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REMARKS ON THE USE OF THEORIES IN MEDICINE.

An address to the Boylston Medical Society of Harvard University, at the Annual Meeting in November 1822. By the President of the Society. E. HALE, JR. M. D.

[Communicated for the New-England Journal of Medicine and Surgery.]

WE meet in this society as students engaged in the acquisition of medical science. Although some of us have been several years in this study, and others have but recently entered upon it; although some have added professional practice to professional inquiries, while others look forward to practice as the future result of their scientific attainments, yet we all come here equally as students, alike interested in the acquisition of knowledge. He who is disposed to lay aside the character of a student when he assumes that of a practitioner in medicine, cannot have learned the magnitude nor the importance of the objects which his profession embraces. The field is indeed extensive enough to employ the most diligent enquirer; and the subjects of investigation possess sufficient interest to satisfy the most scrupulous, that his attention is not bestowed on objects unworthy of his regard.

The obstacles which impede the progress of the student in medicine, are in many respects, the same in every part of his course; and they are to be surmounted by the same means. It may not be amiss therefore at this time, as we return again to the performance of our associated duties to take a view of some of these obstacles as they are affected by the state of the profession in this country, and to inquire by what means we may avoid their influence. The effect of our society is not confined to the know-

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ledge directly obtained and communicated in the examination of the questions which are here discussed. Nor ought the ambition of its members to be limited to objects so temporary. So far as a spirit of inquiry is promoted by our discussions, so far as a disposition is excited to go beyond that beaten path of professional study, which is trodden almost mechanically,—so far do we contribute our aid in raising the standard of professional science among us.

The first of the difficulties which embarrass the medical student arises from the diversity he meets with in the explanations by different men of the same phenomena. He begins by studying the organization of the human body, and the functions of the several parts. He has only gone through with one author and begins to compare his observations with those of another, when he finds that much of what he has learned is condemned as incorrect, or ridiculed as visionary. He has not yet acquired the art of separating the statements of facts from the inferences which are drawn from them, and the whole science appears obscured by uncertainty and contradiction.

This is an evil, which within a short period of time, has borne much more heavily upon those who were initiated into our profession than it does at present; especially upon those who began their studies at a distance from the advantages, such as we here enjoy. The writers of the last century contain so much of accurate observation, that they must continue to be read as long as the science of medicine endures. But many of their theoretical speculations have been wholly superseded by the discoveries of modern days. Let a student acquire his knowledge of the human frame from the works of those great men (and it is but a short time since they were some of the first books put into the hands of students) and he would learn that man was a skilful piece of mechanism, with its levers and its fulcra, its pulleys and its tubes, and its capillary attractions:—all cold and mechanical, as if the Almighty Creator had never breathed into him the breath of life.

At another period he would have been taught that all the operations of the human body are carried on by chemical actions; that we ‘live and move and have our being’ by the agency of fire, and the other elements; by fermentation &c.;—that man in short, is merely a chemical laboratory, in which all the multiplied animal solids and fluids are prepared.

There is much for such a man to unlearn, when he comes to perceive the effect of the vital properties, controlling all the powers of the animal economy; that though mechanical agents are employed, they are but as the instruments of more exalted

powers; that chemical affinities are not permitted to act, except as they are subjected to the same powers, which modify or control them at will.

But it is not by the exploded theories of former generations alone, that the student is bewildered and perplexed. Almost every year brings with it some new theory in some department of our profession; and almost every book he reads teaches him some new doctrine, or gives him a different explanation of some of the phenomena of human life. Nor is this source of embarrassment confined to the beginner in the profession. Let any physician, however enlarged his views or extensive his knowledge, lay aside all professional study for a few years, and he will find that new doctrines have sprung up, and that new terms have taken the place of the old, to such an extent that both the principles and the language of science have become in a great measure unintelligible to him.

Besides, although we are ready enough to pride ourselves on the inductive philosophy of the age, it cannot be denied that speculation has but too often usurped the place of observation. It is no easy task for the reader, especially if he be but a beginner in the study, to distinguish the one from the other,—to separate what is the legitimate result of inquiry, or fair deduction from established facts, from the brilliant effusions of a fruitful imagination. Indeed the author himself is not sure to be aware how often he wanders from the one to the other. In a science where so much remains to be still explored, and where constant additions are making to the stock of our knowledge, it cannot be otherwise than that the theories of many parts of it will frequently be changed, sometimes in consequence of actual discoveries which overthrow established systems, and sometimes by the ingenious speculations of those whose ingenuity exceeds their observation. While too, so much remains to be learned, and so many points remain unsettled in medical science, it is not surprising that the conjectures of different men should vary considerably concerning them. These conjectures are too often blended in the mind of the student with the statements of what is better known, so as to give him the impression of uncertainty in regard to the whole.

Is it then true that medical theories have served only to mislead the student, to perplex and embarrass him? It is far otherwise: although such a charge has often been brought against our profession. There is a class of writers from the distinguished and visionary John Brown, who thought himself able to overthrow every existing system, and establish his own upon their ruins, down to the most miserable writer of a newspaper para-

graph on hydrophobia or yellow fever, who have made the uncertainty of medical science, and the uselessness of medical theories the constant theme of declamation. But where is the man of practice, who is accustomed to look upon the human frame as it actually appears both in health and sickness, and to describe diseases as they exhibit themselves to the physician at the bedside of the patient, who is insensible to the value of the theoretical parts of our science?

There are indeed writers, and such there have been in all periods of medical history, who have given to the world the speculations of their own fancy, as theories in medical science; and no class of men have been more likely to do so than those who begin by decrying all theory. No man perhaps has ever been more violent in denouncing all science in medicine as unstable and uncertain than John Brown; and no one has devised a system more completely speculative, or so little founded on actual observation of the phenomena of life as his. So it is with writers at the present day. The outcries against medical theory are made a sort of prelude to some new and visionary hypothesis.

It cannot be denied however, that to a considerable extent, an impression does exist among those who are little conversant with the true state of knowledge in our profession, that there is a peculiar want of certainty in it, beyond that of other professions; that hypothesis and conjecture have taken the place which belongs to observation and induction. The discoveries which in the present age have been made in some of the collateral branches of science, particularly in Chemistry, have indeed not a little modified explanations of many of the phenomena of the living body, and thus have given some appearance of support to this opinion. But are the discoveries which are made in science to be regarded as unsettling the foundations of all our knowledge, because they make it appear that some of the opinions of former times were incorrect? In no science have so great and such frequent changes been made by the progress of discovery as in Chemistry; yet there never has been a time, when chemistry has held so high a rank among the sciences, or been regarded with so much confidence, as at the present day.

Let us examine this matter a little further, and see what are the advantages of theories in medicine, and the evils which they are liable to produce.

Every science which embraces a great variety of facts and observations, necessarily requires a system of arrangement and classification, in order that the more important principles of the science may be retained in the mind. It is not the knowledge of individual facts, which constitutes the knowledge of science.

The different parts must be brought together, and associated together in the mind, either by the arbitrary distinctions of an artificial system, as in botany, mineralogy, &c. or, by the analogies of the several parts in respect to their character or properties, as in physiology and the kindred sciences.

In none of the sciences is such arrangement more necessary than in medicine. The range of knowledge included in the education of a physician is exceedingly extensive. It were a hopeless task for any man to attempt to store in his memory the immense number and variety of individual facts, which the profession embraces; and if accomplished, it were a useless task. For not only is a system of arrangement necessary for the purpose of acquiring the requisite knowledge, but it is equally so to render that knowledge of any practical utility when-acquired.

What other system can be more convenient in our profession, or more useful, nay, what other is in any degree practicable; than to associate together in description and discussion, such parts as are connected and dependent on each other, in nature and practice? The human body, for instance, must be studied not solely, nor principally, by an anatomical description of its several parts, but by their functions, and the relations they bear to each other and to the whole animal economy. *Materia medica* is learned, not from a mere description of the physical properties of medicines, but by their operation on the living system, both in health and disease.

By far the most important parts of medical theory are those which explain the functions of the several organs of the human body. What but a lifeless skeleton would be our knowledge of the human frame, if we were confined to a mere description of the several parts? It is the theory of their functions which brings the several organs together into one beautiful system, into a complete animated being. And this theory is as much the result of induction, as in any other science whatever. Our knowledge of the circulation of the blood, is an inference derived solely from an acquaintance with the structure and functions of the heart and vascular system. It is in fact a medical theory, discovered and demonstrated by the immortal Harvey, which has continued unchanged from his time until the present day, and which doubtless will continue unchanged, so long as any vestige of science remains on earth.

Until a much later period than the time of Harvey, we had no correct theory of respiration. It was well known that the blood was carried into the lungs,—that there it was exposed to the influence of the atmospherical air, which was brought there for the purpose of meeting it,—and that then it returned to the heart.

But what purpose was accomplished by their meeting, or what change was effected by their reciprocal influence, was unknown. The discoveries of modern chemistry have supplied the deficiency, and have given us a theory of respiration as satisfactory, and probably as permanent, as that of the circulation of the blood.

We might extend our examples into every department of medical science, and the result would every where be the same. We should every where find that medical theories, properly speaking, are but the inferences and conclusions drawn from established facts and observations. They constitute in truth the very philosophy of medicine, without which we should have a mere collection of disconnected materials. Without medical theories therefore, medical science could not exist.

But there are many parts of the animal system, with the functions of which we are still but imperfectly acquainted ; and there are many other phenomena connected with medical science, which we do not profess to be able fully to explain. These must be described, so far as their operations are understood, and there must also be some system of arrangement adopted in regard to them. It is therefore often useful in the absence of fully established theories, to supply their place by such as are in some measure conjectural.

These conjectural theories, or hypotheses (as they ought to be called) serve to fill the chasms which are left in science by the imperfection of human knowledge ; and they ought in no degree to be confounded with those theories in medicine, which are sufficiently founded on well established facts. They are but occasional and temporary additions to the more solid structure, which are to be removed as fast as materials are obtained to complete it. They are not however useless ; nor is their utility limited to their effect in concealing the defects of an unfinished work.

The speculations and conjectures and reasonings of ingenious men, prepare the way for actual discoveries in science. It is not by chance that knowledge is obtained. Nor is it by casual experiments that science is advanced. It is rather by examining theories which are first founded upon analogy and probability, and bringing them to the test of experiment, that we are to ascertain what is to be retained and what to be rejected. Such has always been the progress of science, and such it must continue to be.

There are therefore two distinct classes of theories in medicine, differing essentially from each other. The first consists of inductions from established principles ; and they are as permanent in their nature, and as little liable to change, as the principles of any science whatever. It is these that constitute

the science of medicine. The second class are of a less permanent nature. They vary exceedingly in their character,—from those which rest upon a high degree of probability, down to the wildest vagaries of imagination which disgrace medical science; while they all agree in wanting that kind of certainty which belongs to settled principles.

Theories of this sort, are of course subject to frequent changes, with the varying opinions of different writers. In the progress of science, as new principles become settled, theories of this class are often abandoned; or new observations prove them to be well founded, and transfer them to the other class. It is this circumstance chiefly, which has given such an appearance of changeableness to medical science. Yet these fluctuating opinions ought not to be regarded as essential parts of the science, nor ought they to bring reproach upon those parts which are stable and permanent. They are in their nature distinct, and it is the duty of every student, and every writer, to separate what is only probable, or what is imaginary, from what is proved to be true.

The difficulty to the student from the confusion of medical theories, arises from his liability to overlook this distinction between different theories. It must be confessed that in many instances, our professional writers have not been sufficiently careful to draw the line of distinction. His fondness for a favourite theory has led many an author beyond the limits of established principles, before he was aware of it. By the well informed student, who is accustomed to diligent investigation, this may be easily detected; but the beginner and the less careful student is led astray and confused, by a multitude of inconsistent hypotheses.

There is indeed often room for much difference of opinion in respect to the sufficiency of the evidence upon which the correctness of different theories may rest. What one man may regard as sufficient to establish an opinion upon a firm basis, may seem to another altogether unsatisfactory. Hence we have frequent discussions, and too often angry disputes on medical questions; and these only add to the embarrassment of the student.

He who would establish himself in correct theories, must learn habitually to draw the line between the opinions of the author which he studies, and the observations upon which they are founded. Let the latter be carefully stored in his mind; and let the value of the former be estimated, not by their ingenuity, or their simplicity, or any other intrinsic quality, but by the stability of the foundation on which they rest. To acquire the habit of making such a selection, he should take care to read the works

in which the observations were originally made. Let him trace the course of discovery, before it has become involved in theoretical speculations.

There are many of the older writers, whose speculative opinions have many of them been superseded by modern discoveries, which nevertheless contain a large fund of valuable instruction. It is too much the custom of the present times to neglect these venerable works, as if modern science had destroyed their observations with their hypotheses. The great learning of many of those authors, and the correctness of their descriptions in matters of fact, render them worthy of more attention. Indeed, although they are not well suited to commence the study of the profession with, to a young man who has made some progress in it, they are an exceedingly useful study, independently of the knowledge which is directly obtained from them. As many of their speculative theories are superseded by modern improvements in science, the student of course does not rely upon their works as a whole, but selects as he reads, such parts as are the result of observation, from such as are purely speculative. And thus he acquires a habit of discrimination, which may be applied with great benefit to other and more modern works.

It is important to the student who would not be led astray by theoretical speculations, that he pursue his investigations beyond the labours of compilers of systems of medicine and guides to practice. However useful these may be in their place, as assistants of the lowest order, they are not the sources from which medical science is to be learned. It is from treatises on the several parts of the profession, that the most valuable knowledge is in general to be obtained. The description of the functions and the diseases of particular organs, or the history and treatment of particular diseases, are examples of the class of writings to which I allude. It is in works of this kind, which are the fruit of careful observation, independent of general speculative systems, that the student must explore the depths of science.

This leads me to speak of another obstacle which too often impedes the progress of medical students: to wit, the low standard of professional learning in this country.

It is a remark quoted I think by Johnson, that the medical profession in his time contained more learning than either of the other professions. How far is this from being the case among us! It is most humiliating to acknowledge, but it cannot be denied, that physicians as a body are not reading men. Except elementary books for the use of pupils in medicine, how few medical books are published in this country! And still smaller is the number of those, of which a sufficient number is sold to re-

pay the expense of publication. There is no such thing as a general disposition to cultivate science among us.

There is no other mode of acquiring a competent knowledge of the theory of medicine and its adaptation to practice, than by diligent, unremitting study. With all the advantages which a school of medicine can furnish, and with all the instructions of professors, distinguished for ability and zeal, the man who enters upon the practice of medicine without a diligent study of books, is little better than an empirick. "Nocturna manu versate, versate diurna" must be peculiarly the maxim of every medical student, in every period of his course, from the commencement of his preparatory studies to the last moment of his professional life.

The gentlemen of this society will permit one who has been a member of the society from its organization almost twelve years ago, to congratulate them upon its successful operation in promoting the design of its institution. No institution perhaps can be better calculated to counteract the influence of the obstacles of which we have now spoken. By discussing together the questions which arise in the course of our inquiries and investigations, we obtain the means of distinguishing the true theories of our profession from such as are unfounded; at the same time that we are excited to more diligent application by the interest which the discussion furnishes.

The history of this society shows that although it has not been what a zealous co-operation of the whole medical class might have made it, its favourable influence has not been of trifling importance. Whoever will compare the catalogue of this society with that of the Medical College, will find that those who have been enrolled among our members, have not been the least distinguished of those who have gone out from this school. From the time of the amiable, virtuous, and lamented Burge, who first filled this chair as President of the society, to the present day, we might always find the most zealous in the pursuit of science in the number of our associates. I trust that the diligence and application of its present and future members will make it more and more an honourable distinction to belong to it.

Answer to Dr HAZELTINE's Communication in the last Number of the Medical Journal.

[By the Editors.]

AT page 228 of the 11th volume of this Journal, the reader will find a communication by Dr Hazeltine, containing some strictures upon certain parts of our Review of the Pharmacopœia

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