

Medicine an art, and its truth to be attained. Being an address ... at the opening meeting of the "Library of the Exeter Dispensary", and the "Devon and Exeter Pathological Society" / [Thomas Shapter].

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MEDICINE AN ART,
AND
ITS TRUTHS TO BE ATTAINED.

BEING
AN ADDRESS

READ ON JANUARY 31, 1848, AT THE OPENING MEETING OF THE

“LIBRARY OF THE EXETER DISPENSARY,”

AND THE

“DEVON AND EXETER PATHOLOGICAL SOCIETY.”

BY

THOMAS SHAPTER, M.D.,

PHYSICIAN TO THE DEVON AND EXETER HOSPITAL; THE ST. THOMAS'S
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DISPENSARY, &c. &c.

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THE MEDICAL PROFESSION OF THIS CITY AND NEIGHBOURHOOD,
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THE HISTORY OF THE UNITED STATES

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MEDICINE AN ART,

&c.

It will be in the recollection of many whom I now address, that the establishing a medical library, and a place of literary resort for the professional men of this locality, has been, on several occasions, contemplated, and, on more than one, attempted. If apparent difficulties have too often dulled the former anticipation, those which were real and substantial have embarrassed and eventually concluded the latter attempt. Upon these difficulties there remains now no further necessity for enlarging—they are entirely surmounted by the free occupation of this handsome, I may almost say, magnificent apartment, so liberally granted to our use by the Governors of this Institution.

Meeting for the first time in this room, it appears a not inapt occasion to speak somewhat of the advantages and opportunities thereby afforded. May we not fairly hope, that in due time, by becoming the depositary of a valuable medical library, and by being the means of associating together, for useful professional purposes, the medical men of this city and neighbourhood, it may prove not only of advantage to the medical men themselves, but to that art, which it is their duty, not only to practise, but to study and to understand. To those who now hear me it would be useless to dwell upon the advantages of the accumulating together, in a library such as this, the recorded experience of the eminent and zealous in the various walks of medical literature. I shall, therefore, pass on to some brief notice of the

second purpose to which this room is to be devoted—a purpose certainly not the less useful, perhaps practically the more so, of the two, viz. the chronicling, investigating the true nature of, and following out, from their origin to their close, the accidental and prevailing diseases submitted to personal notice.

When we look back to even a few years, how much that is interesting in the epidemic character of disease has passed away from recollection. In the hurry and active turmoil of professional life, the observation of one day intrudes itself upon the observation of the preceding, so that, after the lapse of a short period, connected accounts of diseases, unless perchance recorded at the time, become difficult to obtain. I trust that a main feature of the Devon and Exeter Pathological Society will be to obviate this difficulty, and that within the walls of this Institution (than which none can be more appropriate*) there will be produced and recorded, while observation is fresh, and therefore more likely to be accurate, the passing characters of prevailing disease; so that, by noting simultaneously the external surrounding influences, a just appreciation of the local physical conditions affecting and determining the characters of these diseases will be induced.

Such are the specific and ostensible objects professed by the societies which are now assembled. But is their limit hereby determined? May we not justly anticipate, from the accumulated observations of our predecessors, and those made by ourselves, and from the opportunities, by open discussion, of the better collegating these observations into general truths, that we here possess the elements and the means, if rightly used, of advancing, and aiding to perfect, that divine art, the prosecuting of which it has pleased Providence should be a portion of our appointed task.

The term “ART,” as applied to medicine, has here been used. I am well aware that there are those who state, and have

* During the last year, 2,416 patients were admitted to the Exeter Dispensary, making a total of 42,728 since its first establishment in March, 1818.

produced much elaborate reasoning to prove, that medicine is a "Science," as contradistinguished from an "Art." Minute discussion on this question need not here be entertained, as my present object, which is to show the proper manner in which medicine should be studied, is uninfluenced thereby,—the same principles of investigation, and the same rules of reasoning being applicable to either. I shall, therefore, only refer to such definitions and illustrations as may bring the question plainly and clearly before us; from these it will at once be seen that dispute in this matter has originated in a great measure from terms being misunderstood.

The definitions of Professor Whewell are simple and concise :

"Art and Science differ, the object of science is knowledge, the objects of art are works. In art, truth is a *means to an end*; in science, it is the *only end*. Hence the practical arts are not to be classed amongst the sciences."*

If the above definitions, and the distinctions they imply, be borne in mind, we see that medicine, which implies the application of certain means to remedy certain departures, in the human body, from that state which is commonly termed health, is an "ART,"—a "PRACTICAL ART"—inasmuch as its object is a something to be done.

Medicine, then, being ranked amongst the "Practical Arts," it becomes obvious that its truths can only be attained by a strict accordance with the rules of art. These, we shall find, are not different from those which are essential to science,—there must be the same accumulation of observations, whether they be experimental or recorded from experience, the same true appreciation of the phenomena thus observed, and the same processes of induction therefrom.

The observations, whence are chiefly gleaned the truths of medicine, are derived, in great measure, from several sciences, the names of which are familiar to us. They are, chiefly, Anatomy and Physiology, Animal Chemistry, Morbid Anatomy, Pathology, and Therapeutics; these are essentially sciences,—knowledge is their object, it is their only end. Ob-

* Philosophy of the Inductive Sciences, p. xli.

servations having been thus obtained, it is then requisite by a process of induction, and successive generalizations, to establish those truths of art, without which art is no art; the latter must be careful, critical, and perhaps laborious,—while the former must be accurate and extensive.

Before the application of these principles to the art of medicine is proceeded with, brief allusion to some fallacies which have prevailed, and greatly to the detriment of its true study, may not be unprofitable; of these the chief are, “that medicine is a conjectural art,” and “that it is dependent for its truths solely on observation, without the aid of induction.”

To speak first of the fallacy which styles medicine a “conjectural art.” Those who affirm this proposition not only infer, but state, that the best practitioner is he who guesses best. It being a solecism, and a contradiction in terms, to say that an art is conjectural, we have, consequently, to examine if medicine be founded and perfected in conjecture, and is therefore to be deemed without the catalogue of the arts; and, further, if he, whose rules of practice are based solely on conjecture, be the best practitioner.

The true meaning of the term “conjectural,” as here used, is “guessing,” “judging by guess;” the technical meaning may be stated thus,—the exhibition, in disease, of remedial means, without a knowledge of the disease to which they are applied, or the effects of these means when applied.

Medicine, whether it be conjectural or whether it be an art, is, as before defined, the application of means to remedy certain states of the body which are technically called “disease.” Now, if a knowledge of disease, or of the means whereby it is to be remedied, were not requisite, medicine would be, on the one hand, independent of disease, and, on the other, of the means applicable to its counteraction;—which is absurd.

It being, therefore, necessary to the art medicine that disease, and the means whereby disease is counteracted, should be understood, we will briefly examine into the meaning of these terms.

Disease is the designation given to a certain condition of the body and its functions, (evinced by signs which are technically called symptoms,) implying that such condition is different from that other which is termed health. Inasmuch, then, as health is the natural and primary condition, and disease is the departure therefrom, it follows that disease is the effect of something preceding it, and on which its existence depends. It should be here particularly borne in mind, that though the proof of an event to us always depends either upon the testimony of others, or the evidence of our own senses, the *certainty* of events in themselves arises from their natural connexion with their proper causes.

We have, then, a CAUSE producing certain changes in the body; an EFFECT, the changes so produced; and SYMPTOMS, certain phenomena whereby these changes are rendered evident to our senses.

If, then, these circumstances be carefully regarded, we shall find they are indissolubly connected, and that in order to understand and fully appreciate them a wide range of satisfied investigation is implied. There must be an accurate understanding of the condition antecedent to disease,—that is, of health; then of the cause disturbing this condition; then of the precise condition which results therefrom; and finally, a just appreciation of the signs whereby this condition is rendered evident to ourselves.

To place this in a narrower compass, it is obvious that any given condition of the animal body must be preceded, as likewise succeeded, by other conditions of the same body. Let us suppose, for the sake of argument, that the given condition is disease, the preceding a state of health, the succeeding death; it is certain that the thorough comprehension of the condition of health, with due appreciation of the disturbing causes producing the given state of disease, and the progress of these resulting in death, must be founded on a series of observations and established by a colligation and generalization thereof, and an induction therefrom.

So much for disease. The next question which presents

itself for consideration is the means whereby disease is counteracted, and this comprises what is commonly understood by the term "remedy,"—remedies being the causes of certain effects in the human body, whereby disease is obviated or diverted.

Thus far we have to deal with science, strictly so called,—the study of health being Physiology, the study of disease Pathology, the study of remedies Therapeutics, we now come to the province of medicine,—to medicine as an "Art,"—to the application of means to counteract certain effects, which are the departure from health,—in other words, the Art of Medicine is the application of Therapeutics to Pathology. For this, it is not only necessary, on the one hand, that the precise state of the disease should be appreciated, but likewise the course such disease will take; that is, to predicate what will happen as a consequence of the present condition, and the successive action of its morbid causes. This also assumes a very wide extent of previous observation, arranged, theorised, and established: it is that knowledge of symptoms and the consequences which they precede, which is technically called "Prognosis."

On the other hand, it is necessary to estimate what will be the effect under existing circumstances of the means used to counteract the present and probable consequences of the diseased state. This important portion of the art of medicine is comprised under the terms "indication of cure," and "treatment of disease."

If the above requirements for the art of medicine be considered, we see that a very vast amount of knowledge is implied:—that we know the cause, and the nature of the effect it has produced; that we have accurately determined, from the signs, its seat, its degree, and in a great measure its nature also; that we have, from all the circumstances considered, separately and in a comparative view, determined the issue; and are now qualified, by means of proper remedies, either to promote that issue, if there be a prospect of its being favourable, or to prevent it, if we perceive that it will be otherwise.

Here, then, we have a regular chain of connexion betwixt cause, sign, effect, prognostic, and indication of cure; for a dis-

ease must be known before it can be cured, and we must foresee consequences before we can prevent them. (Makittrick, p. 23.)

Now all this implies knowledge guided by reason, while conjecture implies ignorance, suggested may be by that faith which commences where reason ends. It likewise establishes medicine to be an art, and as such amenable to, and regulated by, all the rules and principles of art, while conjecture neither suggests nor is bound by any such rules or principles. Medicine is therefore not conjectural.

Doubtless many who apply this term to medicine, if they were to analyse their own thoughts and views, would find that these really were in accordance with the definitions of art, and that this term is merely used by them to indicate that many of the truths of medicine have not been attained. It is, however, of the utmost importance to establish *clearly* to the minds of all, that, inasmuch as disease is the consequence of natural causes, so must its alleviation be guided by natural principles, and consequently that the art of medicine is only true and certain as it is in accordance with these principles.

This being ascertained, the opinion can no longer prevail, (which assuredly it might, and justly so, if conjecture were our only guide,) that the accumulation of facts is useless, and the generalisations of reason thrown away. Viewed as a certain art, we possess the assurance that our labours are not in vain, that though from our blindness we may not always perceive truth, yet we are surrounded by it, and that, by seeking, it may be found; for mental eyesight is like that of the body, its cultivation makes evident that which otherwise is confusion and darkness.*

While thus controverting the statement that medicine has for her only guide conjecture, it must not be concluded that conjecture has not its uses. In medicine it bears its fruits, as it does in the arts and sciences generally. A probable and well founded conjecture, *philosophically*, may suggest such further

* Vide "The Use of the Body in Relation to the Mind." By G. Moore, M.D.

inquiry and improvement as may establish a truth,—*practically*, in the absence of such established truth, it has a value.

The next fallacy to which I propose referring, is that the art of medicine is dependent solely and exclusively on experience.

So strongly does this fallacy prevail, that we find not only the art thus appreciated by the general public, but likewise by a numerous class of the members of the profession—so much so, that the boast is not unfrequent of being a “Practical man,” meaning thereby a special regard for experience, whether general or personal, to the exclusion of all inductive philosophy. In the vulgar appropriation of this term, its definition is, however, still further narrowed, and the “Practical man” is he who, adopting personal experience, excludes that which is general.

Those holding this view are ever boastful of their “Facts.” “Fact” is their watchword. The sentiment, *Quod vidi credo*, if not often expressed, is, at any rate, freely applied,—meaning thereby a belief in all that the senses, uncorrected by reason or philosophy, convey to the mind, and a disbelief in all that is not so presented to them.

An examination of this position will undoubtedly show that such a dogma is not only diametrically opposite to the principles on which the sources of truth are founded, but leads to a belief in much that is not true, and to a disbelief in much that is.

In order plainly to set forth this question, the true force of the term “Experience,” and of the “Facts” which it is its object to observe and record, should be established.

First, what is a “fact?” This to the unthinking will seem so obvious, and so immediately allowed, that to answer it would be puerile. A little reflection will, however, show that even a fact may be difficult of being appreciated, and is often composed of such complex ideas as to render it impossible for the man, who condemns his neighbour’s theories, to show that his own facts are more substantial. That facts may be difficult of appreciation a familiar illustration will prove. A person having no previous

knowledge of the incontrovertibility of one metal into another, and as equally ignorant of the arts of the conjurer, sees a shilling apparently converted into a guinea, will he not naturally from this assert that such is possible, and that such a person has the power of producing such a change; nay, more—that he himself had seen it, and knew it as a fact.

Very slender inquiries will, to the most superficial, soon render evident, that, in order to arrive at a true appreciation of what is fact, in so difficult an art as medicine, and to protect us against the errors to which the imperfections of our senses too readily render us liable, a certain amount of previous observation, combined with a mental process, is absolutely necessary; and, moreover, inasmuch as the principles of the art of medicine are primarily dependent on its facts, their nature and origin should be fully appreciated.

The facts on which depends the art of medicine will be found referable to two classes, the primary and the secondary, neither of which from their nature can be demonstrated, they being essentially based on observation, and only to be proved by induction and analysis. The primary facts owe their origin solely to a perception and colligation of ideas, and are in reality nothing more nor less than *instances* resulting from a generalization of these ideas; while the secondary are due to the colligation and generalization of facts previously ascertained. Thus new ideas and new facts, which assume all the importance of simple truths, are super-induced, and in which we recognise what is commonly understood by the term theory. So that in reality the distinction between fact and theory is only relative. Events and phenomena, considered as particulars which may be colligated by induction are “facts;” considered as generalities, already obtained by colligation of other facts, they are “theories.”*

This may be illustrated by the investigations of Sir George Baker on the cause of the Devonshire colic. After excluding all irrelevant and doubtful matter, he found that those who were attacked by this disease were cyder drinkers; he further found that the cyder was then very generally made in leaden presses,

* Vide Whewell, vol. ii. p. 259.

and that these presses were rapidly dissolved by the action of the cyder; he further found that the cyder contained a very appreciable amount of lead; having generalised all these various facts, he arrived at one simple ultimate truth, viz. that the Devonshire colic was produced by the absorption of lead. Now this to Sir George Baker was a "fact," to us it remains a "theory," that the absorption of lead will produce the Devonshire colic.

Such, then, are "facts," and such is their identity with "theory." Any conclusion which falls short of their certainty is merely hypothesis or coincidence; nevertheless nothing is more frequent than to hear both the one and the other quoted as established and recognised facts. To observe coincidences is most useful, and to indulge in hypothesis is not less so, for while the former leads to the latter, the latter often supplies the true bond of connexion between them, and thus truth is induced. They are not, however, facts; the error of those who so commonly quote them as such, is simply this, that instead of using a process of induction, which is necessary, to originate a fact or a truth, they resort to a process of deduction which is not applicable thereto, and which involves the axiom that the premises shall contain the terms of the conclusion. The result is obviously an absurdity, where this latter is fact, while the premiss itself is only an hypothesis or a coincidence, and these probably resulting from erroneous perceptions or ideas. Errors in theory, and consequently in practice, have largely resulted in the force of this not having been understood,—such, for example, are many of the theories connected with fever. One assumes it to be entirely dependent on an atomy of the extreme vessels, a mere vague conception, but upon this premiss he has induced the nature and treatment of the disease; another has deduced its nature and treatment from assuming that its origin is due to inflammation of the membranes of the brain; and a third to an inflammation of the bowels and stomach. Statements originating, may be, in many *instances*, but still not induced or generalised from a series of well-reasoned facts. Now here the logical deductions may have been most accurate and correct, nevertheless the result is worthless, inasmuch as the premiss, instead of being

sufficient, has solely enunciated the occurrence of certain phenomena. These truly, if sufficiently numerous, might have permitted an induction, and even perhaps, through this medium, have authorized the assumption of a "fact;" for induction first fairly develops and lays down the premiss, then logic deduces the conclusion. Were the truth of this position seriously borne in mind, how many of the mists that surround us would be dispelled; how seldom should we hear quoted as fact the crudest hypothesis, and as truth the most naked "non sequitur."

We will briefly illustrate these observations. It is often stated that a given disease is cured by the administration of a particular medicine. Here four facts are implied: 1st, the fact of a disease; 2ndly, the administration of a particular medicine; 3rdly, the cure of the disease; and 4thly, upon these three facts are colligated another, viz., that the third is dependent on the second. For the sake of argument, we will allow the three first positions, and then we may examine as to the fourth, and we shall perchance find, that this so frequent fact is resolvable into mere coincidence or hypothesis;—for example, when it has simply occurred that there was a disease, a medicine was given, and then a cure of the disease; now here the third is at once seen to be merely a concurrent term, and may be entirely independent of the second, therefore from such data it may be erroneous that the cure was dependent on the administration of the medicine. Hence it is not a fact, but merely a coincidence. Again; the medicine has been given in many cases of disease, and in all recovery ensued, but inasmuch as it is not shown that in other cases in which the medicine was not given, recovery did not ensue, it cannot be stated, as a fact, that the medicine cured the disease. It certainly amounts, however, to more than a coincidence, it is an hypothesis. Again; cure ensued in all the cases of disease in which the medicine was given, and in no case in which it was not given. Here there is so conclusive a chain of circumstantial evidence, that it passes beyond hypothesis, and if worked out by induction assumes the position of a fact.

Further to illustrate the position in medicine of Theory and

Fact, we may suppose the disease to be fever, and dependent on peccant matters in the alimentary canal, and that it is necessary to the cure of the fever to get rid of these, and that this can only be done by a given medicine—an aperient. Supposing all this effected, it may then be assumed as a fact, that the fever was cured by the clearing away from the alimentary canal of injurious matters, and also, as a fact, that the aperient was the means whereby the peccant matters were cleared away.

From the above, the art of medicine is at once seen to be entirely dependent for its facts on a true appreciation of its phenomena. It therefore becomes absolutely necessary that the “facts” or “truths,” for the terms are synonymous, which are to form the basis of our art, should be clear, rigorously applied, and of all things *appropriate*; moreover, they must be referred solely to conceptions of the intellect, (Whewell, p. 197, vol. ii.) A want of attention to these two latter conditions has been from the earliest to the present times, a fruitful source of embarrassment and error.

The mode in which “facts” in medicine are established, is precisely that pursued in the courts of judicature in this country. In the first place, ideas are colligated into instances, from which springs an hypothesis,—in ordinary language, from certain circumstances a crime is supposed to have been committed, and an individual is suspected of being its perpetrator; on the assertion of this hypothesis, or crime with which he is charged, issue is joined. Then great precision in the examination of the instances is sought for with a most careful exclusion of what is inapplicable, so that by degrees a series of “facts” become established. These, however complicated they may be, are generalised into the simple fact or truth which is enunciated by the verdict of the jury, and which verdict is philosophically, as well as legally, understood to have all the characteristics of recognised truth and established fact.

Yet further to pursue the identity in method; after the fact is thus ascertained, then comes the theory with its practical deductions,—a crime has been committed, the course to be pur-

sued must now be in accordance with the theory for the remedying or punishing such crime.*

Having now set out the nature and value of "fact and theory," we are in a position to examine if the art of medicine be solely dependent on experience for its facts.

If we regard experience as one of the agents of philosophy, we shall find that it simply implies "previous observation;" now no previous observation (however it may induce to the belief of a general truth) will establish an universal or even a necessary fact.

A proposition may have been found to have been true in any given number of instances,—it does not, however, follow that the next instance which shall occur may not be an exception to this rule. Thus five hundred cases of fever may not have died, the next case may, so that the experience of the five hundred cases does not show that any subsequent one may not prove fatal.

Moreover, experience must be limited, and can bear no proportion to the cases in which it has not been made, and, therefore, however similar and circumstantial it may have been in the instances observed, it cannot affirm its propositions to be necessary. For example, we know by experience that ague may be produced by residing in a marshy country, but we do not thereby know that it will necessarily be so produced; here experience entirely fails us, and notwithstanding the number of cases of ague that have been observed, nothing but an hypothesis is eliminated.

We must further learn to discriminate between propositions which are necessary, and those extracted solely by experience. Thus experience teaches us that mercury will salivate, but it does not teach us that it *must* do so; nay, more, it cannot inform us *why* it does so. Experience may teach us that a poison is deadly, but it does not inform us *why* it enjoys this property.

"Experience can observe and record what has happened, but

* It is not impossible that the philosophic mind of the great Bacon was somewhat influenced by his professional avocations, and thus directed to those great principles which are developed in the "Novum Organum."

she cannot find, in any case, or in any accumulation of cases, any reason for what *must* happen. She may see objects side by side, but she cannot see a reason why they must ever be side by side. She finds certain events to occur in succession, but the succession supplies, in its occurrence, no reason for its recurrence. She contemplates external objects, but she cannot detect any internal bond which indissolubly connects the future with the past, the possible with the real. To learn a proposition by experience, and to see it to be necessarily true, are altogether different processes of thought." (Whewell, p. 6, vol. i.)

Inasmuch, then, as a proposition founded solely on experience, or, in other words, on previous observation, cannot be received as a truth, and as the art of medicine could not exist as an art without truth, it follows necessarily that it cannot be solely dependent on experience. So that thus to state it is proved to be a fallacy.

We must not, however, forget that experience is one of the most useful handmaids of the art of medicine, and as such, is not only to be regarded for what she may do, but for what she has done, nor is she to be despised, though some of the principles which guided her are now known and proved to be in error. Thus, the observations made on disease previously to the great discovery of Harvey, have their value, and it remains for us properly to appreciate and apply them. A process takes place similar to that which occurs in the individual mind. Many circumstances are observed in youth which in after years are colligated into facts, and may be, inferences were then drawn which subsequent experience may modify or show to be erroneous.

Connected with the two great fallacies that have now been exposed are some practical or lesser errors, to which it may be worth while to devote a passing notice.

First, of that which affirms success in medicine to be due, not to any principles of art, but solely to accident. This is essentially a more naked form of the fallacy that medicine is a conjectural art, and of which we have already so fully treated. We shall, therefore, merely observe that it must be a supposition

originating in the grossest ignorance, which would infer that an art, founded on observation and confirmed by reason, could be attained without acquiring the truths resulting therefrom. It would be as absurd as to suppose a man could be an astronomer who was ignorant of the first principles of mathematics, and had never heard of, nor seen, a planet. Truly, medicines may be given by accident, and by accident rightly given; yet in this case it is most certain they have, though unknowingly, been given in accordance with the principles of art.

Allied to the above error is the appreciation of the Art of medicine at nought. It is obvious that medicines have their application, and, if ill used, are potent means for injury; therefore, they must be, if properly applied, agents for good. This sneer, for it is nothing more, must be passed on to a misapplication and not to an application of the art.

Connected with the fallacy that medicine is dependent solely for its truths on experience, is the error, greatly prevailing in the present day, which assumes that the "numerical method," as it is termed, establishes truths in the art of medicine. With this impression the most industrious collecting and arranging of symptoms has ensued, and doubtless with advantage; but towards establishing a "fact" or a "truth," the numerical method entirely fails—it can only affirm *positively*, with regard to the proportion of instances that which was previously stated *generally*. It is an accurate recorder of experience, but is entirely wanting in a main element to establish truth in the art of medicine. The supposed application of the "numerical method" to this end has originated in the fundamental error of its being *inappropriate*, inasmuch as it applies demonstration, which belongs to the pure sciences, to this art, whose truths are solely dependent on induction. It, therefore, does not here establish a single fact beyond its own numerical statement.

The erroneous application of the "numerical method" has greatly tended to confirm the previously too exclusive attention to symptoms, without investigating and determining their origin

or cause. This, with many, has constituted their sole aim and process of inquiry. So largely and extensively has this error prevailed, that in its pursuit much valuable labour has been uselessly expended in vain repetitions of the same observations. Hence, while huge treatises have been written on many of the prevailing and most interesting diseases, nothing beyond the first hasty description is really known of them. Within this category may be included the Asiatic cholera, the influenza, &c.

Another error is the extravagant appreciation of the revelations of morbid anatomy. There are those who, largely falling into this error, have recognised in the appearances after death, the cause not only of the death itself, but of all preceding disorder; while, probably, the preceding disorder has been the cause of the appearances thus laid bare. The longest established and most serious illustration of this, is the too familiar one of consumption; the extreme condition of the lung has absorbed attention to the exclusion of the constitutional disorder which has preceded it.

Another, and not infrequent error of pathological observation, has been to consider as belonging and essential to the history of a disease all the lesions which may have been observed in all the various and differing cases of such disease as may have occurred; thus, that which is only concomitant, is mixed up with, or even mistaken for, that which is essential, and consequently is assumed to be characteristic while it is only accidental; thus the pathological condition of a fever has been made to comprise almost every lesion to which the human frame is liable, instead of excluding all lesions but such as were universally or generally observed.

We have now seen that the art of medicine is beset with various fallacies and errors, tending to clothe it with an uncertainty which, as an art, does not belong to it. This great principle may, however, be relied upon, that in the art of medicine there is a right and a wrong way; this, to be avoided, as rendering

it useless, or enduing it with danger, that to be embraced, as resolving it into a real and certain utility. It must therefore be of paramount consideration to ascertain what constitutes this "right way;" and consequently the principles on which it is to be eliminated and substantiated should be clearly defined and understood. In the first place, it must be determined in what the art of medicine consists. It consists, as before shown, in common with the other arts and sciences, of truths observed and colligated from ideal conceptions. We must therefore inquire whence these are obtained, and by what means they are eliminated and established. In a previous part of this address so much has been said on these very questions, that there can be no need of now enlarging to any extent upon them. We shall, therefore, only briefly state with regard to the latter, that it consists in what has been termed "Induction," a mental process which is usually and justly spoken of as the genuine source of all our real general knowledge respecting the external world, (Whewell, p. 212, vol. ii.) and which comprises too mental operations, viz. the explication of the conceptions of our own minds, and the colligation of observed facts, by the aid of such conceptions—these are inseparably connected with each other, and when united and employed in collecting knowledge from the phenomena which the world presents to us, constitute the process of induction. With regard to the former, that is, the conceptions which form the basis of our ideas, and from which the facts or truths are colligated and induced, they must be derived essentially from the phenomena of disease itself, inasmuch as they are limited to those only that are *appropriate*; it being an axiom "that each science has for its basis a different class of ideas, and the steps which constitute the progress of one science can never be made by employing the ideas of another kind of science. (Whewell, p. 164, vol. ii.)

Doubtless, in order to appreciate the phenomena of disease, and to correct the ideas originated thereby, it is extremely useful, nay, practically speaking, necessary that the collateral sciences, such as anatomy, physiology, chemistry, &c., should be studied and comprehended, yet not one of these sciences could

originate, or, by any possible means afford, data for colligating one single fact or truth belonging to the art of medicine. For example, the blood is composed of at least forty elements, and any considerable deviation from their normal proportion must of course be so far productive of morbid change. Nevertheless the mere knowledge of the composition of this fluid, without any knowledge of its abnormal condition, would never lead to a single conclusion on disease, or towards the art of medicine.*

It therefore becomes evident that the only true source, whence the truths which constitute the art of medicine can be derived, must be from a careful, accurate, and clear conception of the phenomena derived from the observation of disease itself, and of its conduct under the circumstances, whether natural or remedial, to which it is subjected; and, secondly, from a colligation and generalization, by a process of induction, of these phenomena into truths.

In thus asserting the use, or rather the necessity of induction, in order to establish the truths of the art of medicine, the value of hypothesis must not be lost sight of,—hypothesis not only suggests truth, but is useful by shortening the intellectual process; it is thus a great adjunct in establishing the known from the unknown. Nevertheless its propositions must not be confounded with those of induction, nor can they be allowed without sufficient observations, without these the natural process of discovery is reversed, and error assumes the place of right. Had the force of this been fully borne in mind, so many of the crudest conjectures would not have been stated as hypotheses, nor so many hypotheses as facts. We should not have had the world of medical literature convulsed for centuries with the profitless disputes of the Galenists and the chemists, nor subsequently with those of the iatro-mathematicians—nor would volumes have been written on the “archæus” of Van Helmont, or the “anima” of Stahl, &c. &c.

Doubtless these various hypotheses mainly originated in a laudable desire to explain the causes and rationale of the nu-

* Vide Dr. Moore “On the Use of the Body in Relation to the Mind,” p. 119.

merous phenomena exhibited by disease ; but, being erroneous so far from doing this, it has been left for subsequent investigators to waste much time in unmasking and clearing away the difficulties thus caused : whereas a far less extended series of observations colligated into a few truths, would have done more to establish the art of medicine, than all the lumber thus laboriously collected together.

Not that the present day is deficient in these errors : we have the puerilities of homœopathy, and the sexual excitement and even blasphemies, of mesmerism, quoted as part of medical art ; nor does chloroform, the utility of which as a panacea for all human suffering is now so universally talked of and accredited, enjoy as yet a much higher place in the category of scientific research. With the exception of the series of experiments, carefully made and observed by Mr. T. Wakley, and from which he has induced some fair and highly philosophical generalizations, nothing but a tiresome repetition of "instances," similar to those first promulgated by Dr. Simpson, has issued from the press, viz. that on being inhaled by certain individuals, it temporarily robs the senses of their power, and arrests the healthy action of perception.

Doubtless chloroform may have its applications, but looking at two cases which have come under my own observation, and which singularly bear out the conclusions of Mr. Wakley, I feel somewhat assured that, ere long, it will be much limited in its employment, if not placed in the same category as its predecessor in the same field. Of sulphuric æther, a few short months since, no less marvellous and indisputable things were said ; and scarcely had the disuse of it been ensured by a series of distressing calamities resulting from its exhibition, ere its successor enjoys the reputation it had lost.*

* Connected with the administration of chloroform, I may mention how unfairly the public and the profession are dealt with generally in respect to medical experience. A short time since I saw a note addressed to a public journalist to this effect. That as the inhalation had proved unsuccessful, the case would not be reported, but that the first successful one should be. How can the art of medicine progress when its sons thus lend themselves to confirming a proposition by withholding that which may probably disprove it.

Instead of this loose mode of accumulating unprofitable observations, or of deducing conclusions from hasty hypotheses; the art of medicine should be pursued in accordance with philosophical principles; we might then hope ere long to see it on an equality with those other inductive arts and sciences which have, by these Baconian means, and only by these means, acquired a not unworthy place by the side of the pure and demonstrable sciences.

It would be a profitable task to follow out the history of medicine after the manner in which Professor Whewell has traced the history of the inductive sciences; many errors which have been assumed as truths would then be banished, while many undoubted truths would become established, and thus separated from further question.

May be some, who now hear me, may think this Utopian; they may probably deem it next to impossible to apply principles so accurate to so complicated a series of ideas as are originated by the various phenomena of disease; that from amidst them it would be in vain to look for general, much less, for universal, truths. Has not the same been thought and said in the infancy of all science? How much mysterious ignorance was entertained before the simple truth that the earth moves round the sun was ascertained, and now that this is generally known, how little can we participate in the difficulties that occurred before it was proved. Its now apparent simplicity only creates wonder that it ever should have been doubted. But amongst all the difficulties attendant on the art of medicine, are we without truths? Most assuredly not, some simple truths have been ascertained, and they are beautiful and conclusive examples of the success of an application of the inductive process of reasoning.

The first example to which I shall allude, originated in the accurate observation and philosophic mind of one of the most honoured names in our profession, one of whom it may be the boast of this city that he was born, and practised, within her walls. Dr. Blackall was the first to point out the erroneousness of the then existing mode of regarding dropsies as separate and distinct diseases, according as they affected different organs.

He advanced, however, a much higher step towards elucidating their origin and nature, when, from a series of observations, he generalised the fact that there existed distinct dropsies, indicated by the urine being albuminous or otherwise. The elimination of this fact in medicine disposed to subsequent inquiry. Dr. Bright found that when the urine was albuminous, the kidneys themselves were diseased, and presenting varieties of a condition to which he gave the name of "tubercular degeneration," and to which he attributed the condition of the urine in question. Subsequent observers, (differing somewhat amongst themselves as to the exact nature of the morbid changes in the kidney,) agree that the free circulation of the blood through its texture is interrupted, and that, without reference to the cause producing it, there is a state of congestion in the organ itself. Hence this truth has been eliminated, that the presence of albumen in the urine is due to such condition of the kidney as impedes a free circulation of the blood.

The investigations necessary to establish one truth generally develop others, so those pursued, while tracing the source of albuminous urine to its true cause, have produced some important truths regarding urea. It was observed, that in advanced stages of albuminuria there was great tendency to oppression of the brain, and that, often, death was the result; it was also found, there was, even at this advanced stage of the disease, a greater or less deficiency of urea voided by the urine; it was also found that in other affections in which the ordinary amount of urea was not excreted, the same character of head oppression occurred. Chemistry also detected in these cases that the amount of urea in the blood was excessive. After colligating these various facts the truth has been superinduced, "that the presence of an undue proportion of urea in the blood acts as a poisonous agent on the brain, and, as such, is capable of destroying life."

To quote still from investigations on the urine; that singular and most interesting disease, termed "diabetes mellitus," having been observed, it was at first considered that the large amount of sugar daily separated from the system was due entirely to

some disorder in the kidney. It was subsequently found, however, that in those cases saccharine matter was excreted in other ways; and experiment showed the blood to be largely impregnated with it. Therefore it was at once rendered evident that the presence of sugar in the urine was not due to disease in the kidney; and as much of the food taken in consists of starch, and as the elements of starch are convertible into those of sugar, and as the resolution and assimilation of starch takes place in the stomach and intestines; it follows that the presence of sugar in the urine is due to some error in the functions of these assimilating organs.

The cause of scurvy offers a peculiarly interesting example, not only from the simplicity of the truth eliminated, but from the value of the results deduced therefrom. Lind, considering the peculiarities of the circumstances, situation, and way of life, of those afflicted by this disease gradually evolved this fact,—that scurvy was due to a deficiency of certain acid principles in the food taken in. From this and other observations the theory became established, that unless the food of man contain some of these acid juices, his system will perish for the want of them. A further generalization of facts enables the statement of a yet more simple and comprehensive truth. That if the food be deficient in *any* of the elements *necessary* to maintain life, however plentiful the food may be, disease, and eventually death, will ensue.

Palsy of the face is not an unfrequent occurrence; it is seen both connected and unconnected with palsies of other parts of the body—frequently with the former, which ever indicates the existence of disease within the skull, and consequently danger, while experience has conduced to the hypothesis that when not accompanied with other palsies, it is not dangerous in its indications. This hypothesis becomes a truth, by an induction from other facts. The muscles of the face are supplied from the fifth pair of nerves, and by the portio dura of the seventh; the former is distributed over the temporal, masseter, and some smaller muscles, and is a nerve of sensation and motion; the latter is only a nerve of motion, and is distributed over the superficial muscles gene-

rally. Now by a careful attention to the indications rendered by these facts, we are enabled to fix the seat of the disorder as without the skull, and therefore to affirm it not of dangerous origin.

The Devonshire colic, as before shown, is due to the absorption of lead into the system. Lead is known to be insoluble, and found to be inert, when combined with sulphuric acid. The exhibition of this acid, or of such salts, as would afford it to the lead, was inferred would be a remedy in the disease, and so experience has proved it. Again, the colic and obstructed bowels, partly characteristic of the Devonshire colic, were found to be due to spasms of the intestines, opium relieves spasm, hence its administration in this disorder is accompanied by that relief from the bowels which purgatives by themselves could not promote. Now here we have two simple practical truths established, and through the aid of the inductive process of reasoning.

The application of bark and arsenic in intermittent fever has become practically established by a long series of observation ; while by a process of induction the curative powers of these remedies, in some other affections, has shown, what was before not suspected, that these latter are modifications of that class of disorders of which the former is the type.

I shall not multiply these examples,—they are sufficient to show that, by a careful and patient observation, and by colligating and generalizing the results of appropriate ideal conceptions, simple facts and comprehensive truths are to be arrived at, and that from these may be deduced practical conclusions of the utmost value and importance. To adopt the words of Dr. Barlow, in the very admirable address* delivered by him before the Hunterian Society, “ I do not hesitate to express my conviction that we are, *at this time more especially*, in need of some such simple and incontrovertible maxim, not only as a rule of philosophising, but as a principle of action. It cannot have escaped the notice of any observant member, either of our own body or of the community at large, that there is in the minds of

* Vide Medical Gazette, May 1 847.

a portion of the public a want of confidence in the principles upon which medical practice is based, or rather a doubt, if not a disbelief, of its being based upon any fixed principles at all: and I cannot divest myself of the opinion, that this feeling has gathered strength from a suspicion that there lurks in our own mind some hardly repressed misgiving as to the stability of the ground upon which we are standing. Now it is, if I mistake not, to this suspicion on the part of the extra professional public, and to this want of confidence on our own, that we must ascribe much of the vigour of the rampant quackeries of the day. Let it, however, but be seen that we profess as the fundamental principle, both of our doctrine and practice, a belief in the uniformity of the operations of nature, and in our duty to generalise *only* upon a patient observation of them; and then these quackeries must lose their hold, not only upon every philosophic, but upon every truthful and humble mind. I do not mean to assert that they will thus be exterminated, or that new ones will not arise. I believe that in one form or another they will be continually springing up, as among the necessary consequences of that moral evil which exists in the world, and that the contest between them, and the unpretending exercise of those powers, avowedly limited, which we have acquired, and hope to increase by patient observation of the order of nature, is analogous to the great struggle between moral good and evil, which is to go on as long as the world shall last,—if it be not identical with it.”

I have now brought this address to a close. I fear it may be thought by many who have heard me, that I have spoken too confidently of the advantages and certainty to be derived to the art of medicine from a strict application of the “Inductive Process.” I feel assured, however, that a calm consideration of the results derived to science generally, through its means, will induce the conviction that it may prove the most effectual, if not the only faithful shield against the illusive charms of false theories and insufficient hypotheses; that through its aid error will become apparent, and the vast amount of prejudices we are

constantly imbibing, from the earliest to the closing period of our professional life, be dispelled before the truths thus developed,—so that the art of medicine, no longer fettered by the spells of conjecture and unassisted experience, will thus assert her dignity and true position.

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