations upon which the induction is founded, and gives the results numerically. The numerical method is, in short, none other than that method by which experience and induction are rendered as accurate as possible. When, therefore, we speak of the numerical method in reference to medical science, we only speak, in truth, of a more strict and more systematic method of observation and of induction than the method of common experience.

Special Applications of the Numerical Method.—It is in its applications to medical science that the term numerical is more particularly applied to this method; when applied to the sciences of legislation and political economy, it is termed statistics, and the principles thereby evolved constitute the so-called science of statistics. A special application to investigations involving the health or life of man, in his social relations, is termed vital statistics. Public hygiene, or the science of the social causes and pre-

vention of disease, is the branch of medical science to which vital statistics has been specially applied.

The numerical method is also used in the physical sciences; but the phenomena with which these sciences are conversant are so very different from those of life and organisation, that, except for illustration, I need hardly refer to its uses in this direction. In proportion as the phenomena are simple and expressible in numbers, in the same proportion the method is of easy, certain, and simple application; and conversely. Physical phenomena are so simple and so expressible; vital phenomena the converse. Hence, as applied to medicine, the numerical method is difficult, fallacious, and complex. These qualities belong to it in very different degrees, however, according to its special application. If it is applied to events, simply, as in symptomatology, it is less fallacious than when applied to determine the causal relations of the events, as in etiology or therapeutics. But it is fallacious even when applied to what may be termed the simplest events in medicine, inasmuch as that accuracy of observation which is requisite with reference to each particular event of the aggregate numerical expression is often wholly wanting, and always only partially attainable.

MERITS AND DEMERITS OF THE NUMERICAL METHOD, AS APPLIED TO MEDICAL SCIENCE.—These inevitable difficulties have been quoted by some to the entire disparagement of the method itself, while others, looking at the brilliant results achieved by it in the domain of the physical sciences, have wholly forgotten them, and praised it overmuch. Let us next, therefore, inquire how far, when applied to medical art, the numerical method embodies, in general numerical expressions, the results of repeated observation and long-continued experience. I have lately had occasion to call your attention clinically to two very common diseases, hæmoptysis and tubercular phthisis. Now, the intimate connection of these two, in the way of cause and effect, has been a matter of medical observation since the Hippocratic age. Louis first, and, more recently, Walshe and others, have expressed this relation numerically. Walshe found that about four in every five tuberculized persons had hæmoptysis in the first stage of the disease, or, more accurately, 80.92 per cent. This general fact was drawn from inquiries (not observations) made as to the occurrence of hæmoptysis in 165 individuals—the accuracy of the answers to the inquiries depending upon various cir-

cumstances involving these 165 different persons. It is clear, therefore, that the very basis of the numerical method, namely, the individual facts, is widely different in medical and in physical research. In the one there may be a uniformly established accuracy or inaccuracy; in the other the accuracy or inaccuracy may vary within the widest conceivable limits. From the differences in the nature of the facts, necessarily arise differences in the modes of acquiring them, and therefore equally great differences as to the result. But when clinical facts are used which have been collected by several observers, as they necessarily must be in research, the difference is even more apparent. Many astronomers may observe the same star, many chemists may analyse the same matter, and their observations may be combined numerically, so as to attain a near approximation to the truth; for the general conditions under which the observations are made are identical, thus securing one of the most important requisites to accuracy. All this is wanting in clinical inquiry. Further, the observations are made upon individuals, each of necessity differing widely from the other; or if upon the same individual, he varies much in his condition, at varying intervals of time; so that,

however exactly the observer may observe, and however diligently he may seek to multiply facts, which, being alike, can be compared numerically, he can never attain to the necessary exactitude and similarity.

Even as to things capable of exact numerical expression, the difference is the same. The astronomer having duly measured the movements of a star, or the chemist having carefully and repeatedly analysed a portion of matter, has fixed for ever the mathematical elements of the star's position and course, or the numerical proportion of the constituents of the matter. Quite otherwise with the clinical observer; he cannot accurately express in numbers the simplest vital events. He may count the pulse; but, when counted, its rapidity is but one measure of the state of the circulation; he has still to express numerically the force and rhythm varying from hour to hour independently of any structural change. He may express in figures the rapidity of respiration, the temperature of the body, the amount of urinary and alvine excreta, so far as he is permitted or able to observe them numerically; but he may not be permitted, or may not be able from various circumstances; and when he has observed all he can, much remains that he cannot take note of.

Of how great importance to sound clinical research it may be to determine quantitatively the gaseous products of excretion through the skin, lungs, and intestinal canal, is obvious though hardly suspected; yet how difficult to make the necessary observations.

Fallacies of other Methods used in Medical Research affect equally the Numerical. — Events that are comparable by the numerical method are most usually expressed in general terms, as "hæmoptysis," the event of a spitting of blood; "ascites," the accumulation of fluid in the abdomen, and the like. I have already shewn to you what fallacies in reasoning lurk in the indefinite use of these general terms, and I need hardly remind you that they are equally fallacious when used for the inductions of the numerical method; while they express that which we have observed, they also include much that we have not observed. How much of fallacy may lurk in the numerical expressions drawn from data of this kind, simply from the want of observations, is not readily conceived at first; for we are too ignorant to comprehend the full extent. Experience teaches us something, however, in this respect. Let us suppose, for instance, that ascites had been inves-

tigated numerically antecedently to the recent advances in renal and cardiac pathology. The accumulation of serous fluid in the peritoneal sac, constituting the condition termed ascites, may arise from various diseases of the heart, the liver, the kidneys, or the peritoneum itself; this being remembered, the supposition shews at once what a heterogenous mass of facts would have been collated, many of them having no true grounds of comparison. All our collective terms being so fallacious, the collective facts which they express are necessarily fallacious too, both as to the deductions that may be drawn from them, and the simplest information they may convey.

But having attained by this method to an accurate numerical expression of a general fact, that expression admits of only very limited application to individual cases, inasmuch as special conditions may be at work in these, not taken into account in a numerical estimate. If it has been shewn numerically, that four-fifths of persons attacked with pneumonia have recovered after, or even in consequence of the administration of a certain drug, as tartar-emetic, we still want to know whether the individual case under treatment should be classed with the four-fifths that were benefited by the remedy, or with the one-fifth

that were not. This inquiry at once involves a complex numerical estimate of special conditions in each case—a thing difficult under the best circumstances, but often impossible, for the reasons just stated.

ILLUSTRATIONS OF THE USES OF THE NUMERICAL METHOD.—There are, however, numerous events of a character sufficiently simple, that may be tabulated numerically with useful results to medical art. I allude to such events as death, the result of a surgical operation, delivery of a child in relation to the age of the patient, the sex of the child, and many similar. You will find some very instructive illustrations of these uses in an excellent paper by Professor Simpson, entitled "Value and Necessity of the Numerical Method as applied to Surgery," published first in the Edinburgh Monthly Journal of Medical Science for November 1847, and more lately in vol. ii. of his "Obstetric Memoirs and Contributions." I would refer in especial to the facts stated in support of his fifth proposition, as to the value of the method for correcting the fallacies of limited and unrecorded experience; and also under his sixth, as to its uses in causation, by determining numerically the relations of various conditions, such as the age, sex, *etc.*, of the

patient. There can be no question as to the great and valuable uses to be made of the numerical method in correcting and enlarging our experience of clinical events and conditions. It must especially be borne in mind, however, that a simple numerical statement of one event, or of the relation of one event to another, may be free from fallacies, when deductions from that statement may be wholly erroneous. I have already quoted a numerical statement as to the relation of tubercle to hæmoptysis. Now, a hæmoptysis may be either the result or the antecedent of tuberculization; in other words, either the cause or the effect—a question of great importance in clinical medicine, but not to be determined without the aid of pathological anatomy and histology, as well as of clinical observation. What is the value of this numerical fact, then, you will ask? Simply this: if you have a patient with the signs or symptoms of pulmonary tuberculosis, even although doubtfully and obscurely manifested, the occurrence of hæmoptysis is a sign of the highest value, *quoad* the treatment, for it determines the necessity of the most sedulous *prophylaxis*. And inasmuch as tubercular phthisis is best treated in the earliest stage, and since in proportion as it is incipient, the signs and symptoms are obscure, it

follows that hæmoptysis occurring under such circumstances, has a greater value, *quoad* both diagnosis and treatment, than under any other. The proportion may not be exactly four-fifths as alleged; the disease may not be exactly tubercular phthisis; still, for practical purposes, the general fact is valuable. It shews this, at least, that hæmoptysis is a common premonitory symptom of a class of chronic pulmonary diseases that are commonly fatal when fully developed.

Standards of Comparison of the Numerical Method.—The application of the numerical method to determine causation, and its uses as an instrument of inductive analysis, constitute more complex processes.

In the measurement of physical changes and conditions, a standard of comparison is always required. Hence the heat, weight, and density of bodies are measured by instruments graduated to such a standard, as the freezing and boiling point of water in the thermometer, the height of a column of mercury in the barometer, etc. Standards are equally required to carry on the numerical analytic investigations into the phenomena of life and society. Perhaps the most important of these is the Sta-

dard of Health, or the National Life-Table—the mode of construction and uses of which you should thoroughly understand. A life-table simply embodies the experience of the nation as to the duration of the lives of the people. Its elements are very simple; they are—1, The numbers living, and their ages; 2, The numbers dying, and their ages; and, 3, The numbers born—each head referring to a given time, as a year. The national registrations of births and deaths in England and Wales, and the census of 1841 and 1851, have placed the data for an accurate English life-table in the hands of statisticians. A life-table shews, out of an assumed number (say 100,000) born alive, the number living at every age for 100 or 105 years. The assumed number (whatever it may be), is technically the base or *radix* of the table, and the yearly deaths are called the "decrements of life." The expectation of life, or mean age, differs from the "probable duration of life;" the latter is the time in which the number living is reduced just to one-half; the former is obtained by dividing the sum of the years lived by the total number, and so ascertaining the mean.

For commercial or financial purposes, the life-table is invaluable. Although the duration of the

life of each individual is proverbially uncertain, that of 100,000 may be estimated to a fraction. But life insurers have this further security against loss, that while the Life Table they use is constructed on data drawn from every rank and condition of men, and under every possible condition as regards state of health, diet, occupation, and the like, they only accept select lives, that is, persons in actual health, likely to live long, temperate in their habits, pursuing healthy occupations, resident in a healthy climate, etc.

To conduct numerical inquiries in hygiene, a life-table is necessary as a standard of comparison. Suppose that it were desired to ascertain the influence of factory labour upon children, or of a residence in a school or a city, the first point to be determined would be a standard of average health of children. This is afforded by the probability of infantile life, as shewn by the life-table. Then, the numbers of children living and dying in each year under the circumstances to be investigated should be ascertained by observation, and properly tabulated, when the results could be compared with the life-table. The degree in which the probability of life is increased or diminished, measures the general influence

on duration of life of the circumstances in which the children are placed, whatever those circumstances may be.

The construction of standards of comparison (usually termed averages or means), lies, in truth, at the root of all numerical research; consequently, the first application of the method is directed to the construction of such standards. The pathological anatomist, for example, may weigh the heart in every autopsy, but he can never state how much it is above or below the average, until a sufficient number of healthy hearts have been weighed, and the average weight determined. Unfortunately these standards require to be numerous in medical science, while it is often very difficult, almost impossible, indeed, to construct them.*

Application of the Numerical Method to Simple Experience.—But let us suppose that you wish to determine some question in medical experience, as, *e. g.*, the fatality of a particular mode of

* Among the "Selected Monographs" of the New Sydenham Society published in 1861, is a series of curious controversial papers on arithmetical means, and their fallacies and uses in physiological researches.

amputation of the thigh. You would first establish a standard of mortality, by collecting all the accessible histories of amputation of the thigh, in so far as they stated the events necessary to be known, namely, the mode in which the thigh was amputated, and the event, whether recovery or death. The proportion of deaths to recoveries from every mode of amputation would constitute your standard of comparison. Having got this, you then tabulate your cases numerically, according to the respective modes in which the amputation was performed, and ascertain the proportions of deaths to recoveries by each mode. If, when compared with the standard, the proportion is found to be less, the experience is favourable; if more than the standard, it is unfavourable. This comparison, however, tells you nothing more than this simple fact of experience; the causation or reason of the differences, remains to be investigated by other applications of the method.

But one of the great objects of numerical investigation is to determine the order of events, or cause and effect. This is, indeed, emphatically, *the* knowledge aimed at. The process is complex; it is, virtually, a succession of theories and of provings of theories by the numerical method. It differs only,

therefore, from the method I have described in a previous lecture as to the additional instrument used —namely, numerical synthesis and analysis. Perhaps one or two instances of the practical application of the method to this object will instruct you more than long descriptions. It is proposed, for example, to determine the influence of age on the result of the operation of lithotomy in man. For this purpose you tabulate instances of lithotomy in men under the two heads, the result and the age. Four periods of the latter may be taken, as 0-10 years; 10-20; 20-40; 40-80. Such a table has shewn that the rate of mortality from the operation increases as the age of the patient advances, so that while three per cent die of patients aged under ten years, thirty-three per cent die of patients aged between forty and eighty. It follows, therefore, that circumstances connected with the age of the patient influence the results of the operation; but they are not revealed by the process.

Again, it is proposed to ascertain how far the size of the stone influences the result of the operation of lithotomy. You tabulate the two events as before, the size of the stone being tabulated under the heads—under 2 oz., from 2 oz. to 4 oz., and from

4 oz. to 7 oz. in weight. The result is that, while only ten per cent die with the lowest-sized calculus, fifty-five per cent die with the highest sized. Why this is so, is not, however, revealed by the process.

There are, therefore, various other conditions to collate, so that the etiology may be completed. It may be supposed, *a priori*, that the largest-sized calculi occur in the most aged patients, and consequently that the age may affect the mortality, and not the size of the stone specially; or, as is more probable, the two may co-operate. To determine this point, a fresh tabulation is required, and the relations of age to the size of the stone should be ascertained numerically—the percentage as to deaths at the several ages, from all sized stones being taken as the standard of comparison. But this is not all, for other conditions may exist. The slowness or rapidity with which the calculus formed might be another element in determining the event; or its chemical composition; or the diathesis of the patient; or the complications in each case, as renal or hepatic disease, gout, chronic inflammation of the bladder, etc. For the determination of these and similar questions by the numerical method, minute and accurate observations are necessary, otherwise the

information as to the conditions determining the event in lithotomy cannot be thoroughly and satisfactorily investigated.

Solution of Complex Questions in Etiology by the Numerical Method.—The able "Contributions to Vital Statistics" of Mr. Neison contain illustrations of every kind of numerical investigation, and of the varied applications of the method. From amongst these I select an interesting inquiry into the rate of mortality of medical officers of the Royal army, as shewing the uses of the method in the solution of complex etiological questions. Mr. Neison collected his facts from the records of the Society of Widows of Officers; and I ought to say that his inquiry was instituted with reference to the financial management of this society. Now, as the matter concerned the viability of the married officers only, inasmuch as they alone could leave widows, his first step was to separate them from the unmarried. At the same time, with a view to forming a standard of comparison, he determined the numbers entering the service unmarried liable to death at each age, and the numbers dying—with other particulars necessary to insure accuracy, but not necessary to my illustration.

Comparing the results of this tabulation with a general standard of comparison—"The National Life-Table"—he found that the mortality amongst unmarried army surgeons between the ages of twenty and fifty-four not only much exceeded the mortality of the male population at similar ages of England and Wales, by 124½ per cent, but was actually about equal to that of the Bengal military service at corresponding ages. More remarkable still, the mortality was found to be largely in excess at the youngest ages, being more than four times above the average of England and Wales at the same ages. Mr. Neison next tabulated in like manner the married officers, and he found the mortality of this class to be considerably less. At ages twenty-five to twenty-nine the mortality of the unmarried was at the rate of 2.928 per cent; of the married, was at the rate of 1.190 per cent—the mortality of the same ages of the male population of England and Wales being 0.981 per cent. Thus arises the question—Are the married subject to less mortality than the single? If so; why?

This inquiry is made by tabulating those only who *remain* single all their lives, and, therefore, excluding those who *entering* single, married sooner or later. The effect of this exclusion is to exhibit

single life under a still more unfavourable aspect, by shewing a still higher rate of mortality amongst the unmarried; so that Mr. Neison comes finally to the conclusion, after a succession of corrective tabulations, that the duration of life of the unmarried ought not to be taken into the estimate in calculations intended to measure the duration of life amongst the married, the mortality of the two classes being widely different in favour of the married. What, then, are the causes of this difference? Theoretically it was argued that the younger medical officers are sent to unhealthy stations. The theory was tested numerically—first as to the actual mortality of such stations; and secondly, as to the mortality of those actually sent; and it was found that if the whole of them had been constantly resident in India, or in other equally trying climates, such residence would not account for the extraordinary mortality of the younger medical officers of the army. And there the question is, for the present, left. Probably the next direction the enquiry will take, will be the domestic habits and modes of life of the two classes.

SOLUTION OF COMPLEX QUESTIONS IN PUBLIC HYGIENE BY THE NUMERICAL METHOD—SOURCES OF

FALLACY.—Vital statistics applied to public hygiene constitute, in fact, a numerical method for investigating the etiology of diseases affecting large masses of the population analogous in its details to the preceding. These statistics are liable to serious fallacies, and as public hygiene is now a recognised branch of the profession, I think I shall do well in pointing out to you how they originate. It must be always remembered that, in proportion as the circumstances or events to be compared increase in number, the sources of fallacies increase in perhaps more than a geometrical proportion. Now the conditions which affect the health are very various, and very varying. Age is one of these: if, therefore, the ages of the living be not tabulated under something like quinquennial periods, the results will be utterly fallacious. Again, sex is another important condition; so that both age and sex must be brought into tabulation. Employments and condition of dwellings, *i. e.*, whether rural or urban, agricultural or manufacturing, are also equally important elements; and last mentioned, though not least important, the state of education of the people influences their mortality. Add to these density of population, ventilation of dwellings, state of sewerage and drainage, nature

of the soil, altitude of the surface, etc., and you will readily understand how many fallacies may arise simply by the omission of some necessary element.

FALLACIOUS USE OF NUMERICAL CONCLUSIONS.—One more point I would mention, namely this :—A numerical statement may be true, as a mere fact of experience, but fallacious as premises for comparison and deduction. As an illustration of this source of fallacy of a simple character, I will again revert to the numerical statements as to the relations of hæmoptysis and tubercle, and which we have already seen to be a useful addition to our experience. I need only here repeat that, according to Dr. Walshe's researches, four-fifths of tuberculized persons have hæmoptysis in the first stage of the disease, or more accurately 80.92 per cent. This at first glance is a definite and pure fact. We think we clearly comprehend what we understand by the phrases, "first stage of phthisis," and by the word "hæmoptysis," and we conclude that in the 165 cases inquired about at the Hospital for consumption which afforded Dr. Walshe these data, these conditions, as we understand them, occurred. Still the remarks I have already made as to the fallacies which lurk in the uses of terms,

will have prepared you for a rigid scrutiny of the facts thus generalised numerically, and you will be cautious how you deduce inferences from the generalisation. But the accuracy of the terms being granted, what, etiologically, does the fact teach? Let us inquire. It has been inferred that inasmuch as hæmoptysis is so frequent an antecedent of tubercular deposit, that it is equally a frequent cause, sign, or indication of tubercular deposit; or, if not of that, of at least the predisposition. Is this inference correctly deducible from the numerical fact? I think not; for this reason, that all those persons are wholly excluded from the data so generalised, who having had hæmoptysis have not had tubercular disease. Hæmoptysis will undoubtedly occur in other constitutions than the tubercular, and from other morbid conditions than tubercular deposit in the lungs; but Dr. Walshe's general fact refers only to those who by the very circumstance of their going to the Hospital for consumption, shew that they have probably tubercular deposit already; whether as a cause or effect matters not. If we for the sake of argument allow, therefore, that four-fifths of tuberculized persons are hæmoptoic, we cannot at all concede that four-fifths of hæmoptoic persons are tubercu-

lized. The data for the numerical fact do not include all hæmoptoic persons, whether tuberculized or not, but only those who actually are both. The observations themselves are in fact wholly insufficient to determine the etiological question. It would be necessary for this purpose to include in the inquiry all hæmoptoic people at least—tabulating them under age and sex, and for successive quinquennial periods with the event, that is, death from tubercle or such other alternative events as might be fixed upon, if we would satisfactorily determine the etiological relations of tubercle and hæmoptysis. But this would again lead us further to inquire and determine, what is meant by tuberculisation and tubercle; and here we come at once upon debateable ground, namely, the meaning of collective terms.

Hints on the Application of the Numerical Method to Medical Researches.—I will conclude with a few hints as to the precautions necessary to be taken when you wish to apply the numerical method to the investigation of questions of life and organization.

1. It is most essential that the observations, facts, or events, be as nearly alike as is practicable. There

may be a numerical statement as to two events, *e.g.*, life or death, applicable to the entire number; or the observations may be grouped under subdivisions, *e.g.*, for the purpose of determining numerically whether male or female live or die; these again may be arranged under ages; again under employments, diathesis, race, and the like.

2. The number of observations should be considerable. In proportion as they are numerous, and at the same time accurate and comparable, in the same degree the results are trustworthy. As a general rule, it may be stated that the tendency to fluctuation decreases as the intensity of the law approaches unity. For example, there is much less fluctuation observed in the law of mortality from cholera than of that from typhus; because in the former it is nearly 40 per cent—in the latter about 10 per cent.

3. The calculus of probabilities supplies the means of correcting errors from a small number of observations. This teaches us that where an event has been observed to happen a certain number of times in a given number of cases, the probability of its happening again is not represented by the actual number observed, but lies between limits somewhat

greater and somewhat less than that number; these limits varying more widely as the number of observations are few.

4. The observations must be scrupulously accurate, at least as to the events or circumstances that you tabulate. In selecting published observations, care must be had as to the capacity and trustworthiness of the reporter. As a general rule, without taking into consideration the merits of individuals or the weight of names, reports from hospitals, or reports made under circumstances such that more than one or two have witnessed the cases detailed, are to be preferred to less authentic facts. But cases of very varying degrees of accuracy or fulness may be used, provided there be accuracy as to the special points tabulated. If, for example, you are investigating questions as to strangulated inguinal hernia, the age, the sex, and whether on left or right side, may be correctly stated in a case when the duration, the progress, and the termination may be untruly or incorrectly given. Such a case is available, therefore, for tabulation, as to the three points of accuracy, although worthless as to the other statements.

5. The heads of tabulation may be as numerous as is convenient, but the analysis should be limited

to heads that are well defined and susceptible of disclosing a law; for in proportion as the events or phenomena are complex and the heads numerous, the investigation is difficult and its results uncertain. Beyond a certain point algebraic formulæ become necessary and the necessary calculations are not only laborious, but require a larger acquaintance with mathematics than students are expected to possess.

6. It must always be borne in mind that although the elements are correct, the mathematical certainty of the method applies in absolute strictness to the entire mass of the facts only, and not to the individual instances. In other words, you cannot reason more mathematically or absolutely from the general to the particular than you can from the particular to the general.

7. Numerical tabulation and analysis is an art only to be acquired by practice and by imitation of the best models. When applied, the extent of its application will depend, in part at least, upon the extent of the knowledge of the things investigated possessed by the inquirer.

# LECTURE VII.

## THE ANALOGICAL, PHILOSOPHICAL, OR PURELY INDUCTIVE METHOD OF RESEARCH.

Comparison of the Numerical and Analogical Methods.—In the numerical method we have, I hardly need say, a truly philosophical and inductive although limited method of research. It deals with facts in the first instance, and proceeds from step to step by theory and observation to more and more general principles. Its peculiarity is this, that inasmuch as it reduces everything to numerical ratios and expressions, it necessarily deals only with facts and observations capable of such reduction. But these are but a few of the facts of medicine. The method which I designate more especially the analogical, philosophical, or purely inductive method of research, is not thus restricted. It extends its inquiry to all facts. It uses the numerical method as an instrument

of acquiring general facts, but as a subordinate instrument only. The intellect is its great means of research. It works both by theory and observation; but theory (the result of thought) is of as great importance as observation, because it guides it.

I have already said sufficiently as to the processes of thought by which we arrive at knowledge in this way. "To theory," I remarked, "we owe all *true* progress in knowledge." On the present occasion I propose to shew to you how to theorise with a view to scientific research. I must premise, however, that just as for the attainment of experience, and just as in the application of the numerical method, there must also be, for the right use of this method, acuteness and accuracy of observation, cautiousness of inference, discrimination in classifying facts, sagacity to generalise them, and finally, skill to apply the generalisations reached either to practical uses or to fresh and wider researches.

First Step; Discovery of a Principle for the Theoretical Collocation and Comparison of Facts.—The first step in this method (as in the numerical) is the collocation and comparison of facts or observations according to some common principle,

or with reference to some common principle—either numerically or not. Astronomy and the physical sciences have fundamental common principles by which the construction of theories and the observation and collocation of facts or observations can be regulated. Thus when Adams and Le Verrier theoretically determined that a large planet was revolving on the furthest bounds of our system, although hitherto imperceptible to the eye of man, they had for their guide the great principle of gravity and its laws. Now it is often asserted and lamented that medicine has no such great principle—no great primary FACT to which all theories and researches shall point, and by which they all shall be guided. Hence it arises, it is argued, that medicine is uncertain, and cannot be investigated with the same prospects of success, or even by the same methods, as the physical sciences. I demur to these views altogether. I not only am satisfied that medicine has, like other sciences, its great primary fact or principle, but I can speak positively, because from experience, as to its value and uses.

THE FUNDAMENTAL PRINCIPLE OF MEDICINE STATED. — Practical medicine has the treatment

of disease for its object. Now disease is simply a deviation from the natural order of events as to the structure and functions of the body. The knowledge of that order is physiology; and the knowledge of that order disordered is pathological physiology or pathology; still however physiology. For a long time, it was believed that man was something apart from the rest of creation. He was believed to be its "Lord," and not subject to those laws in virtue of which his fellow-creatures exist. Just as it was formerly an assumed fact that the earth which he inhabited was the ruling sphere of the heavens—the controlling centre of the sun, and moon, and stars—so was man esteemed to be the centre and ruler of organized life. But as advancing cosmical knowledge has dispelled the one delusion, so advancing physiological science has dispelled, in part at least, the other. Man, like the earth he inhabits, has his harmonious yet subordinate position in creation. He is certainly a leading link in the infinite scheme of life, yet he is but a link. This is the great truth of human physiology. Expressed more technically, we may say that the primary or fundamental principle of life is the unity of structure and function of organisms both in time and space. This, then, is the point to

which all your theories should tend, the principle by which they should all be regulated. This should be ever present to your thoughts; this should ever guide your observations. Thus used, it is the bond that will bind science, and observation, and tact together, and confer upon you the highest qualities of the practitioner, namely, the power to take profound philosophical views, and the ability to apply those views to the practice of your art. The principle thus announced will doubtless be severely questioned, and its truth controverted, but it will finally be almost universally accepted.

THE PRINCIPLE OF LIFE AND ORGANIZATION IS OF UNLIMITED APPLICATION.—And do not think that in presenting this great primary fact to your notice, I wish to place any limits whatever to its application. Just as the great law of matter is applicable to the countless suns and systems that for countless ages have swept and still sweep through infinite space, whether they be already discovered or are still to become visible—so this great law of life is applicable to all life, whether animal or vegetable; to all organisms; to all functions, whether comprehended or yet to be discovered; to life in all epochs; to all

living things of the past, as well as to all of the present. The Rev. Baden Powell admirably observes—"Throughout all formations, the grand truth to which every accession of geological discovery bears witness, is the principle of unity of plan continually exemplified in all the varieties of organic structures disclosed. Even the most seemingly monstrous and incongruous forms of animated existence in past times are all, without exception, constituted according to regular modifications of a common plan, and with parts, organs, and functions related by the closest analogies to each other, so that no sooner is a new form discovered, than it is instantly assimilated with some known type, and found to hold an assignable place in the system."* And again—"Of organised life we find some of the conditions equally unchanged [as the physical]; the animals and plants of these remote epochs were like those now existing; subject to the same general physiological laws of respiration and circulation, digestion and nutrition, locomotion and instincts; their eyes and ears adapted to the same optical and acoustical conditions; their reproduction generally regulated by the same laws."†

* Essay on the Unity of Worlds. By the Rev. Baden Powell, M.A., etc. etc., p. 337.

† Ibid, p. 359.

Although this great principle ought to be alike the basis and climax of your theories, it need not by any means be the starting-point of all. There are many minor or subordinate principles, the bases of less and less comprehensive generalizations, which you will use in your theories. You will often find it wholly unnecessary to pass beyond a principle of very limited application, and very distantly related to any higher. But these matters will be best illustrated by details of the principles and processes of the methods.

Relations of Theory to the Analogical Method.—In the first place, let me explain to you what a theory is in the working of this method. Having your observations before you in their individual relations or in a generalised form (either numerical or not, according to circumstances), you proceed to compare them and tabulate them as it were, according to their resemblances or differences. The proper result of this process of tabulation and comparison is the discovery of an analogy, and the phenomena so treated are analogous. The comparison may lead to a generalisation sufficiently definite to constitute in itself a unity of phenomena. Thus you

compare all the facts known as to a certain class of remedies, *e.g.*, the inhaled anæsthetic gases, and you find that they have in common two things,—1st, The property of modifying the nervous system when brought into contact with it, so as to alter or abolish sensorial sensibility; 2dly, That they are all compounded of the same two elements, carbon and hydrogen. They are therefore analogous in their composition, and analogous in their effects. The result is, however, simply a general expression of facts, corresponding to the results of a primary numerical tabulation, or to a simple fact of experience. *Why* these compounds of hydrogen and carbon should thus act under given circumstances is not at all shewn. To determine this question of causation, analogous phenomena manifested under analogous circumstances in analogous structures would have to be compared, and the order of their occurrence investigated; in other words, experimental researches would have to be instituted. But how would you determine what were analogous? By the aid of the great fundamental principle of life—the principle of unity of structure and function. This would enable you to compare general facts, and see which were analogous and which were only similar. Then a general exposi-

tion of them in their relations to each other would constitute the theory. This general exposition would theoretically assume individual facts and details to be either probable or true, not yet observed or investigated experimentally.

Importance of Knowledge to the Effective Use of the Analogical Method.—It hardly needs any comment to shew how necessary the most thorough physiological and pathological knowledge is to this method of research, for it is clear, from a moment's consideration, that such analogies can only be perceived through such knowledge. When Newton caught the analogy between the force which carries an apple to the earth, and the force which regulates the planetary movements, his mind was already familiar with the phenomena of the planetary movements, and had often classed and reclassed them for the purposes of comparison. The perception of such analogies is usually described as a happy accident, but the word accident has no place in the language of the philosopher. It was really and truly in this instance, as in all other similar instances, the culmination of a series of inductive processes, carried on perhaps instinctively and almost automatically, but

not the less inductive, and not the less occupied with observed phenomena and their analogies. Men differ much naturally in their capability to perceive the true relations of things, that is, to detect the phenomena which can be properly compared, and which present true analogies. To seek for analogies is an instinct of the human understanding, and therefore a faculty of general use and application; to discover those that are true and fitting is the characteristic of genius. Hence many seek for and use analogies, false though they be; few use analogies rightly. Göethe had the power to find and use them in a high degree, and, in consequence, was enabled to perceive and demonstrate the principle of unity which regulates the form and structure of the various and apparently altogether dissimilar parts of a plant. So also Geoffroy St. Hilaire, in possession of a similar faculty, detected and demonstrated the principle of unity of structure in animals by means of numerous analogies—a principle I would remark already hinted at by Newton. In like manner Von Bär pointed out the unity of development; so also Göethe and Oken perceived and illustrated the analogy in development between the bones of the skull and the bones of the spinal column. Professor

Owen, taking up and working out this idea, extended it far beyond its original applications, and shewed that the analogy was between the bones of the limbs and of the skull, and the parts of a vertebra as well as between the two latter; thus demonstrating the true nature of limbs.

DIFFERENCE BETWEEN THE METHOD OF ANALOGY AND OF BLINDLY WORKING OBSERVATION.—You will easily comprehend the difference between philosophical theories and the theories of blindly working observation and experience; the former are corrected and limited by fixed fundamental principles, the latter are not. In the one it is just as if a man had to find out *a* something, not knowing how to look, where to look, or what to look for; in the other, as if he were told what the something was, and where and how it might be found. This may be noted in all the great analogies just mentioned; in each the principle to be demonstrated, and the facts required for the demonstration, are clearly indicated. All that was needed, therefore, to be done was to make a diligent observation and collation of the facts necessary thereto. So also as to the planet perceived analogically by Adams and Le Verrier; the idea

directed astronomers when and where to look for it, and see it actually; they watched carefully, and saw it.

How True Analogies may be Discovered.—The next point to consider is the mode in which true analogies may be discovered, so as to guide observation and experiment aright. It consists in none other than that same method we have seen used in numerical tabulation—the simple principle being this, that phenomena agreeing upon one point be collated as to that point in all their relations. For example, if certain of the phenomena of the growth of a flowering plant, from the first vivification of the germ-cell to the perfect evolution of the sexual organs, be compared with the corresponding phenomena of an animal (as man), a series of distinct analogies are discoverable. As the primary phenomena, we have in both the union of a sperm-cell and a germ-cell, and the primordial cell from that union formed; as the last, we have in each a form developed from a primordial cell to the perfection of beauty, concurrently with perfection of the reproductive organs. These analogies are true in fact; they, therefore, are in accordance with the great fundamental law of unity.

Being *so* true in fact, and *so* in accordance, the multitudinous intermediate analogies may be equally conceived theoretically, and demonstrated by observation and experiment. All that is requisite is a sufficient knowledge of the intermediate phenomena in one or in the other class of organisms. I say the one or the other, because if known in one, they may be inferred as to the other.

DISCOVERY BY TRUE ANALOGIES ALWAYS PROGRESSIVE.—Just as in the numerical method the result of one tabulation leads on to another tabulation, and its result to another, so one analogy leads on to another investigation and arrangement of phenomena and another analogy; this to another, and so on *ad infinitum*, or so long as the inquirer can carry on his researches and attain to new facts. The only limit, indeed, to his discoveries is to be found in his limited powers of investigation; but the intellect practised in this method will penetrate in *idea* far beyond the horizon of the demonstrable, and see more or less clearly in the far distance analogies grander and yet grander still. The principle of unity of life and organization is all comprehensive; MIND, therefore, comes within the range of its operations as well as

matter. This is a grand principle; for it is pregnant with researches and results of the highest importance to man in his social, moral, and intellectual relations.

## PRACTICAL EXAMPLES OF THE CONDUCT OF AN ANALOGICAL INVESTIGATION.

EXAMPLE 1.—INVESTIGATION OF THE PATHOLOGY OF "BRONZED SKIN."—I will give you some illustrations of the application of this method to pathological researches, and will take in the first instance an interesting question for solution—the pathology of "Bronzed Skin"—a form of discoloration of the skin which has of late attracted considerable attention. The initial step in the inquiry is the collection and collocation of individual instances of the disease; the next is to tabulate these instances, with a view to discover a common point of agreement. Now this has been already done; first by Dr. Addison, who first directed attention to the disease, and afterwards by Mr. Hutchinson of the Free Hospital in London. Dr. Addison found that the structural change common to all was a change in the structure of the supra-renal capsules; Mr. Hutchinson confirms this conclusion. Other common points of agreement

have been mentioned; in particular a degradation of the blood inducing an anæmic state. Hence it has been theoretically inferred that there is a relation between the functions of the supra-renal capsules and the process of sanguification; hence, also, it has been theoretically concluded that discoloration of the skin is pathognomonic of disease of these structures. These are our conclusions from what may be termed the first tabulation or comparison of facts.

The next step is to determine the relation—1, Between the discoloration and the structural change in the capsules; 2, Between the anæmia and the structural change; 3, Between the discoloration and the anæmia. If we inquire as to the first, we seek to know what are the analogies between this morbid discoloration and other instances of coloration in similar tissues and organs. To determine these analogies we want phenomena and observations that can be compared, and, in particular, it is first necessary to know in what the discoloration itself consists, so that suitable phenomena may be compared and true analogies deduced.

The next step, therefore, is to tabulate and generalise as to this point; and we find, after due comparison, that we can limit the inquiry to colouring

matter deposited from the blood; for by the way of exclusion we learn, temporarily, at least, that it is not due to effused blood, nor to colouring matters circulating with the blood, nor to chemical or other agents. Under what circumstances, then, is colouring matter like that seen in cases of bronzed skin deposited from the blood? This is the next step for observation and generalisation.

The knowledge we possess of colouring matter in animal organisms may be generalised under the two heads physiological and pathological, or normal and abnormal. As a pathological form of deposit, we meet with it in two forms; firstly, as *melanosis;* secondly, as the cutaneous discoloration accompanying the irregular action of the chromatogenous glands of the skin seen in pityriasis, lepra, nigrities, etc. Now, in "bronzed skin" we see this difference and similarity; the colouring matter is not (as in nigrities and the others) limited to the surfaces occupied by the chromatogenous glands, for it has been found as small black spots beneath the peritoneum, and in the omentum. In this circumstance, it is similar to melanosis; it is therefore rather analogous in this respect to that pathological change, than to any morbid condition of the chromatogenous glands.

Nor is this the only analogy with melanosis, for we note that, like it, bronzed skin is associated with a cachectic state, chronic, and very slowly progressive, but too often ending fatally. We therefore proceed to tabulate our observations in reference to this analogy. We compare cases of "bronzed skin," and of melanosis. Now, the first glance at the facts shews us that this analogy is only partially correct; for several cases are recorded in which there was not the resemblance to melanosis just mentioned, in regard to the deposit of colouring matter; on the contrary, in this respect the cases referred to resemble nigrities. We have, therefore, two forms of bronzed skin—one which may be considered melanotic, the other cutaneous; we therefore exclude the melanotic cases—setting them aside—having examined them already, and take up those that are cutaneous only. As to these, it at once becomes necessary to investigate the symptoms by fresh synthetical tabulations, so that the facts may be compared with the physiological and pathological phenomena involving the chromatogenous glands, and the deposit of colouring matter generally in the tissues of animals. Now, these phenomena, as we learn from the facts of natural history, extend throughout every kind of organism

to the lowest; nor need we stop at animal organisms, for vegetables have their colouring matter too; so that the inquiry at once branches out into two wide and almost uncultivated fields of research, the physiology and pathology of colour in organisms.

The inquiry thus extended would not, however, be conducted without direct reference to the other principal points in the inquiry, namely, the relation of the discoloration to blood-changes, and especially to anæmia on the one hand, and to the functions of the supra-renal capsules on the other.

It is not possible to say what direction collaterally the inquiry would take when once the vast mass of facts in comparative anatomy and natural history was made available. Fresh analogies would certainly be discovered, and fresh trains of researches started, until the subject proper was exhausted. On the threshold we can see, however, several important points for investigation. It is manifest that the discoloration is seen most usually on certain portions of the surface, and noting the special characteristics of those portions, we see that they are the parts covered with hair at puberty. This guides us to the physiological relations of the ovaria and testes, and in connection with these organs, we note an analogy

between the bronzing of supra-renal anæmia (assuming theoretically that it is supra-renal), and the nigrities occasionally observed during pregnancy, during the progress of ovarian disease, and in certain cases of amenorrhœa. What, then, are the relations (we might inquire), of the supra-renal capsules to the ovaria and testes? This inquiry brings us to the comparative anatomy and embryological development of this group of organs, and to the relations to them of colour-deposits, or colour-secretion, as seen in lower animals. Again, in "bronzed skin," patches of discoloration are seen on the tongue and mucous membrane of the mouth; this we witnessed lately in a case in the Infirmary. Now, certain animals (mammals and birds), have such discoloration naturally; an analogy which brings it therefore into relation with a very common class of pathological changes in man, namely, the development of a structure or function abnormally, which is normal in other animals, and we consequently take all monstrosities of colour into our inquiry.

EXAMPLE 2.—THE METASTATIC CHARACTER AND GENERAL PATHOLOGY OF GOUT AND RHEUMATISM. I will bring under your notice another illustration

of this kind, so as to give you as complete and correct conception as is possible of the modes in which the analogical method may be applied to practical medicine. I must state, however, as distinctly as possible, that in advancing these illustrations, I advance them as theories only.

You are fully aware of the metastatic character of gout and rheumatism, that is, you know how prone an individual is to suffer from inflammation of certain viscera and visceral tissues, who has rheumatic or gouty inflammation of the joints and articular tissues generally. I have actually applied the method of analogy to the elucidation of this, and other points in the pathology of these diseases in this way. As a first step, a sufficient number of facts being collected, collated, and then tabulated for the purpose of comparison, we establish certain differences and resemblances between gout and rheumatism. One resemblance consists in the liability of the serous membranes, the heart and large vessels, and the articular and tendinous structures, to suffer in common; and the conclusion is, that there is a natural analogy between these structures—something in common as to their nature or structure. Now, an inquiry into the structural

changes which they undergo in these diseases might elucidate this point, and these may be determined by an investigation directed to their pathological anatomy, both structural and histological. Such investigation has been made, and the result is, that there is a difference in these morbid structural changes, as seen in the two diseases. But a further inquiry shews a similarity in the processes, by which the morbid changes are brought about. There is apparently an irritant, or *materies morbi* circulating with the blood in each form of disease, and whether it be that of rheumatism or of gout, it is determined to these structures, and so morbid changes follow. What, then, is there in common in the histological structure or nutrition of the affected tissues? Turning to the facts of embryological development or formation of these structures, facts at first sight are contradictory; for while the serous membranes, neurilemma, bone, muscles, and motor structures in general are developed from the serous layer of the embryo, and thus a community of origin and nutrition is manifest as to them, the heart and large vessels are derived from another primary tissue—the vascular layer. Hence we conclude that the two classes of organs have, apparently, a dissimilar origin and mode

of nutrition. But from what is the vascular layer itself derived? From the union of the two primary, the serous and mucous, so that it is in strictness a sero-mucous layer. Now, the mucous layer gives origin to the viscera of vegetative life, and these are made up of tubes having two structures and two functions. The one is non-striated muscular fibre, with a motor function; the other is mucous membrane, with an excreting, secreting, and absorbing function. They are, therefore, muco-tubular. In the heart and blood-vessels, however, the mucous element is not developed, but only represented by a thin epithelium; the tubulo-motor, or serous element, therefore, is that which is actually developed in these structures; they are, in truth, sero-tubular; consequently there is a real unity of origin and function in the structures affected in gouty and rheumatic disorders.

But in the tabulation or collocation of the primary facts there were certain residual conclusions and differences. How is it (we inquire) that the skin, the mucous membranes, and certain viscera are affected in gout as well as those just indicated? There are several analogies which can be made starting-points of this inquiry. For example (to follow

up the conclusion already come to), we can note that the serous element of those viscera which are developed from the vascular layer, but endowed with the structures of the mucous layer, may be more or less predominant in them, and where more predominant, changes analogous to those taking place in the heart and large vessels may more predominantly occur. We may place in this class the larynx, trachea, and bronchi—muco-tubular structures in which the histological development of the motor portion rises from muscular fibre, through aponeurosis, tendon, and cartilage, to bone. In this way we explain gouty affections of the lungs; for we see an analogy between them and the other affected tissues. For similar reasons affections of fibrous or cartilaginous structures of the skin and its appendages may also be classed here, as of the nose, of the ears, the sclerotic coat of the eye—that is, from analogy of predominant structure. More decisively, however, from both analogy of development, of histological structure, and of function, we can class under a common head the air-cells (they having no mucous element, but only the serous, like the vascular system), together with all those tubular structures, the function of which is analogous to that of the heart, namely, simply to transmit a fluid, as the

veins, the lymphatics, the urinary and biliary ducts, and spermatic vessels. The tissues of these organs may be expected to undergo analogous diseases and analogous transformations in structure — which is in fact the case; or, in other words, the same changes in the nutrition, circulation, innervation, and special functional activity, which occur in the heart and blood-vessels in the course of gouty affections, will occur in them.

But the mucous membranes, the seat of an excreting and secreting mechanism, are also affected in gouty affections. Now what relation has the functional activity or the structure of these to the *materies morbi* of gout? This inquiry involves an investigation of the nature and sources of the *materies morbi;* and as to its nature, we may observe that all researches, as well recent as ancient, indicate it to consist of some of the excreta (one or more) usually carried off by the kidneys, and very frequently of compounds or modifications of urea, as uric acid and urates. Now the source of these, according to the most recent researches into biochemistry, is in the histogenetic changes of those identical tissues which are specially the seat of gouty and rheumatic affections, namely, the motor apparatus,

in the full meaning of the phrase. Thus the theory of a morbid action of such materies morbi upon these structures derives confirmation from their analogies of structure and function, for we can comprehend how, when retained in the blood, it may interfere with their normal histo-genetic changes, and thus be the main cause of that abnormal condition known as inflammation or irritation of these structures, whether it be metastatic or not.

These analogies do not explain to us, however, why the materies morbi should be determined to *mucous* surfaces, until the same principle of unity of structure and function is appplied to the solution of the problem. When one mucous membrane takes on the action of another, the functional activity thus developed is said to be vicarious. Now, in gouty affections, we have vicarious action in this sense, when the salts and compounds of urea are eliminated by other excreting surfaces than those of the kidneys. But both embryology and comparative physiology teach us that there is a community of function, as well as of structure of the mucous membranes, the products of the mucous layer of the embryo, just as physiology and pathology shew us that there is community of structure and function of the products of the serous layer. We

can thus, therefore, class together under a common principle both the vicarious and metastatic phenomena of gout. In this way we understand the saline efflorescence on the skin of the gouty; the irritation of the pulmonary, gastro-intestinal, and genito-urinary surfaces to which the gouty are liable, and, in fact, almost all the phenomena of gout.

Illustration of a Residual Phenomenon.—But for a long time there was in my mind an important exception to this pathological theory of gout and rheumatism—a residual phenomenon—with which I found it difficult to deal. I allude to that leading characteristic of gout, which consists in an inflammation of, and deposit from the synovial membranes of articular surfaces and tendinous sheaths. As the other facts, however, were harmonious with each other, and with the theory, I concluded, by way of analogy, that these synovial structures were not exceptional instances, but that they were in fact secreting organs, and, therefore, similar to mucous membranes in structure and function. Now within the last two or three years Kölliker and Quekett have shewn by histological researches that this, in fact, is the structure and function of these membranes. They very closely resemble the vilii of the intestinal canal.

ILLUSTRATION OF COLLATERAL RESEARCHES BY THE METHOD OF ANALOGY.—I will not extend this illustration further in the direct line of inquiry, as I could easily do, to the demonstration of the true pathology of rheumatic diseases, but rather will shew you how these investigations branch off collaterally, by an instance within my own experience. Finding that in gouty diseases there was a morbid metastatic and vicarious series of phenomena (I speak now of several years past) from urinary excreta in the blood, I concluded theoretically that when the function of the kidneys was impeded so as to prevent the elimination of these excreta from the blood, analogous phenomena would result; that is to say, morbid metastatic conditions of the serous tissues and vicarious action of the mucous surfaces would take place. Bringing this theory to the test of experience and observation, I found it to be practically true; and I need only refer you to the secondary and tertiary diseases arising in the course of nephria, scarlatinal nephritis, and analogous affections of the kidneys, for proofs. The phenomena, it is true, present a physiognomical difference, because the general conditions of the system, as to age, state of the blood, and the like, are different; but the law of morbid

action—the law of selection of structure—and the indications of treatment consequent on those laws, —are fundamentally the same.

I will venture simply to refer you to one or two other illustrations, drawn from my own experience, of the application of this method of analogy to pathology, and of its direct and collateral bearings. Nearly twenty years ago I investigated, in this way, some cases of hysteria brought under my notice at the York County Hospital. I published the result of part of these investigations in the "Edinburgh Medical and Surgical Journal" for 1838, 1839, and subsequently in a separate treatise in 1840. In these volumes you will see how researches thus conducted branch out, and extend onward, until both the lowest and highest phenomena of life and mind are involved in the inquiry.

## EXAMPLES OF APPLICATIONS OF THE METHOD OF ANALOGICAL RESEARCH TO ANATOMY, PHYSIOLOGY, AND HISTOLOGY.

1. Histology of the Skin.—I have hitherto limited my remarks and illustrations almost wholly to pathological research; perhaps it is superfluous to

remark that the analogical method is equally applicable to anatomy, physiology, and histology. In histological researches it constitutes a powerful mental microscope of no mean value. To mention examples:—The skin is derived from the same primordial elements as the muco-tubular system; it is, as is well known, an intestinal tube turned inside out. The derma proper, therefore, corresponds to the non-striated motor element; and we should expect to find this element in some portions of it in man (as the scrotum) and under certain conditions, in lower animals, just as we should expect to find some of the diseases to which it is liable, to belong to the sero-fibrous group. Now, recent histological researches have demonstrated the existence of this element in the derma.

2. General Analogy of the Tubular-Motor Structures.—Take another illustration of this kind. The heart, we have seen, is evolved out of the combined serous and mucous layer of the embryo. In the lowest forms of animals in which there is a distinct mechanism of vessels, the heart is simply a contractile tube; it is, in fact, analogous to the muco-tubular system, from which it is evolved. It therefore in its sim-

plest form exhibits peristaltic or oscillatory movements, like the intestinal or visceral tubuli. It is only as the viscera generally are specialised that the special mechanism of a heart is evolved. Now, according to the principle of unity of structure and function, we might expect that, under appropriate conditions, the veins, lymphatics, and other tubular structures which I enumerated a moment ago, as presenting community of pathological or abnormal conditions, will also present community of normal structure and function. Let us take the venous and lymphatic circulation as examples. The heart in its simplest form is a dilatation of a vessel—a sinus—having contractile properties. It is through a succession of developments that the heart is formed, as it is seen in mammals. It is equally so with the lymphatics and the veins. In many fishes certain lymphatic vessels dilate into contractile sinuses; in reptiles these appear as pulsating hearts. Similarly with the venous system of vessels in some lower forms, *e.g.*, the genus Pelonaia of the Tunicata, the same vessel is both arterial and venous—it is simply a contractile trunk-vessel, with a somewhat peristaltic action, in which the blood oscillates rhythmically in one direction as arterial blood, in the opposite as venous. In

the bivalve mollusca the venous circulation is distinct, and is carried on by a system of contractile sinuses; these appear in the cephalopoda as branchial hearts, or analogues of the right ventricle. In the lowest vertebrate animal, the lancelot or amphioxus, there is the lowest type of circulating apparatus, for the impelling power is derived from a number of pulsating sinuses or dilatations. A minute contractile bulb is found at the origin of each branchial artery, and a pulsatile dilatation or venous heart is developed upon the great dorsal vein, and another upon the trunk of the vena portæ.

Such being the proofs of the correctness of the analogy as to the arterial, venous, and lymphatic systems, let us inquire whether it has been found to be correct as to other portions of the tubular system. If it be a correct analogy, then the tubes carrying fluid secretions should manifest structures and functions similar to those of the other tubes mentioned, and accordingly this has been found to be the case. Claude Bernard found that the choledochus and pancreatic ducts in birds have rhythmical movements. So also Dr. Brown Séquard has shewn to the Societé de Biologie that almost all the excretory ducts of glands in birds manifest these movements. He has

seen them in the urinary ducts and vasa deferentia as well as in the biliary and pancreatic ducts. That the pulmonary tubular system does not form an exception to the law of analogy, is shewn by the observations of Dr. Brown Séquard, who has seen rhythmical contractions at each expiration in the trachea and bronchi of large sea-birds. I need hardly add that these muco-tubular structures should, according to the same law, offer examples of sinuses and pulsating hearts, under circumstances in which such structures become necessary. The urinary bladder is an illustration of such a sinus; I know of no example of a muco-tubular pulsating heart, for I know of no conditions under which these structures are developed so as to require constant and rapid emptying. A near approach to these conditions takes place when a morbid state induces irritability of such dilatation or sinus; we have then a muscular structure like the carneæ columnæ of the heart developed, as in certain forms of hypertrophy of the urinary bladder, stomach, etc.

Classification of Analogies. — The physiological analogies available to medical science, of which the preceding are very simple examples, are almost

infinitely numerous. The most important may be classed under three heads; the first would comprise analogies of structure in regard to nutrition of tissues; perhaps the terms materialization or histogenesis would better express the nature of the process. The second would comprise vital mechanics, or the construction of organs in regard to the wants of the organism. The third would comprise vital dynamics, or the uses of the organs constructed, including mental physiology.

I would, in reference to the first class, recommend to you this method of analogy as the best adapted for determining the true nature of degeneration of tissues, of morbid deposits, and of the phenomena of inflammation. Illustrations of the adaptation of the method to vital mechanics, phenomena of the second class, I have just given to you. For illustrations of its value when applied to vital phenomena of the third class, I would refer you to my own researches into the physiology of the brain. In my first essay, devoted specially to the subject (published in 1840), I shewed the analogy as to structure and function between the spinal and encephalic ganglia; in my second essay, published last year, I shewed the analogy between the operations

of the structures of plants and animals to given ends without consciousness, and the operations of the human cerebral ganglia to given ends without consciousness. By this comprehensive analogy we are enabled to compare these two most extensive classes of phenomena, in so far as the material or molecular changes in living matter are concerned in vital adaptations; and, as the result of that comparison, to reach to the solution of that large and all-engrossing problem of humanity—namely, the true relations of the organ of the mind to mind. Such knowledge is, I need hardly say, but the commencement of a new set of analogies—the radix of fresh tabulations and comparisons, involving all the philosophical, moral, and social questions that have occupied the minds of men.

Objections to the Analogical Method Considered.—There are various objections more or less valid that may be raised against the use of this method, and I will notice some of them.

First, It is objected that it is too laborious for ordinary purposes. The answer is, that the inquirer may labour much or little, as he thinks right, only if he will attain to great results, he must greatly per-

severe. It is wholly a question as to the limits he will assign to himself.

Secondly, It may be objected that it is a process which, when fully carried out, never comes to a termination, but, on the contrary, the field of inquiry is widened continually. This is true in fact, but it proves the method to be true in fact, for according to the fundamental principle of unity, every phenomenon or group of phenomena, is in relation to all the rest. Consequently, in proportion as we extend our knowledge of these relations, we necessarily widen our generalizations. From whatever link of the chain we begin, we at last work through all. If, indeed, it so happens that we come to a pause, and the circle of relations really ceases to expand, then we may conclude—not that we have exhausted the question, but that we have made a false step somewhere. The laws of gravity would cease to be laws if they were not applicable to the fall of a feather as well as to the movements of the universe; so it is with the laws of life. They include by their very nature, the smallest as well as the largest groups of phenomena; this is as true as the axiom that the whole is equal to the sum of all its parts. It is quite certain that false analogies and the theories and researches founded thereon are equally

expansive as the true; but there is this noticeable difference, that the false continually diverge from the real order of events, and the true relations of things to each other; the true continually converge to them, and so demonstrate and connect them. The false become more and more speculative and mysterious, the true become more and more practical and intelligible.

Perhaps the most serious, because most troublesome objection, is, that the analogical method, even when rightly used, leads to researches far too transcendental and impracticable for the ordinary uses of man. I need only say, in answer to this objection, that since it is considered a merit in machinery of human construction, to be able to perform the smallest as well as the largest operations, so I think it must be considered a merit in this method that it is wholly within the volition of the user to what extent he will make it transcendental. Just as Nasmyth's steam hammer will crack a nut or crush an elephant with equal ease and precision, so will this method crack the shell of the smallest as of the largest problem in philosophy. "Transcendental" and "impracticable" are but relative terms; as every thinking man now knows; they are in the mind of

the thinker, not in nature. When the electrician was trifling with his pith-balls and the vivisector with the nerves of a frog, they dealt with no less forces than those which are now in daily use, to transmit messages with the fleetness of lightning, or to rend into its elements the most intractable of matter.

HINTS AS TO THE USES OF THE ANALOGICAL METHOD.—I will now give you a few hints as to the uses of this method of investigation by analogy :—

1. Since it requires as complete a knowledge of the phenomena of life as you can attain, you must make it a habit to look largely and comprehensively forth upon these. Ever be reading in the great book of nature ; collate curiously all new contributions to the science of life and organization. To you vegetable anatomy and physiology are not less important than animal ; comparative pathology not less than human.

2. Look constantly at vital phenomena as a whole ; never separate in thought the study of man from the study of all those organisms which co-exist with him. His body is truly a microcosm—a little world of life, in which all modes of life are in some way or other, at some period or other, represented.

This is a fact to be always acted upon, whether your perceptive powers are engaged in observing phenomena, or your intellectual in comparing them and forming analogies.

3. Take care that the foundations of your analogies be facts, and not general terms, or mere expressions of general facts. For example, pathological anatomists speak of fatty "degeneration" or "calcification." The *facts* are, that fat, or the salts of lime, are deposited in tissues in which, under ordinary circumstances, they are not deposited. Degeneration and calcification indicate theoretically the processes by which these deposits take place. Those terms, therefore, do not express facts, only theories. "Tuberculous," "inflammatory," and all similar terms belong to this category.

4. See that the points of comparison upon which you found your analogies be really such as are comparable. Jenner believed he saw an analogy between the curative influence of morbid states like vaccine cutaneous inflammation, and that induced by the application of tartar emetic to the skin. But in fact there was no true analogy between the groups of phenomena which he compared. The agent, the entire series of processes, and the final result, differ

wholly. The only true analogy is in the condition of the skin, as to its being the seat of circumscribed inflammation—a phenomena common to an immense number of diseases.

5. Choose by preference the simplest and most general facts for your analogies. For example, the formation of sugar in the organism in diabetes is a vital process. As a vital process simply, it is analogous to the formation of sugar, as a vital process simply, in all other organisms, whether animal or vegetable, and by whatever structure or organ. Next come analogies of special processes in vegetables and in animals.

6. Having drawn from well-established facts an analogy which includes phenomena not yet observed, and the knowledge of which is necessary to the confirmation of the analogy, multiply and vary the observations or experiments required in every possible way, so as to secure as perfect accuracy as is possible, before rejecting or accepting the analogy. If opportunities be not afforded you to secure this accuracy, neither reject nor accept, but set the analogy aside until they are afforded.

7. Observe, and experiment, and record the results in such a way, that although you may fail to

confirm the analogy, the facts and observations may admit of being variously combined and compared in future, and so subserve to the construction and proving of new analogies.

8. Keep a constant guard on the imagination, by bringing all theories to the test of observation and experience, and by aiming always at practical ends. And by these I mean additions to our knowledge both of practical medicine and of the facts and phenomena of medical science. There is great danger to be avoided, in the wild speculations which imperfect and false analogies inevitably generate. Some of the most mischievous and most baseless errors in medical science and practice have arisen from the use of these.

9. The perception and comparison of appropriate phenomena, and the construction of analogies, is an art to be gained only by practice, and by careful study and imitation of the best models; when gained, it is applicable to the extension of scientific truth, in exact proportion to the existing knowledge of the investigator. Without accurate knowledge, the analogical method is a dangerous, if not a useless instrument of research.

# LECTURE VIII.

## ON THE NAMING AND CLASSIFICATION OF DISEASES.

PRINCIPLES AND METHODS.—If asked "What's in a name?" one might fairly answer, that in a name rightly invented is comprised our knowledge of the thing named. And learned philologists inform us that the primary and most ancient meaning of the word (for it is in Sanscrit) was that by which we know or recall a thing into knowledge. Hence, when we name diseases, the procedure is of the greatest practical importance, and by no means a merely ingenious exercise in philology, as too many are apt to think. The mental law of naming operates very widely in changing the character of a language, because whenever we discover new relations of things of any kind, names are needed to express and record them. Now, in the ordinary experience of a progres-

sive nation, new relations of things requiring names necessarily arise, and just in proportion as intellectual culture and civilization increase. It is thus that a language becomes more and more copious, and at the same time general terms come to have a special meaning, or particular terms become general, because it happens, that with a higher culture, there is at the same time more precision of speech. So that while new words are being added, old words fall out of use as being too indefinite, or change their meaning altogether.

In all the sciences, the same alterations in language take place. At first, in the infancy of the science, the terms are very few, general, and indefinite. But as discoveries are made, they are changed in their meaning or new terms invented, until a complete terminology or technical language of the science is formed. So that we may affirm in a general way, that the development of any department of science may be measured by the copiousness and precision of its terminology or language.

Unscientific persons and unlearned practitioners usually display an ignorant impatience of these scientific languages, and demand that the man of science shall express his knowledge in plain English. But

experience amply shews, that our mother Anglo-Saxon has so degenerated in its inflexions as to have become too unpliable for this purpose; it is principally the German language, of modern tongues, which is capable of this scientific development. Hence the recent applications of science to the arts in England are almost all designated by Greek and Latin terms, such as *terminus*, *gradient*, *photograph*, *telegram*, and the like. Nay, even our elementary school-books on grammar and arithmetic are full of such scientific words, as *syntax*, *prosody*, *multiplication*, *logarithm*, etc. It is not to be expected that the widely extended science and art of medicine should be exempt from this general law of development and change of language, with all its consequent difficulties and defects. Terms, therefore, continually become obsolete in medicine or change their meaning, and new terms are invented; with less rapidity, however, I think, and to a less extent than in most other sciences. Chemistry, for example, is expected to change its terminology every ten or fifteen years. To a man who studied the science thirty years ago, the language of chemistry is now almost unintelligible. But it must be expected that medicine will advance more and more rapidly in proportion as medical observa-

tion and research become more general and more accurate, and therewith the changes in its terminology be more rapid and extensive. In view of such a contingency, it is much to be desired that some rules for the naming of new relations and new facts in the science were authoritatively laid down, so that some kind of system might be introduced into the language of our art. At present every man invents names as he pleases, often with little regard to the general laws and uses of language, and thus while synonyms increase, it is sadly defective in both precision and fulness.

NAMING AND CLASSIFICATION NECESSARILY COINCIDE.—This business of naming becomes the more important when we remember that the classification of our knowledge is necessarily connected with it. This is easily seen by a consideration of the mental processes by which we acquire and retain knowledge. In naming a thing, the first mental act is to distinguish or differentiate it from all other things; but this implies the process of comparison, whereby we determine in what qualities it resembles, or in what it differs from other things. When we find it differs wholly from other things it is a new thing, and re-

quires a name and a place apart. When it resembles other things in general, it is classed under the same general name as those other things. If, however, it is found to differ in some particulars from those things which it resembles generally, then the general or generic name is modified or changed into a specific name, and all things which resemble it are classed under that name. It is thus that the processes of generalization and comparison enter into the naming of anything whatever.

WHAT IS A DISEASE?—Doubtless much of this is familiar to you who have studied the classifications of zoology and botany, but it is necessary to revert to first principles to understand clearly the naming of diseases. What, for example, is meant when we speak of a disease? Now the word disease is a general term marking the condition or state of existence of a living tissue or organism. The more general idea comprises the series of events termed life; but life presents itself to the medical observer under various aspects. There is the life which continues regularly and uninterruptedly, without pain or hindrance to functional activity of the organism, and there is that which is painful or in which there

is irregularity and hindrance of function. These are opposite or correlative states, and comparable with each other; the one being known as health, the other as disease. When, however, we observe more closely, we soon see that the various states of existence which we class under the term disease differ from each other in some particular or other; and these differences we can connect with some particular organ or tissue, or indicate by some particular change, and thus we differentiate particular diseases out of the general term or idea. And we carry out the same procedure in naming them, for in our classifications of diseased conditions we necessarily arrange particular diseases under heads which indicate their resemblances and differences. But before we give a name to anything, it is necessary to know as exactly as we can what it is we are naming. Now there are three kinds of phenomena which, as medical observers, we specially observe, name generally, and classify. 1. Those which we perceive as belonging to matter simply, and termed the qualities of matter, such as hardness, softness, elasticity, mobility, colour, form, sound. 2. Those which we observe as done by living things or *actions;* and 3. Those which we feel, or which we believe others feel. Those we

feel are the phenomena of consciousness; and since they coincide exclusively with vital changes within the encephalon they cannot be observed—only felt. Now it is the two last-mentioned classes of phenomena which are the proper objects of medicine; those of the first belong to it only in so far as it includes the physical phenomena of matter, or the physical sciences. Strictly, the word disease, as opposed to the conscious state or feeling of ease, refers to the third class of phenomena. But more generally it implies all those changes, as well in structure as in function, which cause, or are caused by injurious agencies acting on the healthy organism, whether there be a feeling or not. A disease in particular, therefore, is a particular series of such changes occurring in the same order in different individuals, and involving the same structures or functions, or both. Unless there be these particular resemblances we cannot specify a particular morbid state, or *a* disease. The power to discover these resemblances and differences of diseases increases in proportion as we are able to discriminate more minutely differences of healthy function and structure, and observe more exactly differences in the order of morbid events. Progress in the one depends upon advances in

anatomy and physiology, in the other on more minute and sedulous observation. It is sufficient to compare the older nosologies of thirty years past with the present, to see that considerable progress has been made in this direction of late years. Our medical language, defective though it be, is more copious and precise, because our knowledge of medical things is greater and more accurate.

CONSTRUCTION OF NAMES FOR DISEASES.—What special rules should we follow, then, in the construction of names for new diseases, or for newly discovered series of morbid states? Experience will perhaps help us to a decision. 1. Some leading symptom is taken as the characteristic to be included in the name, as in the word *hydrophobia*, which simply means "water-dread." But then this implies also that this water-dread shall have a particular cause in the poisonous bite of a rabid animal, and terminate in a particular way. If it arise or terminate otherwise, then the water-dread is distinguished by the terms "spurious," "hysterical," "nervous," or the like, indicating a different cause from that implied, although not expressed, in the general term. Many of the oldest and best terms have been thus formed,

such as *pyrexia*, *febris*, *inflammation*, *dropsy*, *eczema*, *diarrhœa*, *ischuria*, *cyanosis*, etc. It is the easiest and simplest method, and obviously because it requires no anatomical or physiological knowledge. And it is better than those in which theories and not facts or events are indicated. 2. The function or structure disordered, or both, is implied primary in another class of names, such as *pneumonia*, *hysteria*, *nephria*, *dyspepsia*. Names of this kind, however, are very apt to be theoretical or indefinite, and are only admissible when they are the result of careful anatomical research, as in *bronchitis*, *peritonitis*, *periostitis*, *exostosis*, and the like. 3. The cause or supposed cause of the disease is often implied in the name, as in *melancholia*, *rheumatism*, *urœmic convulsions*, *dothinenterite* (for *enteric* fever). These examples obviously imply theories of causation, not one of which, probably, is a true theory. And herein is the danger and defect of etiological names. Nevertheless such terms, if indicative of general facts, as *epidemic*, *endemic*, *diathetic*, *malarious*, are the most scientific and useful, for they not only imply the origin of that particular series of events or symptoms which constitute the particular disease, but, if perfect, indicate also the course of events, and the exact

seat or seats of the changes in structure, upon which the symptoms either directly or indirectly depend. Our present knowledge is, however, much too imperfect for anything more than an approximation to a complete etiological nomenclature, which kind, nevertheless, I have adopted, on account of its intrinsic excellence. 4. Trivial facts have been selected for naming diseases. Thus the fancied resemblance of diseased products to natural objects has led to such names as *exanthem*, *elephantiasis*, *ichthyosis*, *frambœsia ;* or the names of countries have been adopted, as *Barbadoes leg*, *Asiatic cholera*, *Arabian leprosy;* or the names of physicians and surgeons, as in *Pott's*, *Bright's*, *Addison's*, *Graves'*, *Duchenne's*, *disease.* I cannot but think that this is a barbarous method of naming, and should only be adopted when no other is available, for it is sure to lead to a multiplication of synonyms of which we have already too many, and has no power of adaptation to a systematic nomenclature.

I could add other illustrations of the methods commonly adopted in naming diseases, but it will be more useful to note a few rules for naming which naturally flow from the preceding considerations, or

from experience, and which I endeavour to follow in my own nosological arrangement.

1. No new name is to be invented for a disease unless there is no existing name, or unless the existing name be wholly unfit or erroneous. Thus I think the new term "*pythogenic fever*" is an unnecessary substitute for "*enteric fever*," even although the theory it expresses be a true theory, which is, however, doubtful.

2. No morbid state is to be termed *a* disease, and have a name, unless it can be shewn to consist of a connected series of morbid changes or events, due to a particular cause or group of causes, and occurring in a particular structure or group of structures. It is doubtful as yet, for example, whether in this sense there is such a disease as that termed "Addison's disease." I may remind you here, that the blood is practically a structure or tissue—as much so, perhaps, as the capillary system, and perhaps as complex a tissue.

3. All names should, as much as possible, express our knowledge. With this in view, the more general should, when possible, indicate the tissue, structure, viscus, member, or system particularly or predominantly involved, the kind of morbid change

which has taken place, and then the cause or causes. Examples: *pericarditis, hemorrhagic anæmia, oligæmia, rheumatic pneumonia, rubeolar bronchitis, syphilitic periostitis.*

4. When old names are adopted, they should be as strictly defined as possible, or specific words added to mark the seat and cause; as in *tubercular* phthisis, *endemic* or *summer* diarrhœa; Eczema *solare*. *Phrenitis* implies encephalic inflammation; *insania* encephalic disorder of function, involving the mental powers. Strictly, the words are absurd, for the mind cannot be inflamed or diseased.

5. The course of events, that is to say, the time occupied by the disease and any of its stages, and the order, should be either implied or expressed. Thus the prefix *peracute* indicates a disease terminating within 7 days, *acute* in 7 to 21, *subacute* in 21 to 40. The word *chronic* is used when the termination is indefinite or prolonged beyond 40 days. The terms *sudden, latent, paroxysmal, intermittent, remittent, continued,* and the like, all indicate the elements of time and succession; as such they are general terms, and applicable to diseases generally, marking the course or order of the morbid changes.

6. In determining the *causes* of diseases, time is

equally an important element; for causes belong to the course of disease or the order of changes.* In medicine, that which is necessarily antecedent to an event is its cause, and that which is necessarily consequent, its effect. Hence the terms *remote, predisposing, exciting, proximate,* applied to causes, imply an order of events in time. Practically, causes and effects are never single in medicine; there are in every case more series of changes going on than one; it is the combination of the whole into a unity which constitutes the disease. Hence the cautious medical practitioner examines carefully for several causes or "con-causes," when inquiring into a case. In naming, however, he selects that or those which are predominant. As, for example, bronchitis in a gouty man is *diathetic* as to the predisposing cause, and the character of the changes in the tissue affected, but the exciting cause is probably a chill of the mucous membrane from breathing air at a low temperature. The proximate cause of a disease is none other than the phenomena included under pathological anatomy and chemistry. For example, in the case of gouty inflammation there is the formation of uric acid in

* See Etiological Diagnosis. Lecture II.

the tissues or its vicarious excretion from the blood. (Pathological chemistry.)

7. In determining the changes in function (the symptoms) or in structure (the pathological anatomy and chemistry), a like regard is to be had to the doctrine of con-causes. These changes are never limited to a single organ or class of tissues; nevertheless, the function organ or tissue predominantly involved is to be selected in naming.

CLASSIFICATION OF DISEASES.—Classification concentrates and indexes our knowledge. In every science, therefore, the classification of the facts of the science is of primary importance. In medicine, perhaps, more than in any other, a classification is needed, because of the vast number of facts and of their multifarious relations to each other. Without such an indexing and concentration of our knowledge (termed a nosology or nosological arrangement), the study of medicine would be almost a chaos. A natural classification of phenomena of any kind is the best, because it must follow the laws of those mental processes by which we acquire and retain knowledge, and which I have already explained to you. I shall not enter upon the various nosologies or classi-

fications of diseases which have been promulgated from time to time by systematic writers, nor examine their merits and defects. This would be a good mental exercise, however, for the student; I need only say, that I have thought it expedient to take as the basis of my own nosological arrangements that of Dr. Farr. It is not only one of the most complete, but inasmuch as the registration of deaths, both civil and military, is now regulated by it, under any circumstances, the medical student should be familiar with it. But a nosology may serve very different purposes. For example, Dr. Farr, in constructing his, had chiefly in view a uniform nomenclature for the causes of the deaths registered, whereas, as practitioners, we have to regard rather the causes and cure of the diseases we have to treat, and many of which do not tend to death at all. A much more simple nosology, it is obvious, will serve for the one purpose than for the other. Dr. Farr, for example, could safely place neuroma and neuralgia under the head of "cephalic" diseases, but we must be more precise, and place them, according to their seat, amongst nerve or spinal diseases. So also it is of little practical consequence to registration that scabies, worms, and hydatids are grouped together under the

class of "zymotic" diseases with smallpox, hooping-cough, and rheumatism, because that simplicity of arrangement is gained which is the chief object of the system. But it is obvious that, except as to the fact that they are all due to living (parasitic) causes, the diseases have nothing in common as to their seat, symptoms, and course, and consequently the classification is useless for the purposes of teaching and practice. Further: A good classification should be suggestive of new ideas and new relations. To this end, in constructing a nosology, regard should be had to our methods of research, so that each new fact may not only have its proper place, but exercise its proper influence on others. Besides, medicine is so imperfect, and so rapidly progressive, that unless a classification provide for this, we must continually destroy and reconstruct our systems, and thus materially add to our labour.

Leading Principles of Classification.—Now, since the order of morbid phenomena is none other than that of healthy phenomena modified, whether they be those of function or of structure, it is obvious that our pathological facts should be classed in the same way as the physiological. In other words, the

leading principles of a nosology should be those of a physiological classification—perhaps more correctly a biological. When men complain that medicine, as a science, has no principles, they forget that their complaint extends beyond medicine, and that they must substantiate their assertion as to the great science of biology itself. Now, I have already shewn that the law of unity of structure and function of organisms is as much a fundamental principle in medicine as the law of gravity is of the physical sciences.* Do we desire, then, to know the laws governing degenerations of structure and function in man? A knowledge of the laws of evolution and decline of structures and functions in organisms generally will reveal them. Perhaps no morbid change happens to man which is not a normal process in other organisms, either animal or vegetable, and the nature of which may be known by a study of such analogous normal changes. Even the true nature of such complex morbid processes as fever and inflammation will be best learnt in this way—perhaps in this way only. And it further follows, that only by such general principles of causation and course can we

* See Lecture VII., on the Analogical Method.

arrive at a true scientific therapeutics, and escape from the rules of that unsatisfactory unenlightened experience which uses medicines like cod-liver oil, iodide of potassium, arsenic, mercury, for the alteration of morbid tissues, without knowing why, because ignorant of the first laws of healthy and morbid nutrition, and of the relations of the nutrient elements to the living tissue at fault.

These remarks apply chiefly to so much of our nosology as includes the general principles of the practice of medicine, and which, being such, are applicable to the treatment of all diseases. But the law of division of labour operates in the practice of medicine as in all other arts; so that there is a practice of medicine which is a special department of medicine in general, and which requires, like other specialties, its own appropriate nosology. Hence it follows that our nosology must have both a special and a general character. What are the exact boundaries between the various departments of medicine, none has defined, though many have attempted the definition, and, I humbly think, none can define. But in my course, I aim first at the teaching of general principles of practice applicable to all forms of disease; and, secondly, at the special treatment of

diseases according to those principles not taught in other practical courses, as surgery and midwifery. And to this end I make two great divisions of general or constitutional and special or local diseases; which have each their own classification, but which are in relation to each other.

HEADS OF CLASSIFICATION OF GENERAL DISEASES. —1. Taking the principle of unity as a guide, we can differentiate general diseases in precisely the same way as structure and function are differentiated physiologically. Now before there is any blood, or nerve, or viscus, there is tissue. This is the fact, whether we watch the beginnings of life in the individual organism, or in the great world of organised things. Hence the first or most general group of diseases are diseases of tissues. Now these are of two kinds, namely, functional and structural. Of the functional we have an example in FEVER and INFLAMMATION, in both which, as a central and predominant phenomenon, there is an increased activity of function in the excessive yet marked production of heat in the tissues, and either coincidently or consecutively, other changes in their nutrient functions or states. Of the structural changes in the tissues

we have three kinds, namely, excessive nutrition, or "hypertrophy;" degenerate or perverted nutrition, or "dystrophy;" and cessation of nutrition, or "atrophy." Now hypertrophy and dystrophy or degeneration (in which morbid heat-production is included) are active conditions, and must therefore follow the general laws of nutrition. In hypertrophy we have simply exaltation of nutrient activity under circumstances analogous to those by which new instincts and organs are formed in organisms or tissues, and organs and limbs are developed and enlarged in adaptation to external conditions. For hypertrophy proper, as of the heart, bladder, colon, rectum, like heat-production, is often rather a curative than a destructive change—rather physiological, although the change be *relatively* morbid, than pathological.

But can we also bring structural degenerations of tissue under physiological laws? I think we may do this, in part at least, in this way. If we observe the course of events in the life of the tissues we see that it is guided by two general laws. First, they are imperfect at their beginnings, but become more and more perfect as the organism advances towards perfectness. Second, taking this climax of evolution as a standard of comparison, sooner or later they de-

cline and become more and more imperfect as old age advances. Similar conditions are observed in diseases as degenerations. If the changes be towards the imperfections of embryonic and infantile life, they are retrogressive; if towards the imperfections of old age, they are progressive. Further, this generalization may be extended from the embryonic condition of tissues in the species (as too narrow a basis) to the development of tissues and functions in the entire series of organisms; and a more general law already hinted at is discovered, namely, that what are diseases of structure and defects of function in man, are not unfrequently the normal and healthy modes of vital activity in lower organisms, either animal or vegetable. Thus, glucose and other saccharine elements produced morbidly, as in glycosuria, are normal products of transformation of tissues in vegetables and animals; so, also, with morbid products, like fats, starch, oxalic acid, uric acid, carbon. The abnormal production of urates in gout and other diseases, in place of urea, the normal thing, has its counterpart in the normal production of urates, lower down the scale, in birds and reptiles.

This law of the pathological anatomy and pathological chemistry of tissues applies also to abnormal

evolutions of viscera and limbs, and functions of organs. Thus in the strumous diathesis of Europeans, the bony development of the adult corresponds to that of the lower types of man, or of the infantile stage of development of the race. And in the evolution of the facial bones, particularly of the inter-maxillary bone, even a lower type than that of man crops out in idiots. This same law of degeneration is seen in that wondrous fluid tissue, the blood. The degenerate blood-corpuscles observed in cases of anæmia, leukæmia, and erysipelas, exhibit the characteristics of the normal blood-corpuscles in the lower vertebrates. So also with the cerebral or mental functions. In idiots, cretins, and imbeciles, there is often not only a lower type of bony development, but even still more frequently a retrocession as to instincts, appetites, and propensities to the brute. And this because these are evolved and degenerate according to the same laws of differentiation as organs and tissues; for, as I have demonstrated elsewhere by the method of analogy, all even our highest faculties and sentiments are differentiations and evolutions of instincts and desires which are represented in the lowliest organisms by the most simple and

most general vegetative instincts.* So that the law, as we shall see, is equally applicable to the classification of morphological and mental degenerations as of tissue and visceral degenerations. In this universality of application is the test of its truth.

We may say, then, that as to function the morbid state of a tissue may be either that of exaltation, perversion (degeneration), or abolition; as to structure, that of hypertrophy, dystrophy (or degeneration), or atrophy. And the morbid condition of both can be classed as progressive, retrogressive, or atrophic.

2. Diseases of tissues may be general in two ways. First, the tissue may enter into the composition of the viscera generally; or, secondly, entering into this general composition it may also constitute the essential element in a particular system of organs having general functions towards the viscera and other organs. As an example of the first, I may mention the so-called connective tissue corresponding to the germinal membrane of the embryo. As an example of the second, the capillary system, which, while it is locally independent, forms part of the great circulating system, and is regulated and

* Compare the statement of this doctrine and its numerous illustrations in my "Mind and Brain," vol. i., part iii., and vol. ii., part iv.

controlled by important cerebro-spinal nerve-centres, as well as by the heart. Considerable complexity necessarily arises from these relations, however much we may try to simplify our arrangement; but here again the great law of differentiation, whether in the embryo, or in the great world of living things, is the best guide, and enlightens our way through a multitude of complex, and apparently contradictory facts. In the lecture on the analogical method of inquiry, I have already shewn the application of this law to the general pathology of gouty and rheumatic diseases, and traced the tissues affected throughout the various viscera and textures of the body more peculiarly involved in these constitutional or general disorders. We shall continually have occasion to discuss similar general facts in connection with diseases of the nervous system, the blood, the glandular system, and the skin, and the uses of general principles of treatment. Perhaps one of the most striking illustrations of the value of this law is the light it throws and will throw upon the origin of goitre or endemic bronchocele, and the cretinism which is consecutive thereto as a disease of development. What connection is there between the two? Experience has utterly failed to answer the question; but embryonic

anatomy and physiology, as elucidated by the researches of Professor Goodsir and others, shew that the thyroid body belongs to a system of nutrient glands, developed out of an embryonic tissue termed the wolffian bodies, and which includes both the thymus and supra-renal capsules. Now these bodies are also in close embryonic relation with the genetic glands—the ovaria and testes. Hence, as I shew in my systematic lectures, arises the direct pathological relation observed in women between bronchocele in all its forms and the utero-ovarian functions, which none have attempted to explain, and few have observed. Hence also the theory which I propound of endemic cretinism and goitre, that they are due to the action of a poison of endemic origin on this system of glands, including the ovaria, so that local disease of the thyroid and defective ovulation result, ending in defective evolution of the embryo, and the congenital defects known as cretinism.

3. Each organ and system of organs has a function to perform as a part of a harmonious whole. When this function is imperfectly performed, general disorder or disease results; so that local diseases stand in the relation of causes to general diseases. This fact is more particularly shewn as to the blood-

depurating and blood-forming glands like the liver, spleen, and kidneys; but the principle is equally applicable to the relations of organs generally, although there is much difference amongst them as to the extent of their morbific action in the whole body.

In conclusion, I would observe that the application of these principles to practice, not only renders available that higher kind of physiological knowledge which deals with great laws, and which every cultivated practitioner delights to know and investigate; but so links pathology and practice with physiology, that they become mutually helpful. It is not easy to state in words what numerous glimpses of large and valuable generalizations this combination of science and practice opens out to the zealous and well-grounded young physician. But I may venture to say, that none of the great departments of medicine can remain uninfluenced; and no student, however advanced he may be, need ever feel that there are no more worlds of phenomena to conquer.

END OF PART I.

# PART II.

## CLASSIFICATIONS OF DISEASES.

The following classifications are constructed on the principles set forth in the preceding lectures. Two great objects have been aimed at—first, that they shall be suggestive, and excite the student to active thought and research; second, that they shall be copious indexes of the details of principles and practice. For these reasons they appear more complex and difficult at a first glance, than they will prove to be on more intimate acquaintance. Considerable experience in teaching has convinced me that the more easy and simple arrangements are not eventually the best, because their apparently good qualities are obtained at the expense of completeness, accuracy, and truth, so that they fail to help the student at the bedside, or advance his knowledge.

# GENERAL CLASSIFICATION OF DISEASES.

Diseases may be classed as they are predominantly GENERAL or LOCAL.

GENERAL DISEASES involve primarily and predominantly the entire organism or general systems of tissues and organs.

LOCAL DISEASES are primarily and predominantly manifested in restricted portions of tissues, or in particular organs (viscera), but consecutive general diseases may result.

## GENERAL NOSOLOGY.

### A.—GENERAL DISEASES.

CLASS I. PYRECTIC DISEASES, *Pyrexiæ.*—General diseases characterised by a morbid evolution of heat in tissues or organs generally.

ORDER I. FEVERS, *Febres.* *Seat*—Primarily in the blood, the capillaries, and the vaso-motor nerve-centres, or in subdivisions thereof. Local pyrectic changes take place, not necessarily structural.

ORDER II. INFLAMMATORY DISEASES, *Inflammations.*—Diseases affecting tissues and organs generally, and accompanied locally by consecutive structural changes.

CLASS II. CONSTITUTIONAL DISEASES.—General diseases due to specific causes, acting generally on particular tissues or systems of tissues.

ORDER I. DIATHETIC DISEASES.—Constitutional diseases due to an individual predisposition, hereditary or acquired, and having their seat predominantly in the blood or some general tissues.

ORDER II. CACHECTIC DISEASES.—Constitutional diseases, characterised by more or less degeneration of the blood and of some particular tissue or group of tissues, but not necessarily by fever or inflammation.

CLASS III. SYSTEMIC DISEASES.—General diseases, febrile, inflammatory, diathetic, or cachectic, predominantly manifested in one or more systems of organs.

ORDER I. Diseases of the NERVOUS SYSTEM (NEUROSES).
„ II. „ CUTANEOUS SYSTEM.
„ III. „ RESPIRATORY and CIRCULATING SYSTEM.
„ IV. „ ALIMENTARY SYSTEM.
„ V. „ SANGUIFIC SYSTEM.
„ VI. „ DEFÆCATING SYSTEM.
„ VII. „ URINARY SYSTEM.
„ VIII. „ REPRODUCTIVE SYSTEM.

## B.—LOCAL DISEASES.

CLASS I. LOCAL DISEASES of viscera proper, or of tissues and organs locally.

CLASS II. LOCAL DEFECTS of development and function.

# THE NAMING AND CLASSIFICATION OF PYRECTIC DISEASES.

## I. PRINCIPLES.

Fever (*Pyrexia*), and a fever (*Febris*), are morbid states, the characteristic and central phenomenon of which is the abnormal production of animal heat (morbid calorification, *Thermogenia*). The causes of this, and the coincident phenomena, are the causes of fever.

This morbid production of animal heat is modified variously by phenomena which precede, accompany, and follow it, marking disorders of innervation, sanguification, distribution of the blood locally and generally (disorders of circulation), nutrition of tissues, and functions of organs.

Fever in the indefinite sense, or *Pyrexia*, is a general morbid state induced by any sufficient cause, and not necessarily terminating within a definite

period. A fever, in the specific sense, is a pyrexial state due to a specific cause or group of causes, and terminating within a definite period.

*Fever and Inflammation.*—The essential phenomena of fever and fevers may be manifested locally. When the local morbid changes are simply pyrexial, as indicated by morbid calorification, diminished and increased activity of the circulation, with or without cutaneous exhalation, they either have no distinct name, or are termed congestions, irritations, etc.; or are held to be part of the general morbid state, as the burning hands of hectic fever. When the local pyrexial changes are followed or accompanied by local changes in the nutrition of the tissues and in the functions of the capillaries and their contained blood, and are due to a specific cause or group of causes, the morbid state is termed *Inflammation.* "Inflammatio veluti est febris membri." (Galen.)

*General Doctrine of Causation of Pyrectic diseases.*—The proximate causes of fever and inflammation are morbid conditions of the blood, nervous system of the blood-vessels, and tissues. When induced by an injurious agent present or introduced therein the cause is termed a poison. All poisons may excite fever (*Pyrexia*) if so present in sufficient quantity;

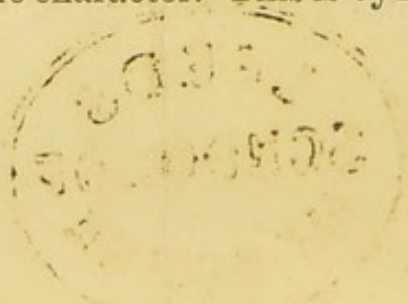
but all poisons are not fever-poisons—*i.e.*, causes of specific fevers (*Febres*).

*Origin of Fever-poisons.*—The true fever-poisons are formed from or developed out of organised or organic matter. They are—1. Pyrexial (or general); 2. Specific; and 3. Complex.

*a.* The General causes of fever (*Pyrexia*) are developed within the organism during its normal processes (as the *excreta*), or consecutively to local pyrexia and inflammation. These are the causes of Constitutional, Diathetic, or Idiopathic fevers.

*b.* The Specific causes of fevers (fever-poisons) are developed from organic matter, either without the organism (endemic, non-communicable) or within the organism (diathetic, epidemic, infectious, contagious). It is suspected, but not yet demonstrated, that some are not only of organic origin, but organised. (Hæmatophytes, blood-parasites.)

*c.* The Complex fever-poisons are developed both within and without the organism, and are compounded of two or more of the general and specific classes. Thus, a marsh or other endemic fever-poison may combine with a pestilential or epidemic fever-poison; or either may concur with local inflammation and pyrexia of a diathetic character. This is by far the most common



group met with in practice. It is very probable, indeed, that no fever-poison ever acts singly, but always more or less in combination with others. Hence epidemic fever-poisons become more active and are more rapidly developed in combination with the endemic, which are thus the most important causes of the more rapid spread and greater fatality of epidemic fevers. In like manner the pyrexial state (inflammatory fever), the results of inflammation of a tissue or organ caused by a specific fever-poison, complicates the pyrexial state (specific fever) caused by the fever-poison. Hence the general principle that all fevers are complex conditions, dependent upon complex causes.

*Classification of Fever-poisons.*— Fever-poisons may be classed either according to their origin or their effects:—

I. General Fever-poisons (causes of Pyrexia):

1. Fibrinous? causes inflammatory fever, synocha.

2. The Diathetic: as in rheumatic fever, acute urticaria, erythema, etc.

3. The *Complex*—retained *excreta* acting conjointly with the preceding. Examples: Rheumatic nephritis, diathetic pneumonia, idiopathic pleurisy.

Strictly there is no idiopathic fever or inflammation, for that term only indicates an unknown or undetected cause of those states.

II. Specific Fever-poisons:

1. The *Non-communicable.*—These are derived from within or without the living organism, and not being reproduced within it, cannot be communicated by or from the sick to the healthy.

2. *The Communicable.*—These are derived from within the living organism by the mode of generation from a similar poison.

3. The Doubtfully or *Conditionally Communicable.*—These are derived from within the organism when placed under certain conditions (Fever-poisons arising *de novo*).

*a.* The Non-communicable Specific Fever-poisons.—These may be divided into two groups—the Diathetic and the Endemic. The Diathetic are excretory fever-poisons derived directly from the tissues, and are the results of their metamorphosis. Examples: the rheumatic and arthritic. These are also General or Idiopathic. The Endemic are divisible into three principal groups:—

1. MALARIA, derived from the decomposition of vegetable matter, or from the soil.

2. MIASMS (miasmata, from *μιαίνω*, I pollute), the products of the decomposition or putrefaction of animal matter. Of these there are two kinds—

(*a*) The *Septic* miasms, derived from putrescent or decomposing animal matter, as flesh. (The Erysipelatous.)

(*b*) The *Excretory* miasms, derived from putrescent or decomposing animal *excreta*. These subdivide into—

(1.) The *Fœcal* emanations from fæces of men and animals. The causes of enteric and dysenteric fevers.

(2.) *Ochlotic* (*ὄχλος*, a crowd). Emanations from the lungs and skin of living beings crowded together. The causes of typhus and typhoid epidemic fevers, and of communicable fevers arising *de novo*?

3. The *Combined* or *Complex Miasms*.—These are for the most part operative in cities or towns where the conditions for the production of malaria and miasmata are found, and give rise to civic endemic fevers. But the Septic and Malarious combine in sea-marshes in which the remains of land

plants and marine animals (for the most part zoophytes) decompose. (Cause of malignant remittents.)

*b.* The Conditionally Communicable.—These arise when the miasmatic fever-poisons act upon the blood in certain morbid states, the result of overcrowding, deficient supply of blood, when sepsis, etc., results ;—the ochlotic.

*c.* The Communicable Fever-poisons.—These are reproduced in the living organism, and are communicated from person to person. It is not necessary, however, that they produce their effects (as fever) in the organism to which they are communicated, for various conditions may prevent this result. The chief of these is, that the recipient has already undergone the series of morbid changes to which they give rise, or had an attack of the fever. Hence the fevers they cause are termed "non-recurrent," and one attack is said to be prophylactic against a second.

*Inflammations and Fever-poisons.*—All fever-poisons act locally, and excite local pyrectic diseases. These may occur either with or without the general Pyrexia. Thus, the plague-poison will induce buboes without fever,—malaria, an ague limited to a limb.

The local states thus induced may be congestions, or inflammations, or both.

The tissues affected in Pyrectic diseases are (*a*) the blood-glands in general; or (*b*) special tissues or organs, for which the fever-poison has elective affinity; or (*c*) special nerves, or groups of nerves, or nerve-centres (Cerebral, Spinal, and Sympathetic Neuroses).

i. The Malarious fever-poisons act primarily upon the sympathetic system, the duodenal and gastric glands, and the spleen, and excite congestions, as in intermittents (agues); or inflammations, as in remittent fevers.

ii. The Septic miasms act upon the lymphatic glands when introduced into wounds, and upon the gastro-intestinal glands when swallowed. Consecutively, upon the blood.

iii. The Excretory miasms act upon the same class of tissues and organs as produce and excrete them. Thus, the Fæcal excite irritation and inflammation of the defæcating surfaces (summer diarrhœa; endemic dysentery). The Ochlotic act upon the pulmonary and cutaneous surfaces.

iv. The Mixed or Complex poisons of endemic origin act upon the glands and organs according as

one or other is predominant. Thus, malaria and fæcal miasm, in combination, cause choleraic tertians: malaria and septic miasm acting conjointly induce petechial fevers.

v. In local affinities, the Conditionally communicable follow the law of the Complex endemic class. Hence gastro-enteric typhus (or enteric fever) is most prevalent where the causes of fæcal miasm, or sewer emanations, abound; epidemic cholera where marsh-poison is conjoined with the fæcal or the ochlotic.

vi. The Absolutely communicable act upon particular tissues and organs, exciting their appropriate forms of inflammation. Thus, the inflammation of the skin which accompanies variolous fever is effusive and suppurative; that of scarlatina and rubeola, congestive and desquamative. The operation of these fever-poisons is modified by the Endemic class of poisons.

vii. Diathetic tendencies and social and climatic conditions often determine what tissue or organ shall be attacked, the mode of death, and the fatality from the same fever-poison. It is very probable, that fever-poisons arising in Europe act very differently in different individuals not only in Europe, but in Asia and Africa, and *vice versa;* and consequently,

that the fever-poisons of climatic epidemics, like cholera, plague, and yellow fever, became modified when introduced among European populations.

*Naming of Fevers and Inflammations.*—Various distinctive names have been assigned to these morbid states, whether local or general, indicative of cause, effects, order of phenomena or course, mode of development, predominant symptoms, and the like.

*As to Cause.*—Inflammation of an organ or tissue excites the so-called inflammatory fever; malaria, the malarious fevers. Inflammations accompanying specific fevers, or caused by specific causes, are named after the fever—as syphilitic, variolous, erysipelatous; when due to diathetic causes, are strumous, rheumatic, gouty.

*As to Effect.*—The viscera affected indicate the fever. Thus, we have nervous fevers, brain-fever, gastric fever, abdominal typhus, dothinenterite. The terms Exanthematic and Eruptive indicate that the skin is affected; when the blood is rapidly disorganised, the terms Putrid and Malignant are used; when there is great prostration, the fever is adynamic, asthenic, etc.

*As to Course or Order of Symptoms.*—This is a fertile source of names. As to duration, *Chronic*

fevers are cachectic states characterised by continuous morbid states of the blood. They are (*a*) Cachexiæ, without paroxysmal aggravation or development of the pyrexial state; (*b*) Chronic fevers strictly, with paroxysmal aggravation or development. Examples: Quartan ague, chronic inflammatory fever, or irritative fever, chronic suppurative fever, or hectic. *Ephemeral* fevers are fevers which last from one to two days. *Intermittent* fevers are fevers of indefinite duration, having pyrexial paroxysms and entire cessation of fever at short intervals—agues or malarious fevers. *Relapsing* fevers are fevers of definite duration (seven to twenty-one days), with one to three paroxysms. *Remittent* fevers are fevers of definite duration, in which the febrile phenomena continue, but pyrexial paroxysms occur at regular intervals. *Continued* fevers are of definite duration, characterised by a continuance of the pyrexial phenomena, through an *increase* to an *acme* or *status*, and thence to a *decline*. Pyrexial exacerbations, but not paroxysms, of fever occur. *Recurrent* fevers are fevers of indefinite duration, in which pyrexial states of definite duration recur from time to time. Such are the syphilitic and leprous Pyrexiæ.

The *time* occupied by the paroxysm, or the interval between them, indicates the kind of fever. In Intermittents, the fever is named according to the interval between the beginning of one paroxysm and the beginning of the next. If twenty-four hours, it is quotidian; if forty-eight, a tertian; if seventy-two, a quartan. (Compare Cullen's *Nosology*, Order I. sec. i., or Dr. Craigie's *Practice of Physic*, vol. i. p. 43, etc.)

The *predominance* of certain phenomena or symptoms at certain stages gives names to fevers. If the initiatory stage is not passed, it is a *masked* fever; when that of depression is prolonged (the cold stage), an *algid* fever, or collapse fever; if the hot stage be remarkably manifested, it is a *burning* fever (synocha, *causos*); when symptoms of the sweating stage are predominant, it is a *sweating* fever (miliary fever).

The *origin* and *mode of spread* of fevers give rise to names. When the cause is inherent in the soil or surface, *i.e.*, topographical, it is *Endemic;* when it spreads amongst the people irrespective of local conditions, it is *Epidemic;* when the essential cause of the fever is developed within the living organism (a specific fever-poison), and is communicated

thence to another living organism, either immediately or mediately by *fomites*, and excites the same or similar phenomena (exanthematic fevers), it is infectious, contagious, or communicable. When, if so developed within the living organism, the cause is not communicable (as in rheumatic fever), or if it is only developed without the organism (as in malarious and sewer fevers), it is non-contagious, non-communicable, not infectious. When the fever-poison is communicated from lower animals to man, it is *Epizootic*, as glanders, hydrophobia, etc. Endemic fevers may be named from the locality or circumstances under which the poisons arise, as ship, prison, and camp fevers; other fevers, from the classes of individuals they attack, as *Diathetic*, *Infantile*, and *Puerperal* fevers.

When a communicable fever-poison is introduced amongst a population susceptible of its action, and the endemic and atmospheric conditions favour its development and communication, a state of health and disease arises generally, termed the *epidemic constitution*.

In the Nosology of the Registrar-General of England, fevers arising from specific fever-poisons are termed *zymotic diseases*.

# II. ETIOLOGICAL NOSOLOGY AND INDEX OF FEVERS.

## A. GENERAL FEVERS. Pyrexiæ.

These general pyrexial states modify Specific Fevers.

I. Inflammatory Fevers—Fevers accompanying inflammations :—

1. Acute Inflammatory Fever (Synocha).
2. Chronic Inflammatory Fever (Irritative Fever).
3. Suppurative Fever. Inflammatory Fever, accompanying inflammation, ending in suppuration :—
   (*a*) Acute. (*b*) Chronic (Hectic Fever).
4. Adynamic or Asthenic Synocha (Typhus-like fever—Fever of Typhoid type, but not a specific form).

II. Diathetic Fevers.

1. Articular, with inflammation of the articular structures :—

(*a*) Rheumatic Fever.—Cause, Lactic Acid ? Carbonaceous compounds ? Fibrin ?

i. Bursal R. Fever—Inflammation of the Bursæ.

ii. Aponeurotic R. Fever — Inflammation ? of the aponeuroses, muscles, and fibrous structures of joints.

(*b*) Arthritic or Gouty Fever. — Cause, Uric Acid ? Nitrogenous compounds ?

i. Paroxysmal or Acute Gout.—Formation or deposit of Urates in synovial membranes and derma, with neuralgic inflammation.

ii. Rheumatic Gout. — Formation or deposit of

Urates, with analogous transformation of articular tissues.

2. Visceral—With Rheumatic or Gouty Inflammation of the serous, sero-fibrous, and elastic tissues of viscera.

Visceral Diathetic Inflammations with inflammatory fever :—

(*a*) Meningitis, Spinal and Cerebral.
(*b*) Endocarditis, Pericarditis, Arteritis.
(*c*) Pneumonia, Pleuro-pneumonia, Pleurisy.
(*d*) Hepatitis (Capsule of Glisson).
(*e*) Splenitis (Trabeculæ of Spleen).
(*f*) Nephritis (Connective tissue of Kidneys — Renal Arteritis).
(*g*) Hysteritis.—Rheumatic inflammation of Cervix uteri.
(Other inflammations of this class affect the ovary, testicle, prostate gland, fibrous tissues of eye, etc.)

3. Cutaneous—With acute or chronic inflammations of the derma (connective tissue), cutaneous glands, and blood-vessels.

Cutaneous Diathetic Inflammations.

(*a*) Erythema.—E. fugax, nodosum, etc.
(*b*) Roseola. (*c*) Urticaria. (*d*) Purpura.

## B. SPECIFIC FEVERS (*Zymotic Fevers*).

a. ENDEMIC FEVERS.—Fevers caused by specific fever-poisons derived from without the organism.

I. Malarious Fevers.—Caused by the products of vegetable decomposition, or emanations from the soil; pyrexial phenomena intermittent or remittent :—

1. Uncomplicated—without local inflammation or cognisable change in the blood :—

(*a*) Intermittent Fevers, or Agues proper.

(*b*) Masked Agues—"The Chills."

(*c*) Local Agues — The phenomenon of the paroxysm limited to a limb or portion of the body.

(*d*) Periodic Neuralgiæ (nervous system exclusively affected).

2. Complicated—with Neuroses, Visceral inflammations, or Sepsis of the blood :—

(*a*) Neurose Malarious Fevers—*Cerebral*, with coma, mania, delirium, etc. ; *Spinal*—Tetanus ; *Sympathetic*—Visceral neuralgiæ.

(*b*) Remittent Fevers — Malarious Fevers complicated with visceral inflammations :—

i. *Cerebro-spinal* Remittents—Endemic Meningitis.

ii. *Pulmonary* Remittents—Pleurisy, Pneumonia.

iii. *Bilious and Gastric* Remittents :—

Endemic Gastric Fevers (Gastritis, with hepatic and splenic congestion) : — (*a*) Of Temperate Regions—Bilious Remittents : (*b*) Of Tropical Regions—Endemic Yellow Fever.

iv. *Pernicious* Remittents — Endemic Pernicious Fevers or Malarious Fevers, complicated with septic or miasmatic poisons :—

*a*. Complicated with Fæcal miasmata (sewer and dunghill emanations) ; Choleraic Remittents ; Dysenteric Remittents ; Malarious Continued Fevers with abdominal symptoms.

*b*. Complicated with Sepsis ; Petechial and Scorbutic Remittents ; Endemic Pernicious Fevers, with hæmorrhages, black vomit, etc.

II. Miasmatic Fevers.—Fevers caused by products of decomposing animal matter.—Pyrexial phenomena continuous ; Gastro-intestinal symptoms predominant.

1. Fæcal Miasmatic Fevers—Caused by sewer and dunghill miasms :—

(*a*) Ephemeral Fæcal Miasmatic Fevers—terminating in one to four days :

i. Endemic Summer Diarrhœa ; ii. Endemic Summer Cholera ; iii. Endemic Dysentery.

(*b*) Continued Fæcal Miasmatic Fevers, terminating from seven to twenty-one days :

i. Simple Continued Fever ; ii. Typhoid Continued Fever (with adynamic symptoms).

III. Septic Fevers—Caused by putrescent animal matter.

1. Glandular Erysipelas (wounds poisoned by putrescent stuff).

2. Hospital Erysipelas. 3. Hospital Gangrene. 4 Puerperal Fever ?

These three last may be classed also with the Ochlotic Fevers.

5. Septic Ileo-typhus—from drinking putrescent fluids, or eating putrescent flesh.

6. Pyæmia ?

b. EPIDEMIC FEVERS.—Poisons derived from within the organism.

I. Ochlotic Fevers.—The Typhus Group. These are fevers spreading epidemically, with cutaneous inflammations more or less distinct, and sepsis of the blood. The poisons which cause them arise *de novo?* during overcrowding of men and animals, from the consequent putrescent emanations of the lungs and skin. They

vary in their nature according to race and climate, and are modified deeply by the operation of malarious and miasmatic fever-poisons, or by any of the causes of sepsis of the blood. When, from these concomitant conditions, the Ochlotic fevers are intensified, and cause a great mortality, and death commonly occurs before the seventh day, they are termed Plagues, Pests, Pestilential Fevers. One attack is generally prophylactic against a second; the fever-poison ceases, therefore, to spread in a district so soon as the entire population has been subjected to its influence. Numerous variations from the typical forms occur during the progress of an epidemic.

Three classes of Ochlotic Fevers are observed—the Cutaneous, Pulmonary, and Gastro-enteric :—

1. *Cutaneous* Ochlotic Fevers.—Typhus fevers, with inflammation of cutaneous glands, and the phenomena of disordered function of the Nervous system :—

*a.* Exanthematic Typhus. *Synonyms :* Typhus exanthematicus; Spotted Fever; Pulicular (or Flea-bite) Fever; Hungarian Fever; Nervous Fever; War Typhus. In the European Typhus, head symptoms predominant; a rubeolar or mulberry eruption commonly appears on the fifth or sixth day.

(*a*) Nosological Varieties.—i. T. Mitior; ii. T. Gravior; iii. Petechial Typhus, with purpura-eruption; iv. Miliary Fever, with miliary eruptions and profuse sweats. (This occurs also as a Gastro-enteric Typhus.)

(*b*) Epidemical Varieties (*i. e.*, variations from the typical form observed in the course of an epidemic).—i. Gastric; ii. Cerebral; iii. Putrid; iv. Ambulatory; v. Latent; vi. Relapsing.

*b.* Sweating Pestilential Typhus.—The "Sudor Anglicanus," or English Sweat. Transformed into the modern miliary typhus?

*c.* Dysenteric Typhus.—With adynamic dysentery of a communicable character. Usually complicated with fæcal miasm, as in camps.

*d.* Glandular Typhus.—*Synonyms:* Levant Typhus; the Levant Plague; Bubo Plague. Occurs in Asia Minor, Egypt, and on the shores of the Mediterranean. Transformed in Northern Europe into an Ex. Typhus? A rubeolar eruption, with or without buboes or carbuncles.

Epidemical Varieties of Levant Plague or Glandular Typhus:—i. *Typical*, with buboes or carbuncles; ii. *Collapse*, the "Pestis Siderans;" iii. *Continued*, Pestis Typhoides; iv. *Ephemeral*, Pestis Mitior; v. *Renal*, with urinary suppression; vi. *Icterode*, resembling epidemic yellow fever; vii. *Ambulatory;* viii. *Local*, buboes without fever.

2. *Pulmonary* Ochlotic Fevers of Epizootic origin? caused by Ochlesis of domestic animals?—

*a.* Pulmonic Typhus.

*b.* Epidemic Peripneumonia with Sepsis (the Black Death).

*c.* Influenza.—Epidemic Catarrh.

Epidemical Varieties of Influenza, or Epidemic Catarrh:—i. Coryza, or Catarrh, the typical form; ii. Gastro-enteric; iii. Renal; iv. Exanthematic—as (*a*) Miliary, (*b*) Scarlatinal, (*c*) Diphtherial; v. Sweating; vi. Remittent or Intermittent.

3. *Gastric and Enteric* Ochlotic Fevers. This class is

specially complicated by the effects of malaria and miasm.

*a.* Relapsing Fever.—After apparent recovery, relapses; Gastric symptoms, with splenic and hepatic congestion and inflammation. *Synonyms:* Febris Recurrens; the Short Fever; Five-day Fever; Seven-day Fever; Bilious Remittent; Remittent Icteric Fever; Bilious Typhoid; Mild Yellow Fever. Prevails epidemically in Europe. A transformation of the Epidemic Yellow Fever? Appears with or without a rubeolar eruption.

Nosological Varieties—

1. British Relapsing Fever.—Gastric symptoms predominant; no well-marked eruption.
2. Silesian Relapsing Fever.—Very commonly there is a rubeolar or measly eruption.

Epidemical Varieties; i. Cerebral; ii. Collapse-form; iii. Renal; iv. Miliary or Sweating.

3. Bilious Typhoid; Relapsing Typoid. A variety of Levant Plague or Yellow Fever?
4. The *Dengue.*—With scarlatinal, exanthematous, and articular complications. Prevalent in the East and West Indies and South America. (The nosological position of this epidemic fever doubtful.)

*b.* Gastro-enteric Typhus. *Synonyms:* Morbus Mucosus; Gastro-adynamic Fever; Gastric Fever; Entero-mesenteric Fever; Intestinal Fever; Adynamic Gastro-enteritis; Dothinenteria; Follicular enteritis; Typhoide; Abdominal Typhus; Enteric Fever; Pythogenic Fever. Spreads over the towns of Europe and the United States, and probably also of India. Specially associated with sewer or fæcal

miasm. Gastric and enteric symptoms predominant, accordingly as special endemic fever-poisons are produced ; frequently a papular inflammation of a rose colour appears about the seventh day.

Epidemical Varieties—

These very numerous, according to the class of blood-glands affected, and according to the visceral complications. They are determined by climate and season, or by domestic, dietetic, diathetic, and other social and personal conditions.

*c.* Occidental Gastric Typhus—Epidemic Yellow Fever. —The plague of the Western Continent, having its centre on the coasts of the Gulf of Mexico ; has spread in Europe, in Italy, Spain and Portugal. Prevails most fatally where malaria and miasmata abound. Gastric symptoms, with hæmorrhage or black vomit, most predominant. An eruption occasionally observed.

Epidemical Varieties—

i. Remittent or typical form ; ii. Prolonged or continued, passing into ordinary Typhus ; iii. Adynamic—Typhus symptoms from the first ; iv. Cerebral, with renal disorder ; v. Collapse-form ; vi. Ambulatory ; vii. Ephemeral, with mild febrile symptoms ; viii. Toxic ; hæmatemesis or icterus, without pyrexia. The relations of this typhus to the Relapsing fever, European typhus, and Levant plague, have yet to be investigated. It is certain that the specific fever-poison is introduced into Europe, and probable that, modified by climate and other conditions, thus introduced, it produces

typhus symptoms, but not the usual phenomena of yellow fever.

*d.* Asiatic Gastro-enteric Typhus—Epidemic Cholera.—Developed, *de novo* (?), in India amongst crowds of men subject to fæcal miasm and malaria. Naturalised in Europe. Typhus stage marked by rubeolar eruption.

Epidemical Varieties—

i. Typical-form—death in collapse-stage; ii. Dry Cholera, or Cholera Siderans—no diarrhœa or vomiting; iii. Cholerine, or Choleraic diarrhœa; iv. Choleraic Dysentery; v. Renal complication—(*a*) with suppression of urine, (*b*) with diuresis; v. Continued form—Choleraic Typhus.

II. The Exanthemata—Are fevers arising from specific fever-poisons generated within living organisms, which usually are accompanied by, or cause inflammation of, the skin and mucous surfaces; and an attack of which is commonly prophylactic against a second. The cutaneous inflammation is congestive, desquamative, effusive, or suppurative, and commences on from the first to the fourth day of the fever.

1. Variolous Fever—Variola, Small-pox.—A fever of fourteen days' duration, in which the inflammation is usually first congestive, and then effusive and suppurative. It may, however, occur without cutaneous inflammation, or the inflammation may be congestive only, or congestive and effusive. The epidemical varieties are determined by variations in the inflammation, and in the course of the fever, and by the operation of other fever-poisons.

Varieties of Variolous Fever—

i. Varieties of Variola from variation in the character of the suppurative inflammation. These protect from a second attack.

(*a*) V. Discreta. Pustules few and distinct from each other.

(*b*) V. Coherens. Pustules numerous, and contiguous.

(*c*) V. Confluens. Pustules very numerous and confluent.

(*d*) V. cum Petechiis. Petechial papulæ intermingled with the pustules.

(*e*) V. sine Variolis. No eruption on the skin.

(*f*) Inoculated Variola. Pustules few, and at first limited to the inoculated spot.

(*g*) V. Vaccinia. Variola from a variolous fever-poison developed in the cow.

ii. Irregular and Spurious Variolous Fevers. Varieties of variola from variations both in the order of the symptoms and in the character of the inflammation. Fever usually of short duration ; inflammation less destructive. Not protective against true Variola.

(*a*) Varioloid—Irregular small-pox. Occurs usually, but not necessarily, after a previous attack of regular Variola or V. Vaccinia.

(*b*) Varicella—Chicken-pox. Inflammation effusive, pock vesicular.

(*c*) Globular Varioloid—The Hives. Eruption in successive crops, mingled with varioloid and swine-pox.

(*d*) Conical pustular Varicella—Swine-pox. Terminates within seven days.

iii. Complex Variolous Fevers. Varieties of Variola from operation of other fever-poisons. Cutaneous inflammation often either wanting, or congestive only.

(*a*) Malignant ; (*b*) Typhoid ; (*c*) Erysipelatous ; (*d*) Rubeolar ; (*e*) Miliary ; (*f*) Diphtherial ; (*g*) Gastric ; (*h*) Dysenteric.

iv. Complicated Variolous Fevers. Varieties with important visceral complications.

2. Rubeolar Fever. Morbilli ; Rubeola ; The Measles. Congestive inflammation of the mucous surfaces supplied by the respiratory nerves (Coryza) ; inflammation of the skin, usually seen on the fourth day—at first pulicular, then confluent, and forming crescentic patches. Fever terminates in fourteen days.

Epidemical Varieties—

i. As to the fever and inflammation :

(*a*) R. sine febre. Eruption, with little or no fever. Usually at the commencement of epidemics.

(*b*) R. sine eruptione. Specific coryza without cutaneous inflammation.

(*c*) R. retrocedens. Inflammation of skin suddenly ceasing.

ii. As to the character of the eruption :

(*a*) R. lævis ; (*b*) papular ; (*c*) vesicular or miliary ; (*d*) hybrid or scarlatinal ; (*e*) confluent ; (*f*) petechial, with hæmorrhages ; (*g*) livid or "black" (with pneumonia).

iii. As to complication with other fever-poisons :

(*a*) Typhoid and Gangrenous or "putrid ;" (*b*) Diphtherial or croupose ; (*c*) Enteric.

3. Scarlatinal Fever. Scarlet fever, Scarlatina, Angina erysipelatosa, etc. Congestive and Desquamative inflammation of the skin, kidneys, and mucous surfaces, with or without inflammation of the salivary glands and tonsils. Eruption usually on the second day ; fever terminates in fourteen to

twenty-one days: occasionally relapsing in character—

(*a*) Nosological Varieties—

i. S. simplex—Inflammation of the skin and mucous surfaces of throat, without inflammation of the glands.

ii. S. Anginosa—inflammation of the tonsils with or without cutaneous eruption.

iii. S. Glandularis—eruption and inflammation of the parotid and submaxillary glands.

iv. S. Glandularis sine eruptione.—The Mumps, *Scottice* Branks; attacks pubescent youth, and is sometimes complicated with inflammation of the ovaries or testes. Is an allied form of scarlatina, and sometimes there is an eruption.

(*b*) Epidemical varieties of Scarlatinal Fevers—

i. From variations as to the cutaneous inflammation and general symptoms.

(*a*) Rubeolar. (*b*) Arthritic, with neuralgia and inflammation of larger joints. (*c*) Rheumatic; *The Dengue?* a relapsing fever with scarlet eruption. (*d*) Relapse Form—return of inflammation and fever on the eighth or ninth day. (*e*) Anasarcous, with desquamative nephritis.

ii. Varieties from complications with other fever poisons.

(*a*) Encephalic. (*b*) Gastro-enteric. (*c*) Relapsing. (*d*) Gangrenous; these termed Malignant. (*e*) Diphtherial.

III. COMMUNICABLE FEVERS, ALLIED TO THE EXANTHEMATA OF DOUBTFUL NATURE AND ORIGIN :—

1. DIPHTHERIA.—Fever, with pellicular inflammation of the throat, extending thence to the air-passages, gastro-intestinal mucous surfaces, and skin. Is epidemic, endemic, and sporadic. Nature of cause doubtful; probably a hæmatophyte or septic protozoon.

*a.* Nosological Varieties of Epidemic Diphtheria—

i. *Diphtherial* Angina. *Synonyms*: Diphtheritic Pharyngitis; Stomacace; Malignant, Putrid, Pestilential, Suffocating Angina; throat Croup. Asthenic inflammation of the tonsils and pharynx; pellicle amorphous, not plastic; glands of neck swollen.

ii. D. Stomatitis. Infantile or gangrenous stomatitis. Livid red inflammation of the lip and cheeks, ending in gangrene; pellicle pulpy, commencing with vesicles; parotids and submaxillary glands enlarged; gastric and gastro-enteric symptoms.

iii. D. Coryza. Pellicle, extending to the mucous membrane of the nares; occasionally profuse epistaxis.

iv. D. Trachealis. Diphtheritic tracheitis. *Synonyms:* Epidemic croup; Angina membranacea; Angina trachealis; Plastic Croup; Larynx croup; Pellicular croup. Plastic inflammation of the larynx and trachea, extending to the bronchi. Cough often spasmodic.

v. D. Cutanea. Pellicular inflammation of portions of the skin, conjunctiva, etc. Usually accompanies the other forms.

vi. D. Traumatica. As Hospital Gangrene ?

*b*. Complex Varieties.—Diphtherial inflammation complicates epidemics of Ochlotic and Exanthematic fevers. Hence varieties of a Complex character—(*a*) Erysipelatous (with Influenza); (*b*) Variolous; (*c*) Rubeolar; (*d*) Scarlatinal; (*e*) Aphthous; (*f*) Typhus; (*g*) Gastro-enteric or Typhoid.

2. Endemic Diphtheroid.

i. Endemic Stomatitis. *Synonyms:* Muguet; Thrush. Is Ochlotic, and occurs in foundling hospitals, the wards of general hospitals, etc. Pellicle contains sporules and thalli of the Oidium Albicans, and extends from the tongue along the gastro-intestinal mucous surfaces.

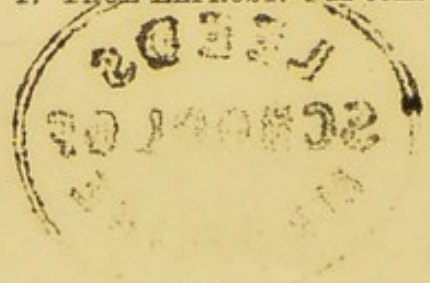
ii. Contagious Blennorrhœa. Inflammation of mucous surfaces from a specific fever-poison, communicable by contact only ? due to a microscopic alga ? (*a*) Vaginal and urethral Blennorrhœa; (*b*) Contagious ophthalmia.

3. Vesicular Aphtha. — Vesicular inflammation of mouth. Epidemic; attacks only once.

4. Pertussis.—Inflammation of the respiratory mucous surfaces from a specific fever-poison, ending in a spasmodic affection of respiratory motor nerves. Attacks commonly but once in a lifetime.

IV. Impure Fevers. — Constitutional blood-diseases continuing for the most part for a prolonged period, with recurrent pyrexial attacks, terminating within from seven to fourteen days. Inflammation due to a specific poison, and manifested primarily on the skin and mucous surfaces. One attack prophylactic.

1. True Leprosy. — A constitutional disease of indefinite



duration (arising from uncleanness and squalor ?), with pyrexial paroxysms and congestive, papular, or tubercular inflammation, of the skin and air-passages, with or without neuroses. Contagious ?

Nosological Varieties—

i. Erythematous ; ii. Squamous, with rapid production of epithelium ; iii. Black, with pigment-deposit in skin or epithelium ; iv. Tubercular, with plastic deposit in connective tissue of skin and mucous surfaces ; v. Gangrenous, with dry gangrene of the extremities, especially of the fingers and toes ; vi. Anæsthetic, —Loss of the sensibility of the surface of the body ; cutaneous inflammation congestive or effusive (blebs), rarely plastic ; vii. Cerebral, with mania, melancholia, etc.

2. The Syphilids.—Syphilitic Diseases—Constitutional diseases due to a specific poison, terminating in a definite period (one to three years ?), and characterised by pyrexial paroxysms, with specific inflammations of the skin, mucous surfaces, connective tissue, and periosteum.

*a.* Nosological Varieties of European Syphilis :—

i. Benign Syphilis.—Inflammation superficial :—

(*a*) Virulent Gonorrhœa—Primary ulcer simple, or a patchy excoriation ; cutaneous inflammation congestive.

(*b*) Papular Syphilis.—Primary ulcer simple ; cutaneous exanthem papular.

(*c*) Pustular Syphilis.—Primary ulcer with raised but not indurated edges ; exanthem effusive and suppurative, ending in superficial ulcerations and crusts.

(*d*) Phagædenic Syphilis.—Primary ulcer either corroding or gangrenous; exanthem pustular or tubercular, ending in ulcers that extend by a margin (Rupia).

ii. True or Scaly Syphilis.—Inflammation of derma deep-seated. Primary ulcer excavated, with a thickened edge and base. Exanthem at first congestive, and ending in (*a*) desquamation; (*b*) tubercles and ulceration; (*c*) condylomata; (*d*) fungoid growths; (*e*) periosteal inflammation.

iii. Ethnic and Climatic Varieties of Syphilis.

(*a*) Yaws or Pian; Frambœsia: African Syphilis—Inflammation commonly superficial; ulcerations Rupia-like, with fungoid growths. Terminates in health in about two years.

(*b*) Radesyge, Norwegian Syphilis.—Inflammations figurate and tubercular, or pustular and papular; ulcerations rupious and serpiginous.

(*c*) Scherlievo.—Frambœsia of Eastern Europe. Inflammation pustular or tubercular; ulcers rupious; yaw-like growths and condylomata.

(*d*) Sibbens.—Frambœsia of Scotland. Inflammation both superficial and deep-seated, roseolar, condylomatous, fungoid.

(*e*) Button Scurvy.—Frambœsia of Ireland.

V. Epizootic Fevers.—Acute fevers, due to a specific fever poison communicated from brutes to man:—

1. Hydrophobia.—A fever terminating within seven days. Poison acts primarily on the pneumogastric system, and the surfaces supplied from it; secondarily upon the cerebro-spinal axis. Derived

from the saliva of the dog and cat races when in fever.

2. EQUINIA or MALIASMUS—Human Glanders.—Fever and inflammation usually of a septic character. Caused by the pus or mucus of a glandered horse or ass.
3. TRICHINIA.—Fever of a typhoid and rheumatic character with muscular inflammations, due to the *Trichina spiralis.*
4. CARBUNCULAR FEVER—Malignant Carbuncle.—Acute typhus-like fever, with carbuncular inflammation, rapidly becoming gangrenous. Poison derived from cattle, with malignant typhus.
5. CONTAGIOUS FURUNCULOID.—Inflammation of the skin, occurring epidemically—furuncular, carbuncular, ecthymatous, or gangrenous; the cause of which is doubtful, but suspected to be of epizootic origin.
6. EPIZOOTIC STOMATITIS.—Vesicular inflammation of the mouth, due to the poison of the disease of cattle termed Murrain. Is a contagious stomatitis. Communicated by the milk?
7. EPIZOOTIC PERIPNEUMONIA?—The histories of some epidemics of influenza point to the lower animals as the probable first source of the fever-poison

# THE NAMING AND CLASSIFICATION OF CONSTITUTIONAL DISEASES.

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CONSTITUTIONAL diseases are diathetic, which have their seat in some general or diathetic tissue or system of organs, and hence their origin in a hereditary predisposition, or in causes acting generally on the health of the individual, and on the parts affected.

Constitutional diseases are cachectic or CACHEXIÆ when there is defect in nutrition, and more or less structural degeneration of the blood as well as of the tissues and organs involved.

Constitutional diseases may be classed according to their seats and causes. The former are threefold, namely, the tissues, the blood, and the nervous system. Constitutional diseases of the nervous system being also systematic diseases, are to be classed under the neuroses.

CAUSES.—The causes are (*a*) *general* involving the organism generally; (*b*) *local* and specially in-

fluencing some organ or limited portion of a tissue. But whether the causes be general or local, the fundamental law of causation is, that the pathological changes follow the physiological order, both as to course and termination. Thus it is probable that the uric and lactic acids are produced at some stage of the healthy transformation of the tissues; the morbid production of them is, therefore, physiological; but the disease consists in the arrest of transformation at the stage of their production, and in the consequent symptoms both local and general. As each tissue has its appropriate sequence of transformation, and as these have their own general laws, the pathological changes in them follow the same order and according to the same laws. Thus the plasma effused in chronic rheumatic arthritis, undergoes a series of changes, which end in the formation of loose cartilages in the joint in one case, or in ossification (analogous transformation) of its ligamentous and cartilaginous structures in another.

General Causes.—The general causes may be classed thus:—1. The particular modes of nutrition peculiar to the individual, or of particular tissues, determines the kind and extent of change. In one

person, for example, there is a special tendency to the formation of uric acid in the tissues, in another to ossifications, in another to cancerous degeneration. These tendencies when congenital are termed hereditary predispositions, and constitute the diathetic causes proper.

2. In every individual the nutrition of tissues and the functional activity of systems of organs vary with his age. Age means, physiologically and pathologically, nothing more than the stages of development and decline in which such variations take place. Hence the constitutional and other diseases of an individual have a peculiar character according as they occur at these stages of development, which may be designated as infancy, childhood, adolescence, puberty, manhood, decline, old age.

3. The primordial laws of nutrition and development which determine the sex of the individual continue to influence the vital processes throughout life. Hence arise sexual differences in the morbid nutrition of the tissues; as, for example, the tendency to degeneration of the blood-vessels is greatest in the male sex. But the genetic glands themselves re-act differently in the two sexes on the nervous system, and on the functions of special organs, thus modify-

ing the constitutional diseases of men and women of the same stock.

4. Although for the sake of classification we select some tissue or system of organs as predominantly the seat of constitutional diseases, all others participate more or less in and influence the general morbid state. In especial, the fundamental processes of nutrition in a tissue or organ are modified by the state of the nervous system, the blood, and the capillaries which distribute it. The nervous system—by its direct action on the tissues themselves and on the motor power of the capillaries; the blood—in virtue of its being the source whence all nutrient material is obtained; the capillaries by their threefold relations to the blood, the nervous system, and the tissues. Hence a variety of causes influence nutrition through these three factors of nutrient activity, both directly and by inducing a reciprocal influence on each other. Mental changes exercise a powerful influence on constitutional diseases, because the nutrition of every tissue and organ is directly modified by mental encephalic changes. Another kind of general causes consists in the defect or absence of the conditions necessary for healthy corporeal action, as proper food, air, water, shelter,

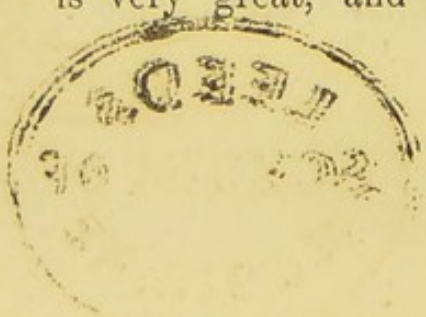
and clothing. A third class are the same as the causes of specific fevers, and induce constitutional diseases either as a consequence of a fever, or by the direct chronic action of a fever-poison. All these general causes come under consideration in general and public hygiene; and the successful treatment of the majority of constitutional diseases rests chiefly on their removal.

Causes of Special or Local Constitutional Diseases.—It is a great characteristic of constitutional diseases that the general morbid state shall be manifested locally. Thus, in the members of one family predisposed to gouty diseases, the heart is more particularly the seat of gouty changes, in another the brain, in another the joints of the fingers. Whatever the causes may be of this, they concur in their mode of operation, which is, so to modify the nutrient activity locally, that the morbid changes shall occur there electively or more readily than elsewhere, when the general causes are operative. Excessive use or activity of an organ is a common cause of this kind. Thus it is that the mammæ and uterus are more commonly the seat of cancer in women than in men, and in married women than

unmarried. Previous disease or injury has a like effect. It is probably thus also, that reducing the temperature unduly of a part, or "taking cold," is so common an exciting cause of local constitutional diseases; the nutrient activity is thereby impeded. All other causes acting upon the nervous system or the capillaries locally, to the hindrance of their proper functions, will also determine the local disease.

METASTASIS.—This is a common phenomenon in the course of diathetic diseases, and is nothing more than the extension of the morbid action from one locality to another, with or without cessation in the part first involved. According to the humoral pathology it is essentially due to a transference of the supposed *materies morbi*, but observation has not established the theory, nor is it sufficient to include all the phenomena. The more probable explanation is, that locally acting causes depress the nutrient powers locally, and thus may induce the constitutional disease locally. Amongst the most common of this class of causes, are changes in particular nutrient nerve-centres, or in centres of vaso-motor nerves in the cerebro-spinal axis, whereby the vital powers, both of the tissue affected and of its capillaries, are modified.

For example: chorea is often associated with heart-disease in persons of the rheumatic diathesis. How is this connection to be explained? Thus: the seat of chorea is in the motor nerve-centres; its most common cause a depressing emotion, such as terror. Now these also depress the functional activity of the heart through its nerve-centres, which all emotions whatever influence. Consequently, when a patient of a rheumatic diathesis predisposed to nervous disease, as an excitable young girl, is frightened into chorea, rheumatic disease of the heart is probable—because, 1. The heart is made up of tissues specially predisposed to take on the kind of disease termed rheumatic; 2. Because the individual is diathetically predisposed to the rheumatic class of constitutional diseases; and, 3. Because the organ affected is particularly predisposed to morbid nutrition in consequence of the condition of its nerve-centres. It is probable, also, that it is in this way the heart is specially predisposed to take on heart disease in cases of acute and chronic rheumatism. The same law of causation equally applies to other organs, and diathetic diseases. The influence of the nervous system on the first beginnings of all local constitutional diseases is very great, and no classification or method of



treatment is complete which omits it from consideration.

## Etiological Nosology and Index of Constitutional Diseases.

*A.* Diathetic or Tissue Diseases.—Hereditary degenerations of tissues.

I. Strumous Diseases.—Diathetic and cachectic degenerations primarily of the mucous membranes and their glands, and of the lymphatic glands and blood-corpuscles, and consecutively of other tissues.

1. Dietetic Strumous Diseases.—Strumous diseases, chiefly glandular, due to defective supply of the things necessary to healthy nutrition and development.

(*a*) *Domestic Struma*, predominantly *infantile*; (*b*) *Endemic Struma.*

2. Tubercular Strumous Diseases.—Cachectic degenerations characterised by the product of tubercle.

(*a*) *Scrofulosis.*—Tubercular degenerations of the glandular system and mucous membranes with defective blood-corpuscles. *Product*, scrofula, yellow tubercle.

(*b*) *General Tuberculosis.*—Tubercular degenerations of the pulmonary cells, and serous elements of viscera. *Product*, miliary, grey, or fibrinous tubercle. Often conjoined with the preceding.

(*c*) *Vascular Tuberculosis—Hæmorrhagic Tuberculosis.*—Tubercular degeneration of the lungs, commencing with defective activity and atheromatous degeneration

of the small arteries and capillaries. Allied to atheromatous constitutional diseases.

(*d*) *Albuminous (?) Tuberculosis.*—Synonyms. Acute tuberculosis. An acute or subacute degeneration seated chiefly in the air-cells and pia mater of cachectic persons, leading to "albuminous" tubercle.

(*e*) *Congestive Tuberculosis.*—A tubercular degeneration of lungs, subacute or chronic, and plastic, preceded by congestion.

(*f*) *Syphilitic Tuberculosis.*—A cachectic degeneration in a syphilitic habit, chiefly seated in the connective and fibrous tissues of viscera.

(*g*) *Waxy or Amyloid Degenerations.*—A chitine-like degeneration of structure allied to the syphilitic and strumous kinds. Varies as to tissue involved :—i. Neuroglia ; ii. Small arteries and cells of viscera ; iii. Glands of mucous surfaces ; iv. Lymphatic glands (in lymphatic leukæmia.)

II. Arthritic Diseases.—Constitutional degenerations of the synovial membranes, arterial tunics, and connective tissue of skin and mucous membranes, with abnormal production of uric acid (and oxalic acid ?) and ending in atheroma, or interstitial fatty degeneration of tissues involved.

1. *Acute Gout.*—A pyrectic disease with production of uric acid in the synovial membranes and skin.
2. *Chronic Gout.*—A cachexia with formation of concretions of uric acid and urinary salts, and with diathetic degeneration of the tissues involved.
3. *Oxaluria ?*—A cachexia with diathetic production of oxalic acid in place of uric acid. A neurosis ?

III.—Rheumatic Diseases.—Constitutional degenerations of the articular, serous, sero-fibrous, and muscular structures, with abnormal production of fibrin and lactic acid, and ending in analogous or fibroid degenerations.

1. *Acute Rheumatism—Rheumatic Fever.*—Irritation and inflammation of the diathetic structures, with pyrectic production of fibrin (*hyperinosis*) and lactic acid.
2. *Chronic Rheumatism.*—Chronic rheumatic arthritis. Analogous degenerations of the muscular and articular structures.
3. *Rheumatic Gout.*—Articular rheumatic inflammation of the smaller joints in persons diathetically predisposed to gout.

IV. Fibroid Constitutional Diseases (*Fibrinous Diathesis* of Dr. Handfield Jones)—Fibrinosis.—Diathetic and cachectic degenerations of the blood and of the fibrous tissues.

1. Of the Blood. Rheumatic and cachectic *hyperinosis*, with deposit of fibrin in the cavity of the heart and vessels.
2. Of the fibrous tissues of viscera, *cirrhosis;* (*a*) Rheumatic ; (*b*) Dietetic (drunkards, etc.)
3. Of connective tissue ; (*a*) Local. Fibroid tumours ; Enchondroma. (*b*) Of skin and mucous membranes. i. Endemic (Elephantiasis, Barbadoes leg) ; ii. Leprous ; iii. Syphilitic ; iv. Strumous ; v. Gouty (fibroid thickening of skin).

V. Osseous Constitutional Diseases—Osteosis.—Diathetic and cachectic degenerations involving the bones,

joints, and aponeuroses of muscles. Allied to rheumatic degenerations.

1. Rickets.—Primarily, softening of the long bones from defective nutrition as to lime-salts, and excessive production of lactic acid ; consecutively eburnation of the bones.

(*a*) *Infantile* (with leukæmia ?) (*b*) Puerperal.

2. Osteosis.—Diathetic ossification of tissues, ligaments, aponeuroses, fibrous and connective tissues.

VI. Fatty Constitutional Diseases—Adiposis.—Diathetic degenerations characterised by the abnormal formation or deposit of fatty matters (hydro-carbons) in elastic, serous and sero-fibrous tissues. Allied to gouty diseases.

1. Atheroma.—Interstitial deposit. Fatty degeneration and calcification of the arteries. (*a*) Gouty strumous atheroma. (*b*) Drunkard's atheroma.
2. Polysarcia.—Constitutional formation of fat in the connective tissue of the skin and serous and sero-fibrous tissues. (*a*) *General Polysarcia ;* i. Acute and transient ; ii. Permanent and progressive. (*b*) *Local Adiposis* (Fatty tumours).

VII. Constitutional Discolorations—Chromatosis.—Diathetic and cachectic degenerations characterised by abnormal production or defect of carbonaceous pigments, and chiefly the black, rarely blue.

1. *Cachectic swarthiness.*—Associated with gouty and rheumatic degenerations and with blood-cachexiæ.
2. *Nigrities.*—Diathetic production of carbonaceous pigment from excretory structures of the skin and the mucous surfaces.

3. *Melasma.*—Cachectic production of pigment in epithelium of the skin and mucous surfaces.
4. *Melanosis.*—Diathetic production of carbonaceous pigment in masses in the connective tissue of the viscera and the skin.
5. *Leucopathia.*—Diathetic defect of colouring matter in hair and epithelium.

VIII. Parasitic Constitutional Diseases.—Verminosis.—Cachectic degenerations due to the multiplication of parasitic organisms within the tissues.

1. *Trichinia* from multiplication of the trichina spiralis, generally in the muscular system.
2. *Hydatid diseases.*—Cutaneous ; hepatic ; cerebral.
3. *Cancer.*—Cachectic multiplication of cancer-cells. (To be distinguished from rodent ulcers and ulcerous fibroid degenerations.)

*B.* Cachectic or Blood Diseases.—Cachexiæ.—Degenerations of the blood, blood corpuscles, and capillary system.

I. Anæmic Blood Diseases.—Anæmia.—Due to loss or destruction of blood-corpuscles, or waste of the nutrient fluid, or both.

1. *Hæmorrhagic Anæmia.*—From hæmorrhages.
2. *Consecutive Anæmia* or *Spanæmia.*—From serous fluxes.
3. *Melanæmic Anæmia.*—*Melanæmia.*—From destruction of corpuscles in the liver and spleen, and conversion into pigment.

II. Scorbutus—Dietetic *Spanæmia.*—Cachectic blood-diseases from defective supply of suitable nutrient elements.

1. *Scorbutic Chlorosis.*—Pallid scorbutus.
2. *Scorbutic Purpura*—(The capillaries involved).

III. Toxæmia.—Cachectic blood-diseases due to poisons introduced into or retained within the blood, apyrectic and chronic in their course. Examples :—Fever-poisons ; mineral poisons ; urinary, hepatic, intestinal, excreta ; alcoholic stimulants.

IV. Leukæmia.—Characterised by degeneration of the red corpuscles and imperfect development of the white. Associated with disease of the formative blood-glands.

1. *Gastric* (dyspeptic anæmia). 2. *Splenic.* 3. *Lymphatic.*

V. Genetic Cachexiæ.—Constitutional blood-diseases, associated with defect or disease of the genetic glands and blood-glands of the reproductive system, and with neuroses of the capillaries of the heart and arteries.

1. *Ovarian* (feminine or true chlorosis). 2. *Thyroideal* and *Thymic* (Graves' disease). (*a*) Cardiac. (*b*) Exophthalmic. 3. *Supra-renal?* (Addison's disease).

VI. Capillary Cachexiæ.—Blood-diseases in which the functions of the capillary system are predominantly involved. Complicated with vaso-motor neuroses.

1. Purpura.—Characterised by passive congestions of, or hæmorrhagic effusion into, the tissues and from free surfaces ; due to loss of contractility of the small arteries.

*a, Febrile* (in fever); *b, Diathetic;* i. from hæmorrhagic

diathesis ; ii. rheumatic ; *c*, *Cachectic* (consecutive to other blood-cachexiæ) ; *d*, *emotional* (consecutive to sudden fear or terror).

2. Capillary Oligæmia.—Defective supply of blood to the skin and tissues, and due to loss of dilatability of the capillaries (?) or small arteries ; *a*, Neurose chlorosis (usually feminine) ; *b*, Emotional anæmia ; *c*, Melasmic oligæmia (a variety of "Addison's disease?")

# THE NAMING AND CLASSIFICATION OF DISEASES OF THE SKIN.

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The skin is a representative system as to its structure and functions. As an organ or series of organs of external relation its innervation is typical; and as to the diseases of its glandular and primary structures, they have their analogues in those of the internal viscera. Hence the importance of a thorough knowledge of cutaneous pathology; for the practitioner has before his eyes morbid vital processes like those which go on within, but which, being hidden from view, can only be inferred from symptoms. It is with reference to this important fact of experience that the following nosology is constructed. The cutaneous neuroses belong to the nervous system, and are not, therefore, included.

The skin may be likened to a composite secret-

ing and excreting viscus, so spread out as to shew the separateness and distinctness of its various elements. Or it may be considered as a musculo-mucous tube, with its subjacent tissues turned inside out over the surface of the body, so that the surface of the tube, with the outlets of the glandular ducts, is external, and the contractile and connective tissue subjacent or internal. But, besides its structures and tissues proper, as a composite viscus or extended mucous membrane, with various gland-ducts opening upon it and its nerves, there are the appendages which belong to it as a protecting structure. From this point of view the skin of man exhibits, either actually or potentially (*i.e.*, is capable of exhibiting under given conditions), the appendages observed on the skin of lower unfeathered vertebrates. But even feathers and porcupine quills are analogous to hair, as well as horns and claws to nails, and hoofs and scales to the horny layer of epidermis. The teeth and structures of the eye belong also to the cutaneous system.

Parts of the bare human skin have those tissues in an atrophied state which clothe homologous parts in other animals, and may become clothed; and portions which are devoid of colour in man or in white races

may become coloured, or *vice versa*. In short, all these various appendages may undergo progressive or retrogressive development, together with their glands.

From these considerations arises a division of skin diseases, according as they are general and visceral; or according as they are local, involving the appendages with their glands. The general diseases of the skin, considered as visceral diseases, are to be grouped with those of the mucous membranes in general.

Different tissues are affected in these general diseases, according as the mucous membranes or their glands are affected. In the majority of febrile cutaneous diseases, the *rete mucosum* and sweat-glands suffer in common with various mucous surfaces—buccal, pharyngeal, respiratory, gastro-intestinal, genito-urinary. In the Syphilitic group, the hair-follicles and sebaceous glands are involved. There may be, however, strictly local diseases of the skin of this group, the mucous membranes remaining unaffected.

Special tissues are involved in cutaneous inflammations. The skin is constituted of tissues having distinct functions, and subject to the action of causes

of diseases peculiar to each. It is made up of three fundamental elements—the Epiderma, the Derma or Corium, and the Glandular System. The Epiderma, or cuticle, consists of (*a*) the horny layer or epithelium, which corresponds in composition with nails, hair, quills, hoofs, horns; and (*b*) the *rete mucosum*, or layer of cells derived from the surface of the derma, and which produces the horny layer. The cutaneous pigment is contained in these cells in the coloured races, or becomes the seat of coloration in the white. It is continuous with the inner or secreting membrane of the cutaneous glands, and is essentially a mucous membrane. The Corium or Derma belongs to the system of fibrous and contractile tissues, as of the arterial tunics, bronchi, sclerotic, etc. It consists of connective and elastic tissue, with muscular fibres. It has two layers, viz., the inner or reticular layer, in which the hair-follicles and glands are imbedded, and the superficial or papillary layer, containing the papillæ, the ducts of the glands, and the vascular rete, which supplies the constituents of the cells of the *rete mucosum*.

The Glands are involutions of the *rete mucosum*, or mucous membrane. Their cell-producing or lining membrane secretes albumen, carbons, oil, and sweat,

and perhaps carbonic acid, with various odorous matters. The oil is poured out by the sabaceous glands—the sweat by the sudoriparous. The piliferous glands, or hair-follicles, and the sudoriparous glands, are deep in the connective tissue. The latter are convoluted tubes like tubuli uriniferi, consisting of a thick fibrous investment and an inner or cell-layer; between these are muscular fibres. They are also the scent-glands of the skin. The tissues of the skin, therefore, and its products, may be divided into three groups of fundamental tissues,—namely, 1. The *mucous* with its horny and other secretions; 2. The *vascular;* and, 3. The *fibrous* or *connective*, including muscular tissue. The diseases may be classed accordingly.

Terminology.*—This is a chaos of names and synonyms, extremely puzzling to the student, and obstructive to progress in cutaneous pathology. The time, however, has not yet come for a scientific nomenclature, so that it is only possible to simplify the existing terms, by grouping those that are syno-

* The student is recommended to look out the origin of all the names of skin diseases in Dr. Mayne's "Expository Lexicon," as a useful exercise in the etymology of medical terms.

nymous under one term selected from the rest as most descriptive either of the appearances, origin, progress, or termination of the disease. Terms indicating morbid variations in the colour, form, mode of spread on the surface, or extension of the disease, or clearly indicating the exciting or predisposing causes, are to be preferred. The pathological results of morbid changes may also be named. Thus, in the variolas and varioloids we have circumscribed inflammation, either effusive or suppurative. This part of the terminology of skin disease should also define, when possible, the particular tissue of the skin involved in the disease—as the papillæ, the epithelium, vascular rete, derma, etc.; and must therefore, to this end, be based upon, and explain the pathological anatomy of cutaneous diseases.

Anatomy and Semeiology.—The results of morbid changes in the skin, unlike those of the viscera, are all visible, and constitute the signs and symptoms of cutaneous diseases. They may be classed according as they are Primary or Secondary. To the Primary belong: 1. Redness, or pimply spots, Erythema—*macula;* 2. Pimple—*papula;* 3. Lumps or tubercles—*nodus, tuberculum;* 4. Blains—includ-

ing (*a*) tetter or vesicle, as in Herpes—*vesicula;* (*b*) Water blebs or blisters, large vesicles—*bulla, phlyctæna;* 5. Pustules—(*a*) vesicular or *psydracious* pustules; (*b*) Purulent or *phlyzacious* pustules; 6. Boil or carbuncle; 7. Hæmorrhages. To the secondary results of cutaneous inflammation belong, 1. The production of epithelial scales—Dandriff, dry scale, or squamous inflammation; 2. Crack or fissure of the derma; 3. Excoriation of the epiderma; 4. Ulcer; 5. Slough; 6. Crusts or scabs; 7. Cicatrix; 8. Freckle, stain, or discoloration.

These results of morbid action are often consecutive in the same case. Psoriasis, for example (a scaly disease), begins with a papula and sometimes ends with a discoloration; a rupious ulcer begins with a vesicle. Hence, in diagnosis from the pathological anatomy, the primary stages of the disease must be determined as well as the terminal.

Classification of Cutaneous Inflammations.—I. *Congestive or red Inflammation.* This is commonly the first stage of inflammation of any of the structures of the skin. The characteristic mark is increased redness, which offers varieties. *Erythema* designates the congestive redness which occupies the

derma in homogeneous patches or otherwise, and is not limited to or specially involves the papillary layer or the vascular rete of glands. *Spotted, Maculated*, or *Pimply redness*, is (*a*) congestive inflammation of the vascular boundary surrounding the excretory or secretory ducts, as those of the sweat and oil glands and hair-follicles, or (*b*) of the tactile papillæ. It is usually *distinct;* but when confluent, it passes into or is complicated with erythema. It is the first stage of all the purely eruptive diseases of the skin, commencing with a red spot, whether acute or chronic. It is the characteristic of typhus exanthems. The redness varies in tint according to the condition of the blood or of the capillaries of the part, or of both. When the blood is morbid, the tint assumes a livid hue: Ex., Rubeola nigra. When morbid capillaries allow the morbid blood corpuscles to be effused, there are various tints of yellow, green, and purple, or lividity. *Petechiæ* are spots of papillary inflammation in which there is effusion of red corpuscles. If the effusion be in patches, the purple spots are *vibices*. The erythema in gouty inflammation is of a deep or mahogany red, changing into yellow: Ex., Erythema nodosum, E. arthriticum. This is probably due to dia-

thetic causes influencing the blood corpuscles of the part (uric acid). *Pigment* deposits in the epiderma take place in chronic cachectic or diathetic states (*chromatosis*), and modify the inflammatory tint; hence the "coppery" hue in syphilitic inflammation, the liver colour in pityriasis versicolor, etc.

*Figurate Forms of Congestive Inflammation.*—Whether it be circumscribed or diffused, the redness may take a particular form or figure (*figurate*). (*a*) It may advance by a margin (*marginate*): Ex., Erysipelas proserpens and Erythema marginatum. (*b*) The margin may assume a characteristic form, as —i. *Crescentic:* Ex., Rubeola. ii. *Annulate* or *circinate:* Ex., Erythema circinatum, E. annulatum, E. iris. iii. *Gyrate:* Ex., Roseola gyrata. (*c*) It may be symmetrical in its progress—that is, spread equally over the two halves of the body: Ex., Symmetrical erysipelas. These figurate forms of inflammation are equally manifested whether the inflammation be congestive, effusive, exudative, suppurative, or ulcerative, and give rise to specific names: as Ex., Lichen *Annulatus;* Herpes *iris;* Psoriasis *gyrata;* Prurigo *scutulata;* Herpes *serpiginosus,* etc.

II. *White Inflammation.*—Is probably a vaso-motor change. It occurs when empty capillaries take the place of the full or congested, or are intermingled with them. It may be *diffuse*, as in Urticaria; *papillary*, as in Strophulus albidus and S. candidus; *intermingled* with red papillary inflammation as in Eczema rubrum; *figurate*, as in Herpes iris or Variola, in which red and white circles alternate; *intermittent* or fleeting as in Erythema *evanidum*, Urticaria *evanida*. In a certain class of cases there is a circumscribed pallor, due probably to a death-like condition of the capillaries. It is seen as a central point in anthrax; in certain forms of human glanders; in the first stage of gangrene of the nose in the course of typhus, or from frost bites, etc. It also occurs in cases of imperfect innervation of the cutaneous capillaries in which serum is poured from them, whether into the cellular tissue (anasarca) or from the surface (white effusive inflammation): Ex. Pemphigus.

*Œdema*, with or without pallor, is a frequent accompaniment of those acute congestive inflammations which depend upon the action of a fever-poison: Ex., Erysipelas—Variola. It indicates low capillary power, and is apt to precede effusive and destructive inflammations of a low type.

III. *Inflammation with Plastic Exudation.*—This is characterised by redness and swelling, and differs according to the portion of the skin affected. (*a*) *Papillary* exudation takes place when the papillary layer is the seat of inflammation; the result is a small hard red elevation of the skin, termed a *papula*, as in Strophulus, Lichen, and Prurigo. The papulæ may be flat, pointed, or globular, when the papillæ are usually exclusively the seat of the exudation; but it may take place also in the connective issue or sheath of the sebaceous glands (*Acne rosacea, A. indurata*). The congestion usually extends to the interspaces, and erythema is conjoined with the papulæ. (*b*) *Tubercular* inflammation of the derma occurs when there is exudation into the deeper connective tissue of the derma, or of that constituting the fibrous investment of the sudoriparous or piliferous glands: Ex., Tubercular syphilis, Erythema nodosum, E. tuberculatum. (*c*) The exudation may be diffusely circumscribed, and occupy the connective tissue generally, as in Urticaria, Condyloma; or (*d*) may extend to the subcutaneous cellular tissue, ending in anasarca and suppuration, as in Erysipelas phlegmonoides; or in fibroid degeneration, as in True Leprosy and Barbadoes Leg.

IV. *Effusive Inflammation of the Skin.*—When, after congestion or irritation of a portion of the vascular rete of the epiderma, or of the papillary or excretory ducts, effusion of serum takes place, and it is retained beneath the epithelium or horny layer, a bleb, blister, or vesicle is formed. The extent, colour, form, and other characteristics of this effusive inflammation, coincide, *mutatis mutandis*, with those of congestive inflammation. When the papillæ are specially involved, and the vesicles burst, leaving a bare exuding surface, the disease is Eczema; when the vesicles form in clusters, and are confluent, it is Herpes. If they be large and solitary, it is Pemphigus or Pompholix.

Effusive inflammation will become suppurative, and pus be formed on the inflamed surface. Hence certain diseases, as the Variolas, are vesicular in the earlier stages, and suppurative in the later, ending in sloughing, excoriation, or ulceration. *Petechiæ* may intermingle with the vesicles.

Effusive inflammation will be *figurate*. Either the vesicles multiply by a margin from a centre, as in Herpes circinatus, or one vesicle is the centre for an ulcerative inflammation spreading by a margin, as in Pemphigus or Rupia. These are also developed

symmetrically, as in Herpes zoster, under the influence of the nervous system.

V. *Suppurative Inflammation of the Skin.*—The term is limited to abscess of the derma; of which there are two forms—namely, pustules and abscesses proper, in which the subcutaneous tissue and lymphatic glands are involved.

Pustular suppurative inflammation is always circumscribed. (*a*) It may be acute as to each pustule, and as to all: Ex., Variolous pustules. (*b*) It may be acute as to each pustule, but chronic as to all, when pustules follow each other in succession: Ex., Parasitic pustular inflammations—Sycosis, Scabies, Acne. (*c*) The suppuration may be superficial, and restricted to the papillary layer, when the pustule is usually sero-purulent or psydracious: Ex., Impetigo. (*d*) Or it may be deeper-seated in the reticular layer, causing the phlyzacious pustule: Ex., Ecthyma. (*e*) It may be complicated with other forms of inflammation—i. Exudation into the connective tissue: Ex., Acne indurata, Boil, Ecthyma chronicum. ii. Effusive papillary inflammation: Ex., Scabies pustulosa, Eczema impetiginoides, Impetigo erysipelatodes. (*f*) It may differ according as it terminates—i. In

cicatrization: Ex., Variola, Ecthyma. ii. In ulceration and crusts: Ex., Crusta lactea, and other forms of Impetigo. iii. Gangrene or sloughing: Ex., Ecthyma luridum, Carbuncle, or Anthrax. (*g*) It may be figurate: Ex., Impetigo figurata.

Abscesses of the derma are (*a*) circumscribed—Ex., Glanders; or (*b*) diffused—Ex., Erysipelas phlegmonoides; or (*c*) limited, as when caused by Ectozoa, the Guinea worm, ova of chiggre, etc.

VI. *Ulceration of the Derma.*—The term is limited to chronic ulcerations. (*a*) May be circumscribed and superficial, as in chronic Impetigo, rodent ulcer; or (*b*) circumscribed and deep-seated, with exudation into the reticular tissue, when it is ulcerative tubercular inflammation: Ex., Lupus exedens, Leprous ulcers, Gouty ulcers. (*c*) May be uncircumscribed—Strumous ulcers.

Ulceration may spread by a margin, either superficially, as in Herpes serpiginosus, Lupus serpiginosus, rodent ulcers, syphilitic ulcers. In this and other respects, spreading ulceration follows the laws of spreading inflammations, and may be figurate.

VII. *Destructive Inflammation of the Derma.*—

(*a*) The inflammation terminates in death of the tissues. May be circumscribed, as in furuncle; or spread by a margin, as phagædenic ulcer of skin. (*b*) The inflammation terminates in atrophy of the derma: Ex., Lupus non exedens, Keloid.

VIII. *Cutaneous Hæmorrhages.*—The minute arteries of the vascular rete give way under certain morbid states, and hæmorrhages take place. When the connective tissue or surface of the papillary vascular rete is the seat, the hæmorrhage is *punctiform:* Ex., Purpura in P. hæmorrhagica. When it is situate in the vascular rete of the sudoriparous glands, it is *nodose;* when diffused over the surface, as in advanced scorbutus, the patches are *vibices.* Cutaneous hæmorrhages may be symmetrical, and due to changes in the action of the nervous system; in this and other respects they follow the order of congestive and effusive inflammations.

IX. *Discolorations of the Skin.*—These may depend either upon the absence of pigment in the epiderma where it ordinarily occurs (Leucopathia), or the presence of pigment where it ordinarily is not (Yellow bronzing; Melasma). When the change is

in the colour of the hair, it is generally to whiteness (canities). Pigment may be poured out by the sebaceous and sudoriparous glands; in the former case (*Stearrhœa nigricans*, etc.) it is like the epithelial or hair pigment, in the latter (*chromidrosis*) it belongs to the urinary pigments.

Epidermal pigment deposit results from congestive and effusive inflammations of the epiderma; as in solar erythema and lichen, herpes, blisters. Ordinary pigmentation is prevented by ulcerative inflammation of the epiderma, the pigment layer of cells (rete mucosum) being destroyed, when *leucopathia* results. These colour changes may be figurate, in accordance with the general laws of figurate cutaneous inflammations. They are symmetrical when the discoloration is due to changes in the innervation of the vascular rete of the epiderma or the glands.

Etiology of Skin Diseases.—The causes of skin diseases may be classed under the three heads of General, Local, and Figurate.

I. *General Causes.* — These may be either Hæmatic, Toxic, or Constitutional (diathetic).

1. *Hæmatic Causes* are those agents which act

upon the cutaneous tissues through the circulation, being either present or multiplying in the blood, and which induce hæmatic cutaneous diseases. These include the entire group of febrile cutaneous diseases dependent upon blood-poisons. When the poison increases or multiplies, and is communicable from one person to another, the disease is infectious or contagious: Ex., Variola, Syphilis. When after one attack (variola), or several attacks (syphilis), of the cutaneous inflammation, the patient is no longer morbidly susceptible of the action of the poison, it is non-recurrent.

2. *Toxic Causes.*—When certain mineral and vegetable poisons are received into the blood, and circulate with it through the capillaries of the vascular rete of the skin, they excite, under given conditions, various forms of inflammation, which may be termed Toxic cutaneous inflammation. Of this class of causes there is a great variety; amongst these, (*a*) Mineral Poisons, as mercury, arsenic, iodine, sulphur, and their salts; (*b*) Narcotics—Belladonna, opium, hydrocyanic acid; (*c*) Terebinthinates—Tar, copaiba; (*d*) Dietetic Poisons—Poisonous fish, fruit, fungi, etc. In addition to erythematous, papular, or effusive inflammations (erythema, lichen, herpes, eczema, pem-

phigus), these toxic agents for the most part excite also pruritus, formicatio, or stinging.

3. *Constitutional* or *Diathetic Causes.*—It not unfrequently happens that the predisposing and exciting causes of skin diseases arise or take effect only in persons of certain habits, or of a particular diathesis, or having special cachectic conditions of the blood or tissues, or hereditarily, or at a certain age, or in one or other of the sexes. These constitutional conditions may be classed as follows:—

(*a.*) Nervous Diathesis.—Predisposes to—i. Excessive activity of the vascular rete on the application of causes; ii. Excessive receptivity of the nerve-centres, and therewith susceptibility to action of causes, otherwise harmless, of cutaneous inflammations and neuroses. Hence idiosyncrasies as to articles of food, drugs, and various local irritants of the skin; tendencies to prurigo and pruriginous affections—as Urticaria, Erythema evanidum. The cutaneous diseases proper of this diathesis are included under the *Neuroses.*

(*b.*) Arthritic or Gouty Predispositions.—The determination of urates to the skin, as a *causa morbi*, is amongst the best established facts of pathology; uric acid has been found in the blebs of pemphigus.

The gouty skin-diseases are a distinct group, and may be classed according to the tissue affected—namely, the epiderma, epithelium, glands, and connective tissue of the derma; and according as the inflammation is congestive, effusive, or desquamative, or acute or chronic: middle life and old age are most predisposed. The ulcers on the legs of old persons, with hardened edges and condensed connective tissue below, are often arthritic; so also the fetid perspirations of the feet. The arthritic diathesis predisposes more especially to all those febrile cutaneous inflammations in which the connective tissue of the derma, or of the sudoriparous glands, is involved: Ex., Syphilis. It also predisposes to diathetic purpura, to pigmentary changes of a diathetic character in the hair and epithelium; and in women to nervous hæmorrhages from the skin. Children of gouty parents are apt to have depositive inflammations, as strophulus and lichen, and severe attacks of scarlatina and rubeola.

(*c.*) Strumous Diathesis and Cachexia.—Infancy and childhood manifest this class of diathetic predispositions most strongly. Under certain conditions (as dentition), it predisposes to rapid development of the epithelium (dandriff), to active inflammation

when hæmatic or local causes are applied, and to a rapid evolution of its successive stages—viz., effusion, suppuration, and ulceration. Hence, strumous children are particularly liable to severe attacks of the effusive and suppurative exanthemata. They are, for the same reasons, predisposed to cachectic diseases of the skin, as chronic pemphigus and ecthyma; to parasitic diseases of all kinds, as pediculi of the scalp, scabies, favus, impetigo, together with enlargement and ulceration of the cutaneous lymphatic glands. In strumous adults, low forms of diseases are manifested, as lupus, cutaneous cancer, zeroderma, inveterate squamous diseases, atrophic diseases of the hair, parasitic diseases, as prurigo, morbus pediculosus, etc. The group includes all cachectic diseases.

(*d.*) Syphili-strumous Diathesis.—It is necessary to distinguish between cutaneous diseases due to the action of the syphilitic poison, which are specific and communicable, and those that are ordinary diseases of the skin occurring in persons of a syphilitic habit or diathesis, and which are modified thereby as to their symptoms and course. In the syphili-strumous diathesis there is a tendency to defective nutrition of the connective tissue, both of the derma proper

and of the glands therein. Hence a dingy pallor of the surface, imperfections in the horny layer, keratitis, defective nutrition of teeth, nails, and hair, defective transpiration and sebaceous secretion. Inflammation and its sequelæ—exudation and ulceration — occupy for the most part the connective tissue, and are of a low type. These constitute a group of cutaneous diseases to which a peculiar or special cachectic character is given by the diathesis.

(*e.*) Age and Sex. — Certain groups of glands and hair-follicles are under the direct influence of the generative glands, being dependent upon them for development, or activity, or influenced by physiological states of the generative organs. In this way certain ages, as well as the sexes, manifest particular forms of cutaneous disease. The sebaceous and scent-giving sudoriparous glands situate in the region of the sexual hair, are most commonly thus influenced. Hence various forms of acne, stearrhœa, baldness or atrophy of the hair, and discolorations (nigrities). The mammæ are highly developed sebaceous glands, and are sometimes multiple in women, being developed abnormally in the axillary regions and groins. The sudoriparous glands also pour out

pigments and scents under the like influences, and fat, in women, is deposited in the subcutaneous cellular tissue.

(*f.*) Hereditary Tendencies.—These are to be distinguished into (*a*) the *Diathetic*, when there is a tendency to certain classes of diseases; and (*b*) the *Special*, when there is a tendency to particular forms of disease, as ichthyosis, lepra, psoriasis, erythema of the nose and face, etc.

II. *Local Causes of Cutaneous Diseases.*—These may act either generally, or upon special glands or tissues, developing special forms of disease. (*a.*) All hæmatic poisons may act locally, and excite local symptoms only: Ex., the plague-bubo, erysipelatous, scarlatinal, and diphtherial inflammation. (*b.*) Dynamic causes may act either locally only, or, by their local action, intensify the operation of general or hæmatic causes. Heat, light, abstraction of heat, or cold, friction, and the atmosphere, are of this class. Hence the origin of local eruptions on the face, and the aggravation of these in variola, rubeola, etc., by exposure to heat and the air. (*c.*) Accumulated animal matters on the skin; as sordes, excreta, crusts, oil, scales. These act either as irritants, or

predispose to the production of parasitic organisms. (*d.*) Parasitic organisms. These are of two kinds, the animal, or *ectozoa*, and the vegetable, or *epiphytes*. They differ as they are indigenous and have their habitat on the human skin, in which case they multiply thereon; or as their habitat is on other animals, as the horse or sheep, or elsewhere, as in sugar, flour, when they do not necessarily multiply in or on the skin. This difference determines whether the disease terminates spontaneously, or requires to be cured by preventing the multiplication or reproduction of the parasite. The inflammations and other changes induced by parasites may be figurate or not. If ectozoa be the cause, unfigurate, papular, effusive, and suppurative inflammations (scabies), or abscess (ova of the *Pulex penetrans* or chiggre, and *Filaria medinensis* or Guinea worm), result. If due to *epiphytes*, the morbid appearances are often figurate because of the conditions of existence and reproduction of the parasitic organisms. (*e.*) Mechanical and chemical irritants. These are of various kinds, as powders, dyes of clothing, detergent soaps, needle-like products of animals and vegetables, irritant poisons inserted locally, as of the stinging ray, nettle, ant, bug, etc.

III. *Causes of Figurate Diseases of the Skin.*—This is a proposed new group of cutaneous diseases, to include those in which the cause of disease multiplies locally in the cutaneous tissues, and spreads symmetrically, so as to assume a determinate outline or figure. This may be—i. *Symmetrical*, as to the body or limbs; when the state of the sympathetic nerves of the skin may be considered the determining cause of the form assumed. Ex., Herpes zoster, or zona. ii. *Marginate.* In these there is probably a multiplication of the *materies morbi* in the skin itself, as part of the morbid process, in which case the disease is locally contagious; or, in other words, the diseased condition extends along the skin by a margin, in consequence of progressively direct inoculation of the healthy tissue by a *materies morbi* generated in the tissues successively affected—as in Erysipelas proserpens, Lupus serpiginosus. iii. *Circumscribed* or *circular.* (*a*) The *crescentic* form, as in rubeola, seems due to the anatomical distribution of the capillaries, or of their nerves, and belongs, therefore, to the symmetrical class. (*b*) The *circinate* is due to the spread of the *materies morbi* from a centre by a circumference, as in Psoriasis circumscripta, Herpes circinatus, H. Iris. (*c*) The figure

is *annular* or ring-like when that portion of the skin which has been first affected (the central) is restored to health, while the morbid action extends at the periphery, as in Lepra vulgaris. (*d*) When the spread in the annular form is interrupted at a segment of the circle, and two or three of these coalesce, the form assumed is the *gyrate*. (*e*) When a number of centres and circumferences of spread have become confluent, so as to occupy a considerable surface, it is *serpiginous*, as in Lupus serpiginosus.

The *materies morbi* which thus multiply in or on the skin or its tissues, may also be classed—i. The *Hæmatic*, in which a local inoculation having occurred, the *materies* multiplies locally, and the disease spreads symmetrically; but at the same time the blood is affected, and the *materies*, multiplying therein, is deposited from the blood on other portions of the surface. There are two forms of these hæmatic figurate inflammations—the acute and the specific. The acute are the figurate exanthems resulting from the virus generated in the exanthematic fevers. The specific are illustrated by true syphilis, in which the primary or local sore (chancre) is circular or circinate, and the exanthems of the secondary or constitutional stage are also circinate. These are modified

by diathetic states, particularly the rheumatic and the strumous. ii. The *Diathetic.* In this class there is a mode of morbid nutrition developed in the cutaneous tissues, which is manifested as a special form of inflammation. And it seems probable that when diathetic inflammation is developed locally by local causes, the adjoining tissues take on morbid action, in consequence—not of the action of the local cause —but of the inflammation it has induced extending by contiguity. This seems to be the mode of spread in certain forms of diathetic erysipelas or erythema, usually termed gouty, and in herpes and pemphigus. iii. The *Epiphytic.* In this class the *materies morbi* is a fungus, lichen, or mould, and follows the laws of multiplication of the Cryptogamia. In epiphytic figurate diseases, the circular form (it has been suggested) is probably due to the same cause as the circular form of lichens on rocks and stones, of " fairy rings" in meadows, and the like. The extension or cessation of the disease will depend upon the multiplication and dying out of the cryptogamous plants ; and these will depend upon whether the skin offers conditions favourable or unfavourable to their continued existence and reproduction. Hence it is only under certain conditions of patients that these epi-

phytic diseases can occur at all, or, in other words, be induced or communicated. A general law seems to be common to the entire class—namely, that they multiply most rapidly on diseased organisms, whether animal or vegetable. Hence cachectic or diathetic states highly predispose to epiphytic diseases. These states also seem not only to determine the kind of inflammation which results from the action of the parasites, but also the form which they or their reproductive organs assume. Or, in other words, there is great variety as to the form and *modus operandi* of epiphytic organisms of the same species, so that it has been stated that the Achorion of Favus can be developed into the Torula cerevisiæ, or into the microsporons.

## ETIOLOGICAL NOSOLOGY.

I. Hæmatic or Febrile Diseases of the Skin.—A virus multiplying in the blood and the cutaneous tissues excites fever and inflammation of the skin (an exanthem).

1. *Herpetic Fevers.*—Exanthem—Herpes, clustered vesicles, usually about the lips—Herpes labialis. Occurs in both endemic and epidemic fevers.
2. *The Exanthemata.*—Exanthem very constant, but not essential ; one attack prophylactic against a second.

i. Variola and the Varioloids.—Exanthem at first papular, then vesicular, pustular, and ulcerative. In irregular forms, effusive, papular, or petechial, erysipelatous.

ii. Rubeolar Fevers.—Morbilli ; Rubeola ; Inflammation congestive, at first roughly papular or pulicular, then confluent, crescentic. In irregular cases, erythematous or scarlatinal, vesicular, miliary, petechial.

iii. Scarlatinal Fevers.—Congestive inflammation of the epiderma—at first papular, then confluent, sometimes intermingled with vesicles, with inflammation of the throat-glands, external or internal, or both.

iv. Diphtheria cutanea.—Exanthem, a pellicular inflammation of portions of the skin, conjunctiva, etc. May be wholly local, but usually accompanies the buccal, pharyngeal, and tracheal forms of diphtheria.

3. *Exanthematic Typhus Fevers.*—Epidemical fevers, one attack prophylactic of a second. Cutaneous inflammation, congestive, macular, papular, or carbuncular.

i. Exanthematic Typhus—Spotted Typhus. Exanthem congestive, macular, or papular, of a deep or mulberry red, appearing about the fifth day. May be petechial or vesicular (Petechial Typhus ; Miliary Fever).

ii. Glandular Typhus—Levant Plague. Exanthem congestive and rubeoloid ; cutaneous glands and lymphatics inflamed (Buboes and Carbuncles).

iii. Bilious Typhus—Relapsing Fever, European Yellow Fever? Exanthem, when present, papular, rubeoloid.

iv. European Gastro-enteric Typhus ; Typhoid Fever. Exanthem papular, of a rose-colour, appearing first about the seventh day.

v. Occidental Gastric Typhus. Yellow Fever. Exanthem, when present, rubeoloid, or papular. Yellowness due to superficial and diffused cutaneous hæmorrhage ?

vi. Asiatic Gastro-enteric Typhus—Asiatic Cholera ; Epidemic Cholera. Exanthem occurs in typhus stage ; macular, papular, diffused, and desquamative.

4. *Septic Cutaneous Fevers.*—Due to a sepsis or putrescent ferment received into the blood.

i. Erysipelas proserpens. Exanthem an erythema, with œdema or effusive inflammation ; serpiginous, marginate. ii. Erysipelas phlegmonoides. Exanthem red or white ; subcutaneous cellular tissue involved. iii. Erysipelas Glandularis. Inflammation phlegmonoid, erythematous, effusive ; cutaneous lymphatic glands enlarged and suppurating.

5. *Epizootic Cutaneous Fevers.*—Virus derived from cattle and horses.

i. Equinia or Maliasmus—Human Glanders. Inflammation œdematous and erysipelatous, with bullæ ; suppurative and destructive as to termination. ii. Carbuncular Fever. Inflammation erysipelatous, carbuncular, gangrenous ; Anthrax or malignant carbuncle ; Phlegmonous erysipelas.

II. Specific Diseases of the Skin.—Impure Fevers. A virus multiplying in the blood, and exciting recurrent attacks of fever and inflammation ; insusceptibility to the action of the virus finally established.

1. *True Leprosy.*—Inflammations usually recur during the lifetime in various forms : (*a*) Erythematous ; (*b*) Desquamative ; (*c*) Pigmented (black leprosy) ; (*d*) Tubercular or plastic, with

or without ulceration ; (*e*) Effusive (in blebs), with anæsthesia of the skin and gangrene of the extremities; (*f*) Parasitic (Acari and pediculi).

2. *The Syphilids.*—Inflammation recurrent in acute febrile paroxysms ; various as to race, climate, and constitution.

i. Benign Syphilis. Inflammation for the most part limited to the epiderma and papillæ ; connective tissue, and fibrous or sero-fibrous membranes generally, not commonly involved. (*a*) Virulent Gonorrhœa. Primary ulcer, a patchy excoriation ; exanthem rubeolar or macular. (*b*) Papular Syphilis. Primary ulcer simple, exanthem papular. (*c*) Pustular Syphilis. Primary ulcer with raised but not indurated edges ; exanthem effusive and suppurative, ending in crusts and superficial ulcerations. (*d*) Phagædenic Syphilis. Primary ulcer either corroding or gangrenous, exanthem pustular or tubercular, ending in crusted marginate ulcers (Rupia) ; not always benign.

ii. True, or Scaly Syphilis. Inflammation occupies connective tissue of the derma. Primary ulcer excavated, with thickened edges and base (specific plastic exudation). Exanthem at first congestive, ending in (*a*) desquamation ; (*b*) tubercles and ulceration ; (*c*) condylomata ; (*d*) fungoid growths ; (*e*) periosteal inflammation, and deposits in connective and fibrous tissues generally.

iii. Ethnic and Climatic Syphilis. (*a*) African Syphilis. Yaws, or Pian ; Frambœsia. Inflammation at first congestive and superficial ; then deeper seated, with rupia-like ulcerations and yaws or fungoid figurate growths (mulberry-like). (*b*) Norwegian Syphilis.

Radesyge, or wheel-like cachexia. Exanthem figurate, papular, pustular, tubercular ; ulcerations rupious, marginate, serpiginous. (*c*) Levant Syphilis — Scherlievo. Frambœsia of Eastern Europe. Exanthem pustular, tubercular ; ulcers figurate, rupious ; condylomata and yaw-like fungoid growths. (*d*) Scottish Frambœsia—Sibbens. Exanthematous inflammation both deep-seated and superficial ; roseola, followed by condylomata and fungoid figurate growths (like raspberries). (*e*) Button Scurvy. Irish Frambœsia or Sibbens.

3. *Contagious* (*?*) *Furunculoid.*—Inflammations of the skin occurring endemically. Exanthem in successive crops, and various ; impetiginous, ecthymatous, furuncular, carbuncular, gangrenous. Cause, probably epizootic and communicable.

III. Constitutional Diseases of the Skin.—Diseases dependent on constitutional conditions, either predisposing or exciting, and due to (*a*) a *materies morbi* produced in the blood or tissues ; or (*b*) to special modes of nutrition of the skin and its structures, occurring with or without fever.

1. *Rheumatic and Gouty Diseases of the Skin* are acute and chronic, and congestive, effusive, capillary, and excretory.

i. Congestive Gouty and Rheumatic Diseases. (*a*) Erysipelas ; (*b*) Roseola ; (*c*) Urticaria—U. evanida, U. perstans, U. tuberosa (cachectic) ; (*d*) Erythema—E. fugax, E. læve (cachectic), E. nodosum, E. tuberosum, E. papulatum, E. podagricum, E. chronicum.

ii. Papular Rheumatic or Gouty Diseases. (*a*) Lichen —L. urticatus, L. pruriginosus, L. agrius or eczema-

toides, L. evanidus, L. tropicus, L. infantilis or Strophilus ; (*b*) Prurigo. (These two groups of congestive and papular diseases are apt to occur in persons who have an idiosyncrasy for special articles of diet or for drugs, and to be associated with cutaneous and other neuroses.)

iii. Effusive Gouty and Rheumatic Diseases. (*a*) Herpes —H. zoster, H. phlyctenoides. (*b*) Eczema—E. rubrum, E. senilis, E. infantilis, E. serpiginosum. (*c*) Pemphigus—P. acuta, P. chronica.

iv. Desquamative Gouty and Rheumatic Diseases. These are consecutive to the congestive, papular, and effusive forms. (*a*) Pachulosis (inveterate eczema) ; (*b*) Psoriasis diffusa ; (*c*) Pityriasis versicolor (cachectic).

v. Capillary Gouty and Rheumatic Diseases. (*a*) Acute Purpura hæmorrhagica ; (*b*) Purpura urticans ; (*c*) Diathetic hæmorrhages (hæmorrhagic diathesis) ; Hysteric hæmorrhages (neuro-arthritic diathesis).

2. *Cachectic Diseases of the Skin* are diseases in which the cutaneous inflammations or structural changes are modified by cachectic states of the blood and tissues. They are infantile, senile, strumous, syphili-strumous, gouty, cancerous, visceral ; and, for the most part, effusive, squamous, suppurative, ulcerative, or dystrophic.

i. Cachectic, Effusive, and Suppurative Diseases. (*a*) Crusta lactea (infantile). (*b*) Impetigo—I. sparsa, I. figurata. (*c*) Ecthyma—E. chronicum, E. cachecticum, E. lividum, E. furunculoides. (*d*) Rupia—R. syphilitica, R. escharotica, R. prominens. (*e*) Carbuncle.

ii. Cachectic Squamous Diseases. (*a*) Favus ? (*b*) Psoriasis inveterata ; (*c*) Pellagra.

iii. Cachectic Diseases of the Capillaries and Blood. Purpura—P. senilis, P. scorbutica, P. splenica.

iv. Cachectic Ulcers. (*a*) Strumous. (*b*) Gouty. (*c*) Chlorotic (on legs). (*d*) Splenic (on legs). (*e*) Syphilitic. (*f*) Leprous, cancerous.

v. Dystrophic Diseases. (*a*) Zeroderma (wrinkled skin). (*b*) Alopæcia—A. senilis, A. syphilitica. (*c*) Epithelioma ; (*d*) Keloid ; (*e*) Vitiligo, or Leuce.

IV. Sordid Diseases of the Skin are diseases primarily dependent upon an unclean condition of the skin, either as to excreta, products of inflammation, parasitic organisms, or inorganic matter, or as to all these ; often associated with cachectic states of the general health or of the skin, and appear more particularly in children and the aged of cachectic habits.

1. *Parasitic Diseases of the Skin.*—Parasitic organisms multiplying and exciting morbid changes in the skin.

i. *Ectozoic Diseases.*—Inflammations dependent upon the presence of an animal parasite or *ectozoon.*

(*a*) Scabies group. Varieties of itch, caused by a Sarcoptes or Acarus. *a.* Scabies vulgaris, caused by human Acarus. Varieties—S. papularis (rank itch), S. vesiculosa, S. pustulata. *b.* Epizootic Scabies, caused by Sarcoptes from animals ; viz., Acarus setosus, or bovis (cow) ; A. cynotis (dog's ear canker) ; A. hippopodis (horse's foot canker) ; A. felis, mange. *c.* Artisan's Scabies, caused by Acari (?) from sugar, flour, silk cocoons, etc. ; Grocer's itch ; Baker's itch ; Silk cocoon winder's itch.

(*b*) Acari or epiphytes in sebaceous follicles. Doubtful group. *a*. Acne—A. vulgaris, A. rosacea, from Acarus folliculorum ? Sycosis faciei ? Impetigo faciei ? *b*. Lupus—L. serpiginosus ? L. exedens ? Molluscum contagiosum ?

(*c*) Phtheiriasis—*a*. Morbus pediculosus. From pediculi : P. capitis, P. pubis, P. corporis. *b*. Prurigo—P. vulvæ ? P. podicis ?

(*d*) Pulicular Diseases. From the pulex—*a*. Maculæ puliculares (flea-bites). *b*. Abscessus pedis (ova of Pulex penetrans).

ii. *Epiphytic Diseases.*—Diseases of the skin, caused by the multiplication of microscopic fungi and algæ on the epiderma, in the sebaceous ducts and hair-follicles, and on the hairs. They are congestive, effusive, and ulcerative, and lead to desquamation, and to atrophy of the hair.

(*a*) *Ringworms.*—Circular inflammations of the epiderma, usually desquamative, but sometimes congestive only, or ending in effusion, suppuration, or ulceration, with impaired nutrition of the hair. Seat, the epiderma and hairs or hair-papillæ ; cause, a microscopic fungus—the Tricophyton tonsurans (Gruby) or Tricophyton decalvans (Malmsten) or Microsporon Andouini.

*a*. Ringworms of the scalp, characterised by desquamation and baldness. Trichosis (Mason Good). Trichosis furfuracea ; Trichonosis furfur ; Tinea tonsurans ; Porrigo furfurans, P. scutulata, P. circinata, P. tonsorea, P. decalvans ; Alopæcia circumscripta, A. areata, A. gyrata ; ophiasis. *b*. Ringworms of the face, limbs, and trunk. Inflammation papular, ending in scales or vesicles. *Varieties :*

Lichen and Herpes—L. circumscriptus, L. annulatus, L. gyratus, L. marginatus, L. figuratus, L. serpiginosus ; Herpes circinatus, H. circinatus phlyctenoides, Pemphigus circumscriptus. *c.* Squamous ringworms. Doubtful as to epiphytic causes. *Varieties :* Lepra vulgaris ; Psoriasis gyrata, P. circumscripta, P. centrifuga, P. palmaris.

(*b*) *Tinea or Favus.*—Figurate or uncircumscribed diseases of the sebaceous glands and hair-follicles of the scalp, face, and trunk, extending to the epiderma, and ending in scales, crusts, excoriations, pustules, or ulcers. Causes : the Achorion Schönleinii (Remak).

*a.* Tinea or Favus of the Scalp. Yellow circular crusts, the centre at the orifices of the hair-follicles, coalescing or figurate. Erythema, Excoriation, or Ulcer of the Epiderma. Varieties—i. *Distinct Favus*—F. urceolatus, F. disseminatus, F. furfuracea, F. dispersus, F. isolatus ; Porrigo favosa, P. lupinosa. ii. *Patchy* or *figurate Favus*—Favus confertus—Porrigo scutulata, P. scutiformis, P. scutulata conferta. iii. *Confluent Favus*—Porrigo squamosa, P. larvalis ; Eczema chronicum (?)

(*b*) Tinea or Favus of the Face, Body, and Limbs. Favus urceolatus, mentagra, Sycosis menti, S. furfur, S. pustulosa.

(*c*) *Diffused Epiphytic Squamous Diseases.*—Cause, the Microsporon furfur (Eichsted). or Achorion Schönleinii. Pityriasis—P. rubra capitis, P. palpebrarum, P. versicolor ; Onyxis ; Alopæcia ?

V. Figurate Diseases of the Skin are Hæmatic, Diathetic, and Parasitic, and, in being developed, spread by a

margin or assume the form of a circle, or of a segment thereof.

1. *Figurate Congestive Inflammations.*—(*a*) Rubeola; Roseola—R. vaccinia, R. annulata. (*b*) Erythema—E. iris, E. circinatum, E. annulatum (Palmare), E. marginatum. (*c*) Erysipelas—E. marginatum, E. proserpens. (*d*) Urticaria gyrata.
2. *Figurate Depositive Inflammations.*—(*a*) Papillary. i. Lichen—L. annulatus, L. circumscriptus, L. figuratus, L. gyratus, L. serpiginosus, L. marginatus, L. tuberculatus annulatus. ii. Strophulus volaticus (circinatus). (*b*) Dermic. i. Condyloma. ii. Tubercle.
3. *Figurate Effusive Inflammations.*—(*a*) Herpes—H. iris, H. circinatus, H. proserpens, H. serpiginosus, H. tonsurans. (*b*) Pemphigus—P. circumscriptus. (*c*) Eczema—E. serpiginosus.
4. *Figurate Squamous Inflammations.*—(*a*) Lepra vulgaris. (*b*) Psoriasis—P. gyrata, P. circumscripta, P. centrifuga, P. annularis.
5. *Figurate Suppurative Inflammations.*—(*a*) Porrigo; P. Favosa? (Favus), P. scutulata, P. circinata. (*b*) Impetigo figurata.
6. *Figurate Ulcerative Inflammations.*—(*a*) Rupia. (*b*) Lupus—L. exedens, L. exedens serpiginosus. (*c*) Ulcus rodens. (*d*) Frambœsia (fungoid). (*e*) Hunterian chancres.
7. *Figurate Dystrophic Diseases.*—(*a*) Porrigo decalvans. (*b*) Alopœcia—A. circumscripta, A. areata, A. gyrata. (*c*) Ophiasis. (*d*) Lupus non exedens. (*e*) Kelis ovalis. (*f*) Melanosis circumscripta.

VI. Diseases of Special Cutaneous Tissues.

1. *Horny and Papillary Layer.*—(*a*) Papillary nævus. (*b*) Pachulosis. (*c*) Verruca (Warts). (*d*) Tylosis (Laminated Corns). (*e*) Clavus (Fibrous Corns). (*f*) Onyxis.
2. *Vascular Rete.*—Vascular nævus.
3. *Colour Rete.*—(*a*) Pigmentary nævus. (*b*) Ephelis (Sunburn). (*c*) Lentigo (Freckle). (*d*) Chloasma (Pityriasis versicolor). (*e*) Melasma (yellow and swarthy). (*f*) Melanosis. (*g*) Leucopathia.
4. *Diseases of Cutaneous Glands.*—(*a*) *Sudoriparous Glands.* i. Ephidrosis; ii. Osmidrosis; iii. Chromidrosis; iv. Hæmidrosis. (*b*) *Sebiparous Glands.* i. Secretion increased: Stearrhœa—S. Simplex, S. Flavescens, S. Nigricans, S. Cyanea; Ichthyosis; Cornua. ii. Secretion suppressed: Zeroderma. iii. Secretion retained: Acne, Milium, Molluscum, Atheroma. (*c*) *Lacteal Glands.* i. Hypertrophy; ii. Multiple glands; iii. Galactirrhœa.
5. *Diseases of the Hair and Hair-follicles.*—(*a*) Hairy nævi. (*b*) Alopæcia—i. Congenital; ii. Senile; iii. Accidental. (*c*) Canites (Grey hair). (*d*) Albinismus. (*e*) Trichosis (Diseased hair)—T. furfuracea, T. plica; (*f*) Trichiasis (Felting).

# THE NAMING AND CLASSIFICATION OF DISEASES OF THE NERVOUS SYSTEM.*

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PRIMARY CLASSIFICATION.—In all vital processes, as in the phenomena of the universe, there is manifested an adaptation to ends. This teleological law is a fundamental law of life, and the power of adaptation a property of living matter. The adaptation to ends in creation, and the conscious and knowing exercise by man of his body and limbs to the attainment of ends, are both attributed to an agent termed mind. I have, therefore, named the vital force which correlates the teleological law, MIND-FORCE. In accordance with the fundamental law of

* This classification is founded on the views of the author regarding the anatomy, functions, and diseases of the brain and nervous system, as developed in his systematic and clinical lectures, and in his various monographs. A detailed exposition of them may be found in the author's lately published work, "Mind and Brain," and more particularly in Part VI., vol. ii. In the Appendix will be also found a reference to Monographs. Papers by him illustrative of the diseases of the vasomotor system may also be found in the "Edinburgh Medical Journal" for February and July 1863.

development of living things, whereby the Special arises out of the General, this general teleological property of living matter is specialized and manifested in higher organisms, in a particular tissue made up of cells and connecting fibrils; and this is differentiated into a combination of systems or organs termed the nervous system. The correlative teleological force is termed the *vis nervosa.* By means of this *vis nervosa* the nervous system acts on the tissues and organs of the body in general, and on its own constituent elements, so that their functional activity and the whole of the vital processes are adapted to ends. It acts in attaining this adaptation in a threefold manner; it excites and stimulates; controls and restrains, or "inhibits;" guides and regulates. The teleological force thus operating in tissues is termed the *vis medicatrix* and "nature;" in viscera and organs, the *vis conservatrix;* in limbs and natural weapons, *instinct;* in rational actions, feeling, and thought, the *mind* or *soul.* Following the law of differentiation and evolution, the nervous system is evolved into subordinate "systems," and attains its most complete development in the organs of the human mind. Its diseases are termed NEUROSES.

In man the functions of the cranial portion of

the nervous system, termed the encephalon, are referred to mind, and coincide with various states of existence known as conscious states. When man refers his feelings, and consciously performed actions to his body, they are termed *corporeal;* when not to the body but to the mind, they are *mental.* The nervous diseases which include disorders of the former are termed CEREBRAL, CEREBRO-SPINAL, and SPINAL NEUROSES; but the encephalic diseases manifested by mental disorders, diseases, or defects, are cerebro-mental, and known as VESANIÆ. There are, however, a large class of actions which are not consciously performed, or if consciously, involuntarily. They chiefly concern the great viscera which prepare the materials in which force is stored up to be distributed and given off in the organs of thought and will, and in their own tissues. Their functions are guided, and they are adapted to ends by another division of the nervous system, termed the sympathetic. The diseases of this system are the SYMPATHETIC NEUROSES. The "minor sympathetic," or pneumo-gastric system, belongs partly to the sympathetic and partly to the encephalic and cerebro-spinal systems. It regulates the functions of digestion, respiration, and cardiac

circulation, and its diseases must be considered apart as PNEUMO-GASTRIC NEUROSES. But before complex viscera and compound encephalic centres are evolved, the nutrition of the tissues, and (in organisms which have blood developed in them) the activity of the small arteries and capillaries are regulated, and controlled to ends by a distinct system of nerves and ganglia or ganglionic cells, which, because of its functions, is termed the *trophical* or *vasomotor* system. Although intimately connected with the other systems (being that out of which they are differentiated) it has its own class of neuroses. These, because of the universality of capillary and tissue-change, are of the most fundamental importance in practical medicine.

While the muscles and viscera have their own nerve-centres, through which their functions are regulated and adapted to ends, so also the capillaries of the muscles, viscera, and nerve-centres have their nerve-centres, whereby their nutrition and the circulation of the blood through them are controlled and regulated. These probably extend throughout the cerebro-spinal axis from the hemispheres downwards, and even enter as ganglia into the composition of such organs as the heart and uterus.

All these four groups of neuroses can be subdivided in accordance with the subordinate organs and functions of the systems to which they belong. But in all there are three kinds of function to be considered with their corresponding structures and disease, the afferent, central, and efferent.

THE SEATS OF NEUROSE DEGENERATIONS.—These follow the order of development and anatomy:—1. The primary and essential degenerations are in the two fundamental tissues—the nerve-cells and their connecting fibrils—grouped together in co-ordinating masses, namely, ganglia and commissures. As to the morbid structural changes in the ganglionic cells and commissures, pathological anatomy is almost a blank. 2. Consecutive degenerations of tissue arise from diseases of the capillaries and arteries, as blood carrying-structures. 3. Like degenerations arise from irregular distribution of the blood in consequence of disorder or defect in the vasomotor system of the nerve-centres. This class is almost wholly unknown, because the vasomotor centres of the encephalon and medulla spinalis are unknown; their probable seats are in the medulla oblongata and cerebellum. 4. The degenerations

may be consecutive to structural changes in the investing sheaths of the nerves and ganglia, and in the protecting parietes and membranes of the cerebro-spinal axis. These belong chiefly to the fibrous and sero-fibrous tissues. The pia mater belongs, however, to the vascular tissues, and is probably glandular in its nature, being like a blood-gland spread out. 5. The degenerations may be defects of evolution and development, and not diseases of nutrition. In this case they are usually manifested by defects of development of the containing parietes, more especially of the cranium, or else by defects of function as to the mental faculties. The latter are the congenital mental defects known as idiocy and imbecility. These various degenerations may all be diathetic. Those of the primary nerve-cells and fibrils belong to the so-called nervous temperament and diathesis;* those of the vasomotor system and the blood-vessels to the neuro-vascular and vascular diatheses (sanguine temperament); those of the serous and sero-fibrous membranes to the rheumatic and fibrinous; those of the pia mater and its appendages, and probably the pituitary body and pineal gland, to the blood and blood-gland diatheses—the strumous and

* See Lecture III.

lymphatic. Of these diatheses, the nervous and neuro-vascular diatheses are the most important to the pathology of the neuroses.* The result and coincidence of all degenerations is to modify the production of the *vis nervosa* and the teleological functions of the structures involved.

NAMING OF THE NEUROSES.—Names of nervous diseases are usually drawn from the special symptoms. They may be classed generally under the function disordered, as nutrition, secretion, motion, sensation, thought. The kind of changes in function may be classed under the three heads of exaltation, perversion, and abolition or enfeeblement. To express these respectively, the Greek prefixes *hyper*, *para*, *a*, have been used, as in *hyperæsthesia*, *paræsthesia*, *anæsthesia*. The terms *paresis* and *paralysis* are usually applied to motor neuroses, characterised by enfeeblement or loss of power of motor tissues or organs generally, but paralysis is often used abusively to indicate loss of sensation, or of recipient and afferent power. It applies strictly to abolition of power of voluntary motion. All these terms denoting changes

* See my Lectures on the Physiognomy of Disease, in "Medical Times and Gazette" for February 1 and 15, and March 1, 1862.

of function are by their very nature vague, because in the course of the same disease of a portion of the nervous system, they will succeed each other or alternate with each other. Thus neuralgia may coincide with anæsthesia, or hyperæsthesia may precede it, and melancholia with mania. Predominant symptoms of neuroses are often indicated in names, as in *apoplexy*, *delirium*, *delirium tremens;* or their supposed cause and seat, as in *meningitis*, *hypochondriasis.* They are also distinguished as they are symptomatic or idiopathic. The symptomatic (a numerous class) are those which constitute a portion of the symptoms of another disease. Thus neuralgic pain in inflammations is a symptomatic neurosis; so also as to the spasmodic cough in pertussis, which is an epidemic disease. The idiopathic neuroses are traceable to no known cause, or to the causes of other diseases, or run their own course, or are due to a definite series of changes, as *insania*, *epilepsy.* Greek words are most commonly used in naming neuroses; the combination of a Latin and Greek term in one name is inadmissible; *e. g.*, *Encephalitis* is more correct than *cerebritis.* The terminal *ia* is indicative of the chronic neuroses.

CAUSES OF THE NEUROSES.—These are either local or general; but whatever they be, the fundamental law of causation is, that the pathological changes follow the physiological order, both as to course and termination. For example, in the vesaniæ there is often an evolution or exaltation of function as well as retrocession to lower types of mind. But the natural tendency as to age is to abolition of function, and which is due to structural changes acting on the mechanism. In insanity, so long as *vis nervosa* is produced, and ideation goes on, there is no structural change in the brain. This coincides with the abolition and deprivation of ideas termed *dementia* and *amentia*.

GENERAL CAUSES modify either the nerve-tissue proper (vesicular neurine) or the accessory structures. Those of the former consist primarily in conditions which interfere with the due nutrition and reproduction of the nerve-cells and their connecting fibrils, and with the proper evolution of *vis nervosa*, and more particularly an insufficient amount of nutrient materials in the blood, such as the phosphorised fats. These, however, may be supplied in sufficient quantities for normal activity, but not to keep up

with the waste which follows upon excessive activity and a too rapid production of the vis nervosa; which in this respect takes the place of a too rapid and wasting production of heat (a correlative force) in the tissues generally. In this way excessive activity of the nervous system, or of portions of it, becomes a highly predisposing cause of the neuroses, as of other general diseases. Excessive use of motor nerves and motor nerve-centres, predisposes to spasm and palsies; excessive activity of the brain in thought or in emotions, to the vesaniæ. These excesses, when habitual or long-continued, are apt to develope hereditary tendencies. Thus great mental labour, drunkenness, strain on special nerves, and the like, of parents, are often manifested in children as neuroses. Here the influence of the nerve-centres on the nutrient forces of tissues is shewn, as in hereditary insanity, epilepsy, hysteria, angina pectoris, and even gouty diseases in general, which, primarily, are neurose degenerations in the nutrition and transformation of certain tissues. Diathetic tendencies to diseases of the vasomotor system are also thus induced, and therewith structural degenerations of the blood-vessels, and the numerous class of diseases which result therefrom; for vascular activity is in the most intimate relation to nutrition.

When these vasomotor and vascular changes take effect in the nerve-centres themselves, the functions and diseases of those centres are affected accordingly. An incurable form of mania with general paralysis is a typical example. The blood-degenerations in general have important causal relations to the functions of the nervous system. Hence cachectic states are frequent predisposing and exciting causes of neuroses; the nutrition of special nerves and nerve-centres, already enfeebled by other causes, is still farther modified by morbid blood-states. At the close of grave diseases this is a very common cause of death, as in the vasomotor paralysis of the vessels of the lungs and brain, in the so-called cases of uræmic poisoning and in serous apoplexy. The functions of the pia mater are not yet understood, but there is reason to think that it belongs to the class of blood-glands like the thyroid, thymus, and spleen; it has obviously close functional relations with the nutrition of the vesicular neurine, through the blood on the one hand, and its own vasomotor system on the other. In this way, general cachectic states may become suddenly influential on the encephalon, and consciousness be modified by the sudden interruption of encephalic transformation and production of *vis nervosa*

through the pia mater. Changes also in the vasomotor system so modify arterial nutrition that heat is produced morbidly in tissues, and in its turn modifies their activity. In this way nervous pulsations and palpitations arise in the large arteries and the heart from vasomotor changes; as in anæmia and chlorosis, or in cases of "sick headache," and the like. These, owing to the defective nutrition of the arteries, are accompanied by a vibratory movement of the tube; but when there is no antecedent defect of this kind, the pulsations have no vibrating murmur, and there is a large access of blood to the tissues (congestive hyperæmia). When this change takes place suddenly in the vasomotor nerves and nerve-centres of the encephalon (as, for example, during sleep), sudden neuroses arise, as congestive apoplexies, epilepsies, strokes, seizures.

Age modifies in every individual the activity and nutrition of the nervous system and its vessels, and consequently its diseases. This is chiefly shown as to functional activity at periods of development, but as to nutrition at periods of decline. Sex modifies all the neuroses, not only by the influence exercised on the activity of the nerve-centres by the genetic glands, but also through those primordial laws which

determine the sex *ab ovo*. Woman differs diathetically from man in this respect. Employments, and social and individual conditions arise out of differences of sex, which also profoundly operate as general causes upon the whole system or on subordinate systems. These belong to hygiene.

Complex general causes are very common in general diseases of the nervous system. Its central position amongst the tissues and viscera necessarily implies that it shall be involved more or less in their diseases. Perhaps one of the most important, and the least known class, arises from the reciprocal relations of the nerve and blood systems. It seems probable that morbid states of the nervous system influence profoundly the constitution and functions of the blood-corpuscles as well as of the capillaries and the tissues in general.

The LOCAL CAUSES of neuroses are of two kinds: 1. Those which, seated locally in the body, act both on the local nerve-tissue and on the nerve-centres with which it is connected; and, 2. Those in which the disorder or disease of nerve-tissue does not extend from the part implicated, as in rheumatic neuritis of the sciatic nerve. These local causes of neu-

roses follow, nevertheless, the general laws of the local causes of other constitutional diseases. In considering these, it is necessary to remember that the term local is of wide application; for a morbid nutrition of a nerve-fibril often extends from the periphery upwards and from the centre downwards, along its whole course, and involves the vesicular neurine, whether sensory or motor, with which it is connected. And, in like manner, the nutrition of commissural fibrils and ganglia will follow the line of physiological action of the *vis nervosa*, so that what are strictly local diseases are also focal diseases, and really exciting causes of more general disorders. The etiology of the neuroses as to this class of causes is almost a blank.

## Etiological Nosology and Index of Diseases of the Nervous System. Neuroses.

### 1. General Nosology.

*A.* Nervous Diseases classed according to disorder of function. (Symptoms.)

1. Tissue Nervous Diseases. Trophesiæ, Tropho-neuroses.* Manifested by changes in the

* See this word in "Mayne's Expository Lexicon." I have formed the class *trophesiæ* to find a distinct place for the new and important group of diseases of the small arteries, capillaries, and

nutrition and transformation of tissues and in capillary function.

2. Motor Nervous Diseases. Kinesiæ. Motor diseases and defects manifested in the voluntary and involuntary muscles. *a.* Spasmodic diseases, *Hyperkinesiæ*. *b.* Diseases of trembling and disorderly movement, *Parakinesiæ*. *c.* Palsies, due to loss of power over, or nutrition of, muscles, *Akinesiæ*.

3. Sentient Nervous Diseases. Æsthesiæ. Diseases and defects of sensibility, sensation, and perception. *a.* Excessive sentiency, *Hyperæsthesiæ*. *b.* Morbid pain, *Neuralgia*. *c.* Perverted sentiency, illusions of sensation and perception, *Paræsthesiæ*. *d.* Insentient diseases, palsies of sensibility, sensation, and perception, *Anæsthesiæ*.

4. Mental Diseases and Defects. Vesaniæ.

*B.* Neuroses classed according to ganglionic seat, or portion of the nervous system involved in disorder or degeneration.

1. Trophical or Vasomotor. 2. Sympathetic. 3. Pneumogastric. 4. Spinal. 5. Intracranial Vasomotor. 6. Cerebral. 7. Cerebro-mental.

*C.* Neuroses classed according to the nature and causes of disorders and degenerations.

1. Pyrectic. Febrile and inflammatory neuroses. 2. Diathetic. Nervous diseases due to constitutional causes: Strumous, gouty, rheumatic, hysterical, neuralgic. 3. Cachectic. Nervous

tissues, which are primarily dependent upon changes in the nervous system, and thus facilitate the study of them.

diseases due to degenerations of the blood or of special tissues. 4. CONSECUTIVE. Following upon visceral affections and diseases of nerves.

## 2. SPECIAL NOSOLOGY.

I. TROPHESIÆ. Vasomotor or trophical neuroses, manifested as diseases and defects of nutrition, transformation of tissues, arterial action, and capillary function.

1. GENERAL TROPHESIÆ. Trophical or vasomotor neuroses, manifested in tissues generally, or in particular systems. *a.* Manifested in tissues generally : (*a*) *Hyperæmia*, nervous congestion ; (*b*) *Thermogenia*,* or nervous heat ; (*c*) *Oligæmia*, or nervous pallor (capillary anæmia) ; (*d*) *Rigors*, nervous coldness. *b.* Manifested in systems : (*a*) *Sympathetic ;* (*b*) *Spinal*, including the *intervertebral* system ; (*c*) Intra-cranial.

2. CONSTITUTIONAL TROPHESIÆ. Vasomotor or trophical neuroses, dependent either on diathetic predispositions or on cachectic states. *a. Neurose Heredity*, neuro-vascular diathesis. *b. Neurosis* or "nervousness." *c. Neuræmia. d. Hysteria* (feminine neurosis).

3. VISCERAL TROPHESIÆ. Vasomotor or trophical neuroses manifested in the visceral systems. *a. Neurose hyperæmia. b. Neurose oligæmia. c. Neurose œdema* (dropsy of cellular tissues). *d. Serous fluxes :* (*a*) into serous sacs (neurose dropsies) ; (*b*) from free surfaces (white hæmorrhages) ; i. Mucous fluxes ; ii. Watery fluxes (as nervous coryza) ; iii. Neurose albuminuria.

4. SPINAL TROPHESIÆ. Vasomotor neuroses asso-

* See for this word, "Mayne's Expository Lexicon."

ciated with morbid functional activity of the spinal and intervertebral ganglia, as well as of the sympathetic, and manifested in the arterial and capillary system of the skin and limbs.

*a.* Muscular Trophesiæ. Vasomotor neuroses of the tissue of voluntary muscles, from defective functional activity of the vasomotor ganglia of spinal cord ? (*a*) Muscular neuralgia : i. Spasms and cramps ; ii. Fidgets ("anxietas tibiarum") ; iii. Neuralgic paresis ; (*b*) Wasting palsy (Roberts). *Synonyms :* Creeping palsy, partial or local palsy, atrophie musculaire, atrophie musculaire progressive, paralysie musculaire atrophique, fatty muscular degeneration : i. General ; ii. Symmetrical ; iii. Local (restricted to a limb or set of muscles).

*b.* Arterial Neuroses. Spinal vasomotor neuroses of special arterial systems, or of particular arteries ; (*a*) Pulsations ; (*b*) arterial neuralgia ; (*c*) painful throbbings : i. hysterical ; ii. hæmorrhagic ; iii. Pyrectic : iv. Sympathetic or consecutive ; *a.* Hemicrania ; *b.* Cephalæa.

*c.* Cutaneous Trophesiæ. Vasomotor neuroses of the skin. (*a*) *Heat and Flushings.* (*Æstus Volaticus :*) i. simple ; ii. with congestive inflammations (Erythema *Evanidum*, etc.) (*b*) *Neuralgiæ :* i. Cutaneous hyperæsthesia ; ii. Capillary *neuralgia ; a.* with congestive inflammations ; *b.* with effusive ; (*a*) Symmetrical herpes ; (*b*) Anæsthetic leprosy ; (*c*) With nigrities (hysterical) ; (*d*) Venous or livid ; (*e*) Hæmorrhagic (nervous hæmophilia) ; (*f*) Gangrenous. (*c*) *Cutaneous capillary paresis* without pain ; i. hyperæmia ; ii. with hæmorrhage : *a.* diathetic ; (*a*) in hæmorrhagic diathesis ; (*b*) hysterical neuræmia ; (*c*)

in purpura hæmorrhagica ; iii. Nervous œdema ; *a.* Local ; *b.* Symmetrical ; (*a*) Palpebral (of eyelids) ; (*b*) Precordial ; (*c*) Lumbo-sacral ; (*d*) Paraplegic ; (*e*) Hemiplegic ; (*f*) Febrile (acute anasarca). (*d*) *Spasm of cutaneous capillaries? and of small arteries.* i. Nervous pallor (capillary anæmia, oligæmia) ; *a.* Local ; *b.* Symmetrical ; ii. White inflammation ;* iii. Retrocedent or "metastatic" œdema.

II. Sympathetic Neuroses.—Seated in the ganglia of the sympathetic system. Symptoms manifested as pain and spasm in the glands and viscera it supplies. Frequently associated with vasomotor neuroses.

1. Mesenteric Neuralgiæ.—Painful spasmodic and paralytic neuroses, manifested in the intestines. (*a*) Spasmodic colic, peristaltic spasm ; (*b*) Spasmodic stricture ; (*c*) Volvulus ; (*d*) Spasmodic Ileus (anti-peristaltic spasm) ; (*e*) Lead colic : i. Paroxysmal ; ii. Continuous ; iii. Abdominal ; (*f*) Febrile (malarious and miasmatic) ; (*g*) Inflammatory.
2. Hepatic Neuralgiæ. Cystic spasm ; Splenalgia.
3. Genito-urinary Neuralgiæ. (*a*) Nephralgia ; (*b*) Spasm of ureters ; (*c*) Spastic dysuria ; (*d*) Spasmodic stricture ; (*e*) Neuralgic spasm of vulva (*Pudendagra*) ; (*f*) Neuralgic spasm of anus (*Proctalgia*) ; (*g*) Ovarian neuralgia ; (*h*) Hysteralgia, neuralgic menstruation ; (*i*) Irritable testis. The neuralgia of the outlets are often conjoined with spinal neuroses.

III. Pneumogastric Neuroses.—Nervous diseases having their seat in the pneumogastric system, manifested in the organs and mechanism of circulation, respiration,

* See Naming and Classification of Diseases of the Skin, p. 301.

and digestion, and as morbid corporeal appetites and emotional actions.

1. Alimentary Neuroses.—Neuroses of the pneumogastric system, involving alimentation, digestion, and the appetites for foods and drink. *a. Trophesiæ:* (*a*) Dyspepsia; (*b*) Apepsia; (*c*) Glycosuria (diabetes mellitus). *b. Æsthesiæ:* (*a*) Epigastric "sinking;" (*b*) Flatus; (*c*) Pyrosis; (*d*) Gastrodynia: i. Continuous (neuralgic dyspepsia); ii. Paroxysmal. *c. Kinesiæ:* (*a*) Visceral: i. Spasmodic gastric neuralgia; ii. Pyloric neuralgia; (*b*) Æsophageal: i. Spasmodic Dysphagia; ii. Globus; iii. Ructus; iv. Ruminatio; (*c*) Muscular: i. Hiccup; ii. Nervous vomiting: *a.* Gastric; *b.* Spinal or sympathetic; *c.* Encephalic. *d. Vesaniæ:* Symptomatic affections of the appetites for food and drink: (*a*) Polydipsia; (*b*) Frequent sipping; (*c*) Hydrophobia: i. Epizootic; ii. Hysterical; iii. Hypochondriacal; (*d*) Adipsia; (*e*) Bulimia; (*f*) Pica: i. Dietectic; ii. Puerperal; iii. Hysterical; (*g*) Inappetence; (*h*) Nausea: i. Vertiginous (sea-sickness); ii. Hysterical; iii. Diathetic ("antipathies").

2. Cardiac Neuroses.—*a. Æsthesiæ;* (*a*) Cardiac Neuralgia: i. Coronary (angina pectoris); ii. Aneurismal; iii. Emotional (heart-ache). *b. Kinesiæ;* (*a*) Spasmodic Neuralgia (Spurious Angina Pectoris); (*b*) Cardiac Palsy; (*c*) Nervous Palpitations: i. Hysteric; ii. Chlorotic; iii. Exophthalmic; (*d*) Nervous Pulsations; i. Sternal; ii. Epigastric; iii. Cervical; iv. Thyroideal. (These are also vasomotor neuroses.)

3. Respiratory Neuroses.—Nervous diseases of the

visceral respiratory system. *a. Kinesiæ;* (*a*) Spasmodic Gasp (nervous Hydrophobia); (*b*) Spasmodic (or paralytic ?) croup (Laryngismus stridulus); i. Epileptiform; ii. Febrile; (*c*) Spasmodic Asthma; i. Simple; ii. Toxic; iii. Complicated. (*d*) Spasmodic sneezing; (*e*) Spasmodic cough (Tussis Ferina). *b. Æsthesiæ;* (*a*) Pruritus (tickling); (*b*) air-hunger; (*e*) Apnoë. *c. Vesaniæ;* Due to centric changes in the respiratory system, often hysterical, and associated with other diseases; (*a*) Laughter; (*b*) Weeping and sobbing; (*c*) Sighing; (*d*) Panting; (*e*) Ejaculating; (*f*) Shuddering; (*g*) Yawning; (*h*) Mutitas (nervous dumbness); (*i*) Stuttering.

IV. Spinal Neuroses.—Nervous diseases having their seat in the spinal cord as a conductor to and from, and as a series of centres to the vasomotor, sympathetic, and voluntary systems of motion.

1. Spinal Æsthesiæ.—*a. Hyperæsthesia;* morbid sensibility of the skin. *b. Paræsthesiæ;* illusive sensations of the skin and sense of touch. *c. Anæsthesia;* Abolition of sensibility, usually symptomatic of disease of the spinal cord, of its membranes, and of the intervertebral ganglia (or posterior roots).

2. Spinal Neuralgiæ.—Nerve-aches, paroxysmal or continuous, due to diseases of the spinal sensory nerves and centres. *a. Inflammatory Neuralgiæ, Neuritis*; (*a*) Traumatic; (*b*) Gouty and Rheumatic; (*c*) Syphilitic; (*d*) Depositive (neuroma).—These are often anæsthetic also. *b.* Cranial Neuralgiæ, usually congestive and

symptomatic. (*a*) Head-aches : i. Frontal ; ii. Coronal ; iii. Occipital ; iv. Hemicrania (Clavus) ; v. Cephalæa. *c.* Trifacial neuralgiæ ; (*a*) Anæsthetic ; (*b*) Spasmodic ; (*c*) Otalgia. *d.* Vertebral neuralgiæ ; (*a*) Cervico-occipital ; (*b*) Cervico-brachial ; (*c*) Dorsal : i. Sternal Neuralgia ; ii. Mammary (Mastodynia) ; iii. Intercostal (Pleurodynia) ; iv. Inter-scapular ("Spinal tenderness") ; v. Dorso-lumbar (Rachialgia) ; vi. Sacral (Coccyodynia). (*e*) Sciatic Neuralgiæ—Neuralgiæ seated in the great sciatic nerve and its branches : i. Glutæal ; ii. Posterior crural ; iii. Anterior crural ; iv. Peroneal ; v. Plantar. (*f*) Articular neuralgia, Arthralgia : i. Hysterical ; ii. Toxic (lead, mercury) ; iii. Sympathetic ; iv. Cachectic.

3. Spinal Kinesiæ. *a. Hyperkinesiæ ;* (*a*) Spasmodic neuralgia (spinal Tic) ; (*b*) Finger-spasms (Spasmus Scriptorius) ; (*c*) Limb-spasms : i. of extremities ; ii. Torticollis ; iii. Trismus ; iv. Exophthalmos ; (*d*) Tetanus (vasomotor ?) : i. Pyrectic ; ii. Traumatic ; iii. Toxic ; iv. Hysteric ; v. Idiopathic (rheumatic or gouty ?). *b. Parakinesiæ ;* (*a*) Tremors ; (*b*) Shaking palsy ; (*c*) Local chorea. *c. Akinesiæ.* 1. *Palsies*—For the most part symptomatic of centric, spinal, or encephalic neuroses. *a.* Neuralgic and Anæsthetic Palsy : (*a*) Facial ; (*b*) Lead Palsy. *b.* Wasting Palsy (a Trophesia). *c.* Paraplegia : (*a*) Inflammatory ; (*b*) Functional ; (*c*) Structural. *c.* Sphincter Palsies. 2. *Pareses ; a.* General Pareses. *b.* Local Pareses (Ptosis, Lagophthalmos, etc.) *c.* Unbalanced Paresis : (*a*) Spinal

curvature ; (*b*) Paralytic torticollis ; (*c*) Clubbed hands and feet ; (*d*) Stroke-palsies.

4. Pyrectic Spinal Neuroses.—Inflammations and febrile congestions of the intra-spinal structures. *a. Spinal Meningitis*—Inflammation of the membranes of the cord, more particularly the pia mater : (*a*) Idiopathic (rheumatic or gouty ?) ; (*b*) Epidemic ; (*c*) Intermittent or malarious ; (*d*) Traumatic. *b. Myelitis*—Inflammation (or congestion ?) of the cord : (*a*) Idiopathic ; (*b*) Hæmorrhagic (spinal apoplexy) ; (*c*) Traumatic—from concussions and wounds ; (*d*) Consecutive (to adjoining diseases).



5. Cachectic Spinal Neuroses.—Neuroses, chiefly forms of Paraplegia, from structural degenerations of the membranes, blood-vessels, and tissue proper of the spinal cord.

V. Intra-Cranial Vasomotor or Capillary Neuroses.—Neuroses, seated primarily in the vasomotor centres of the encephalon (cerebellum and medulla oblongata ?), and manifested by transient abolition or defect of corporeal consciousness and voluntary action.

1. Encephalic Hyperkinesiæ.—General convulsive diseases. *a. Hysterics :* (*a*) Emotional ; (*b*) Epileptic. *b. Eclampsia*, convulsive fit (Symptomatic Epilepsy) ; (*a*) Dentitional ; (*b*) Puerperal ; (*c*) Visceral ; (*d*) Hæmic. *c. Epilepsy* (Recurrent Eclampsia) ; (*a*) Typical ; (*b*) Paræsthetic (with aura and other illusions) ; (*c*) Imperfect or partial (minor fit) ; (*d*) masked (*Epilepsia larvata*) : i. delirious ; ii. maniacal ; iii. dreamy.

2. Encephalic Parakinesiæ. *a.* Perversions of voli-

tion and co-ordination of muscles, without change in consciousness ; (*a*) Chorea ; (*b*) Scelotyrbe (Jactitations and gesticulations). *b*. With ideational changes ; (*a*) Automatic actions ; (*b*) Involuntary imitation ; (*c*) Motus Vertiginosi : i. rotatory ; ii. dromical or running ; iii. backstepping. (*d*) Mental Epilepsy, sudden uncontrollable impulses to perform actions (an *insania*).

3. Encephalic Akinesia.—Functional abolition of volition, with or without abolition of consciousness ; *a*. Catalepsy, limbs pliable ; *b*. Catochus, limbs rigid ; *c*. Carus or Cataphora, deep sleep without stertor ; *d*. Trance, motionless sleep with dreaming ; *e*. Leipothymia (Paroxysmal faintness).

VI. Cerebral Neuroses.—Diseases of the encephalon, seated primarily in the encephalic nerves and ganglia, their membranes, and blood-vessels, involving volition and ideation, but not cerebro-mental.

I. Sensorial Cerebral Neuroses.—Diseases of the nerves of the special senses, and their ganglia, for the most part symptomatic ; *A. Percipient Neuroses*, Diseases of the cerebral nerves and their ganglia, involving the perceptions and perceiving power.

1. Tactile Neuroses.—Of the sense of touch ; *a*. *Hyperæsthesia*, cerebral sensitiveness of the skin ; *b*. *Parœsthesia*, illusions of touch and temperature ; *c*. *Anæsthesia ;* (*a*) Tactile paresis (as to weight and resistance) ; (*b*) Thermal Anæsthesia (as to heat and cold) ; (*c*) Sensational.

2. Corporeal-sense Neuroses.—*a.* Neuralgiæ of indefinable seat ; *b.* illusions of size of body ; *c.* illusions of space, floating, inversion, etc., illusions of the *ego*, duplex and triplex consciousness.

3. Gustatory Neuroses.—*a. Parageustia*, illusions of taste ; *b.* Ageustia, loss of taste.

4. Olfactory Neuroses. *a. Parosmia*, illusions of smell ; ii. *Anosmia*, loss of sense of smelling.

5. Auditory Neuroses. *a.* Hyperæsthesia, acuteness of hearing ; *b. Paracusis*, dulness of hearing (from defective accommodation of tympanum ?) ; *c.* Nervous deafness ; *d.* Paræsthesia ; (*a*) Peripheral (*Susurrus* or tinnitus) ; (*b*) Centric (*Spectral voices.*)

6. Optical Neuroses.—*a. Hyperæsthesiæ ;* (*a*) Photophobia ; (*b*) Chromatophobia. *b. Paræsthesiæ*, optical illusions ; (*a*) Photopsis ; (*b*) Chromatopsis ; (*c*) illusions as to size of objects ; (*d*) Phantasma (spectral forms). *c. Anæsthesiæ*, blindness ; (*a*) total Amaurosis ; (*b*) partial ; i. Hemeralopia ; ii. Nyctalopia ; iii. colour-blindness, Dyschromatopsis. *d. Amblyopia*, defective vision from defective accommodation of organ ; (*a*) Dyplopia ; (*b*) Myopia ; (*c*) Presbyopia.

*B. Ideational Neuroses*—Transitional Vesaniæ, as to morbid changes in the feelings and thoughts. 1. *Hyperæsthesia*, irritability of temper. 2. *Phrenalgia*, mind-pain ; (*a*) depression of spirits ; (*b*) Hypochondria. 3. *Paræsthesiæ*, delusions and delusive feelings ; (*a*) Euphoria, delusions as to bodily health ; (*b*) Hallucinations (perceptional delusions of the senses) ; (*c*) *Delirium*, incoherence of ideas with hallucinations, delusions, and illusions ; i. Febrile and inflammatory, muttering, busy, phrenalgic ;

ii. Cachectic ; iii. Puerperal ; iv. Traumatic ; v. Hysteric ; vi. Epileptic ; vii. Methystic ; viii. Maniacal ; ix. Toxæmic. 4. *Anæsthesia ;* (*a*) Athymia, mental torpor ; (*b*) Phrenoplexy.

II. Cerebral Palsies.—Diseases of the cerebral ganglia involving volition. *a. Functional Volitional Palsies ;* Seat, vasomotor centres and cerebellum ? (*a*) Emotional palsy, consecutive to emotions ; i. Paraplegia ; ii. Aphonia ; (*b*) Hysterical ; (*c*) Diphtherial. *b. Apoplectic Palsies ;* palsies supervening suddenly, with or without abolition of the consciousness ; (*a*) Apoplexy, sudden loss of consciousness followed by palsy ; i. Congestive or hyperæmic ; ii. Effusive or dropsical (serous apoplexy) ; iii. Hæmorrhagic or sanguineous—(i.) As to source ; *a.* Capillary, hæmorrhage from small arteries ; *b.* Vascular (hæmorrhage from a blood-vessel) ; (ii.) As to seat ; *a.* Meningeal (from the membranes) ; *b.* Ganglionic (into cerebral substance) ; iv. Obstructive (Oligæmic and Embolismic apoplexy) ; v. *Consecutive* (sudden rupture of softened brain, etc.) ; *c. Palsy-Strokes ;* sudden palsy, with or without loss of consciousness—(*a*) Hemiplegia ; (*b*) Local palsy or Paresis ; *d. Slow Palsies*, cerebral palsies coming on insidiously and progressing slowly ; speech and instruments of ideation chiefly affected—(*a*) General Paresis ; i. with insanity ; ii. without insanity ; (*b*) Drunkards' Paralysis ; (*c*) Local Paresis.

III. Pyrectic Cerebral Neuroses.—Inflammations and febrile congestions of the brain and membranes ; *a. Perimeningitis,* inflammation of the dura mater, traumatic, rheumatic, syphilitic, consecutive (to otitis), hæmorrhagic (with hæmatoma) ; *b. Meningitis,* inflammation of the pia mater (and arachnoid ?), often con-

joined with inflammation of the brain-substance. Varieties, congestive, effusive, purulent, hæmorrhagic, febrile (typhus, hydrophobia, etc.), tubercular, parasitic, obstructive (from fibrin and pigment in vessels); *c. Encephalitis*, inflammation of substance of the brain, with or without meningitis. Varieties in general are progressive, circumscribed, acute, chronic, recurrent, complicated.

VII. Cerebro-Mental Neuroses. Vesaniæ.—Encephalic diseases, disorders, and defects, involving the understanding, feelings, and conduct in general.

# THE NAMING AND CLASSIFICATION OF MENTAL DISEASES AND DEFECTS.

## (VESANIÆ.)

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PRIMARY CLASSIFICATION.—The word MIND has been commonly used to indicate not only the states of feeling, thinking, and conscious action of the living man, but also the cause and seat of those states, whether he be living or dead. In the latter sense it is synonymous with soul. Without abandoning the general doctrine, I limit my inquiries to the living man, and class all his states of consciousness whatever with all other vital processes, because they are due to the same teleological cause (a mind-force *), and take place according to the same general laws. I therefore use "mind" and "mental" to indicate conscious states of existence of man, which

* See p. 329, and "Mind and Brain," Part iii., vol. i.—MENTAL DYNAMICS OR TELEOLOGY.

coincide with correlative changes in the encephalon. And by the term "mental faculty" I mean knowing acts of energy or doing of the man—not of his mind. By "encephalon" I mean that part of the nervous system contained within the skull, and the seat or "organ" of the feelings and faculties.* If these encephalic functions be either exalted, perverted, degenerate, or abolished, then the corresponding faculties and conscious states are either exalted, perverted, debased, or abolished. The encephalic or cerebro-mental neuroses thus caused and characterised by mental disorder, disease, and defect, are the VESANIÆ. The term "vesania" was first used by Linnæus to indicate "*Insania chronica, partialis tranquilla,*" being a genus of his order MENTALES, and corresponding to the modern "monomania." It was subsequently used by Cullen to indicate an order which comprised both mental diseases and deficiencies, "mentis functiones læsæ, sine pyrexia, vel comate," which is nearly the modern definition of

* I adopt "encephalon" to avoid the confusion which attaches to the word "brain," commonly used as synonymous with encephalon. In a more restricted sense it indicates the cerebrum as distinct from the cerebellum, the two being termed "the brains." But very recently a popular physiologist has used brain and cerebrum to indicate the cerebral hemispheres as well as the cerebrum proper.

insanity. I use Vesania to indicate the disorders and defects of the consciousness as to desiring, feeling, thinking, and acting.

All the vesaniæ are not, however, mental diseases in the sense of *insania.* They may be distinguished, therefore, as they are, SYMPTOMATIC, TRANSITIONAL, and IDIOPATHIC. The symptomatic vesaniæ accompany other diseases as part of the general symptoms, and terminate like those with the morbid state, *e.g.*, the delirium of fever, traumatic loss of memory. The transitional vesaniæ are those in which the morbid encephalic condition is either a transition-stage between mental health and disorder, such as the incubation-stage of acute mania; or else an ALTERNATING and transitional condition between various forms of mental disease, as between melancholia and mania.

The term INSANIA is applied to the idiopathic Vesaniæ, and indicates those which are dependent chiefly or primarily on morbid conditions of the encephalon not classed with the other neuroses, and involving the patients' social rights. This kind is often COMPLICATED, however, with the other encephalic disorders, as in the kind of mania accompanied by general paralysis, in epileptic mania, etc.

Idiopathic Vesaniæ can also be classed under the two heads of mental diseases and defects. Mental *diseases* termed INSANITAS (by some abusively termed mania) follow the order of all other diseases. They consist in changes from ordinary health to disorder, arising in a particular way, manifested by distinctive symptoms, and terminating after a definite manner. Mental *defects* are not morbid states, but consist in either abolition of the faculties or weakness and defect as to all or some, due to defects of development or of structure of the encephalon. These I name FATUITY, *Idiocy*, *Desipientia*. If mental defect be consecutive to insanity, it is termed *dementia*, *amentia*, *fatuity*, and the like; more correctly INSIPIENTIA, a privation of judgment.*

SUBDIVISIONS OF MENTAL DISEASES AND DEFECTS.—The chief characteristics of the Vesaniæ being morbid changes manifested predominantly either by general disorder of the mind, or by particular disorder in the conduct, the feelings, or the judgment, it is easy to constitute four corresponding groups. But the differentiation of these in the form

* Sapientia sanitas, insipientia autem insanitas quædam.—CICERO.

of a nosological arrangement is attended with insurmountable difficulties, if the same psychological method be carried out exclusively, for that method either does not recognize the encephalic functions or ignores them, and founds its classifications upon the ever varying phenomena of consciousness alone. Its terms, in their defects and ambiguities, reflect the shifting basis upon which it is built,* and so psychology is full of contradictions. And since these terms have been introduced into our mental nosologies, we have, as a natural consequence, the same contradictions and confusion, so that continual attempts are made at new arrangements with continual failure. Nor have the attempts at simplicity been more successful, for they are too often mere cloaks for ignorance. At best the simplicity has been attained either by naming particular kinds of disease which should be kept apart, by the same term, or else, more conveniently, by not naming them at all; and thus the chief object of a classification, namely, that it should represent our knowledge of the subject, and suggest research, is wholly abandoned. I have already indicated in what way, in my humble judgment, we should name and classify diseases for the

* See this demonstrated in my "Mind and Brain," vol. i., p. 55.

right ends of classification, and I have endeavoured to apply the method in a threefold way to the Vesaniæ; aiming, in the first instance, rather at a classified index or *catalogue raisonné* of morbid mental states than an ordinary nosology of visceral diseases, which as to encephalic or mental diseases is simply impossible. Those states of the encephalon which coincide with mental diseases and defects, and which we have to classify, follow the physiological order in their development, and we must therefore follow the same order in their arrangement. Now, the law of unity of structure and function elucidates these vital states as perfectly as any other. The encephalon is nothing more than a highly differentiated series of structures in which the great laws of life and organisation, as manifested in form and function throughout the whole of living things, from the lowliest organism upwards, are writ at large, and constitute the laws of human consciousness. So that all the states of men's minds, whether they be instincts, desires, feelings, sentiments, or faculties, and whether healthy or morbid, have their correlatives, and are manifested as vital laws, in that multitudinous living world of which he is the highest evolution and differentiation. We have, therefore,

to trace these as they are evolved from below upwards, and found upon the order of development observed our nosological classification. If we combine therewith such distinctive terms as mark the seat, cause, course, predominant result, and the like, all is attained that the present state of things admits of.

*Leading Divisions.* — 1. In the teleological changes of fundamental tissues, and in the actions of the lowliest organisms, instincts and processes are manifested strictly analogous to those instincts and propensities in higher animals which are in direct relation with organs and viscera, and have for their end the protection, health, and happy continuance of the individual and the species. Now, these are predominantly exalted, perverted, debased, or abolished, in consequence of disorder or defect of the encephalic functions, and constitute a distinct order of Vesaniæ, which I have termed *Orectic*, or Orexiæ.* They correspond to the Epithymiæ of the older nosologists, and are best observed physiologically in children and the lowest animals. 2. In man and other animals there are states of consciousness termed feelings, emotions, passions, manifested

From Ὄρεξις, *libido, appetitus.*



corporeally by changes in the organs of circulation and of expression of the feelings, and associated with pleasure and pain. They are distinguished from the appetites and propensities by their connection with the reason and higher sentiments. They have always been distinguished from other states, and when predominantly morbid constitute the "emotional insanity" of writers. The phrase is both too restricted and too vague. I prefer, as more precise, to name them Thymic and THYMIÆ, from the word θύμος, by which Plato and the Greeks designated this class of conscious states, and the supposed cause. 3. In virtue of the law of evolution and differentiation, the animal instincts and appetites, and all the fundamental mental processes, expand into and culminate in the reason; a word which denotes those faculties by which man obtains, retains, and accumulates knowledge, and represents and communicates it by language. No general term has been used to express this group of mental states so comprehensive as PHRENESIS, popularised in "frenzy," and "phrenetic." I therefore adopt it to express the morbid states and defects of the knowing and æsthetic faculties, and designate them PHRENIC and PHRENESIÆ. All these groups may

pass into each other in morbid states, or all may be morbidly modified together. In these cases differentiating terms may be used, according as the one kind or the other is predominant. Thus, there are *Phrenesiæ* in which the animal appetites are exalted and perverted, as well as the reason overthrown. Such a condition is furious mania, or orectic phrenēsy.

Classification of Vesaniæ as to Seat.—In ordinary diseases we can fix upon the organs or tissues which are the seat of the disease, and we therefore endeavour to determine what particular portions of the encephalon are the seat of the physiological and pathological changes which cause mental diseases and defects. It is possible to fix in a general way upon the encephalic seat of groups of mental disorders, as, for example, those of the reason, which probably have their seat in the hemispheres. And in like manner, mental defects may be connected with variations in the form of the head and face, as indicating the extent of development of parts of the encephalon (Phrenology, Cranioscopy). But neither cerebral anatomy nor physiology enables us to specify with even an approach to accuracy,

what particular portions of the encephalon are the seats of special kinds of mental degeneration and defect. We are, in truth, ignorant of the exact mental relations of so large and elaborate a structure as the cerebellum, and as to other ganglionic structures, the neat theories of certain physiologists are wholly hypothetical. This ignorance arises from the peculiarities of structure and function of the encephalon as compared with other portions of the nervous system. While the morbid change may be purely local, the unity of action of all its parts is so great, that the entire organ is influenced thereby. And this is true even of that simple state of consciousness known as pain — whether it be corporeal or mental. Then, not only do distant nerves and centres, in virtue of the law of incident, excitor, or afferent action, induce local encephalic changes, which in their turn influence, in virtue of the same law, the whole encephalon; but multitudinous visceral influences of the same class arise, and by acting (probably) upon the vasomotor centres of the encephalon, of which, perhaps, the cerebellum is the chief, modify the functional activity of various portions of the encephalic tissue to an incalculable extent, simply by changing the condition of

the capillary circulation and the activity of tissue-change. Add to these general causes of disease the direct influence of the blood, when defective or when the bearer of poisonous agents, and we can understand why the researches into the pathological anatomy of mental diseases are so unavailable in a classification. It is probable, indeed, that if our researches were so complete, by means of the microscope and chemical research, as to leave nothing to be desired, we should still be unable to determine what changes coincide with particular forms of disease, inasmuch as they are wholly dynamical, and leave no trace whatever. And this is the most true of the most difficult forms of insanity, namely, those which hover between health and disease.

Classification as to Causes.—The causes of mental diseases and defects are identical with those of nervous diseases in general. The proximate causes consist in functional changes in the fundamental tissues of the portions of encephalon involved, namely the nerve-cells and their connecting fibrils, and in the ganglia which co-ordinate and harmonize their functional activity. These changes lead to exaltation, perversion, and debase-

ment, and, finally, to abolition of function, coincidently with structural changes. They are consequent upon defective nutrient activity of the tissues, or irregular distribution of the blood, because either of defects in the vasomotor system of the encephalic organs, or of diseases of the capillaries and large vessels. Diseases of the membranes of the brain, and especially of the pia mater, must be classed amongst the more common of the less proximate causes. The exciting causes are chiefly those which influence either the nutrient activity of the vesicular neurine or the activity of the capillaries. The latter are both external and internal in their origin. The external are chiefly those which are mental stimuli, and reach the encephalon through the senses as impressions; the internal are the various so-called "sympathies," and are derived from the blood and viscera. These are very various and very numerous, because of the unifying functions of the encephalon. Hence it is that a knowledge of the physiological relations to the encephalon of the blood, and the organs and viscera, is essential to a knowledge of the pathology and treatment of mental diseases and defects. Of all the organs, the reproductive system exercises the most varied influence on the encephalon,

so that the highest feelings and faculties, as well as the lowest propensities, are modified by it. The mere difference of proportion of the constituents of the blood modifies its action on the tissues. Thus a want of water in the blood causes the feeling termed thirst, and all the other mental changes, such as delirium, which the withholding of water induces. Inordinate use of the encephalic tissues acts equally on the blood, because by that is meant increased production of cells and *vis nervosa*, and therewith waste and exhaustion of the blood-materials. Such morbid blood reacts in its turn on the tissues.

Numerous social conditions, as employments, food, drink, vices, and the like, thus interfere with the nutrition of the encephalic tissues; and either become the exciting and predisposing causes of mental diseases in the individual, or else induce such tendencies to morbid nutrition and function as is transmitted to the offspring and constitutes heredity. For heredity is nothing more than a tendency in the offspring to continue in the modes of nutrition and functional activity of the parents or ancestors, and which is the fundamental law upon which the maintenance of species and the continuance of life itself depend. Just as with new instincts and habits, so

these induced hereditary tendencies are intensified from generation to generation, if the vital conditions which began them in the parent continue to influence the offspring. And as to some, it is probable that they are intensified from generation to generation, independently of those conditions, or any of them. In this way congenital mental diseases and defects arise, known as idiocy, imbecility, weakness of mind, and privation and defect of certain faculties, and sense-organs. Age, sex, diathesis or constitution, climate, race, have all a direct predisposing influence.

Classification of Insaniæ.—The insaniæ or idiopathic vesaniæ are distinguished from other vesaniæ, as well as from all other diseases, by the fact that the mental disorder, disease, or defect, renders the patient incapable of judging or acting fitly for himself, his family, or society. He is both individually and socially disabled in mind. This disability, which forms so leading a part of the phenomena of the insaniæ as to require special notice in any classification, is manifested in very different degrees of completeness according to the extent, causes, and intensity of the encephalic disease or defect out of which it arises. Hence no definition

of insanity as a disablement, rigidly applicable to all cases, or even applicable to the same case in successive stages, is possible. We may, however, class the insaniæ in a few leading groups. 1. When an individual, either from excessive exaltation of the instincts and propensities congenitally, or consecutively to disease, or from palsy of the inhibiting structures, has no proper perception of consequences, or none of the antagonistic feelings and faculties, and thus is incapable of self-control and moral sense, and commits crimes or practises vices, he manifests immoral (not "moral") and criminal imbecility. 2. His knowing faculties may be unaffected, and he desires to restrain his morbidly vicious and criminal propensities, but cannot. This is impulsive insanity; it is termed "uncontrollable impulse," when the orectic acts are suddenly committed, and the disease is in truth a sort of mental epilepsy. 3. His instinctive desires and his acts may be both morbid, but his higher sentiments and faculties may be unaffected, and yet too weak to control his acts. This is what has been termed *folie lucide*, and moral insanity; it would be more correctly designated immoral or vicious. 4. Every thought, or particular processes or trains of thought, may be morbid, and

accompanied by that encephalic change which causes mental pleasure or pain, as in melancholia. This is *emotional* or *pathetic* insanity. 5. There may be neither morbid feeling, nor morbid desires, nor motor impulses, but hallucinations and delusions as to things and events, and which guide the patient's conduct. These are simply erroneous ideas, due to encephalic disease or disorder of encephalic function, of which he cannot detect the error, because memory is palsied, and there is either no reminiscence of his past experience, or no power of comparison of the present with the past, so that his delusions may be corrected, and true knowledge attained. This is termed NOTIONAL INSANITY. 6. Notional insanity may differ as it is partial or general. If general, then, all notions are constantly varying and incoherent, and the actions purposeless or irrational. The person thus affected is said to be out of his mind. This is ECPHRONIA (Mason Good), and includes mania, or "universal insania," and delirium. 7. But, if partial, there are "fixed" ideas or notions—not always occupying the mind—but recurring always in the same order, and uncorrected by reminiscence or comparison with the present. The changes in particular portions of the ideagenic tissue affected are out of relation to those

in all other portions—are self-included, as it were; and thus that exact co-ordinate action in thought and will of all parts of the encephalon which constitutes mental soundness may be abolished as to a class or classes of actions, leaving others unaffected. These are known as "MONOMANIAS." 8. Fixed ideas may take possession of the man and influence the conduct, although these may have originated in no disorder or disease, properly so called, but caused simply, like illusions from strong impressions on the senses, by over-excitement of that portion of encephalic tissue, due to excessive or long-continued mental activity about the same class of ideas. This state I have termed ENTHYMIA. The subjects of it are known as enthusiasts, fanatics, and the like. These and other morbid mental states recur periodically, there being intervals of mental health, or alternate with each other, or pass into each other. Thus the enthymia of the fanatic is apt to pass into mania, and this into dementia, so that the enthymic condition is but the first stage of the affection, the end of which is abolition of the mental faculties. Not uncommonly the disease is arrested at some one of its stages, and becomes a permanent imbecility, eccentricity, or

chronic mania, requiring, however, its own name, like all other stages, and which is MORIA.

The insaniæ, like all other neuroses, differ according as the motor (kinetic) or sensorial (ideagenic) elements of the encephalon are involved. In the purely impulsive class, the motor are the seat of change, so that they are strictly analogous to the encephalic, convulsive hyperkinesiæ, I term vasomotor (see Nosology of Neuroses, p. 350). But when both kinds of tissues are affected, the changes in the ideagenic or sensory portion do not necessarily stand in the relation of cause to those in the motor portion and the consequent actions, as is generally believed, but both are due to a common cause. For example, it is not the feeling of pain or a painful sensation which makes an animal writhe when painfully injured, but those encephalic changes which cause the feeling of pain, and which extend their influence to the motor centres of the limbs and trunk. In every volition, whether it be to move, to restrain movement, or to regulate, things are the same. It is the man who makes the effort of will, not his consciousness of willing, which is a state coincident with evolution of force. Hence it happens that all those actions which indicate states of consciousness may

and do occur independently of consciousness—are cerebral reflex actions,* strictly analogous to spinal, sympathetic, or vasomotor reflex actions. And hence arises an important difference in practice between actions and feelings, volitions and thoughts. We cannot observe the latter, only the former; and consequently, can never as certainly know that a man is conscious at the time he performs certain actions, as that the actions are performed. We may infer the consciousness, but the inference is open to doubt; or we may be told of it by the only observer, the man himself. Doubtless, in the vast majority of instances, his evidence, when in health, is reliable, if he be not feigning; but it may be, and often is, wholly fallacious in disease. For a man to know with absolute certainty, at a given present moment, whether he was conscious or unconscious at a certain past moment, an encephalic change coinciding with a reminiscence is necessary; but the reminiscence itself depends upon the fact whether certain encephalic changes coinciding with an act of memory, or of the conservative faculty (memniscence), had taken place, whereby reminiscence is alone possible. In practice this is not an

* See *Appendix* to "Mind and Brain," vol. ii.

uncommon thing. Thus, a person with senile dementia will suffer severe pain, as indicated by his writhings, groans, and expressions, but in a short time afterwards will deny that he suffered pain at all. So persons operated upon surgically, when under the influence of chloroform, will scream or shout as if suffering pain, yet when restored to ordinary consciousness, will deny that they felt pain. It is impossible in such cases to say whether pain was felt or not, for the denial may be an error due to want of memory or reminiscence, or may be the truth, and the cry expressive of pain may have been purely automatic. The same difficulties surround the expression of the knowledge of external things, and of right and wrong in criminal cases. Any man in stating what he has seen and felt, states really what is in accordance with his encephalic changes; so that whether his statements be true or not, depends upon the correspondence between those changes and the external conditions which induced them. But by a faculty known as imagination, encephalic changes arise which have no correspondence with external things; and when these are morbidly produced, delusions and hallucinations as to events arise which have no more foundation in truth than

the more simple illusions of the senses, or mere phantoms. The physiological type of these sensorial changes is in dreaming; and morbid dreaming, or PARONEIRIA, is therefore fitly placed amongst the transitional Vesaniæ.

SUMMARY.—The rules which, according to the preceding views, should guide us in naming and classifying mental diseases and defects may be thus stated:— 1. To include all modifications of the consciousness which are generally classed as mental under the term. 2. To consider them as all alike dependent on changes in which the whole of the organ involved—the encephalon—participates, but with a predominant manifestation of change of function as to a particular portion or portions of the organ. 3. To differentiate these manifestations of predominant morbid states by the same rules and according to the same methods (the psychological) as are adopted generally for the differentiation of predominant healthy states. 4. To distinguish the various states pathologically according to their origin, course, and causes. 5. To mark out such as are symptomatic only, or do not disable the individual personally or socially as to his will and judgment, from those which do. 6. To

correlate in a nosological arrangement the psychological and pathological facts through the physiological or biological, and to this end trace up the differentiation of the encephalon and of its functions as the organ of consciousness, through the correlative evolutions in lower organisms and in lower stages of development, according to the principles and method I have already laid down and in part worked out.* In this way the practical ends which should be secured in all classifications (laid down in Lecture VIII.), will, in my humble judgment, be best attained both as to healthy and morbid mind.

## Nosologies and Indexes of Mental Diseases and Defects (Vesaniæ).

### I. Psychological Nosology and Index of the Vesaniæ.

The Vesaniæ are encephalic nervous diseases, characterised by mental disorder, disease, or defect.

1. Symptomatic V. Mental disorders and defects associated with other diseases, as symptoms.
2. Transitional V. Mental disorders which constitute the transitional stages to mental diseases and defects.
3. Idiopathic V. Mental diseases and defects

* See "Principles of a Scientific Psychology," "Mental Physiology," and "Mental Organology," in my "Mind and Brain; or the Correlations of Consciousness and Organisation," vol. ii.

which disable the person as to his self-control and his conduct, individually and socially. Are of two kinds, Insanity and Fatuity.

*A.* Insanity (*insania, insanitas*). Disabling mental disease consecutive to ordinary mental health, not necessarily continuous or permanent, nor dependent on irremovable encephalic lesion. The forms may be classed as they are psychological (according to symptoms), or pathological (according to causes and course).

1. Psychological varieties of Insanity.

I. Orectic Insanity.—Morbid appetites, instincts, and propensities predominantly manifested. 1. *Harmless*, in regard to the individual and society. 2. *Vicious* and *criminal*. *a. Impulsive* and *uncontrollable*—mental epilepsy; *b. Continuous*, immoral insanity, criminal lunacy, "moral" insanity; (*a*) *Selfish*, or *pleasure-seeking* (Edonic); (*b*) *Unprescient*, or imbecile.

II. Thymic Insanity.—Morbid feelings and sentiments predominant. 1. *Enthymic*, Notions and feelings manifested, as fixed antipathies, prejudices, and strong convictions, not necessarily delusive, but with morbid selfness. 2. *Euthymic*, Delusive and exaggerated notions and morbid selfness, with feelings of satisfaction or happiness. 3. *Lypethymic* (λυπη, grief), Delusive or exaggerated anxiety, fears, regrets, and apprehensions (Lypemania, melancholia, tristimania, Phrenalgia). 4. *Athymic*, Morbid apathy of feeling and sentiment. 5. *Phrenic*, Morbid selfness and delusive egoistic ideas, with defective intellect, but no predominant changes as to pleasure or pain (*Moria*, Egoistic insanity, *Monomania*).

III. PHRENIC INSANITY.—Derangement or defect of the intellect and understanding. 1. *Ecphronia*, "Out of his mind," total derangement. *a.* Morbid dreaming, *Paroneiria; b. Delirium* (Symptomatic Ecphronia); *c. Mania*, Total derangement of the faculties, with excessive volitional activity; (*a*) *Orectic* Mania, with the appetites and propensities predominantly morbid; (*b*) *Thymic*, with predominantly morbid feelings and sentiments; i. *Euphorial*, or joyous; ii. *Phrenalgic*, or unhappy; (*c*) *Delusional*, with hallucinations and delusions predominant. *d. Notional Insanity*, Delusive ideas, usually fixed, but without excessive volitional excitement (Tranquil Mania). *e. Enthymic Ecphronia*, Transitional to mania, and with more or less volitional activity. *f. Insipiency, Moria*, More or less defect of the understanding consecutive to mania. *g.* Sudden Ecphronia, *Phrenoplexy*, Sudden total derangement or abolition of the faculties.

*B.* FATUITY (*Fatuitas, desipientia, Moria*).—Disabling want of understanding, or weakness of mind, not succeeding to an ordinary state of mental health, continuous, and due to encephalic defects of structure, nutrition, or development.

I. CONGENITAL FATUITY.—Encephalic defects, arising either during embryonic and intra-uterine life, or before the close of the first dentition. 1. *Complete*, or Idiocy, manifested by an entire want of the observing and thinking faculties; 2. *Incomplete*, or *Imbecility, Congenital Moria*, One or more of the knowing and observing faculties active; 3. *Morphous*, With defective development of the organs of the observing and

knowing faculties, the cranium, and limbs; 4. *Theroid*, with a manifestation of brute-like characters of body and mind; 5. *Complicated*, with spasmodic and paralytic diseases and defects.

II. Consecutive Fatuity (*Moria*, *Insipientia*).—Total deprivation of mental power, or weakness of mind consecutive to insanity and other encephalic diseases. 1. Total privation of understanding, *Amentia*, *Dementia*; *a.* Juvenile; *b.* Senile (Dotage); 2. Weakness of mind, *Moria*, consecutive *Imbecility*.

III. Insane Fatuity—*Fatuous Insanity*.—Insanity occurring in the fatuous and weak-minded; chiefly orectic and emotional.

2. Etiological and pathological varieties of Insanity.

I. As to course or order of symptoms.

1. *Acute*, terminating within forty days; 2. *Chronic*, continuous for months or years; 3. *Paroxysmal* or *transient*, occurring suddenly, and terminating completely within four days; 4. *Recurrent*, attacks of insanity with intervals of health (lunacy); 5. *Alternating*, chronic insanity, with alternating variations in the symptoms; 6. *Transitional*, insanity in which one psychological form is the transitional stage to another; 7. *Consecutive*, when one form follows another; 8. *Complicated*, when one or more encephalic neuroses* constitute a part of the morbid states.

II. As to remote and predisposing causes.

1. General causes. *a. Heredity. b. Age* (stage of

* See Nosology and Index of Diseases of the Nervous System, p. 350.

development), and nutrient activity (differs in the sexes); (*a*) *Infantile*, to end of first dentition; (*b*) *Juvenile*, to end of second dentition; (*c*) *Adolescent*, to commencing puberty; (*d*) *Pubescent*, to end of third dentition (wisdom teeth); (*e*) *Adult*; (*f*) *Climacteric*; (*g*) *Senile*. *c*. Habits and regimen. (*a*) *Enthymic*, from impressive and exhausting thought, feeling, and emotion; (*b*) *Orectic*, from vicious propensities; i. *Dietetic* (alcohol, narcotics, bitters); ii. *Erotic*, excessive amatory excitement and pleasure; iii. *Onanistic* (including all depraved sexual excitement).

2. Pathological causes common to other morbid states, or dependent on them. *a*. *Pyrectic*. *b*. *Diathetic*; (*a*) Strumous and Tubercular; (*b*) Gouty; (*c*) Rheumatic; (*d*) Atheroma (of encephalic vessels); (*e*) Syphilitic. *c*. *Blood-diseases*; (*a*) Retained excreta; (*b*) Toxæmia; (*c*) Cachexiæ (pellagra, etc.) *d*. *Diseases of the Nervous System*;* (*a*) *Traumatic* (including insolation, concussion, etc.); (*b*) *Vasomotor Neuroses*; i. Hysteria; ii. Epilepsies; iii. Congestive seizures; iv. Cerebral palsies; v. Spinal Neuroses; vi. Nerve-diseases. *e*. *Peripheral influences of the Viscera* through their nerve-centres; (*a*) *Cutaneous*; (*b*) *Pneumo-gastric*; i. Lungs; ii. Heart; iii. Stomach and Duodenum; iv. Liver and Spleen; (*c*) *Intestinal*, Colon and Rectum; (*d*) *Genital*, as to sex; i. In males—Orchidial and Prostatic; ii. In females—*a*. Ova-

* Compare Nosology of Diseases of the Nervous System.

rian ; *b*. Utero-ovarian ; *c*. Uterine ; *d*. Puerperal (utero-gestation, parturition, lactation).

## II. Physiological or Biological Nosology and Index of the Vesaniæ.

Class I. Orexiæ.—Orexies, Orectic Vesaniæ, characterised by functional disorder, disease, or defect of the encephalic centres subservient to the instincts, animal desires, and propensities, and instinctive sentiments.

Class II. Thymiæ. — Thymias, Thymical Vesaniæ, chiefly insaniæ, manifested by disorder, disease, or defect of the encephalic centres subservient to the feelings, emotions, passions, and sentiments.

Class III. Phrenesiæ.—Phrenēsies, Phrenic Vesaniæ, chiefly insaniæ, manifested by disorder, disease, or defect of the encephalic centres subservient to the knowing and representative (or sematic) faculties.

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Class I. Orexies.—Morbid instincts, animal desires and propensities, manifested, as primordial instincts, in plants and animals ; connected with encephalic centres in relation with the organs and viscera of the body, and not necessarily associated with morbid states of the feelings or faculties. They are egoistic, reproductive, and social. *Seat*—Medulla oblongata, cerebellum, and posterior lobes of hemispheres ?

I. Egoistic Orexies, Autorexies.—Morbid states of the instincts, appetites, and desires, which aim at the maintenance of the individual in bodily health and happiness.

1. Trophical or Nutrient Orexies.—Morbid appetites for the primary forces, light and heat,

and for materials suitable to the production and accumulation of force. *Seat*—The posterior basilar convolutions, medulla oblongata, and cerebellum ? The primordial instincts seen in plants ; the fundamental intuitions are for pleasure and avoiding pain. Manifested in the maniacal and fatuous, and as symptomatic Vesaniæ. *a.* As to heat and light, basking (*insolatio*) ; Self-stripping (*nudatio*) ; Self-burning ; crouching, or shunning heat and light. *b.* As to food and water. Gluttony ; instinctive and depraved appetites ; urine drinking ; sitophobia.

2. Volitional Orexies.—Morbid instincts to energize, and morbid desires for muscular activity, and to exercise power. *Seat*—The voluntary system and the cerebellum ? *a.* Restlessness, maniacal excitement, mischievous and destructive activity. *b.* Out-door activity. *c.* Impulsive acts. *d.* Habitual actions ; attitudinizing, gyrating, etc. *e.* Motionless apathy, volitional indecision. Seen as uncontrollable impulses, etc.

3. Conservative or Biotic Orexies. — Morbid manifestations for continuous and happy existence ("Love of life"). Intuitions prescient ; manifested as growth and contractility in plants. *Seat*—Medulla oblongata, cerebellum, and posterior basilar convolutions ? *a.* Anxiety as to disease and death. *b.* Poltroonery, insane cunning and timidity (hysterical, homicidal). *c.* Horror (fear of the mysterious) ; impulsive suicide, self-mutilation. *d.* Imbecile recklessness, apathetic indifference. Seen in mania, melancholia, dementia, and as uncontrollable impulses.

4. Personal Orexies — *Emorexies.* — Morbid selfness as to "me" and "mine," with fundamental intuitions of self, person, and property. *Seat*— The lateral and vertical convolutions ?

*a. Decorative.*—Instincts for cleanliness and sweetness. Seen as Decorative Moria — *Adonis-mania* — vain, erotic, or warlike—Love of scents. Insane neglect of person, and filthiness.

*b. Acquisitive.*—Instincts and propensities to acquire and accumulate nutrient or constructive materials, or attractive, glittering things. Intuitions prescient. Seen as insane acquisitiveness, kleptomania, violent robbery, "magpie" instinct, hoarding, sordid avarice, insane mendicancy.

II. Reproductive Orexies. — Morbid manifestations of the instincts and appetites which secure reproduction and protection of the offspring, and dependent on the morbid action of the reproductive organs and their sympathetic centres on the encephalic centres. *Seat*— The medulla oblongata, cerebellum, and supra-cerebellar convolutions of the posterior lobes ? The influence of the reproductive organs varies in the two sexes, and extends differently in each to the egoistic instincts, so as to modify them in favour of the offspring into philoprogenitive instincts. The trophical or nutrient are predominantly modified in the female, the conservative and volitional predominantly in the male ; the decorative with warlike impulse in the male, with desire to attract in the female. The acquisitive and constructive are modified in both sexes by the reproductive organs.

The reproductive instincts thus developed and

modified are differentiated into the social orexies, and through them into the domestic and social sentiments, passions, and emotions.

1. *Erotic Orexies, Erorexies.*—Morbid manifestations of the sexual instinct (union of the sexes), having for its object the integration of the sperm-cell, and germ-cell, and dependent on the evolution of the genetic glands, or on the condition of their nerve-centres. Normally, the male seeks the female.

*a. Exaltation.*—Masculine : (*a*) Decorative and strutting Moria : (*b*) Satyriasis. Feminine : (*a*) Hysteric Modesty ; (*b*) Erotic Hysteria ; (*c*) Nymphomania.

*b. Perversion.*—In the male, or in both sexes : (*a*) Precocity ; (*b*) Senile Pruriency ; (*c*) Manustrupatio ; (*d*) Proctorexia (Sodomy and Pæderastia) ; (*e*) Bestiality.

*c. Abolition, Anaphrodisia.*—(*a*) Impotence ; (*b*) Misogynia ; (*c*) Viragoism.

2. Philoprogenitive Orexies.—Instincts for the nutrition, protection, and defence of the young, morbidly manifested.

*a.* Maternal Orexies.—1. *Nutrient and protective.* (*a*) *Exaltation :* i. Morbid maternal anxiety ; (*b*) *Perversion :* i. *Pæderexy,* Insane instinct for nursing children, dolls, etc. ; ii. *Zoorexy,* Morbid impulse or folly for pet animals (cats, etc.) (*c*) *Abolition, Astorgia :* Apathy for offspring (in suckling women). 2. *Defensive.* (*a*) *Exaltation :* i. Morbid cunning : *a.* Hysterical ; *b.* Fatuous ; ii. Cunning mischief (Pyromania, etc.) ; iii. Cunning ferocity ; iv. Cunning murder : (*b*) Perversion and abolition : i. Morbid dislike to children ; ii. Infanticide.

3. Domestic or Family Orexies.*—Morbid instincts and instinctive feelings of the sexes and their offspring when united in a family. *a. Conjugal;* (*a*) Doting fondness; (*b*) Insane jealousy; (*c*) Conjugal antipathy; (*d*) Erotic cruelty (in males); (*e*) Cunning hate (in females). *b. Filial* and *fraternal;* Abolition of instinct of family union (moral imbecility in youth).

III. Social Orexies.—Exaltation, perversion, or abolition of the instincts and instinctive sentiments of human society. The analogous instincts are manifested by gregarious and constructive animals (chiefly insects and vertebrates), and being differentiated into the social feelings, sentiments, and acts of man, when morbid, constitute a transitional group to the thymical vesaniæ and insaniæ.

IV. Sensual or Edonic† Orexies.—Insane voluptuousness and pursuit of animal or orectic gratification. Usually selfish, with moral imbecility, deficient prescience, and defective family and social instincts and sentiments. *Vicious Insanity. Synonyms:* Moral insanity, folie lucide, manie sans delire.

1. *Sensorial edonic Orexies.*— Insane appetites for excitements of sensorial changes ("stimulants"). *a. Alcoholic Stimulants: Oinomania.* (*a*) Dietetic; (*b*) Paroxysmal; (*c*) Maniacal; (*d*) Symptomatic. *b. Narcotic Stimulants:* Opium, tobacco, Indian hemp, betel-nut, etc. *c. Bitter*

* "Mind and Brain," vol. ii., part iv. chap. 9, and part v. chap. 8.

† ἡδονη, pleasure.

*nervines:* Hop, wormwood (in Sirop d'Absinthe), gentian, etc., in dram "bitters." *d. Scents.*

2. *Decorative: Adonisia* (Adonis vanity). Morbid extravagance in dress and decoration.
3. *Erotic:* Erotic licentiousness.

V. Orectic Insanity.—*Immoral* or *Vicious Insanity.* General manifestation of morbid or degraded impulses, appetites, and instincts; the manifestation varying in character as to the causes. 1. *Infantile:* "Lucid mania," or vicious insanity in young children, with precocious audacity, sexuality, acquisitiveness, etc. 2. *Juvenile and adolescent: a.* In young males; *b.* in young females. 3. *Alcoholic:* Vicious insanity from habitual drunkenness. 4. *Traumatic:* After wounds to the head, insolation, concussion, etc. 5. *Epileptic.* 6. *Imbecile* (coincident with congenital or induced fatuity). 7. *Senile:* Vicious insanity in the aged, usually erotic.

Class II. Thymiæ.—*Thymias. Thymic Insanity. Moria.* Mental diseases and defects predominantly involving the feelings, emotions, and sentiments, with morbid delusions or delusive ideas as to "me" and "mine;" but not necessarily with complete or general disorder or defect of the knowing faculties. *Seat*—The ideagenic or sensorial substance of the cerebellum and hemispheres?

I. Enthymia.—Transitional or symptomatic morbidity of the feelings and temper, manifested as exalted selfness, with fixed antipathies, prejudices, and convictions, not necessarily delusive, but usually erroneous, and leading to eccentricity or folly. *a. Emotional,*

induced by violent impressions ; *b. Enthusiastic* (devotedness to particular ideas and phenomena) ; *c. Thaumaturgic* or *mystic; d. Superstitious; e. Artificial* (mesmeric, electro-biological, etc.)

II. Euthymia.—Insanity characterised by morbid exaltation of the self-feelings, and by delusive pride, self-esteem, and satisfaction. *a. Euphoria:* Delusive satisfaction as to bodily health and well-being. *b. Chærothymia:* Insane joyousness, hopefulness, and general satisfaction. *c. Pædiothymia:* Insane jocoseness and playfulness. *d. Superbia:* Insane pride and self-esteem as to personal qualities, bodily strength, rank, wealth, and success. (*a*) *Maniacal;* (*b*) *Paralytic*, with general paralysis ; (*c*) *Edonic*, with insane gratification of pleasurable desires ; (*d*) *Decorative*, with insane decoration of person ; (*e*) *Enthymic*, with weakness of judgment, but no marked defect in understanding.

III. Lypethymia.—*Melancholia.* Insanity characterized by morbid humility as to self, and by fear, terror, remorse, grief, and anxiety, as to "me" and "mine."

1. *General Lypethymia* or *Melancholia.* *a.* Acute ; *b.* Transitional to, or alternating with, mania ; *c.* Chronic ; *d.* Paroxysmal.
2. *Orectic Lypethymia* or *Melancholia*, with predominant modifications of the instincts and instinctive feelings : *a.* Sitophobia ; *b.* Self-mutilating; *c.* Suicidal ; *d.* Homicidal ; *e.* Domesticidal ; *f.* Akinetic, with loss of volitional energy : (*a*) Melancholia attonita (motionless M.) ; (*b*) Cataleptic : i. general, ii. partial (of the neck-muscles).

(*c*) Mute melancholy ; (*d*) Wandering or restless (melancholia errabunda).

3. *Notional Lypethymia* or *Melancholia.*—Lypethymia with depressing delusions and notions as to the past, present, and future ; often with hallucinations. i. *Hypochondriacal :* With delusions as to bodily diseases and defects. *a. Dysphoria,* a general delusive feeling of ill-health. *b. Hypochondrias,* delusions as to state of viscera and limbs. *c. Sexual,* delusions as to reproductive power and state of sexual organs : (*a*) Pubescent ; (*b*) Suggestive ; (*c*) Onanistic ; (*d*) Syphiliphobia. ii. *Social :* *a.* Misogynia ; *b.* Erotic longing (erotomania in females) ; *c.* Home-longing (nostalgia) ; *d.* Domestic (as to wife and children) ; *e.* Political ; *f.* Misanthropic ; *g.* Suspecting and accusing ; *h.* Aggressive and morose. These are transitional to mania and dementia.

4. *Enthymic Lypethymia* or *Melancholia.* Delusions arising from dwelling on abstract ideas as to mysterious and dreadful agencies and "the invisible world." *a.* Zoanthropia ; *b.* Demoniacal possession ; *c.* Dread of witches, magnetizing, vampyres, etc. ; *d.* Demonophobia ; *e.* Self-accusing ("religious" melancholia) ; *f.* Thaumaturgic ("spiritualistic" insanity).

IV. Athymia.—Abolition of power of feeling, and of the feelings. 1. Symptomatic (of other Thymiæ). 2. Acute apathetic dementia ("Phrenoplexy"). 3. Apathetic fatuity.

V. PHRENIC THYMIA. MORIA.—*Egoistic insanity; social insanity, monomania;* folie ; manie raisonnante. Morbid sentiments as to self, and delusive egoistic notions and incongruous ideas with enfeebled judgment, but without violence of conduct or morbidly predominant appetites, passions, or feelings. Allied to *Euthymia.* 1. *Premonitory* and *Symptomatic: a.* Maniacal transitional moria (preceding mania) ; *b.* Fatuous transitional moria, preceding dementia. 2. *Consecutive*, succeeding to lypethymia, mania, or dementia. 3. *Congenital* (*Imbecility*). 4. *Monomoria:* One idea or class of ideas predominant. *Psychological varieties: a.* Personally vain and coquettish ; *b.* Erotic ; *c.* Joyous, benevolent, and affable ; *d.* Avaricious ; *e.* Aggressive and abusive (Thersites moria) ; *f.* Libellous and accusing ; *g.* Astute and mischievous ; *h.* Ambitious and proud ; *i.* Inventive, scheming, and lavish ; *j.* Literary (the " fools of literature ") ; *k.* Political ; *l.* Loquacious and argumentative. These often pass into recurrent and chronic mania.

CLASS III. PHRENESIÆ.—*Phrenesies.* Vesaniæ characterized by exaltation, perversion, degradation, or abolition of the intellectual powers.

1. COGNITIVE OR KNOWING PHRENESIES. Affections of the knowing desires and faculties.

I. ORECTIC COGNITIVE PHRENESIES. The apprehending faculties and desires. 1. *Curiosity; inquisitiveness. a.* As to *facts* and *things* present. Morbid inquisitiveness. *b.* As to *qualities* and *powers.* Wonder ; desire to know hidden causes, the mysterious, invisible, abstract, and superstitious. Thaumaturgic Phrenesies. *c.* As

to *events*, Desires to know the past and the future. Morbid states most commonly *enthymic* (as "medium-ism," fanaticism, etc.)

2. *Doubt* and *desire for certainty* (verification). *a.* Morbid incredulity or unbelief.* *b.* Indecision as to opinions. *c.* Disputatiousness. *d.* Insane credulity, delusive certainty (delusions). These states are not unfrequently enthymic or hereditary in their origin, and premonitory to mania, moria, or thymia.

II. APPREHENDING COGNITIVE PHRENESIES.—Morbid states of the active faculties comprised under ATTENTION. *Seat*—The nerves of the senses, their ganglia, and ideational centres. Associated with sensations.

1. *Objective attention and perception.*† *Seat*—The ganglionic centres which co-ordinate the muscles of accommodation of the senses, and the sense-nerves and nerve-centres. (Ganglionic centres in the medulla oblongata, cerebellum, tubercula quadrigemina, and optic thalami ?) *a.* Hysterical hyperæsthesia ; *b.* Clairvoyance ; *c.* Quickness of observation ; *d.* Maniacal susceptibility ; *e.* Reverie and absence of mind ; *f.* Somnambulism ; *g. Paræsthesiæ* of cerebral nerves and hallucinations.‡

2. *Ideational Phrenesies.*—Disorders of the percep-

* See Rush "On Diseases of the Mind," 5th Edition, chap. 11, "Of Derangement of the Principle of Faith, or the Believing Faculty."

† "Mind and Brain," vol. i. p. 143 ; vol. ii. p. 96.

‡ See "Cerebral Neuroses," in the Nosology and Index of Diseases of the Nervous System.

tions, ideas, and thoughts generally, from defect in attention, perception, memory, and comparison. *Seat*—The cerebral (and cerebellar ?) hemispheres. *a.* Ludicrous comparisons ; *b.* Continuous ideation (*Agrypnia* or sleeplessness) ; *c.* Incoherent ideation : (*a*) Delirious ; (*b*) Maniacal ; (*c*) Fatuous ; *d.* Hallucinations and delusions ; (*a*) As waking-dreaming (delirium) ; (*b*) As morbid sleep-dreaming (*Paroneiria*) ; (*c*) As insanity.

III. Mnemonic Phrenesies.—Morbid states of the conservative and reproductive faculties (memory and recollection).*

1. Of *memory* as the *conservative faculty: Memniscence.* Morbid production of mnemonic tendencies or memories proper ("deep impressions," "fixed ideas"). *a.* Enthymic ; *b.* Emotional ; *c.* Hysterical or hyperæsthetic ; *d.* Maniacal.
2. Of *memory* as the *reproductive faculty: Reminiscence.* Morbid excitement of memories. *a.* Of ancestral memories (*reminiscent atavism*) ; *b.* Of unconsciously acquired memories ; *c.* Paroxysmal reminiscence ; *d.* Senile, pathological, maniacal, reminiscence. (Reproduction of memories long passed, with abolished memniscence).
3. Of *both memory and recollection.* Memory in the general sense. *a.* General defect, *Amnesia.* *b.* Partial defect, *dysmnesia :* (*a*) As to things ; (*b*) As to events. *c.* Total abolition, *oblivion.*

* "Mind and Brain," vol. i. p. 144 ; vol. ii. p. 67.

IV. Morbid Imaginations.—Presentative faculty. Morbid states of the faculty of placing notions of things and events (not feelings) before the consciousness as objects. *Hallucinations*, or delusions as to persons and things. *a. Percipient*, real external things transformed into hallucinations. *b. Reminiscent*, spectral memories. *c. Prescient*, prophetic dreams and visions; anticipations of events transformed into hallucinations. *d. Æsthetic*, hallucinations of music, poetry, etc.

V. Morbid Intuitions (of Cognitive Faculties).—Exaltation, defect, or abolition of fundamental intuitions and their derivative notions. 1. Of the "*concrete Ego*," and notion of *personal identity*. *a.* Double and triple personality. *b.* Loss of personal identity; metamorphosis of self (abolition of personal identity). *c.* As to states of person: (*a*) Size of body or limbs; (*b*) Place and direction of body in space; (*c*) Condition of limbs and bodily organs. 2. *Of the special knowing faculties.* Delusive notions founded on morbid intuitions of the sciences.*

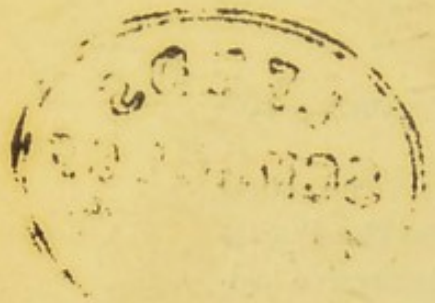
2. Volitional or Executive Phrenesies.—Morbid states of the volitional faculties, which represent perceptions, conceptions, notions, imaginations, and sentiments, by signs and symbols, or in form, colour, and sound.

I. As to *intuitive notions*, or intuitions correlating form, colour, and sound; namely, unity, duality, bisection as antagonism, symmetry, multiplicity and infinity, repetition (rhythmical and geometrical).

* Compare "Mind and Brain," vol. ii., part 4, chap. 8, "Fundamental Intuitions as Scientific Ideas or Causal Ideas of the Sciences."

II. As to *intuitive sentiments.* 1. The IDEAL: Geometrical harmony of form, sound, and colour. 2. The PLEASING: (Evolved out of the instincts and instinctive feelings). *a.* Ludicrous (mental titillation); *b.* Monstrous or terrible; *c.* Gigantesque or powerful; *d.* Picturesque or sympathetic; *e.* Mystic, or the abstract and imaginary as to cause and order of things ("the invisible world").

III. As *to execution*, by the limbs, tongue, and respiratory organs. 1. *Volitional*, with consciousness. 2. *Automatic* (as to writing, speech, music, dancing). 3. *Imitative.* These executive faculties are exalted, degraded to the level of those of savage or semi-civilized nations and of children, or abolished, in ecphronia and fatuity, and in various forms of enthymia as Medium-ism, Mesmerism, Hysteria, Clairvoyance, Enthusiasm. Being motor faculties, their actions follow the laws of all motor neuroses, and may and do occur independently of conscious volition or ideation.



# INDEX.