

**The principles of theory indispensable to sound observation in the practice of medicine ... A lecture introductory to a course of materia medica / [William Seller].**

**Contributors**

Seller, William, 1798-1869.

**Publication/Creation**

Edinburgh : Printed at the University Press, 1841.

**Persistent URL**

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THE  
PRINCIPLES OF THEORY  
INDISPENSABLE TO SOUND OBSERVATION  
IN THE  
PRACTICE OF MEDICINE.  
A LECTURE

INTRODUCTORY TO A COURSE OF MATERIA MEDICA.

BY WILLIAM SELLER, M.D.  
FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, EDINBURGH.

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EDINBURGH:  
PRINTED AT THE UNIVERSITY PRESS.

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1841.

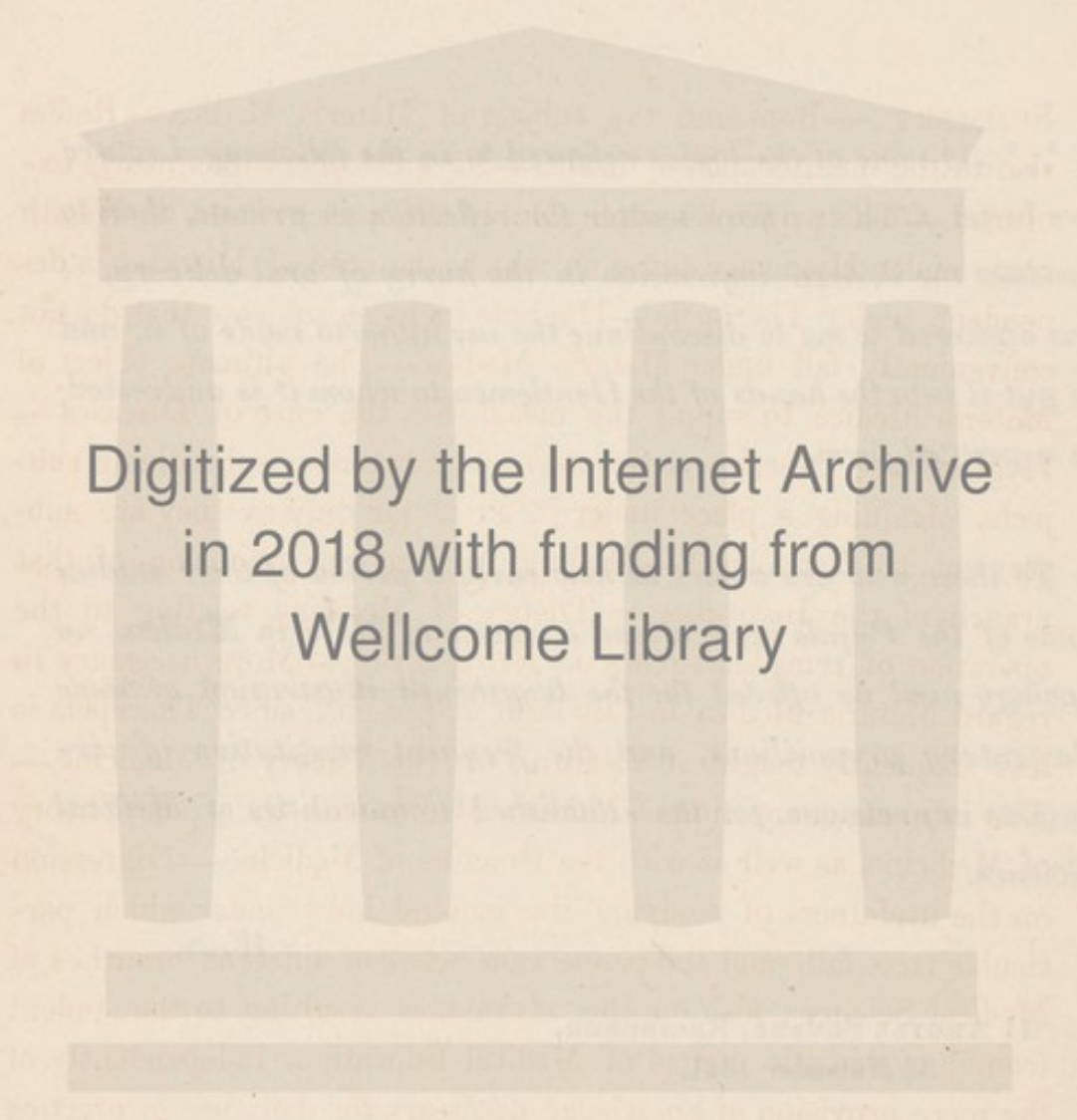
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\* \* \* *As some of the topics referred to in the following Lecture are better fitted to afford matter for reflection in private, than to produce the desired impression in the hurry of oral delivery, it has occurred to me to discontinue the use hitherto made of it, and to put it into the hands of the Gentlemen to whom it is addressed, in a printed form.*

*To those who are aware at how early a period of their studies some of the Pupils must attend a course of Materia Medica, no apology need be offered for the lengthened illustration of some elementary propositions, and the frequent substitution of circuitous expressions, for the established technicalities of Medical Science.*

W. S.

11 ARGYLE SQUARE, EDINBURGH,  
3d November 1841.



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**SUMMARY:**—Remedies the subject of *Materia Medica*—Refers also to the maintenance of health—Surgical operations nearly excluded—The principles applicable to the preservation of Health come under Hygiene; those on which the cure of Diseases is dependent, under *Therapeia*—Hygiene includes subjects that do not conveniently fall under *Materia Medica*—The ultimate object of *Materia Medica* to supply the means for the cure of Diseases—Hygiene, the Descriptive Sciences and Chemistry subordinate subjects, obtaining a place under it, in so far only as they are subservient to that object—*Materia Medica*, an extension of that branch of the Institutes or Theory of Medicine relating to the operation of remedial agents on living action—More necessary to regard *Materia Medica* in this light at present, since *Therapeia* is less frequently taught in Lectures on the Theory of Medicine—The intimate connection of *Materia Medica* with the whole Theory of Medicine, as well as with the Practice of Medicine—Digression on the usefulness of studying the general laws under which particular facts fall, and the connection between different branches of Medical Science; also on the advantages resulting to the student from a systematic course of Medical Education, independently of the mere provision of knowledge necessary for daily use in practice—What the Theory of Medicine refers to—Medicine is a special department of Physiology—Why the study of the principles of Physiology at large prepares for the Practice of Medicine—The history of Medicine shows the Practice of Medicine to be subject to continual error without principles drawn from Physiology—These errors reducible to errors of Empiricism, and errors of Dogmatism

—Sources of the errors of Empiricism—Erroneous notion of Disease and Remedies—The Health of one individual not the same as that of another—Disease not substantially distinct from health, but an ever-changing alteration of the same acts which constitute health—The name of a disease generally represents not one alteration, but a progressive alteration, or a progressive series of alterations, in acts of life—False conclusions from inattention to these distinctions—Kind of Medical knowledge which accumulates without the assistance of science—Why it is so limited—Logical error in the use of the word observation—Intuitive tendency to regard successive phenomena in the relation of cause and effect—Errors from this source—Knowledge of the general course of nature the only guard against these—Illustration from the history of Surgery—Errors of Dogmatism—Conclusion.

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## LECTURE.

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MATERIA MEDICA is the department of Medicine which treats of Remedies. In its largest signification, it embraces whatever relates to the means, ascertained to be of effect, for the maintenance, and for the recovery of health. But the limits of this department are, to some extent, arbitrary, whether it be regarded as one of the natural divisions of Medical Study, or as a group of allied subjects detached from the parts of Medicine to which they respectively belong, as tending to overload these, and joined into one course, merely for the convenience of being taught together.

Materia Medica derives its objects from very different natural and artificial sources, uniting them into one system, solely in virtue of their common character, as remedial agents: yet it is impossible to deny the name of Remedy to surgical operations, which are necessarily excluded, with the exception of such as are subservient to the abstraction of blood, counter-irritation, and the like. Again, the term remedy does not apply, with much strictness, to the means resorted to for the preservation of health, unless confined to the case of what is called Prophylactic Treatment, where the advent of disease is already apparent. But in a practi-

cal subject, to waste time, in a nice adjustment of words, is little advisable.

Our subject, by what name soever it is to be designated, while it bears distinct reference to the maintenance of health, has the means of cure in disease for its ultimate purpose.

The principles applicable to the preservation of health constitute the department of Hygiene—those on which the cure of disease depends, that of Therapeia. The whole of our subject, taken in its utmost latitude, must be comprised under these two heads.

The continuance of health is dependent not only on the performance of certain indispensable conditions, such as the supply of aliment, drink, air, and warmth, but also on the removal or neutralization of many positively noxious agencies, Miasms, Contagion, Poisons, and the causes of disease in general, whether these operate by interfering with the due performance of some one or more of the foregoing conditions, or on any other known, or still unknown, principle. Hence Hygiene must discourse on the causes of disease, as well as on the limits, within which the application of the vital stimulants (so the above-mentioned indispensable conditions of life are termed) may vary, so as to be still compatible with health. Moreover Hygiene considers not only the circumstances affecting the health of man in his individual capacity, but those also which influence that of bodies of men—or it seeks to ascertain the rules to be acted on to diminish the rate of disease in camps and fleets, in crowded cities and manufacturing towns—and takes account of all topics bearing on the improvement of the public health.

To go into the whole extent of Hygiene would lead us away from the proper design of this Course, which is simply preparatory to entering on the ordinary Practice of Medicine, and at the same time, would be an encroachment on the departments assigned to other Teachers, since many parts of

Hygiene belong to the province of Forensic Medicine, or of General Pathology.

The course of study which we are now entering on is a very mixed branch of Medical knowledge, so that some principle must be sought, as a guide to determine how much of each of the included topics belongs to it of right.

While, then, the subjects of this course fall conveniently under the two heads of Hygiene and Therapeia, neither Hygiene, in its reference to the circumstances essential to health, nor the physiological action of the agents which become remedies (that is their action during health), though a principal part of Therapeia, is here studied for its own sake, but only because it is impossible to ascertain the effects of such circumstances, and of such agents, in disease, without a previous knowledge of their general mode of acting in the healthy state. The application of both to the cure of disease is the ultimate object of our department—the study of their effects in health one of the means for the effectual attainment of that object.

In like manner we avail ourselves of the knowledge supplied by Botany, Zoology, Mineralogy, and Chemistry, for the description, preparation, and identification of the several articles that have obtained a place in this subject, studying the necessary parts of these sciences, not for their own sake, but for the purpose of applying the means of treatment, during the actual presence of disease, with greater certainty.

The principle, therefore, to be kept steadily in view, for conducting a course of this description, as apportioning its due place and weight to each of the multifarious topics pressed on our attention, is the subserviency of everything besides to the one purpose of placing within the reach of the Practitioner, in their most effective form, the available remedies, of whatever kind, against the progress of diseases.

To follow out correctly the operation of each article on the living body in a state of health, and to render the knowledge so obtained instrumental to determining what morbid conditions the same is fitted to counteract, it becomes necessary to understand the ordinary actions of life, and the deviations from these which constitute disease, to the utmost that the actual state of Medical Science permits. Our subject, therefore, is intimately dependent on the principles of Medical Science. *Materia Medica* was originally an appendix to the Institutes of Medicine. It is now properly regarded as an extension of *Therapeia*, considered as that branch of the Institutes, or Theory of Medicine, which has reference to the operation of remedial agents on living action. With the two other branches of the Institutes of Medicine—namely, Physiology, which concerns living action in health, and Pathology, which concerns living action in disease,—*Materia Medica* establishes likewise the closest relations.

If these views be correct, *Materia Medica* should not be regarded as holding its chief dependence on the descriptive sciences, and on Chemistry; these indeed are of indispensable use, yet it is only in the preparatory steps, so that their place is subordinate. It is from the Institutes of Medicine that *Materia Medica* should derive its character as a course of Medical study; from that part of Medical Science which embraces all the general laws ascertained respecting the operation of remedial agents on living action, and all the general precepts established for the application of such agents to the cure of diseases.

Though I see no reason to think that it was ever advisable to look on *Materia Medica* in any other light, yet it becomes the more necessary at present to insist on this view of its character, because the subject of *Therapeia*, or Therapeutics, owing to the rapid growth of pure Physiology, is

now often omitted altogether from courses of Lectures on the Theory or Institutes of Medicine.

It is in accordance with this view that I propose (except in the Chemical department) to adhere to the Therapeutic arrangement of the articles of the *Materia Medica*—that is, to that arrangement which is founded on their known effects on the living body ; for, as it appears to me, the prevalence of a Botanical arrangement, in our best works of *Materia Medica*, originated in a misapprehension of the proper character of this subject. To this point I must revert in my next lecture, when I come to exhibit to you the arrangement of the course.

In the meantime, at the outset of a course of Lectures, on a subject which plainly connects itself most intimately both with the Theory of Medicine as a science, and with the Practice of Medicine as an art founded on that science, it cannot be out of place to bestow a small portion of our time on the consideration of the nature and objects of the theory of Medicine, and on the kind of union which subsists between the knowledge of Theory and the improvement of the rules of Practice, as well as the attainment of skill in the treatment of diseases.

Such considerations cannot but lead us into reflections of a very general kind, and into a field, which to many may seem at first sight over-speculative. And I am aware that young men, earnest in the pursuit of that kind of knowledge which they foresee may be required of them at any moment, without warning, when, at no distant date, they have engaged in the practice of their Profession, are apt to think every hour lost which is not employed in the acquisition of facts and matters of practical detail. I should ill discharge the duty of a Teacher of Medicine, were I to counsel you to

abate one jot of that zeal, by which Students of Medicine are so honourably distinguished, for the attainment of particular knowledge, because I know that, unless a sufficient foundation of that kind be laid in the course of your studies in the Schools, that most necessary provision for Practice will never afterwards be effectually within your reach. Yet it has often occurred to me, during a long acquaintance with medical education, that a somewhat greater share of attention, than is customary, to the great principles by which facts are connected together, and to the essential relation which one kind of science bears to another, in the cycle of medical studies, would not be without some momentous advantages. To look to points of this description would not, I am persuaded, prove an additional burden to the severe tasks already imposed upon the student, but would tend rather to render these less irksome. I have often had occasion to remark, that you do not grudge the heavy calls made upon your time, unless when you have been induced to regard some of the studies, in which you are obliged to engage, as having no immediate bearing on the success of your future labours in the exercise of your Profession. But let me entreat your patience for a short digression on the advantage of the study of the great principles, within which those numerous facts fall, that must be stored in your memories, and on the necessity, or at least, the reasonableness, of subjecting your minds to those terrible details which make up Courses of Medical Lectures, and which, you are quite right in thinking, no memory is capacious enough to carry unbroken to the bed-side of the patient.

A principle in science is a general fact—a comprehensive statement of facts—a law which includes many facts—and such a principle has a manifold use. One may be called its scientific use, when it enables us to employ the facts em-

braced in it with greater facility, for the extension of the whole science; others are its practical advantages, when an art is founded on the science of which it is a part—namely, to make it more easy to recal the facts comprised under it, and to deduce new facts from it, or, what is the same thing, to infer how facts previously known will vary with a change of circumstances. Of these latter uses of a principle, the more to be prized in Medicine is the assistance it affords to the memory, since the deduction of new facts from any principle of that science, unless some immediate means of verification are proposed, is permitted only within the narrowest possible limits.

A collection of principles, then, is an artificial memory; and surely no department of knowledge stands more in need than Medicine of assistance of that description.

The other point to which I begged your attention before proceeding to the concluding subject of this Lecture, is a short defence of the general plan (of particular defects I say nothing)—a defence, I say, of the general plan on which medical education is conducted, against the oft-reiterated charge, that the memory is burdened with a number of particulars which have no immediate bearing on the after-practice of the art.

This charge implies a very narrow view of the case—a view which overlooks entirely one of the most signal uses of a systematic education in any department whatever. The object of education is to discipline the faculties, as well as to impart knowledge. To this end, the aim of a Teacher should be to exhibit just views of the nature of the subject in which the student is engaged—to habituate his mind to the kind of ideas which prevail in it—to point out to him the character of the evidence of which its conclusions are susceptible—to show him the progress of discovery, the steps

by which advances have been made, the errors by which improvement has been retarded, the sources of fallacy, both in observation and inference, and the way by which the road to truth has been regained; and though his memory may not receive a tithe of what has been brought before him, and though, in after life, it may not retain a tithe of what it received at first, yet if his mind has been made to revolve on the subject for a time—if it has been left free to the thoughts which the Lecturer's facts, descriptions, and reasonings suggest, he will come out from this preparation with a quickened attention to objects of the kind, on which he has been engaged—with increased acuteness of observation, when allied appearances present themselves—with an enlarged memory for impressions similar to those, with which he has been kept conversant—and with a more clear-sighted judgment, when inferences are to be drawn by the comparison of phenomena analogous to those, which have been the subjects of his study.

When the student complains that he is made to read many books, and to listen to many lectures, which afford little knowledge applicable to the after-practice of his art, he forgets that there is no part of education, no department of study, in which the same thing does not happen. I suppose no one will dispute the very hacknied proposition, that reading improves the mind; but does any one imagine that this improvement signifies the mere recollection of all that is read? How little he must have read, who remembers all that he has read? In how many thousand ways does reading improve the mind, otherwise than by the mere remembrance of what the author has written? Can a person read books, written in a good style, even though he forget every word contained in them, without being improved in his power of expressing himself on ordinary occasions?—can he habitually read well-reasoned arguments, without

improving in his powers of reasoning ; which improvement will continue long after the arguments from which he derived this benefit have passed from his mind ?—can he read works of description without feeling his power of apprehension quickened ?—can he read works of imagination without feeling his fancy awakened and expanded ?—can he read works that encourage noble and generous sentiments, and condemn a grovelling selfishness, without feeling his moral character elevated ?—while all these effects are independent of the remembrance of what he has read, or at least continue after that has passed from his memory. If all this be matter of common observation, is it to be believed that the case is different in science, and especially in medical science—that science which has the complex phenomena of life for its object ? Shall there be no room, by reading and listening to sound reasonings on the phenomena of living beings, for the improvement of those faculties of memory and judgment, which are called into daily exercise in the practice of Medicine ; independently of the degree in which the reasonings, and the facts on which the reasonings are founded, are retained in the memory throughout life ?

Such, then, is the reward promised to us in recompense for the weariedness that will often arise in following courses of lectures, as well as for the irksome feelings with which one must often read treatises made up of dry facts and severe reasonings.

I recur now to what I was going to observe, when led away by this digression, on the intimate connexion between the Theory of Medicine and Medicine as a practical art.

The term Theory of Medicine has often been the subject of misapprehension. It is an unfortunate expression—I say unfortunate, because it impresses many with the belief that this indispensable branch of medical instruction rests

merely on speculative hypotheses. It is true, that in Physiology, General Pathology, and Therapeutics, subjects ever expanding and stretching into new fields of research, there must often be much that is hypothetical, some part of which truth marks for its own, while the rest, after a time, failing to answer the proper test, is consigned to oblivion. But to cast away invaluable truth, merely because plausible error sometimes mixes with it, is surely short-sighted wisdom.

Let us bear in mind, then, that the Theory of Medicine rests on Anatomy, the descriptive science of structure, both healthy and morbid, and that its conclusions are based upon experiment and instructed observation, or on inferences cautiously drawn from these. That these conclusions embrace : All that we know of the vital susceptibilities of the component parts of the body, and of the effects on these of the indispensable vital stimulants, Aliment, Water, Warmth, and Air : All that we know of the communication of life, to what was but now aliment : All that we know of the conditions under which a new individual grows out of another : All that we know of the means through which the mind becomes conscious of impressions from without, and through which the will operates on external nature : All that we know of the liability of the body to morbid action, and of the laws under which extraordinary acts avert destruction : And finally, all that we know of the extent to which remedial means, from without, avail to assist the natural powers of the system towards the restoration of health.

Those who are ever exclaiming against the Theory of Medicine, and crying up experience as the sole source of improvement, must have forgotten the kind of knowledge to which the term, in its ordinary acceptance, refers. For this is the very kind of knowledge, the aid of which enables the judgment to exclude the errors inevitably produced,

when, in the study of diseases, trust is put in the mere exercise of the senses.

We must catch the spirit of the economy of living nature to interpret aright even those phenomena which present themselves to sense. And to catch that spirit effectually, we must look even beyond the strict limits of the Institutes of Medicine.

Physiology, contrasted with Pathology and Therapeutics, is a limited technical signification of the term. In its largest acceptation, Physiology, or Physiological Science, stands contrasted with Physical Science, and, in this sense, it includes the whole philosophy of organic nature. When Physiology receives this extended meaning, the whole of Medicine comes to be but a part of that science—a branch or special department of Physiology. That the phenomena of diseases are a part of Physiology, seems to me a proposition as self-evident, as that the Tempest belongs to Meteorology, and that the objects of that science are not merely placid skies and fair weather.

To consider Physiology, in this enlarged aspect, is not without some material advantages. For the several subjects of research, in which Life is concerned, when rightly scrutinized, reciprocally throw light on each other. There is found, in all these subjects, numerous points of common character. For their successful cultivation, nearly the same great rules are throughout available; in a word, organized nature, the world of living action, is everywhere distinguished by resembling features, parallel relations, and corresponding boundaries. The common character which pervades the course of organic nature, renders an acquaintance with its general laws and phenomena the most appropriate and instructive preliminary training, for the attainment of experience in the Practice of Medicine and Surgery.

To understand the general truths of Physiology, is not the knowledge of Practical Medicine; but to have imbibed the genuine spirit of Physiology, is to be prepared to enter on the study of practice with the best assurance of success.

What I would urge on your attention at present as a subject for reflection, is, that Medicine should be practised at the bed side of the patient, in the same spirit in which the study of Physiology at large is successfully pursued; that skill in practice is not to be acquired by the mere inspection of the sick, and the mere routine application of remedies, but that it is the joint result of familiarity with the sick-chamber, and of the pains taken to teach the thoughts obedience to the scope and current of living nature—a habit of mind, which no quickness of parts, unimbued with the essential truths of Physiology, can ever originate.

The history of Medicine unequivocally shows, how impossible it is to apply even correct precepts to the treatment of diseases, or to improve experience, without a foundation of scientific principles; that every such attempt ends in the multiplication of frivolous absurdities, or in the positive aggravation of maladies. But the same history gives equal assurance that it is not enough to apply principle to assist experience, in the treatment of diseases; it teaches a lesson which it has been hard to learn, that if the principles trusted to be not founded on the actual course of living nature, but merely the fruit of human ingenuity, they are worse than useless.

In the past history of Medicine, we can trace the pernicious influence of two predominant errors, each opposite to the other in character: the one is the narrow spirit of Empiricism—the other is the extravagant presumption of

Dogmatism. These have been, through long ages, the Scylla and Charybdis, on which, by turns, was shipwrecked the promise of an improved Medicine. Nor are the errors themselves yet exploded, though the names have almost become obsolete.

Empiricism professes to be founded on experience alone, while it rejects all science as useless in the Practice of Medicine. Dogmatism, on the contrary, claims to be altogether rational; to found every part of practice on principle, or previously established science.

Those who support Empiricism as the proper basis of Practice, are in the right to this extent, that observation correctly understood is the sole foundation of Medicine. But I think I shall be able to show you satisfactorily ere long, that observation, either as a means of improving individual skill, or of extending the boundaries of Medicine at large, is impracticable, without a great deal of that kind of previous knowledge which the Dogmatist or Rational Physician terms science; and that what a pure Empiricism dignifies with the name of observation, is a pseudo-observation, being for the most part a fertile source of error, and rarely, but by accident, the means of reaching the truth.

On the other hand, since there are no abstract principles in Medicine, like those of the mathematical parts of knowledge—since every principle must be grounded on ascertained facts—and since Physiology is still very far from having brought to light all the hidden acts of living nature, either in health or disease,—even those practitioners who have the deepest insight into the animal economy must very often content themselves to think, as well as to act, in the treatment of diseases, without a scientific principle, and to confess that much of their daily practice is not Rational but Empirical.

A sound Practice is found to be neither exclusively Empirical, nor exclusively Rational, but compounded of both. Whoever thinks to proceed on a purely Empirical plan, in the treatment of disease, is sure to run into endless error; whoever flatters himself with the hope of being always Rational in his method of Practice, will not fail to become the dupe of his own fancy.

I feel warranted in drawing your attention, at some length, to the nature of the fallacy involved in Empiricism, which represents practical skill as attainable without any preparation, founded on those branches of knowledge, grouped together as Medical Science, both because of its extensive and pernicious, though secret, prevalence, as respects Medicine in general, and because it is in the department of the *Materia Medica* that the mind is most open to this fallacy, and in which it is most detrimental.

Empiricism proceeds on an erroneous idea of the nature of Disease: this idea is the same with the popular notion, namely, that it is something substantially distinct from the body, which has entered into it and keeps it in a state of thralldom, till a remedy more powerful than the disease is brought to expel the intruder, and restore the system to the liberty of health. The remedy is looked upon as a power operating distinctly from the healthy living action of the body, distinctly from the occupant disease, and is regarded as a sort of mediator between these two; whereas health, disease, and the operative effect of a remedy, are all but so many different states of the same living agencies.

Founded on this idea of disease, is the empirical and popular plan of advancing Medicine, namely, to take note of the names of diseases, and of the remedies which experience seems to declare possessed of an antagonist power

for their expulsion, while no doubt is entertained of the allotted denomination of the malady being all-sufficient to point out its specific form, in every individual, through every stage of its progress, and of the mere name of the remedy being an ample warrant for its employment, in all the modifications of diseased action which fall under the word, however large, with which a supposed experience has coupled it.

Even in the purely physical world, things bear the same name, which differ somewhat in their character: thus, in Chemistry, chalk bears the same name with white marble, and plaster of Paris the same name with one kind of alabaster. But what are these, though somewhat startling instances, in comparison with the latitude given to names in physiological nature! The slight differences in different individual substances belonging to the same chemical and mineral species, and to individual masses of matter in general, whether great or small, are too slight to affect much the conclusions of physical science, or the ordinary operation of physical laws. The whole of physical nature, as far as the eye can reach, or thought imagine, is one individual universe, governed by laws of uniform and undeviating operation. But does the case of physiological nature approach to this? Do external agents affect different individuals of the same living species in the same manner, just as such agents operate on resembling masses of inert matter? When the subject is regarded in this light, we find every single individual in physiological nature constituting a system analogous to the one universe of physical nature—a world within itself, subject to its own particular laws. The health of one living individual, therefore, is not the same as the health of another living individual; the state of health in one, approximates to the state of health in another, yet is not the same, when the circumstances of age, sex, temperament, cli-

mate, and mode of life, are similar ; and the deviations from health, which constitute disease, while they approach to each other sufficiently to obtain the same name, may be, in effect, so different as to require opposite modes of treatment. When to this reflection is added, what admits of no denial, that ordinary diseases are not single morbid acts, but that each is a progressive series of such acts, the precise nature of the fallacy will be discernible, which is involved in the idea of cultivating Medicine by providing a catalogue of Remedies against another catalogue of Diseases, each severally for each. There is here, as in other cases of the fallacious reasonings which escape common attention, not less than in designed sophistry, the substitution of one thing for another, either by the change of one of the words originally employed for a second word which seems to have the same, while it has really a different import : or by the use of the same word in a new acceptation. For in the popular or empirical notion of Medicine, the name of a disease being regarded as representing uniformly a substantive and unchanging form, or an unalterable individual object, instead of its true sense, as denoting a progressive series of variable states of action, what is true of one state in such a series, in one individual, is erroneously held to be true of every part of the series in every individual.

The prevalence of this mode of viewing diseases is not an absolute bar to the advance of some parts of Medicine. The first steps in its progress were due to this method, and since some diseases much less than others suffer distortion by this mode of cultivation, more might have been accomplished in the way of improvement, while it still maintained its ground, but for the difficulty of ascertaining facts, before the rise of Medical science, even in regard to morbid phenomena taken collectively as one disease. What I affirm here is, that on

the empirical plan of cultivating Medicine, not only are errors of logic committed by confounding the whole of a disease with its part, and the part with the whole, but that it is not easy to ascertain the truth in what concerns a part only of a disease even in one individual. As this seems to imply a defect of Observation, which is not in general denied to those who in early times laid the foundation of useful arts, a further explanation is required.

There are, it is plain, two distinct acts of mind to which, in the looseness of common language, the term Observation is applied. It is indiscriminately used to denote simple acts of perception, and cases in which an inference or judgment is founded on acts of perception. When observation turns on the mere sensible qualities of objects, it is but seldom deceptive. No nicety of training, or previous instruction, needs to be gone through for the exactest exercise of this kind of observation. It is a faculty, naturally more acute in some individuals than in others. A turn for minute observation, within no very narrow limits, prevails in very rude states of life, as among the native tribes of America, to a greater extent than among men of the most cultivated minds. This faculty cannot be said to improve with the advance of knowledge; it is not by his superior acuteness of observation that the man of science excels his rude predecessors, the founders of the arts of life, but because he carries his research into channels, and uses means, in aid of observation, with which they were unacquainted. Accordingly we find, that all those parts of Medical knowledge, which this kind of observation can reach, attained a great degree of perfection in the most ancient times. Twenty centuries have hardly added anything to accuracy of description, in the mere external aspect of some common diseases of an unusually fixed character. The symptoms of Epilepsy, of Tetanus, of Ague,

and the like, were detailed with an exact fidelity, which does not omit even the dropping of rings from the fingers, when the patient happens to wear them, during the cold stage of Ague.

But let us inquire for a moment if this gift of primitive times be the kind of observation on which the growth of improvement, in the practice of Medicine, essentially depends.

The basis of all practical Medicine is the discovery, that in consequence of the employment of a certain remedy, or succession of remedies, a particular stage of some disease is cured, which would otherwise have proved fatal, or at least have led to more or less permanent inconvenience or injury.

To the unassisted judgment, this discovery is by no means so easy as it may seem at first sight. When, after the use of a remedy, or succession of remedies, in a case of disease, recovery takes place, and the recovery is ascribed to the treatment pursued, it will not be denied that something more than the mere faculty of observation, to which I referred a few moments since, is exercised; that there is here an act of judgment—an inference as to two things being to each other in the relation of effect and cause. Nothing can be clearer than that this kind of mental act is totally distinct from the mere appreciation of sensible qualities in one object. Yet it is not the less certain that the term observation, in ordinary language, includes both these acts so currently, that it would be vain to suggest a more logical method of speaking. The usage of language, on this point, must result from many familiar effects being, to all appearance, as intimately connected with their causes, as any quality of an object with the object itself. That heat fuses gold; that the rising of the sun is the cause of day; that food is

necessary to the continuance of life ; that Sulphate of Magnesia acts as a purgative ; that a blow on the face produces a livid mark ; were all originally inferences or acts of judgment, though now so familiar to the mind as to be confounded with simple acts of perception. Be this, however, as it may, this indiscriminate use of the word observation in two senses is a material source of fallacy in all cases, where effects and causes are not as manifestly connected, as a quality with an object. There is here, as in a case before referred to, a self-imposition—the inadvertent substitution of one thing for another, by the use of a word in one sense, which had been before used in another. For it being acknowledged, that observation, in the sense of a nice appreciation of sensible qualities, is a natural gift, hardly capable of being improved by training, and belonging, as it were of right, to uneducated men, and it being assumed that experience in the Practice of Medicine is to be attained by observation, without remarking that observation here signifies inferences as to phenomena standing in the relation of cause and effect, the rash conclusion is come to, that experience in Medicine is to be obtained without any preparation of scientific knowledge.

While I admit, then, most freely, that the exact appreciation of sensible qualities is often the gift of uneducated persons, I must still repeat that inferences, as to phenomena in the relation of cause and effect, which the medical observer is called on hourly to make, are subject to continual error, unless the mind, by previous instruction, has been trained to familiarity with the ordinary course of such phenomena.

This tendency to error in the estimate of effects and causes, when no previous progress has been made in the laws of

the phenomena concerned, has its origin in a principle of man's mental constitution. When a man sees two events occur in immediate succession, he believes intuitively that these events stand in the relation of cause and effect; he ascribes to the first the power of generating the second; he is persuaded that as often as the first is produced, the second will follow; and the invariable succession of the second, after the first has taken place, is the only natural test, by which he can try the accuracy of his first inference. On this inference he must rely, in his uninstructed state, until the test fails; that is, until he discovers that the succession is not invariable.

When, therefore, the inference he has made refers to phenomena falling frequently under his notice, he quickly obtains the means of rectifying the errors, into which the determined bias of his mind to regard phenomena, as existing in this relation, unceasingly leads him. But when the phenomena concerned are of rarer occurrence, complex, or seldom arising under exactly the same form, then the course of error begins. Under such circumstances, the uninstructed mind has no guard against error; it falls a willing prey to its inherent tendency to interpose this relation between successive phenomena.

In evidence of the truth of this statement, let me refer you to the history of the errors, in all departments of knowledge, which prevail among men in a rude condition. Of these errors there is hardly one that cannot be traced to this source.

If, then, there be anything sound in this view, you will allow me to conclude, that no superior acuteness of his senses, no minuteness of attention, can bring the uninstructed observer, when complex phenomena are concerned,

on a level with the man who has made progress in allied parts of knowledge.

We see here also why the man of previous acquirements is possessed of so much advantage over the other : it is not because his senses are more acute—it is not because he has become endowed with mental faculties of which the other is destitute, but because he has surveyed nature more extensively, he has laid up a store of knowledge drawn from her numerous departments, he has made progress in penetrating the general plan on which her laws proceed ; and this preliminary preparation enables him to resist the inclination of his mind to connect successive events in the relation of cause and effect, unless when the inference is in conformity with the scope of the laws which he has before made the subjects of his study.

It would be superfluous to proceed to show how closely these general reflections apply to the particular subject of Medicine. No one can consider for a moment how complex medical phenomena uniformly are—how little experiment is admissible in medical treatment—and how seldom any two cases of disease are exactly alike, without feeling the force of the application.

In every part of Practical Medicine, it is easy to see, in the discrimination of diseases, as well as in the estimate of the results of treatment, there is a continual exercise of judgment in regard to the relation of cause and effect amidst phenomena not easily unravelled, and seldom recurring in exactly the same form.

But to be imbued with the spirit of Physiology in its largest acceptation, is to enter into the plan on which health proceeds, on which diseases originate, and on which remedies operate. Without such a preparation there can be no sound observation in Medicine.

The particular history of Medicine and Surgery fully bears out this view of the subject.

How inexplicable does it appear at first, that the well-known improvements on the Practice of Surgery, made within the last hundred years—for example, in the treatment of wounds and the ligature of arteries, which look so simple and obvious to us as to be of almost intuitive suggestion, from the days of Machaon, who cured the wounds of Homer's heroes, downwards—should have escaped the attention both of professed Surgeons, and of men in general who are otherwise so acute when the mere evidence of sense is concerned. A moment's reflection solves the difficulty. The light of Physiology, that is of Theory, is essential to the progress of Surgery. Till that is afforded, the most attentive observation of isolated cases but multiplies and rivets errors. There was no want of experience, in the common acceptation of that term, during those long ages—ages distinguished, far beyond recent times, for wars, violence, accidents, and all the events which give employment to Surgery; but their experience gave them little help—nay, too often misled them, because they were ignorant of the course of nature in the animal economy; that is, they were ignorant of that which it is the business of Theory to teach. The discovery of the circulation of the blood was not made by a Surgeon, as it ought to have been, had the intimate connection between the Practice of Surgery and the plan of living nature been sufficiently appreciated at an earlier period of time. But great as have been the direct benefits of that discovery on practical Surgery, these are of less account, in comparison with the importance of the effects resulting from the conviction which it has forced upon Surgeons, that it is through the knowledge of the science of life alone, that their art is susceptible of improvement. In later times, Surgeons have become eminent in Physiology; and

hardly any Surgeon rises to eminence in the improvement of his art, who does not also distinguish himself in Physiology. Without the name of Hunter, the History of Physiology would be as defective as the history of practical Surgery. How different was the case in former times! when, instead of turning their attention to the improvement of the defects of science, hardly more than one or two arose in a century, who knew the few exact laws of theory which had then been established! Such was the case in Europe two hundred years ago, when Surgery was put to shame by the reputation of Sir Kenelm Digby's sympathetic powder, which was applied to the sword with which a wound had been inflicted, while the Surgeon for seven days was prohibited from meddling with the wound itself; and, strange to say, this application was in truth found to be much more successful, than the regular surgical practice of those times.

Such are the results of observation unassisted by science or theory;—and let it not be imagined that the same attention to the cultivation of the whole Theory of Medicine is not at present requisite, to secure that the Practice of Medicine and of Surgery shall still go forward, and be kept from retrograding, as has been necessary in past times, to bring them to the state in which they now are.

It will not surely be maintained seriously, that though the Theory of Medicine be necessary for the improvement of the general precepts of Practice, yet that a man may practise skilfully by tact, without attention to science. There are, it is true, some men, who, within a limited range, have a success far from despicable, without having turned much of their attention to the principles of their art: these are good practitioners by imitation—not by the education they have given themselves, but as having imbibed the spirit of

the scientific practitioners around them. Upon the same ground, the study of grammar might be dispensed with, because some people learn to speak with little inaccuracy, though they never acquired the rules of grammar, merely by having mixed with good society. Would the public trust a practitioner if he confessed his skill to be of this imitative character? Moreover, what would become of him if he were placed, as many members of the profession must be placed for the chief part of their lives, in an isolated position, apart from intercourse with better informed practitioners? or even if cases should occur in his practice which carry him out of his imitative routine?

If, then, our determination be made up that the Empirical method is inadequate to afford improvement in the precepts of Practice, or skill in the application of these to use—and that general principles are essential to both, we must begin to exercise a vigilance of a different kind, by labouring to secure, that the principles of theory which we employ are free from error, and founded on the laws of living nature. For we find the Dogmatic or Rational method, which was adopted by the men of the most distinguished name in medicine, from the time of Aristotle down to Boerhaave, though the reverse of the Empirical plan, did not therefore prove successful, or lead to any rapid improvement of the art of Medicine. Men of penetration saw the inadequacy of the Empirical method, long before they found it possible to seize the true spirit of Medical Science. It was not true Rationalism, but an ill-understood form of it, that led them into error, and stopped the advancement of Medicine. Their Rationalism missed carrying them into the right path, because the founders of the various sects, particularly of those which arose after the long-sustained veneration for the names of Aristotle and Galen began to decline, failed to

appreciate the real character of the science of life—failed to perceive, that the conclusions of that science can be based only on cautious induction—failed to discover that we must begin by ascertaining facts, and wait patiently for the slow developement of principle.

As they did not light on the true character of Physiology at large, they could not but mistake the proper nature of that branch, which Medicine constitutes, of the whole science. Principles were constructed by a mere effort of imagination, without any preparatory induction of particulars, and so system after system arose, agreeing in little with each other besides the insufficiency of their foundation, no one of which afforded a satisfactory solution of the phenomena of diseases, or of the operation of remedies, except to the mind of the humble disciple, who had sworn to see nature, not through his own senses, but through the dogmas of his master.

The ill-success of such a misunderstood Rationalism can be no argument against the usefulness of physiological science towards the improvement of Medicine, unless Physiology at large be still cultivated on the same erroneous plan.

But Physiology, and therefore the Science or Theory of Medicine, at length begins to feel the influence of the Baconian Philosophy, and to make a progress commensurate at least with that of the more difficult departments of the inductive sciences, so that to neglect its assistance in the Practice of Medicine is much the same kind of wisdom, as it would be in the metallurgist, or the colourman, the dyer or the calico-printer, the brewer or the distiller, to reject the aid of Chemistry, in the practice of their respective arts.

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